June 1999

VOLUME I of II



Naval Medical Research Center 8901 Wisconsin Avenue Bethesda, MD 20889-5607

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Јипе 1999

TABLE OF CONTENTS

Volume I of II

- 1. Executive Summary
- 2. Glossary of Terms, Acronyms and Abbreviations
- 3. Purpose of the Historical Site Assessment
- 4. Property Identification
 - 4.1 Physical Characteristics
 - 4.1.1 Name
 - 4.1.2 Mission
 - 4.1.3 Function
 - External Command Relationships Location 4.1.4
 - 4.1.5
 - 4.1.6 Facility Type
 - 4.1.7 Topography
 - 4.2 Environmental Setting
 - 4.2.1 Rainfall and Temperature
 - 4.2.2 Threatened or Endangered Species
 - 4.2.3 Soil
 - 4.2.4 Hydrogeology
 - Wetlands
 - Subsurface Conduits 4.2.6
- 5. Historical Approach
 - 5.1 Approach and Rationale
 - 5.2 Boundaries of Site
 - 5.3 Documents Reviewed
 - 5.4 Property Inspections
 - Command Safety Program Inspections 5.4.1
 - Radiation Safety Program and NRMP Inspections 5.4.2
 - 5.5 Personal Interviews
- History and Current Usage 6.
 - 6.1 History

J

- 6.2 Historic Ownership
- 6.3 Historic Property Review
- 6.4 Aerial Photographs
- 6.5 Current Usage and Operating History
 - 6.5.1 Licensing and Operating History
 - Licensed (Radioactive) Material Use 6.5.2

June 1999

- 6.5.3 Sealed Sources
- 6.5.4 Waste Management Practices and Storage
- 6.5.5 Spills and Contamination Events
- 6.5.6 Use of Uranyl Acetate/Nitrate
- 6.6 Adjacent land usage
- 6.7 Future Usage
- 7. Findings
 - 7.1 Potential Contaminants
 - 7.2 Potential Contaminated Areas
 - 7.2.1 Previous Radiological Survey results
 - 7.2.2 Impacted Areas-known and potential
 - 7.2.3 Non-Impacted Areas
 - 7.2.4 Building Descriptions and Classifications
 - 7.3 Potential Contaminated Media
 - 7.4 Related Environmental Concerns
- 8. Conceptual Model and Site Diagram Information
- 9. Conclusions
- 10. References
- 11. List of Aerial Photographs (AP)
- 12. List of Charts (C)
- 13. List of Documents (D)

Volume II of II

- 13. List of Documents (D) (continued)
- 14. List of Figures (F)
- 15. List of Floor Diagrams (FD)
- 16. List of Other Photographic Documentation (P)
- 17. List of Tables (T)

Јипе 1999

1. EXECUTIVE SUMMARY

The purpose of this Historical Site Assessment (HSA) is to provide documentation useful in determining the level of effort necessary to fulfill the radiological decommissioning requirements of the U. S. Nuclear Regulatory Commission (NRC).

Base Realignment and Closure (BRAC) legislation passed and signed into law in 1995 mandated that the Naval Medical Research Center (NMRC) (formerly Naval Medical Research Institute) relocate some of its programs and research efforts and cease operations at the National Naval Medical Center (NNMC) campus in Bethesda, Maryland by the end of October 1999. NMRC, the Navy's largest medical research facility, opened its doors in Bethesda in October 1942 to conduct research, development, tests, and evaluations to enhance the health, safety, and readiness of Navy and Marine Corps personnel in the effective performance of peacetime and contingency missions. As a Tenant Command on the NNMC campus, NMRC has specific environmental obligations to fulfill before vacating the NNMC buildings it currently occupies. One of those obligations is the radiological decommissioning of those NNMC buildings and the leased Rockville Annex facility that were used to conduct research and development missions.

NMRC will be among the first Navy commands to undergo a facility decommissioning using the Nuclear Regulatory Commission's (NRC) dose-based criteria for radiological release for unrestricted future use and the guidance provided in the MARSSIM (Multi-Agency Radiation Survey and Site Investigation Manual, NUREG-1575, December 1997). NMRC's decommissioning efforts will include the preparation of this Historical Site Assessment, the development and implementation of a Radiological Decommissioning Plan, clearance of equipment and materials, and the transfer of operations involving licensed-materials use from a Navy Radioactive Material Permit to an Army installation's NRC license.

This document should not be used as a complete historical accounting of the research efforts and activities conducted at NMRC. This document focuses on those aspects closely or directly related to NMRC's acquisition, use, storage and disposal of licensed (radioactive) materials during the period 1942 through 1999. All available and pertinent NMRC files and documentation have been examined with the purpose of preparing this Historical Site Assessment. Data and findings were summarized and

June 1999

recommendations are provided regarding decommissioning the NMRC sites at Bethesda and at the Rockville Annex. The potential radioactive contaminants include Hydrogen-3 (tritium), Carbon-14, Phosphorus-32, Phosphorus-33, Sulfur-35, Calcium-45, Chromium-51, Cobalt-60, and Iodine-125.

In the 15 buildings at the Bethesda and Rockville sites, 532 rooms and areas (defined in this report as survey units) were evaluated to determine the level of required radiological decommissioning efforts. Of the total of 532 survey units, 386 (about 72 %) have been classified as non-impacted and will require no decommissioning efforts. The remaining 146 survey units (about 28 %) have been classified as impacted areas and will require examination for potential radioactive contaminants. The examination for potential radioactive contaminants will include surveys, direct measurements, sampling and analysis, and scanning with appropriate instruments and equipment. Of these 146 impacted areas, one survey unit was classified as Impacted Class 2 and the remaining survey units have been classified as Impacted Class 3. There were no survey sites classified as Impacted Class 1, which is the classification requiring the most extensive decommissioning effort. A randomly selected percentage (numbering approximately 20 to 40 additional survey units) of NMRC common areas, restrooms, and non-impacted areas will be evaluated for potential radioactive contamination. If contamination is found, the classification may be revised. Every reasonable effort will be taken to reduce the contamination to background levels, which would be well below the regulatory release criteria.

It is anticipated that if radioactive contamination is found in NMRC survey units, that contamination would be confined to small areas within a small percentage of the survey units. Sink traps and floor drains will be likely areas for detection of elevated activity. Significant resources are required to accomplish the actions necessary to satisfy the NRC's release criteria for unrestricted use. The estimated cost of performing the necessary decommissioning efforts is \$250,000 to \$600,000, depending on the availability of no-cost resources (manpower, instruments, materials, services and equipment). The 6- to 12month decommissioning period will begin in September 1999 and could be concluded as early as April 2000. Decommissioning efforts at the NMRC Rockville Annex site must be completed before the lease expires in November 1999. NMRC Bethesda buildings when vacated in March or April 2000, will revert back to the ownership

5

June 1999

of NNMC. Future occupants of NMRC Bethesda buildings may include NNMC, the National Institutes of Health (NIH), the Stanley Foundation, and the Uniformed Services University of the Health Sciences (USUHS).

Additional and supportive information is provided as an extensive collection of Aerial Photographs, Charts, Diagrams, Documents, Figures, Other Photographic Information and Tables. Lists for this collection of information are provided following the reference section of the Historical Site Assessment.

June 1999

2. GLOSSARY OF TERMS, ACRONYMS AND ABBREVIATIONS

Acronyms and Abbreviations:

Annex NMRC Rockville Annex Laboratories, Wash	itute			
	NMRC Rockville Annex Laboratories, Washington			
Avenue, Rockville, MD				
	above-ground storage tank			
	Base Realignment and Closure			
BUMED Bureau of Medicine and Surgery				
CERCLA Comprehensive Environmental Response, Co and Liability Act	ompensation,			
CFR Code of Federal Regulations				
CHESDIV Chesapeake Division				
D&D decontamination and decommissioning				
DOD Department of Defense				
DOT Department of Transportation				
EFA Engineering Field Activity				
EPCRA Emergency Planning and Community Right	to Know Act			
ESA Environmental Site Assessment				
Irradiators Sealed-source, cesium-137 gamma irradia	tors			
LLW low-level radioactive waste				
LUST leaking underground storage tank				
µR/hr Micro-Roentgens per hour (exposure rate)	Micro-Roentgens per hour (exposure rate)			
R Roentgen (exposure)	Roentgen (exposure)			
Rad (dose)				
Rem (dose equivalent)				
R/hr Roentgens per hour (exposure rate)				
Rad/hr Rads per hour (dose rate)				
Rem/hr Rem per hour (dose equivalent rate)				
NEHC Navy Environmental Health Center				
NEPA National Historic Preservation Act				
	NMRC Bone Marrow Research, Nicholson Building in			
	Rockville, MD			
NIH National Institutes of Health				
	Naval Medical Research Center			
NMRI Naval Medical Research Institute				
	National Naval Medical Center			
	Nuclear Regulatory Commission			
	NMRC's Navy Radioactive Materials Permit			
pCi/L pico-curies per liter				
POC point of contact	point of contact			

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June 1999

RADSAFOFF	NMRC Radiation Safety Office		
RAM	radioactive materials		
SOP	standard operating procedure		
US	United States		
USFWS	U.S. Fish and Wildlife Service		
USN	United States Navy		
UST	underground storage tank		
WSSC	Washington Suburban Sanitary Commission		

June 1999

2. GLOSSARY OF TERMS, ACRONYMS AND ABBREVIATIONS (continued)

Key Terms and Definitions (reference 10.1, MARSSIM):

Area	A general term referring to any portion of a
Alea	site, up to and including the entire site.
Class 1 areas	Impacted areas with the highest potential for
	contamination or insufficient evidence to
	support reclassification as class 2 or 3.
Class 2 areas	Impacted areas with low potential for delivering
	a dose above the release criterion and little or
	no potential for small areas of elevated
	activity.
Class 3 areas	Impacted areas with little or no potential for
	delivering a dose above the release criterion
	and little or no potential for small areas of
	elevated activity.
Classification	The act or result of separating areas or survey
	units into one of the three designated classes:
	Class 1 area, Class 2 area, or Class 3 area.
Cleanup	A numerical limit set by a regulatory agency as
standard	a requirement for releasing a site after
	cleanup.
Contamination	The presence of residual radioactivity in excess
	of levels which are acceptable for release of a
	site or facility for unrestricted use.
Decommissioning	The process of removing a facility or site from
	operation, followed by decontamination, and
	license termination (or termination of
	authorization for operation) if appropriate.
DCGL, Derived	A derived, radionuclide -specific activity
Concentration	concentration within a survey unit corresponding
Guideline Level	to the release criterion. The DCGL is based on
	the spatial (uniform) distribution of the
	contaminant and hence is derived differently for
	the non-parametric statistical test $(DCGL_w)$ and
	the elevated measurement comparison $(DCGL_{EMC})$.
	DCGLs are derived from activity/dose
	relationships through various exposure pathway scenarios.
Direct	Radioactivity measurement obtained by placing
measurement	the detector near the surface or media being
	surveyed. An indication of the resulting
	radioactivity level is read out directly.

June 1999

Impacted areas	Any area that is not classified as non-impacted. Areas with a possibility of containing residual radioactivity in excess of natural background or
MARSSIM	fallout levels. Multi-Agency Radiation Survey and Site Investigation Manual (DOE,DOD, EPA, NRC); provides for conducting decommissioning activities to satisfy regulatory release criteria.
Non-impacted areas	Areas where there is no reasonable possibility (extremely low probability) of residual contamination.
Release criterion	A regulatory limit expressed in terms of dose or risk; compliance demonstration is simply a decision as to whether or not a survey unit meets the release criterion
Residual radioactivity	Radioactivity in structures, materials, soils, groundwater, and other media at a site resulting from activities under the cognizant organization's control.
Scanning	An evaluation technique performed by moving a detection device over a surface at a specified speed and distance above the surface to detect radiation.
Site	Any installation, facility, or discrete, physically separate parcel of land, or any building or structure or portion thereof, that is being considered for survey and investigation.
Survey	A systematic evaluation and documentation of radiological measurements with a correctly calibrated instrument or instruments that meet the sensitivity required by the objective of the evaluation.
Survey unit	A geographical area consisting of a room, hallway, structures or land areas of specified size and shape for which a separate decision will be made whether the unit attains the cleanup standard; are established to facilitate the survey process and the statistical analysis of the survey data.

June 1999

3. PURPOSE OF THE HISTORICAL SITE ASSESSMENT

In some cases, where sealed sources or small amounts of radionuclides are described by the HSA, the site may qualify for a simplified decommissioning procedure. The HSA:

- Identifies potential, likely, or known sources of radioactive material and radioactive contamination based on existing or derived information
- Identifies sites that need further action as opposed to those posing no threat to human health
- Provides an assessment for the likelihood of contamination migration
- Provides information useful to scoping and characterization surveys
- Provides initial classification of the site or survey unit as impacted or non-impacted

The NMRC Radiation Safety Officer (RSO) has prepared this Historical Site Assessment (HSA) in support of the closure and radiological release of the NMRC sites at Bethesda, Maryland and Annex at Washington Avenue, Rockville, Maryland. This HSA focuses on those NMRC facilities slated for transfer, closure, decontamination, and decommissioning as pertaining to the legislated Base Realignment and Closure (BRAC) requirements. These BRAC activities involve closing down operations at Bethesda and moving most of those operations to the new facility at Forest Glen, Maryland. NMRC will be a co-tenant with Walter Reed Army Institute of Research (WRAIR). Walter Reed Army Medical Center (WRAMC) will become the new Host Command. Since 1942, the NMRC has been actively involved in various types of medical research of interest to DOD. Medical studies have included radiation studies, diving, biological defense, immune cell biology, infectious diseases, resuscitative medicine, environmental stress, aviation medicine, and nutrition research. Medical studies and biomedical research have been conducted which involved the use of chemicals and other hazardous materials, biological materials, animals and animal products, and radiological materials. Since 1987, the NMRC has leased the

June 1999

privately held industrial property from a commercial realty management group. The (NMRC Rockville) Annex is located at 12300 Washington Avenue, Rockville, MD and is housed in a 19,000-square foot, two-story masonry building. The first floor contains administrative offices and research laboratories. The second The story is nearly entirely comprised of research laboratories. Annex houses laboratories involved in enteric and malarial research. Medical studies and biomedical research have been conducted which involved the use of chemicals and other hazardous materials, biological materials, animals and animal products, and radiological materials. All the surrounding properties are located within Rockville city limits and are predominantly for industrial and commercial uses. (reference 10.2, EPA 1997) Document D-01 provides additional information regarding the use of radioactive materials at the NMRC Rockville.

Another local, off-site location at which NMRC uses radioactive materials is the NMRC Bone Marrow Registry Program located at 5516 Nicholson Lane, Kensington, Maryland. The NMRC Bone Marrow Registry Program occupies several rooms and laboratories in the leased building at 5516 Nicholson. Limited quantities of radioactive materials had been used in the facility before NMRC began using this building. Initial radiation surveys conducted by the NMRC Radiation Safety Office confirmed that no residual radioactivity was present in the one laboratory in this building in which NMRC started using radioactive materials in 1998. Document D-02 provides additional information regarding NMRC's use of radioactive materials in this building. The NMRC Bone Marrow Registry Program will not vacate this building in Therefore, this building will not require decommissioning 1999. efforts by NMRC during 1999.

4. PROPERTY IDENTIFICATION

4.1 PHYSICAL CHARACTERISTICS

4.1.1 NAME. Naval Medical Research Center (NMRC); the Naval Medical Research Center (NMRC) was known as the Naval Medical Research Institute (NMRI) during October 1942 to September 30, 1998. Located as a tenant on the National Naval Medical Center (NNMC) complex in Bethesda, Maryland. Chart C-01 provides the FY-99 NMRC Organizational chart. Document D-03 provides a NMRC letter detailing NMRC's name and unit identification change that took effect on October

June 1999

1, 1998. **Table T-01** provides a brief description of NMRC buildings and their historical uses.

4.1.2 MISSION. NMRC's mission, as assigned by the Secretary of the Navy, and the tasks to be performed to accomplish this mission, as assigned by the Commander, Department of the Navy, Bureau of Medicine and Surgery, are to: Conduct research, development, tests, and evaluations to enhance the health, safety, and readiness of Navy and marine Corps personnel in the effective performance of peacetime and contingency missions and to perform such other functions or tasks as may be directed by higher authority.

- **4.1.3 FUNCTION**. The functions of the Naval Medical Research Center are to:
 - Provide basic and applied research competence in infectious diseases, tissue transplantation, diving and hyperbaric medicine, casualty care, environmental medicine, and human factors directly related to military requirements and operational needs.
 - Maintain a program of basic biomedical research in areas of military importance to develop knowledge in anticipation of future problems.
 - Provide a scientific potential of the application of new biomedical knowledge to operational problems and requirements.
 - Provide a source of scientific advisors and consultants readily available to the operational commands.
 - Provide biomedical research capabilities to support field laboratories, naval hospitals, and other naval activities in problems beyond their capabilities.

4.1.4 EXTERNAL COMMAND RELATIONSHIPS.

Current Host: National Naval Medical Center (NNMC) Support: Bureau of Medicine and Surgery (BUMED) Area Coordinator: Naval District Washington (NDW)

June 1999

Future Host: Walter Reed Army Medical Center (WRAMC)

Support: Bureau of Medicine and Surgery (BUMED) Area Coordinator: Naval District Washington (NDW)

4.1.5 LOCATION. Address: 8901 Wisconsin Avenue, Bethesda, Montgomery County, Maryland 20889-5607. Geographic coordinates: Latitude (North) 39.003078 [39° 0' 11.1"]; Longitude (South) 77.089600 [77° 5' 22.6"]; Universal Transverse Mercator (UTM) - Zone 18; UTM X (meters) - 319052.7; UTM Y (meters) - 4318987.5. (reference 10.2, EPA 1997).

4.1.6 FACILITY TYPE. NMRC Bethesda. Since 1942. the NMRC has been actively involved in various types of medical research of interest to DOD. Medical studies have included radiation studies, diving, biological defense, immune cell biology, infectious diseases, resuscitative medicine, environmental stress, aviation medicine, and nutrition research. Medical studies and biomedical research have been conducted which involved the use of chemicals and other hazardous materials, biological materials, animals and animal products, and radiological materials. A number of structures that had once been located on the NMRC site have been removed or replaced. Additionally, a number of buildings still in use today have undergone significant changes in their use and many have undergone extensive renovation. NMRC Rockville Annex. Since 1987, the NMRC has leased the privately held industrial property from a commercial realty management group. The (NMRC Rockville) Annex is located at 12300 Washington Avenue, Rockville, MD and is housed in a 19,000-square foot, two-story masonry building. The first floor contains administrative offices and research laboratories. The second story is nearly entirely comprised of research laboratories. The Annex houses laboratories involved in enteric and malarial research. Document D-04 provides a letter that relates that the current lease will expire in November 1999. Medical studies and biomedical research have been conducted which involved the use of chemicals and other hazardous materials, biological materials, animals and animal products, and radiological materials. All the surrounding properties are

June 1999

located within Rockville city limits and are predominantly for industrial and commercial uses. (reference 10.2)

4.1.7 **TOPOGRAPHY.** The NMRC site is located in the City of Bethesda, which is just northwest of Washington, D.C. This portion of Maryland is in the eastern Piedmont physiographic province, which contains hard, crystalline igneous and metamorphic rocks. Bedrock in the eastern part of the Piedmont consists of schists, gneiss, gabbro, and other highly metamorphosed sedimentary and igneous rocks of probably volcanic origin. Elevation at the site is approximately 275 feet above mean sea level. (reference 10.2)

4.2 **ENVIRONMENTAL SETTING.** Topographic maps, geologic maps, and soil surveys were reviewed to help identify natural and man-made features on both the NMRC site and the surrounding vicinity.

4.2.1 **RAINFALL AND TEMPERATURE**. Average annual precipitation for the region is 39.5 inches. Prevailing winds are from the south, except during the winter months of January to March, when they become more northwesterly. The average temperature is 58 degrees Fahrenheit and the average daily temperature in July is 88 degrees Fahrenheit. (reference 10.2)

4.2.2 THREATENED OR ENDANGERED SPECIES. The U.S. Fish and Wildlife Service (USFWS) provided comments concerning the presence of threatened or endangered species at the subject site in accordance with Section 7 of the Endangered Species Act. They stated that they have no records of Federally listed or proposed endangered or threatened species known to exist in the area as identified as the NMRC site. No Biological Assessment or further Section 7 Consultation with USFWS is required. Outside Agency correspondence is included in this HSA as Documents D-05 through D-07. Documents D-05 and D-06 pertain to threatened and endangered species. Document D-07 pertains to the historic preservation of NMRC buildings. (reference 10.2)

4.2.3 **SOIL.** Soils at the site include Ashe and Glenelg series soil categories. The soil subsurface is differentially weathered Wissahickon schist that overlies

June 1999

less-weathered schist. The Ashe series consists of moderately deep, somewhat excessively drained soils on uplands of the Piedmont Plateau. The Glenelg series consists of very deep, well-drained soils on uplands of the Piedmont Plateau. (reference 10.2)

4.2.4 **HYDROGEOLOGY**. Based on interviews with facility personnel, the (1997 Environmental Site Assessment, ref 8.3) site inspection, and review of relevant documents, there is a possibility that NMRC use of the site could have affected the local groundwater and surface water supply. There were no groundwater wells observed on the site during the 1997 ESA. There are, however, a number of wells in use in the surrounding area. The NMRC facility relies on potable water provided by the City of Bethesda.

4.2.5 WETLANDS. Stoney Creek is located at the east and southeastern edge of the NMRC Bethesda site. The NMRC buildings are located at an elevation approximately 40 feet above Stoney Creek. The proximity of Stoney Creek to the NMRC site provides reasonable cause to consider the potential for the existence of wetlands, either upstream or downstream from the site. The steep slopes of the NMRC site itself preclude the formation of wetlands directly adjacent to the property. (reference 10.2)

4.2.6 **SUBSURFACE CONDUITS.** Subsurface conduits at the NMRC site include steam pipes, sanitary and storm-water sewers and potable water lines. Steam pipes originate at the NNMC power plant and run throughout the entire NNMC complex. The NMRC sanitary sewers predominantly connect to sewer mains that ultimately discharge at a publicly owned treatment works (POTW) that is part of the Washington Suburban Sanitary Commission (WSSC). (reference 10.2)

5. HISTORICAL APPROACH.

5.1 **APPROACH AND RATIONALE.** After a thorough review of historical-site monitoring data, amounts of radioactive materials (RAM) used, periods of RAM use, and the locations of RAM use, the types of radiological surveys to be performed in conjunction with

June 1999

this D&D effort will be site/location specific. This document should not be used as a complete historical accounting of the research efforts and activities conducted at NMRC. This document focuses on those aspects closely or directly related to NMRC's acquisition, use, storage and disposal of licensed (radioactive) materials during the period 1942 through 1999. The goal of the Naval Medical Research Center is to free release all areas from radiological controls to background levels or to levels well below regulatory release criteria. A procedure for surveying, identifying and removing all radioactive contaminants above background will be developed that will incorporate overlapping and/or redundant surveys of all areas that contained radioactive materials. The NMRC Radiation Safety Officer will coordinate all radiological closeout activities. Cost estimates have been prepared to approximate the level of funding needed to cover expenses such as instrumentation, equipment, bottled industrial gases, calibration services, supplemental manpower, and thirdparty monitoring surveys and reports. Documents D-08 through D-10 provide cost estimate information for decommissioning Document D-11 activities, surveys, equipment and instruments. provides a tentative move schedule. This move schedule relates when NMRC Programs and Departments are scheduled to vacate NMRC buildings and relocate to the new facility at Forest Glen, Maryland. Based on this tentative move schedule, a tentative decommissioning schedule has been developed. Schedule changes are anticipated due to the unpredictable nature of the relocation of laboratories, offices, and equipment to a new off-site facility.

5.2 BOUNDARIES OF SITE. The NMRC is located in Bethesda, Maryland and operates as a tenant command of the National Naval Medical Center (NNMC). Bethesda lies west of Washington, D.C. and is in Montgomery County. The entire NNMC complex comprises approximately 243 acres and is bounded by Wisconsin Avenue to the west, Jones Bridge Road to the south, a school and residential area along the northern border, Interstate 495 to the northeast, and a sparsely developed, wooded area to the east. Of the 243 acres, the NMRC itself totals no more than 10 acres. The NMRC site is primarily surrounded by other properties owned by the U.S. Government. These include the NNMC and the National Institutes of Health (NIH). Immediately to the southeast of the NMRC complex is a small stream, Stoney Creek, which ultimately drains into the Potomac River. The approximate latitude and longitude are 39.0031 and 77.0896 degrees, respectively. Some of NMRC's research efforts are conducted in an off-site location.

June 1999

NMRC Rockville Annex research efforts are conducted in a leased privately held, two-story building at 12300 Washington Avenue, Rockville, Maryland. The enteric and malarial research programs at the Annex will relocate to the new facility at Forest Glen, Maryland. NMRC will perform D&D efforts at this facility before the lease expires in November-December 1999. The boundary of the survey sites will be limited to the buildings and not to the surroundings grounds. The one exception to this boundary plan is the inclusion of the immediate grounds surrounding the NMRC Building 150, the former Cobalt-60 Irradiation Facility.

5.3 DOCUMENTS REVIEWED. The documents reviewed prior to developing the Historical Site Assessment (HSA) included: (1) NMRC Radiation Safety Program files (which included the NRMP and its inspections, amendments and renewals, Committee Meeting Minutes and Updates, Radioactive-material-use Authorizations and protocols, radionuclide receipt and waste disposal logs, sealed sources leak-test results, inventories, records of spills and accidents, laboratory wipe-test and survey monitoring results, and other documents and records), (2) Command files, records and historical accountings, (3) NNMC radiation safety documents, (4) Command Environmental Assessment Reports, and (5) other pertinent documents. Documents D-12 through D-15 provide information on the past, present and future use of NMRC buildings.

5.4 **PROPERTY INSPECTIONS**

5.4.1 **COMMAND SAFETY PROGRAM INSPECTIONS.** Command Safety Inspection records and files were reviewed for content. As a component of these inspections, the radiation Safety Program was audited, personnel interviewed, and workplaces visited. A review of command inspection records revealed no documentation to indicate unsafe radiation conditions nor the presence of residual radioactivity at the NMRC site.

5.4.2 **RADIATION SAFETY AND NRMP INSPECTIONS.** Summarized in this section are NMRC Radiation Safety and Naval Radioactive Material Permit (NRMP) inspections that were conducted by the NRC, NEHC, and BUMED. Deficiencies were assigned severity levels as defined in Title 10, Code of Federal Regulations, Part 2 (10 CFR 2). Severity levels range from one (1) being the most severe to five (5) as the least severe. The deficiencies were not related to unsafe

June 1999

levels of radioactivity or residual contamination. Several inspections and visits monitored the cleanup efforts for P-32 spill that occurred in October 1993. **Documents D-16 through D-25** provide representative samples of the various Navy Radioactive Material Permits (NRMP), NRC licenses, and a Atomic Energy Commission license that governed the possession, use and disposal of licensed (radioactive) materials at NMRC during the period 1942 through 1999.

5.4.2.1 NRC Inspection; conducted on 15-17 December 1997, with satisfactory results; corrective actions remedied one severity level 5 deficiency.

5.4.2.2 NEHC Inspection; conducted on 28-30 July 1997, with satisfactory results; corrective actions remedied two severity levels 4 and 5 deficiencies.

5.4.2.3 NEHC inspection; conducted on 14-15 March 1994, with satisfactory results; corrective actions remedied three severity levels 4 and 5 deficiencies.

5.4.2.4 BUMED and NEHC on-site review was conducted on 21 October 1993 in response to a Notice of Violation; a radioactive material (RAM) spill occurred on 7 October 1993 at the NMRC Annex, Rockville, Maryland; the spill involved the use of the radioisotope, phosphorus-32, by an untrained person using an unapproved protocol; corrective actions remedied three severity levels 3 and 4 deficiencies.

5.4.2.5 Joint BUMED and NEHC; conducted a Special Inspection on 18 March 1993, with a satisfactory rating; corrective actions remedied two severity levels 4 and 5 deficiencies.

5.4.2.6 NEHC Inspection; conducted on 4-5 February 1993, with unsatisfactory results; corrective actions remedied four severity levels 3 and 4 deficiencies.

5.4.2.7 NEHC Inspection; conducted on 15-18 June 1992, with satisfactory results; corrective actions remedied four severity levels 4 and 5 deficiencies.

June 1999

5.4.2.8 NEHC Inspection conducted on 18-19 June 1991, with satisfactory results; corrective actions remedied four severity levels 4 and 5 deficiencies.

5.4.2.9 NEHC Inspection; conducted on 25-26 April 1990, with satisfactory results; corrective actions remedied six severity levels 4 and 5 deficiencies.

5.4.2.10 NEHC Inspection; Gamma Irradiator NRMP Inspection conducted on 23-24 May 1983, with a satisfactory rating; corrective actions remedied two severity level 5 deficiencies.

5.5 **PERSONAL INTERVIEWS.** Personal interviews were conducted to obtain additional information about NMRC's history and its use of licensed materials during the period 1942 though 1999. The current Radiation Safety Officer reported to NMRC on 20 March 1995. The persons interviewed included former NMRC Radiation Safety Officers, former NMRC radiation safety technicians and assistants, NMRC licensed-materials users, NMRC's historian, and NNMC radiation safety personnel.

6. HISTORY AND CURRENT USAGE

HISTORY. The Naval Medial Research Center was 6.1 commissioned on 27 October 1942 and assigned a general mission of basic, applied and developmental research relating to the health, safety and efficiency of naval personnel. Its original staff, mostly military, was concerned with immediate and practical problems of World War II operations. Extensive studies were conducted on protective clothing, insect repellants, desalination of sea water, aviation oxygen equipment, physiological effects of tropical environments and the effects of immersion in cold water. Other investigations concerned vaccines, night vision, body armor, nutrition, oral hygiene and tropical diseases. After the war, a number of civilian scientists were added to the staff and the research program became more a blend of basic and applied Following the pattern envisioned by those mostly research. responsible for its genesis, the Center headed towards being a large multi-discipline laboratory with military and civilian scientists working on equal footing to provide the Naval Medical Department with a scientific center of international reputation. Rapid developments in nuclear weapons and power dictated the need for a build up of competence in nuclear physics and radiobiology

June 1999

with the major naval capability for medical support centered at NMRC. Before and during the 1960's, NMRC originated proposals to obtain further radiation sources and to extend studies on the biological effects of protons, neutrons, and very short half-life isotopes. These efforts culminated in the decision to create the Tri-Service Armed Forces Radiobiology Research Institute (AFRRI) on the NNMC Bethesda campus in 1961. This creation and other factors led to the demise of all major programs on radiation at Radioactive material use at NMRC since the early 1960's NMRC. have involved the used of sealed-source irradiators and check sources and a variety of unsealed licensed materials. Command documents such as those presented as Documents D-12 and D-13 were examined to gain insights on NMRC's past operations involving the use of radioactive materials. Document D-26 provides details regarding NMRC's history and its relocation to the new facility at Forest Glen, Maryland.

6.2 HISTORIC OWNERSHIP. Because the NMRC is a tenant on NNMC property, there is no separate legal description of the site found in local government documents. A review of the parcels that comprise the NNMC indicates, however, that NMRC is located primarily on parcel 639, with a small wooded section adjacent to Stoney Creek located on parcel 772. All of the surrounding properties are located within Bethesda city limits. At the time of the NMRC site development, the area was wooded and bordered on the north by grassy fields or small farm plots as indicated in the 1937 aerial photograph provided as AP-1 in the Aerial Photographs section of this HSA. (reference 10.2)

6.3 HISTORIC PROPERTY REVIEW. In accordance with Section 106 of the National Historic Preservation Act (NHPA), consultation was conducted with the Maryland Historical Trust, Office of Preservation Services. A letter providing comments were issued by the Maryland Department of Housing and Community Development, Division of Historical and Cultural Programs on December 16, 1997 (Document D-07). (reference 10.2)

6.4 AERIAL PHOTOGRAPHS. Aerial photographs of the NMRC were reviewed for areas of potential vegetative stress or other outward signs of contamination and for confirmation of the existence of physical structures or buildings that were identified in original NMRC as-built drawings which were not found during the 1997 Engineering Site Assessment (ESA) (reference 10.2). In the 1997 ESA, every effort was made to include photographs for each decade since the establishment of

June 1999

NMRC (1945, 1948, 1961, 1965, 1970, 1976, 1979, 1985, 1989, 1995) and one aerial photograph that pre-dates (1937) NMRC's original construction. Aerial photographs of the 1950s were unavailable. The aerial photographs, obtained from the national Archives and Air Photographs, Inc., are provided as Aerial Photographs AP-01 through AP-13. The 1937 photograph indicates that NMRC was constructed on two privately owned land masses that formed a sparsely wooded area to the south and grassy fields or small farm plots to the north. By 1945, buildings 17, 18, 22, 111, part of 119, 139, 140, 157, and 165 had been built. The 1945 aerial photograph also shows that ground had been broken for the construction of buildings 17A, 21, and 176. Small buildings are difficult to see in the photograph from 1948 but by then, buildings 17A, 21, 119, and 146 were built. The historical view of the NMRC facility by aerial photography then jumps to the 1960s because photographs of the complex during the 1950s were unavailable. The addition of building 17B had been completed by 1961, as had the construction of buildings 28, 29, and 150. Building 165 had been demolished by this time. To the south of NMRC, construction of the Armed Forces Radiobiology Research Institute (AFRRI) was underway. The 1976 aerial photograph depicts the early phases of construction of building 53 for diving research where building 140 once stood. In addition, building 157 had been demolished between 1970 and 1976. The period between 1976 and 1979 was highlighted by the construction of a new NNMC power plant to the southwest of the NMRC. By 1985, both building 111 and the old NNMC power plant building had been demolished. By 1989, the original diving research and naval toxicology facility, building 119, was no longer standing and the construction of building 59 had been completed. The 1995 aerial photograph is an accurate representation of NMRC during 1997 and 1998. Table T-02 provides information about the use of NMRC buildings and rooms. Floor Diagrams FD-01 through FD-38 provide floor diagrams for the existing NMRC buildings. See the List of Floor Diagrams for the available floor plan drawings.

June 1999

Table T-02. USE OF NMRC BUILDINGS AND ROOMS

Building	Utilization	Square	Most
Building	(1998-1999)	Footag	Recent
	(1990-1999)	e	Year of
		(SF)	Historical
		(31)	
	0.6.6.1	10057	RAM Use
Rockville Annex	Office,	10657	1999
	Laboratory,		
	Storage, etc.		
17	Office,	51526	1999
	Laboratory,		
	Storage, etc.		
18	Office,	8254	1999
	Laboratory,		
	Storage, etc.		
21	Office,	21818	1999
	Laboratory,		
	Storage, etc.		
28	Office,	3415	
	Laboratory,		
	Storage, etc.		
29	Office, etc.	489	
49	Storage, etc.	1089	
53	Office,	21699	1999
	Laboratory,		
	Storage, etc.		
59	Office,	2695	
55	Laboratory,	2000	
	Storage, etc.		
69	Office,	805	
05	Laboratory,		
20	Storage, etc.	1195	
79	Office,	1195	
	Laboratory,		
	Storage, etc.	10.10	1000
139	Office,	4343	1998
	Laboratory,		
	Storage, etc.		
174/219	Storage, etc.	2142	
150	Vacated building		1963
Sub-total		130127	

June 1999

6.5 CURRENT USAGE AND OPERATING HISTORY

6.5.1 LICENSING AND OPERATIONS.

Prior to 1986, the NNMC Radiation Safety Officer oversaw NMRC's uses of radioactive materials. NMRC records indicate that an Atomic Energy Commission (AEC) radioactive materials license was issued to NMRC for its cobalt-60 facility. This AEC license was terminated in 1963. NMRC maintained NRC licenses for its three cesium-137 gamma irradiators during the 1980's and 1990's. Since 1987, NMRC has used radioactive materials under the conditions of its own Navy Radioactive Materials Permit (NRMP), as part of the Navy's NRC Master Material License. The conditions of NMRC's current NRMP will be amended in March or April 2000 to remove two authorized locations from NMRC's NRMP. These locations are NMRC Bethesda and the NMRC Rockville Annex site.

NMRC has used licensed materials since its operations began in 1942. NMRC possessed an Atomic Energy Commission (AEC) materials license for its Cobalt-60 Facility at NMRC building 150. This AEC By-product Materials License, Number 19-2891-3, was issued on October 2, 1957 and expired on 31 March 1963. Until 1987, NMRC's use of radioactive materials was controlled by NNMC's NRC License, Number 19-02891-05). NMRC held its own NRC License, Number 19-02891-06 for the three cesium-137 gamma irradiators it possessed. NMRC's 9000-Curie irradiator was obtained in 1981; the 2500-Curie irradiator in 1986; and the 300-Curie irradiator in 1992. Beginning in 1987, the Navy adopted its Navy Radioactive Material Permit (NRMP) Program. NMRC's use of unsealed and sealed sources were covered in NRMP Number 19-64223-41NP (initial permit application dated 29 January 1988). When NMRC's name changed from the Naval Medical Research Institute on October 1, 1998, NRMC's NRMP number was changed to 19-32398-41NP to reflect the change in NMRC's Navy unit identification code. NMRC will terminate use of licensed material at the NMRC Bethesda site (March-April 2000) and the Rockville Annex site (November-December 1999). Representative samples of the AEC license, NRC licenses, and

June 1999

NRMPs mentioned above are included as **Documents D-16 through** D-25.

6.5.2 LICENSED (RADIOACTIVE) MATERIAL USE. Historically, NMRC has used a variety of licensed materials, ranging from (1) sealed sources in irradiators and check sources, (2) unsealed radionuclides in liquid form, (3) radioactive gases, (4) radioactive foils, and (5) radioactive microspheres. Since 1992, NMRC's use of radioactive materials have been limited to use of Cesium-137, sealed-source gamma irradiators and unsealed, liquidform radionuclides (H-3, C-14, P-32, P-33, S-35, Ca-45, Cr-51, and I-125). A review of NMRC's historical and current radiation safety documents for radioactive materials use has been completed for the period 1957 through 1999. Records of use of radioactive materials before this period were not readily available. A review of the records for the period 1957 through 1999 confirm that radioactive materials were used and/or stored in several NMRC (formerly NMRI) laboratories, areas, and buildings. Summaries of the radioisotopes used at NMRC are provided in the table below. Table T-03 summarizes NMRC radionuclide information (radioisotopes, half lives, and major radiations and energies). Table T-02B provides an in-depth historical review of use of radioactive materials at NMRC during the period 1954 through 1999. Table T-04 provides information such as the beginning and ending years of use, isotopes used, maximum on-hand quantities, building and room numbers, investigators and some comments. Table T-05 is provided to demonstrate that personnel were monitored for their occupational exposure to ionizing radiation at NMRC and that personal radiation exposures were maintained as low as reasonably achievable. Tables T-06 through T-10 provide summaries of annual posted dosimeter results with explanations to demonstrate that exposure to the general public (non-radiation workers) were not subjected to ambient exposure rates above the 2-mrem/hour limit nor was it likely that the annual dose to any member of the general public could exceed 100 mrem for the year.

June 1999

Table T-03: RADIOISOTOPES USED AT NMRC (1942 - 1999)

RADIOISOTOPE		HALF LIFE	MAJOR RADIATION	RADIATION
SYMBOL	NAME		NADIATION .	ENERGY (keV)
НЗ	HYDROGEN-3	12.3 Y	BETA	18.6 (max E)
C14	CARBON-14	5730 Y	BETA	156 (max E)
P32	PHOSPHORUS-32	14.3 D	BETA	1710 (max E)
P33	PHOSPHORUS-33	24.4 D	BETA	248 (max E)
\$35	SULFUR-35	87.4 D	BETA	167 (max E)
Ar41	ARGON-41	1.83 H	BETA	1198 (99.2%) 2492 (0.8%)
			GAMMA	1293 (99.1%)
Ca45	CALCIUM-45	165 D	BETA	256 (max E)
Sc46	SCANDIUM-46	83.8 D	ETA	357 (max E)
			GAMMA	889 1120
Cr51	CHROMIUM~51	27.7 D	GAMMA	320 (10%)
Co57	COBALT-57	270.9 D	GAMMA	122 (85.5%) 136 (11%) 692 (0.16%)
Fe59	IRON-59	44.6 D	BETA	273 (45%) 466 (53%)
			Gamma	1099 (56.5%) 1291 (43%)
Se75	SELENIUM-75	119.78 D	GAMMA	121 (16.7%) 136 (59%) 264 (60%) 280 (25%) 400 (11%)
Kr79	KRYPTON-79	34.9 D	GAMMA	136 (0.7%) 261 (9%) 398 (10%) 511 (15%) 606 (10%)
Kr85m	KRYPTON-85m	4.4 H	BETA GAMMA	840 (78.6%) 305 (14%) 151 (75%)
Sr85	STRONTIUM-85	64 D	GAMMA	514 (99%)

TABLE T-03: RADIOISOTOPES USED AT NMRC (1942-1999) (continued)

June 1999

RADIOISOTOPE		HALF LIFE	MAJOR	RADIATION
SYMBOL	NAME		RADIATION	ENERGY (keV)
Nb95	NIOBIUM-95	35 D	BETA	160 (max E)
			GAMMA	765 (100%)
Tc99m	TECHNETIUM-99m	6.05 H	GAMMA	140 (89%)
Ru103	RUTHENIUM-103	39.5 D	BETA	226 (90%)
			GAMMA	497 (88.9%) 610 (5.6%)
Inll1	INDIUM-111	2.8 D	GAMMA	171 (90%) 245 (94%)
Sn113	TIN-113	115 D	GAMMA	255 (2.1%) 24 (61%)
1125	IODINE-125	60.2 D	GAMMA	27 (110%) 31 (25%)
Xe127	XENON-127	36.4 D	Gamma	172 (22%) 203 (65%) 375 (20%)
1131	IODINE-131	8.1 D	BETA	606 (90%)
			GAMMA	637 (6.5%) 364 (82%)
Ba133	BARIUM-133	7.2 Y	GAMMA	302 (14%) 356 (69%) 382 (8%)
Xe133	XENON-133	5.3 D	BETA	346 (99%)
			GAMMA	31 (39%) 81 (36%)
Cs137	CESIUM-137	30 Y	BETA	511 (94.6%)
			GAMMA	662 (90% from Bal37m)
Ce141	CERIUM-141	32.5 D	BETA	434 (70%) 580 (30%)
		I I	GAMMA	145 (48%)
Yb169	YTTERBIUM-169	31.97 D	Gamma	177 (21%) 198 (35%) 308 (11%)

June 1999

6.5.3 SEALED SOURCES.

6.5.3.1 One Cobalt-60 Gamma Irradiator Facility, NMRC building 150, was operated during 1950-1963; operations were discontinued following a contamination event; residual contamination may be present. Cobalt Facility Information: 2500 Curies (Ci) of Cobalt-60 (Co-60), produced by the nuclear pile at Oak Ridge National Laboratory (ORNL) from Co-59, was divided into 60 encapsulated portions, 40 of which were of 50 Ci strength, and 20 of which were of 25 Ci strength. Each of these capsules was contained within a pneumatic capsule that was further contained in a pneumatic carrier tube. The tube system, through application of either positive or negative pressure, connected two radiation chambers separated by a radiation shield. This arrangement permitted either of the two chambers to be entered whenever the RAM was pneumatically transferred to the other. The equipment and sources were housed in a reinforced concrete building that was divided by a heavy radiation shield into two radiation exposure rooms and a control room. The building is constructed of reinforced concrete one foot thick. It is covered with an overhead reinforced concrete slab of concrete 10 inches thick. The control room is separated from the two radiation rooms by a massive radiation shield 3 feet 10 inches thick, constructed of reinforced barite concrete which is 45 pounds heavier per cubic foot than ordinary concrete. This aggregate was used to decrease the size, hence the cost, of the building. Two periscopes pierce the radiation shield, one for each radiation room. The radiation shield between rooms 1 and 2 consisted of a loose fill of barite and scrap iron surrounding the center portion of the tubes of the pneumatic tube transfer system. A 3feet barite concrete shield, in addition to the ordinary reinforced concrete building walls further protected the radiation room 1, in which the cobalt capsules were stored. Loading and changing of capsules was accomplished in room 1 through the use of a robot carried on a monorail, with visual control conducted through the periscope. Transfer of capsules was completed between rooms in about 6 seconds. Operator safety features included a warning gong and a safety switch to stop all transfers until persons evacuate the

June 1999

radiation room chamber. In addition, panel lights in the control room indicated capsule positions, interlock switches on both doors disrupted operations until closed, and an audible monitor sounded for each room to signal completion of source transfer. Document D-27 provides information regarding the radiological status of NMRC building 150. In addition, Photographs P-01 through P-05 in the List of Photographs section provide photographs of building 150 and the cobalt-60 source apparatus. Floor Diagram FD-38 in the List of Floor Diagrams section provides a floor diagram of the remaining ground floor of building 150 and the surrounding grounds.

6.5.3.2 Two Cesium-137 Gamma Irradiators located at different NMRC sites, with activities of 300 and 9000 Curies, are used by NMRC researchers and technicians to irradiate specimens and animals. No human irradiations were performed. In August 1998, a third unit containing 2500 Curies of cesium-137, was disposed and removed from the command by Shepherd & Associates, Incorporated.

6.5.3.3 Leak Test Results. The leak test results for all Cs-137 gamma irradiators were negative for all periods monitored during 1980-1999. No residual contamination is suspected in NMRC buildings or on the grounds. **Document D-28** provides sealed source leak test results. NMRC's sealed sources consisted almost solely of cesium-137 gamma irradiators. Other sealed sources included detectionmeter check sources, microcurie-activity calibration source rods, and encapsulated radium-226 pellets removed from excess counting equipment.

6.5.4 WASTE MANAGEMENT PRACTICES AND STORAGE AREAS. Researchers and technicians using radioactive materials were required to maintain separate waste containers for each isotope used. Further segregation occurred for liquids, solids, carcasses, scintillation vials, and sharps. Since all radioactive material (RAM) wastes were turned in to the Radiation Safety Office for tracking, storage and subsequent disposal and/or transfer. Burial of waste was prohibited.

June 1999

Sewer disposal of liquid aqueous liquids was permitted in most laboratory sinks. During the early 1990's, sewer disposal was restricted to disposal in only two designated sinks. Solid waste disposal via decay-instorage occurred for shorter half-life RAM (< 65 days). Long half-life RAM wastes were transferred to NNMC for transfer to a commercial contractor. Since 1992, dilute, aqueous RAM waste is collected from the laboratory operations by researchers and technicians and turned in to the NMRC Radiation Safety Office. The Radiation Safety Office then disposes of the liquid waste in one of two designated sinks. Solid wastes are packaged by the researchers and technicians and turned in to the Radiation Safety Office for storage and subsequent disposal. Tables T-11 through T-19 and Documents D-29 and D-30 provide summaries of NMRC's annual receipts (inventories) of radioactive materials), annual solid radioactive waste disposal logbook entries, and annual sanitary sewer disposal of liquid radioactive materials logbook entries.

6,5.5 SPILLS AND CONTAMINATION EVENTS

6.5.5.1 In 1962 at the NMRC Cobalt-60 Facility (Building 150), an animal and specimen irradiation facility, a contamination event was discovered. The facility had a sealed-source activity loading totaling 2500 curies consisting of twenty 25-Ci clayencapsulated sources and forty 50-Ci ceramicencapsulated sources. The discovery of the contamination occurred following an investigation of abnormally personal internal monitoring results; operations were ceased during 1962. The sources were removed and sent to the ORNL. Decontamination events involved removing materials from the site, removing several inches of the soil from the fenced vicinity of the building and packaging and shipping contaminated wastes to an authorized Army disposal site. The termination of the AEC License Number 19-2891-3 on 31 March 1963 occurred before all decontamination efforts had been completed. Residual radioactivity remains at the site; the amount and type are undetermined and requires characterization before the area can be assigned a radiological classification. Document D-27 provides documentation regarding the 1962 discovery of

June 1999

cobalt-60 contamination, halting of all cobalt-60 operations in 1962, removal of all sources in 1963, the decontamination efforts, and the expiration of the NMRC Atomic Energy Commission license in March 1963.

6.5.5.2 In 1993, an incident occurred at the Rockville Annex involving the unauthorized use and spill of P-32, inadequate post-use monitoring, and nonreporting of broken glass tubes containing P-32 during the use of a laboratory centrifuge unit. Contamination was spread to various locations at the site; decontamination events occurred to clean up as much as possible and the residual radioactivity was covered until radiation decay occurred; no other spills occurred since then. No residual radioactivity remains at the Rockville site in 1999 from that 1993 spill. **Document D-31** provides information regarding this spill.

6.5.5.3 Leakage of Xenon-127 gas in the hood of room 112 of building 53 was discovered during October 1985. The leakage was attributed to a leaky connection between the container and the gas-tight syringe used to draw gas doses from the container. It was suspected that another contributor to the leakage was the nonclosure of the container valve after a gas sample was withdrawn from the container. The leakage was estimated to be between 28 mCi and 100 mCi over a 9week period, depending on the actual time of loss. No decontamination efforts were required. No residual contamination remains at the building 53 site as a result of this leakage. Documentation of this event is provided as **Document D-32**.

6.5.6 USE OF URANYL ACETATE/NITRATE

Uranyl acetate was obtained approximately 10 years ago and has been used in two labs in building 17B (Rooms 15 and S-30) periodically over the last 10 years. U-238 (depleted) was used in the form of uranyl acetate or uranyl nitrate and was not high enough in radioactive content to be included in NMRC's Permit (since 1988) or on NNMC's NRC license (prior to 1998). This material was not considered a licensed material. The material was purchased as a powder or pellets

Junc 1999

and was mixed with liquids to fixate slides in laboratory procedures. Possible means of disposal included disposal down the sinks in the labs or as bio-hazardous waste. There were no documented spills of this material; at no time were the materials under pressure that could have resulted in a spread of contamination to the walls and ceilings; there was a potential for contamination of this unsealed material on the countertops and at the sinks. A protocol and reference information describing the use of uranyl acetate or uranyl nitrate in two NMRC laboratories in building 17 is provided as **Document D-33** in the List of Documents section.

6.6 ADJACENT LAND USAGE. The NMRC site is primarily surrounded by other properties owned by the U.S. Government. These include the NNMC and the National Institutes of Health Immediately to the southeast of the NMRC complex is a (NIH). small stream, Stoney Creek, which ultimately drains into the Potomac River. The approximate latitude and longitude are 39.0031 and 77.0896 degrees, respectively. Figure F-01 provides the Site Location map for NMRC. Figure F-02, the Site Resource map, presents the layout of buildings, both past and present, at the NMRC site. Also included in this Historical Site Assessment (HSA) is the NMRC Rockville Annex. NMRC Rockville Annex research efforts are conducted in a leased, privately held, two-story building at 12300 Washington Avenue, Rockville, Maryland. This Annex building is on a remote, isolated site in a commercial area.

6.7 FUTURE USAGE. Control of the NMRC buildings at NNMC in Bethesda and at the Rockville Annex will revert back to owners or property managers. The lease for the NMRC Rockville Annex building will likely expire during December 1999. NMRC research efforts will move from the building during June and October 1999. Control of the building will revert to its commercial management firm. The upper levels of building 150 were removed in the 1960's. The building has not been used or occupied since that period. During February-April 2000 following decommissioning actions, the remains of building 150 and the surrounding grounds will revert back to the owner, NNMC. During February-April 2000, control of NMRC buildings 17, 18, 21, 29, and 49 (and possibly others) will revert back to NNMC ownership before they are turned over for major renovations then occupancy by components of the National Institutes of Health (NIH). During February-April 2000, control of NMRC building 53 (and possibly others) will revert back to NNMC ownership before they are turned over for major

June 1999

renovations then occupancy by components of the Uniformed Services University of the Health Sciences (USUHS). Document D-14 (NIH agreement letter) and Document D-15 (USUHS agreement letter) provide documentation regarding future users of NMRC Bethesda buildings.

7. FINDINGS

7.1 POTENTIAL CONTAMINANTS

A review of NMRC and NNMC radiation safety records, licenses and permits, radionuclide receipt and disposal logs, and on-hand inventory records has been completed. This review indicated that the potential radioactive contaminants at the NMRC site would be some of those radionuclides listed in **Table T-03**.

Table T-20 provides a list of potential contaminants in NMRC buildings and was compiled using the radionuclide receipt and disposal logs and inventory records. The potential radioactive contaminants include Hydrogen-3 (tritium), Carbon-14, Phosphorus-32, Phorphorus-33, Sulfur-35, Calcium-45, Chromium-51, Cobalt-60, and Iodine-125. Other tables provided in this report specify the contaminants for particular NMRC rooms and spaces.

June 1999

Table T-20. Potential Radioactive Contaminants and Radiological Classifications (1942-1999)

BUILDING	BUILDING	RADIOLOGICAL	FLOOR	OCCUP	ANCY	ISOTOPES OF
NUMBER	DESCRIPTION OR	CLASSIFICATIONS	AREA	OR YEARS OF		CONCERN
	USE		(SQUARE	RAM		
			FOOTAGE)	Start	Stop	
17	Offices, Labs,	Non-impacted	84,398	1942	1999	H3,C14,P32,
17A	Storage,	and Impacted	(total)	1946	1999	P33,S35,
17B	Utility	Class 3		1956	1999	Ca45, Cr51,
10	Machinery		14 200	1942	1999	I125, U238 H3, C14, P32,
18	Animal	Non-impacted	14,300	1942	1999	S35, Cr51
	Facility,	and Impacted Class 3				535, CESI
	Model shops, Offices, Labs,	Class 5				
	Storage					
21	Animal	Non-impacted	35,828	1946	1999	H3,C14,P32,
	Facility,	And Impacted				P33, S35,
	Offices, Labs,	Class 3				Ca45, Cr51,
	Storage					1125
28	Machine Shop,	Non-impacted	5,856	1952	1999	H3,C14
	Offices, Labs,	And Impacted				(highly
	Storage	Class 3				unlikely)
29	Offices, Labs,	Non-impacted	630	1955	1999	H3,C14
	Storage, X-ray	And Impacted				(highly
	Facility	Class 3				unlikely)
53	Diving	Non-impacted	35,000	1976	1999	H3,C14,P32,
	Facility,	And Impacted				P33,S35,
	Offices, Labs,	Class 3				Ca45, Cr51, I125
5.0	Storage	Non-impacted	2,695	1989	1999	None
59	Diving Decility	Non-impacted	2,695	1909	1999	None
69	Facility H2/O2 Research	Non-impacted	805	1992	1999	None
69	Facility	NOU-IMPacted	805	1992	1555	None
79	Equipment	Non-impacted	1,195	1992	1999	None
15	Facility	Non Impacted	1,155	1992	1000	none
139	Offices, Labs,	Non-impacted	4,343	1944	1999	H3,C14
100	Storage	And Impacted				(very
		Class 3				unlikely)
150	Cobalt-60	Impacted Class	1100	1950	1963	Co-60
	Irradiator	2 and 3 Areas				
ANNEX	Offices, Labs,	Non-impacted	10,657	1986	1999	H3,C14,P32,S3
	Storage	And Impacted				5,Cr51
		Class 3				
ALL	Offices, Labs,	Non-impacted				(highly
OTHERS	Storage					unlikely)

June 1999

7.2 POTENTIAL CONTAMINATED AREAS

7.2.1 PREVIOUS RADIOLOGICAL SURVEY RESULTS. All available NMRC daily, weekly, monthly, and quarterly wipe test and survey monitoring results (1979-1999) were reviewed for evidence of residual contamination in NMRC sites. Incident and spills records were also reviewed. A significant spill involving phosphorus-32 (P-32) occurred at the NMRC Rockville Annex in October 1993. No residual radioactivity remains because of the 1993 spill. More than 100 half lives for P-32 have elapsed since that incident. There have been no other incidents of radioactive material spills at the Rockville Annex site. There have been no significant spills or incidents involving radioactive materials at NMRC Bethesda since the 1962 event involving cobalt-60 at and around NMRC building 150. NMRC decommissioning efforts will include final surveys for the Building 150 site and surrounding grounds. With the possible exception of the building 150 site, previous survey data for NMRC sites indicate that there is no reasonable expectation to find residual radioactivity that greatly exceeds background levels. It is anticipated that no NMRC survey unit will have evidence of residual radioactivity that exceed unrestricted-release-criteria quideline values. The NMRC survey sites selected for scoping surveys are all sinks and traps and the building and grounds of Building If contamination is found, characterization surveys, 150. remedial actions, and remedial action surveys will be completed before the final surveys for these sites are initiated.

Table T-20 provides a list of potential contaminants and radiological classifications for NMRC buildings. This list was compiled using the radionuclide receipt and disposal logs and inventory records.

Table T-21 in the List of Tables section provides a summary of the sites and periods of radiological wipe testing and survey meter monitoring. The table indicates those NMRC buildings and rooms that were used for RAM work and were subjected to periodic radiation monitoring. The purpose of the monitoring was real-time detection of residual contamination in the laboratories and on individuals. Once residual contamination was detected,

June 1999

immediate actions were taken to reduce the residual activity to background levels. The NMRC Radiation Safety philosophy has been to maintain a residual radioactivity ALARA and/or at background levels. **Document D-34** provides actual NMRC quarterly radiological survey monitoring and wipe test results (by building and room numbers), summaries, and laboratory layout diagrams. When areas of elevated activity (contamination as determine by readings more than twice background levels) were detected, the Radiation Safety Office took immediate actions to decontaminate and remonitor these areas until background radiation levels were achieved.

Document D-35 provides a sample of calibration certificates for NMRC Radiation Monitoring and Detection Equipment and Instruments for the period 1995-1999.

7.2.2 IMPACTED AREAS - KNOWN AND POTENTIAL. Impacted areas have some potential for residual contamination. Impacted areas are further divided into three classifications. Table T-22 provides the radiological classifications of NMRC building and rooms.

7.2.2.1 **CLASS 1 AREAS.** Class 1 areas are impacted areas that, prior to remediation, are expected to have concentrations of residual radioactivity that exceed the $DCGL_W$ ($DCGL_W$ is defined in MARSSIM). NMRC characterized none of its survey sites as Class 1.

7.2.2.2 CLASS 2 AREAS. Class 2 areas are impacted areas that, prior to remediation, are not likely to have concentrations of residual activity the exceed the $DCGL_W$.

7.2.2.3 **CLASS 3 AREAS.** Class 3 areas are impacted that have a low probability of containing residual radioactivity.

7.2.3 NON-IMPACTED AREAS. Non-impacted areas have no reasonable potential for residual contamination.

7.2.4 **BUILDING DESCRIPTIONS AND CLASSIFICATIONS.** The NMRC Radiation Safety Officer completed a historical review of documents of NMRC's use of radioactive materials for the period 1942 through 1999. Interviews were also

June 1999

completed. These reviews and interviews revealed that NMRC has used licensed materials in the majority of the NMRC buildings on the NNMC Bethesda campus and in most of the rooms in a two-story lease building located in Rockville, Maryland. The possession limits for unsealed radioactive materials varied from a few microcuries to several hundred curies for certain short-lived isotopes. The isotopes of contamination concern for the majority of the NMRC survey units will be tritium (H-3), Carbon-14, and Sulfur-35. The isotope of concern for the Building 150 survey unit will be Cobalt-60. No residual Cesium-137 contamination as a result of the gamma irradiator usage is expected because of the negative (semi-annual) leak-test results for the period 1981 through 1999. Based on the history of the radioisotopes used and the periodic room and area surveys conducted by NMRC Radiation Safety, it is not anticipated that any significant quantity above background will be found during the final survey of all NMRC survey sites.

Table T-22 provides the radiological classification for NMRC buildings in which radioactive materials have been used. Demolished buildings and sites are not included in the table. Also listed are 1999 radioactive contaminants of concern. The 1999 contaminants of concern are defined as those radioactive materials, while accounting for radioactive decay, may be present as residual radioactive contamination. Table T-22 also provides a complete list of NMRC building and room numbers, isotopes of concern, and radiological classifications.

Table T-23 summarizes the NMRC Impacted Class 2 and Class 3 Areas.

Table T-24 summarizes the Non-impacted Areas.

NMRC survey sites are classified as:

- Non-impacted (offices and non-laboratory areas),
- Impacted Class 2 (one site with known residual contamination; building 150; cobalt-60; 1962 contamination event), or

June 1999

• Impacted Class 3 (current NMRC licensedmaterial-use and -storage areas).

7.3 **POTENTIAL CONTAMINATED MEDIA**. The potential contaminated media will consist of building surfaces and soil.

7.4 RELATED ENVIRONMENTAL CONCERNS: None

8. NMRC CONCEPTUAL MODEL AND SITE DIAGRAM INFORMATION

For the convenience of scheduling necessary radiological activities and to maximize the use of available resources, NMRC's Decontamination and Decommissioning (D&D) Plan has been divided into four distinct phases. These phases may be completed serially or concurrently.

Figures F-01 and F-02 in the List of Figures section of this HSA provide diagrams of the NMRC site on the NNMC Bethesda campus. Because only one isolated building is involved, no diagram is provided depicting the NMRC Rockville Annex site. Floor Diagrams FD-01 through FD-38 in the List of Floor Diagrams section provide floor plans for the NMRC Bethesda and NMRC Rockville Annex sites.

Table T-25 provides a summary of the four phases depicted in the Conceptual Model Diagram, Figure F-03. (Shown here and provided in the List of Figures section.)

Table T-26 provides a Milestone Chart for D&D Final Status Survey Activities. This table shows that the successful completion of the Historical Site Assessment accomplishes the first step in this milestone chart, "Evaluate Contamination Potential".

Table T-27 summarizes the types of radiological surveys that may be performed and documented to satisfy regulatory decommissioning requirements.

Document D-36 (reference 10.5) (also provided in Table T-28) provides NRC-approved screening values. These screening values will be compared directly to NMRC's final status survey data to verify compliance with the NRC's release criteria for unrestricted use. Criteria for interpreting sample survey

June 1999

measurements when no reference area is used are provided as **Table T-29.** Using the screening values will eliminate the need to perform pathway dose calculations to satisfy the NRC limit for unrestricted release of no more than 25 mrem/year evaluated over a period of 100 years. References 10.1 and 10.3 through 10.7 provide screening values and regulatory guidance information.

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June 1999

Table T-26. NMRC D&D Conceptual Model Information

NMRC	Buildings	Number o	f Survey	Floor	Area
D&D		Uni	ts	(square	feet)
Phase		Non-	Class 2	Non-	Class
		impacted	or 3	impacted	2 or 3
1	17,18,21,22,29, 49,79,139,146, 174,219	283	103	60,274	27,592
2	Rockville Annex	31	25	4,115	6,602
3	150	1	1	0	2,380
4	28,53, 59,69	71	12	20,941	7,673
Totals		386	146	85,330	44,252

June 1999

Figure F-03. NMRC CONCEPTUAL MODEL (June 1999)

NMRC D&D Phase I (8/1999-2/2000) Main NMRC Bethesda building numbers: 17,18,21,22,29,49,139, 146,174,219

Contaminants of concern: H-3, C-14, P-32, P-33, S-35, Ca-45, Cr-51, I-125

BUILDING SURFACE CLASSIFICATIONS

Number	Total
Of Survey	Area
Units	<u>(SF)</u>
283	60,274
103	27,592
	Of Survey <u>Units</u> 283

NMRC D&D Phase	III (8/1999-2/2000)
NMRC Building 150	and Grounds

Contaminant: Co-60

	Number	Total
	Of Survey	Area
	Units	(SF)
Soil:		
Impacted Class 3	1	1,500
Building Surfaces:		
Impacted Class 2	1	880

MRC Rockville Am	nex location (1 buil	ding)
Contaminants of conc	ern:	
-3, C-14, P-32, S-35	5, Cr-51	
BUILDING	SURFACE CLASS	BIFICATIONS
	Number	Total
	Of Survey	Area
	Units	<u>(SF)</u>
	31	4,115
Ion-impacted		

NMRC Bethesda bui	lding numbers: 28,5	3,59,69	
Contaminants of cond	cern:		RAN
H-3, C-14, P-32, P-33	3, Ca-45		
BUILDING	SURFACE CLAS	SIFICATIONS	
	Number	Total	
	Of Survey	Area	
	Units	<u>(SF)</u>	
Non-impacted	71	20,941	
Impacted Class 3	12	7,673	
			100

9. CONCLUSIONS

A comprehensive Historical Site Assessment (HSA) to support the closure and relocation of the Naval Medical Research Center (NMRC) (formerly the Naval Medical Research Institute, NMRI) has been completed. This HSA will serve as the springboard from which NMRC's Radiological Decontamination and Decommissioning (D&D) efforts will be launched.

Even though radiation safety documents for the period 1942 through roughly 1970 were not readily available for review, NMRC's annual historical reports were useful in shedding light on the type of projects undertaken, where experimentation and work were performed and by whom, and the types/quantities of radioactive materials used. In addition, data for the past two decades were thoroughly reviewed and have been summarized in this HSA.

As was presented in this HSA, NMRC's history of military medical research during 1942 to 1999 at the Bethesda site and during 1986 to 1999 at the NMRC Rockville Annex site included the use of sealed and unsealed radioactive materials. NMRC's sealedsource use involved the use of cobalt-60 during the 1950's and 1960's and the use of cesium-137 in gamma irradiators in the 1980's and 1990's. Residual cobalt-60 contaminants are suspected in and around the remnants of building 150. Required, semiannual leak test results for the gamma irradiators provide assurance that there is low probability of residual cesium-137 contamination at the NMRC sites. The use of unsealed radioactive materials in more than 150 laboratories, rooms, and areas dictate that some level of decommissioning is required for each area of radioactive material use to ensure and document compliance with the NRC's release criteria for unrestricted use. The contaminants of concern are Hydrogen-3 (tritium), Carbon-14, Phosphorus-32, Phosphorus-33, Calcium-45, Chromium-51, Cobalt-60, and Iodine-125.

NMRC's decommissioning efforts will focus on survey sites in the existing NMRC buildings. In addition, a random selection of areas designated as non-impacted will be subjected to the same level of D&D effort as some impacted areas. After equipment, materials and wastes are removed from radioactive-materials-use areas, it is anticipated that the residual contamination will be confined to small areas within a small percentage of the survey units. Sink traps and floor drains will be likely areas for detection of elevated activity.

June 1999

10. **REFERENCES**

- 10.1 NUREG-1575, MARSSIM, Multi-Agency Survey and Site Investigation Manual (December 1997).
- 10.2 ESA 1998, Environmental Site Assessment, Naval Medical Research Institute (NMRI), by the Environmental Company, Inc., May 1998.
- 10.3 10CFR20.1402, Title 10, Code of Federal Regulations, Part 20 - Standards for Protection Against Radiation, Subpart E.
- 10.4 Draft Regulatory Guide DG-4006, Demonstrating Compliance With the radiological Criteria for License Termination (supersedes NUREG 1500), August 1998.
- 10.5 NRC Nuclear Licensing Reports, Volume 12, Number 11, D&D Screening Values, November 1998
- 10.6 **Reg Guide 1.86**, Nuclear Regulatory Commission Regulatory Guide 1.86 (circa 1974)
- 10.7 NUREG/CR-5849, manual for Conducting Radiological Surveys in Support of License Termination, Draft for comment June 1992 (superseded by NUREG-1575, MARSSIM).

June 1999

11. LIST OF AERIAL PHOTOGRAPHS (AP)

Aerial Photo	Abbreviated Title	Date
Number		
AP-1	NMRC Bethesda Aerial Photograph	1937
AP-2	NMRC Bethesda Aerial Photograph	1945
AP-3	NMRC Bethesda Aerial Photograph	1948
AP-4	NMRC Bethesda Aerial Photograph	1961
AP-5	NMRC Bethesda Aerial Photograph	1965
AP-6	NMRC Bethesda Aerial Photograph	1970
AP-7	NMRC Bethesda Aerial Photograph	1976
AP-9	NMRC Bethesda Aerial Photograph	1979
AP-10	NMRC Bethesda Aerial Photograph	1985
AP-11	NMRC Bethesda Aerial Photograph	1989
AP-12	NMRC Bethesda Aerial Photograph	1995
AP-13	NMRI Aerial View	1952

June 1999

12. LIST OF CHARTS (C)

Abbreviated Title
IMRC Organizational Chart (FY-99)
1

June 1999

13. LIST OF DOCUMENTS (D)

Document Number	Abbreviated Title	Date
D-01	NMRC NRMP Information - Rockville Annex	
D-02	NMRC NRMP Information - Bone Marrow Registry Program at the Nicholson Building	
D-03	NMRC Letter, Command's Name and UIC Change from NMRI to NMRC	981026
D~04	Leased facility - NMRC Rockville Annex; lease to expire on 30 November 1999	981119
D-05	Maryland Department of Natural Resources - Threatened and Endangered Species	971120
D-06	U. S. Department of Interior - Biological Assessment and Endangered Species	971117
D-07	Maryland Department of Housing and Community Development - National Register of Historic Places	971216
D-08	Cost Estimate - NMRC Radiological Decontamination and Decommissioning	990602
D-09	Price Quote - Decommissioning Building 150	990405
D-10	Price Quote - Radiation Monitoring Equipment	990430
D-11	NMRC Relocation Move Plan	990415
D-12	NMRI Historical Briefing Data	661001
D-13	NMRI Historical Report	911231
D-14	Memorandum of Understanding between NNMC and NIH	980817
D-15	Letter of Agreement between USUHS and NMRI/NMRC	980911
D-16	NMRC NRMP, No. 19-32398-41NP, Amendment 01	990208
D-17	NMRC NRMP, No. 19-32398-41NP; also includes the termination of NMRI NRMP, No. 19-64223-41NP	981125
D-18	NMRI NRMP, No. 19-64223-41NP, Amendment 02	981001
D-19	NMRI NRMP, No. 19-64223-41NP	971215
D-20	NMRI NRMP, No. 19-64223-41NP, Amendment 01	930824
D-21	NMRI NRMP, No. 19-64223-41NP	920817

June 1999

D-22	NMRI NRMP, No. 19-64223-41NP, Amendment 06	920526
D-23	USNRC License Renewal Application, No. 19-02891-06	860129
D-24	USNRC Materials license, No. 19- 02891-05, Amendment 29	821208
D-25	US Atomic Energy Commission Byproduct Material License, No. 19-2891-3; superseded Authorization Number 25285 issued April 16, 1954.	571002
D-26	NMRC/WRAIR Historical Information and New Facility Information	
D-27	NMRC Building 150	
D-28	Quarterly Sealed Source Leak Test Results (1995 - 1999)	
D-29	NMRC Radioactive Materials Inventory Results (1995 - 1999)	
D-30	Annual Reports of Discharges into the Sanitary Sewer (1989 - 1998)	
D-31	NMRC Rockville Spill Information	1993
D-32	Leakage of Xenon-127 gas in the hood in building 53, room 112	851029
D-33	Protocol and Reference Information for NMRC Use of Uranyl Acetate/Nitrate	
D-34	NMRC Quarterly Radiological Survey/Wipe Testing Results (by building and room), Quarterly Summaries, and Laboratory Lay-out Diagrams (1995 - 1999)	
D-35	NMRC Calibration Certificates for Radiation Monitoring and Detection Equipment and Instruments	
D-36	NRC Document SECY-98-242 - Screening table for Building Surface Contamination, as Guidance Support of the Final Rule on Radiological Criteria for License Termination	981021

June 1999

14. LIST OF FIGURES (F)

Figure	Abbreviated Title
Number	
F-01	Site Location Map
F-02	Site Resource Map
F-03	NMRC Conceptual Model. (June 1999)

June 1999

15. LIST OF NMRC FLOOR DIAGRAMS (FD)

Floor	Abbreviated Title
Diagram	
Number	
FD-01	NMRC Bethesda Footprint
FD-02	NMRC Rockville Annex - First Floor
FD-03	NMRC Rockville Annex - Second Floor
FD-04	NMRC Building 17 - Third Floor
FD-05	NMRC Building 17A - Third Floor
FD-06	NMRC Building 17B - Third Floor
FD-07	NMRC Building 17 - Second Floor
FD-08	NMRC Building 17A - Second Floor
FD-09	NMRC Building 17B - Second Floor
FD-10	NMRC Building 17 - First Floor
FD-11	NMRC Building 17A - First Floor
FD-12	NMRC Building 17B - First Floor
FD-13	NMRC Building 17 - Basement Floor
FD-14	NMRC Building 17A - Basement Floor
FD-15	NMRC Building 17B - Basement Floor
FD-16	NMRC Building 17 - Sub-Basement Floor
FD-17	NMRC Building 17A - Sub-basement Floor
FD-18	NMRC Building 17B - Sub-Basement Floor
FD-19	NMRC Building 18 - Second Floor
FD-20	NMRC Building 18 - First Floor
FD-21	NMRC Building 18 - Basement Floor
FD-22	NMRC Building 21 - Third Floor
FD-23	NMRC Building 21 - Second Floor
FD-24	NMRC Building 21 - First Floor
FD-25	NMRC Building 21 - Basement Floor
FD-26	NMRC Building 28 - First Floor
FD-27	NMRC Building 28 - Basement Floor
FD-28	NMRC Building 29 - First Floor
FD-29	NMRC Building 29 - Upper Level
FD-30	NMRC Building 53 - First Floor
FD-31	NMRC Building 53 - Basement Floor
FD-32	NMRC Building 59 - First Floor
FD-33	NMRC Building 59 - Basement Floor
FD-34	NMRC Building 69 - First Floor
FD-34	NMRC Building 79 - First Floor
FD-36	NMRC Building 79 - Second Floor
FD-37	NMRC Building 139 - First Floor
FD-38	NMRC Building 150 - remaining ground floor
	level

June 1999

16. LIST OF OTHER PHOTOGRAPHIC DOCUMENTATION (P)

Photo Number	Abbreviated Title	Date
P-1	NMRC Bethesda building 150, north view	1963
P-2	NMRC Bethesda building 150, south view	1963
P-3	NMRC Bethesda building 150, south view with work crew	1963
P-4	NMRC Bethesda cobalt-60 source array	1962
P-5	NMRC Bethesda cobalt-60 source array (close-up view)	1962
P-6	NMRI Ground Plan	1950
P-7	NMRI Ground Plan	1953
P-8	NMRI Ground Plan	1960

June 1999

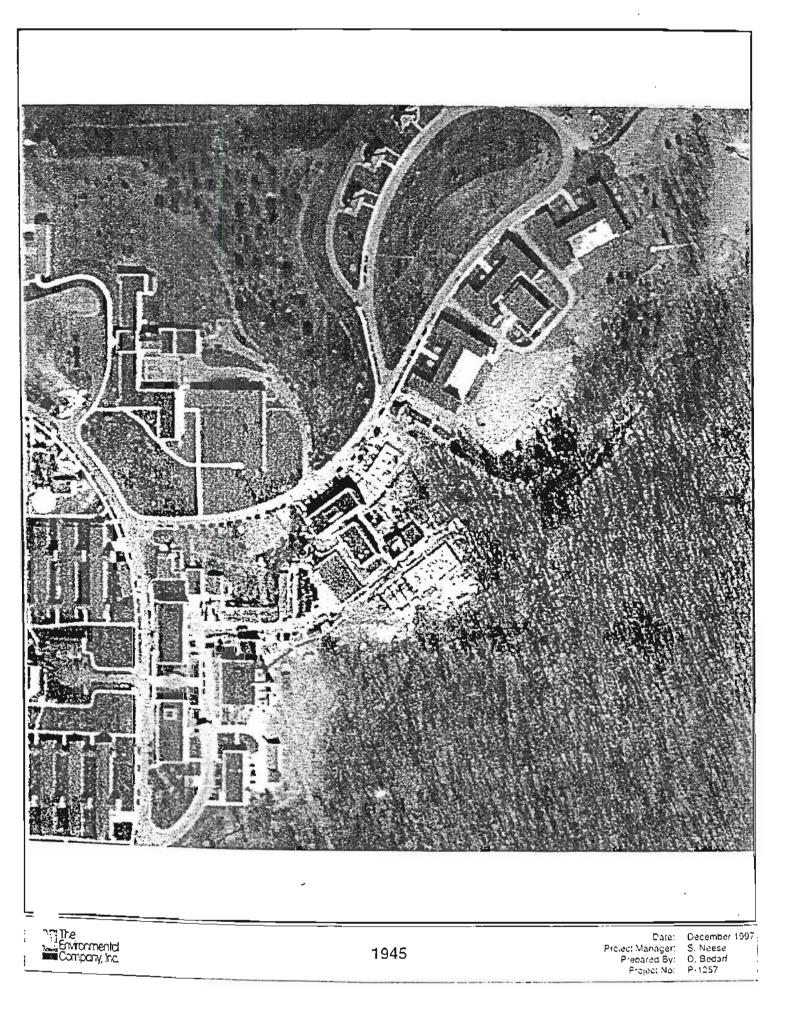
17. LIST OF TABLES (T)

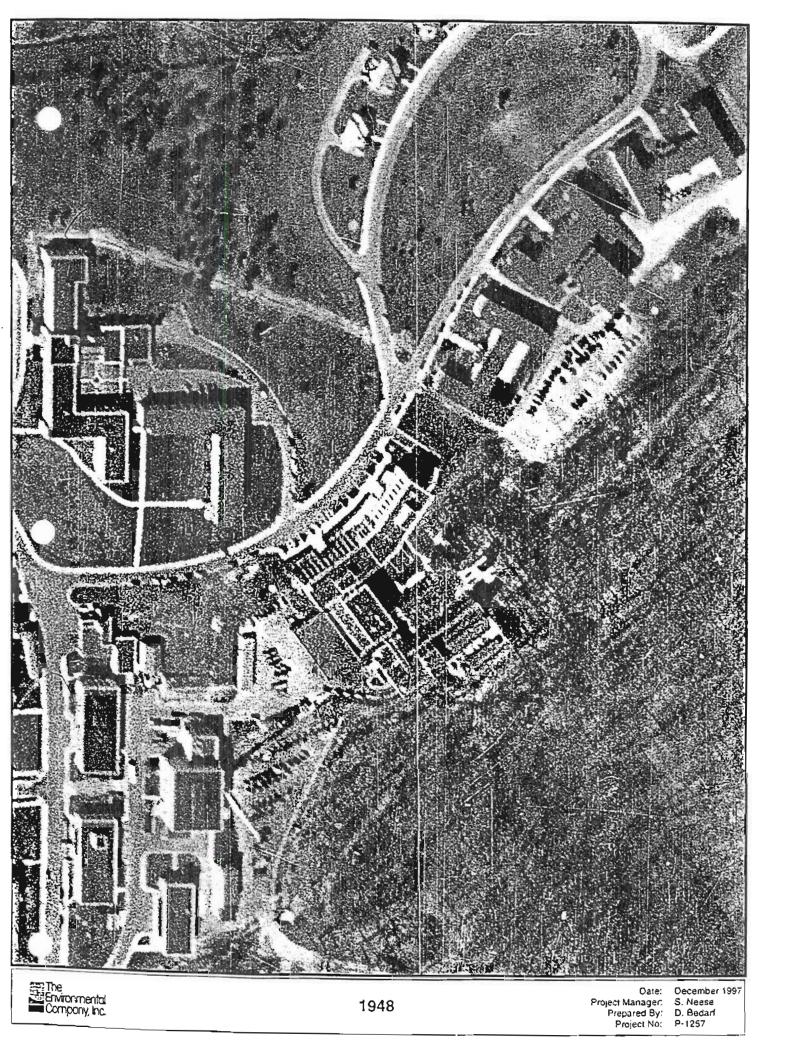
Table	Abbreviated Title	
Number		
T-01	NMRC Building History and Information	
T-02	Use of NMRC Buildings and Rooms	
T-03	Radioisotopes Used At NMRC (1942-1999)	
T-04	Historical Review of Use of Radioactive Materials at NMRC (1954-1999) (beginning and ending years of use, isotopes, maximum on-hand activities, building and room	
	numbers, investigators, and comments)	
T-05	Personnel Dosimeter Results - Annual Summaries (1990 - 1999)	
T-06	Posted (Environmental) Dosimeter Results - 1995	
T-07	Posted (Environmental) Dosimeter Results - 1996	
T-08	Posted (Environmental) Dosimeter Results - 1997	
T-09	Posted (Environmental) Dosimeter Results - 1998	
T-10	Posted (Environmental) Dosimeter Results - 1999	
T-11	Radioisotope Inventory Log - NMRC Bethesda (1989-1999)	
T-12	Radioisotope Inventory Log - NMRC Rockville Annex (1987-1999)	
T-13	Radioisotope Inventory Log - Total for NMRC (1989-1999)	
T-14	Solid Radioactive Waste Log (1989 - 1999)	
T-15	Liquid Radioactive Waste Log - NMRC Bethesda (1982 - 1999)	
T-16	Liquid Radioactive Waste Log - NMRC Annex (1988 - 1999)	
T-17	Liquid Radioactive Waste Log - Total for NMRC (1982 - 1999)	
T-18	Sewer Disposal of Radioactive Materials in NMRC Sinks (1982-1999)	
T-19	Inventory of Solid Radioactive Waste (1998- 1999)	
T-20	NMRC Potential Radioactive Contaminants	
T-21	Summary of NMRC Radiation Wipe Testing and Meter Survey Monitoring (1979-1999) (Buildings and rooms)	
T-22	Radiological Classification of NMRC Buildings (1999)	

Јипе 1999

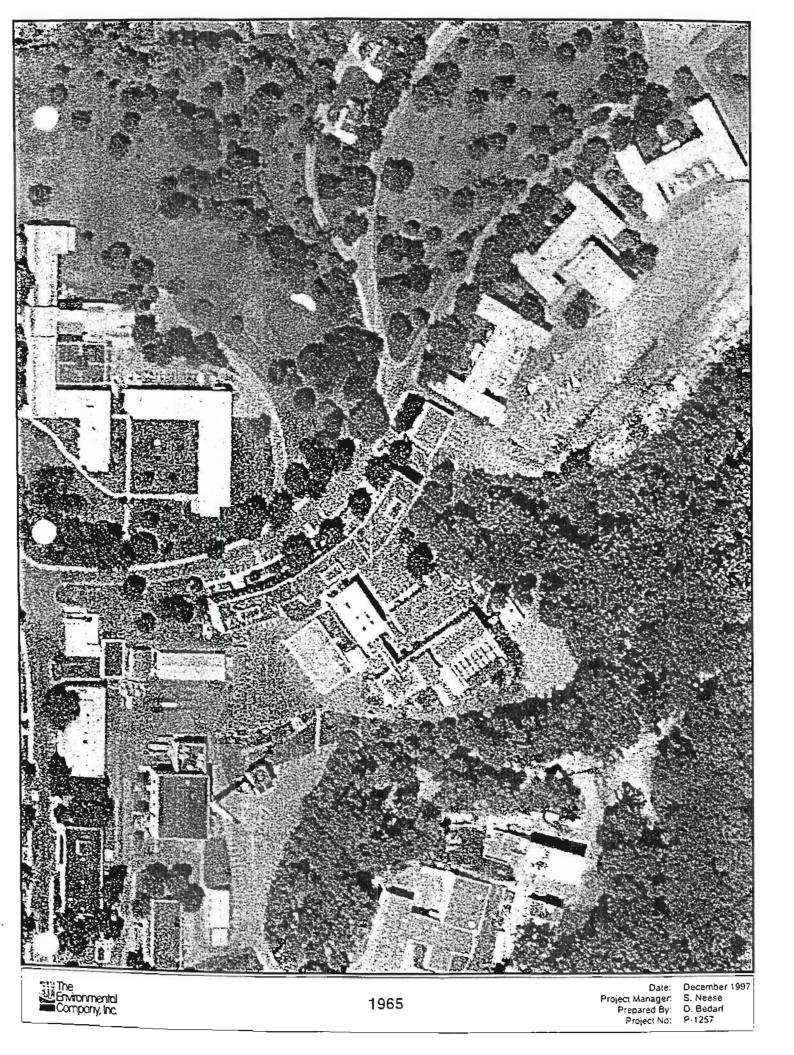
T-23	NMRC Survey Units - Radiological Impacted	
	Classes 2 and 3	
T-24	NMRC Survey Units - Radiological Non-impacted	
T-25	D&D Conceptual Model Information	
T-26	Milestone Chart for D&D Final Status Survey	
	Activities	
T-27	NMRC Radiological Decommissioning Surveys	
T-28	Residual Radioactivity Values (Screening	
	Value Table)	
T-29	Interpretation of Sample Measurements When No	
	Reference Area Is Used	

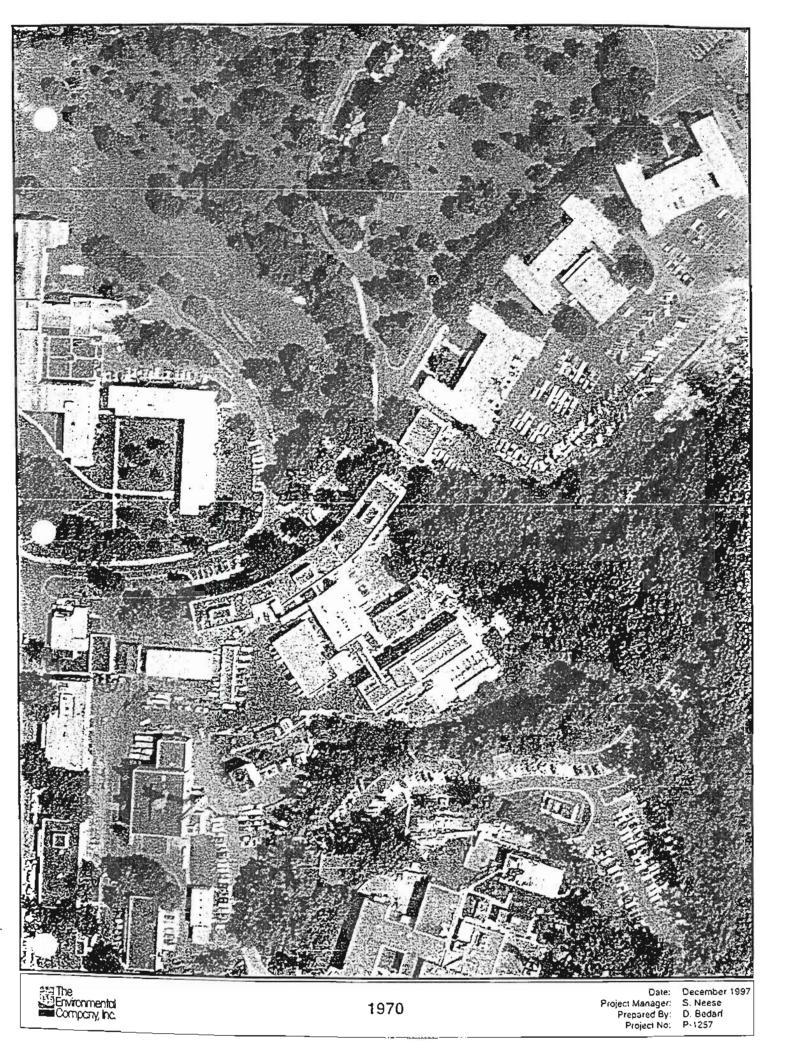






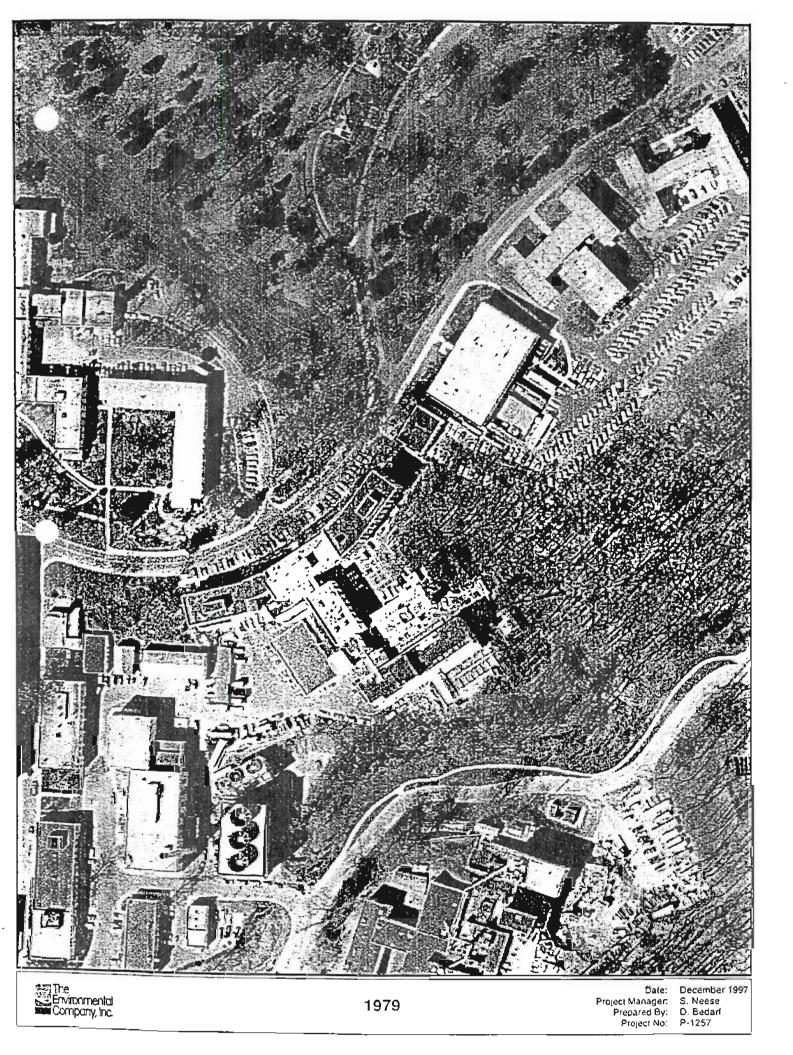




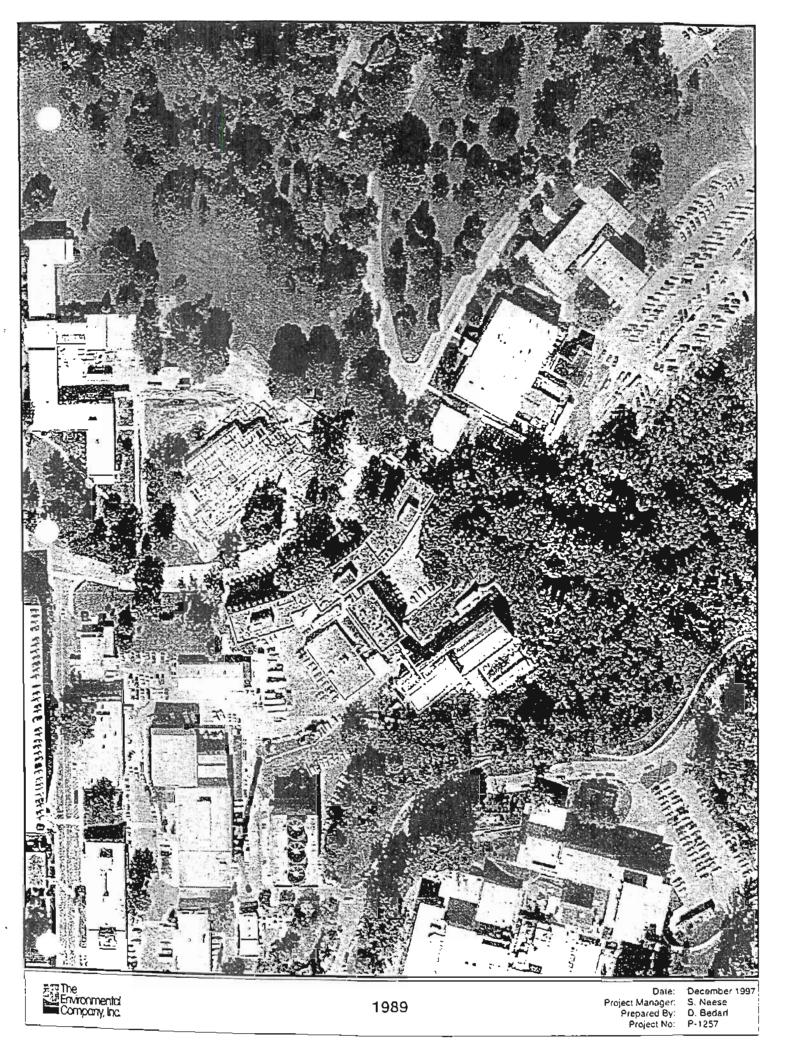


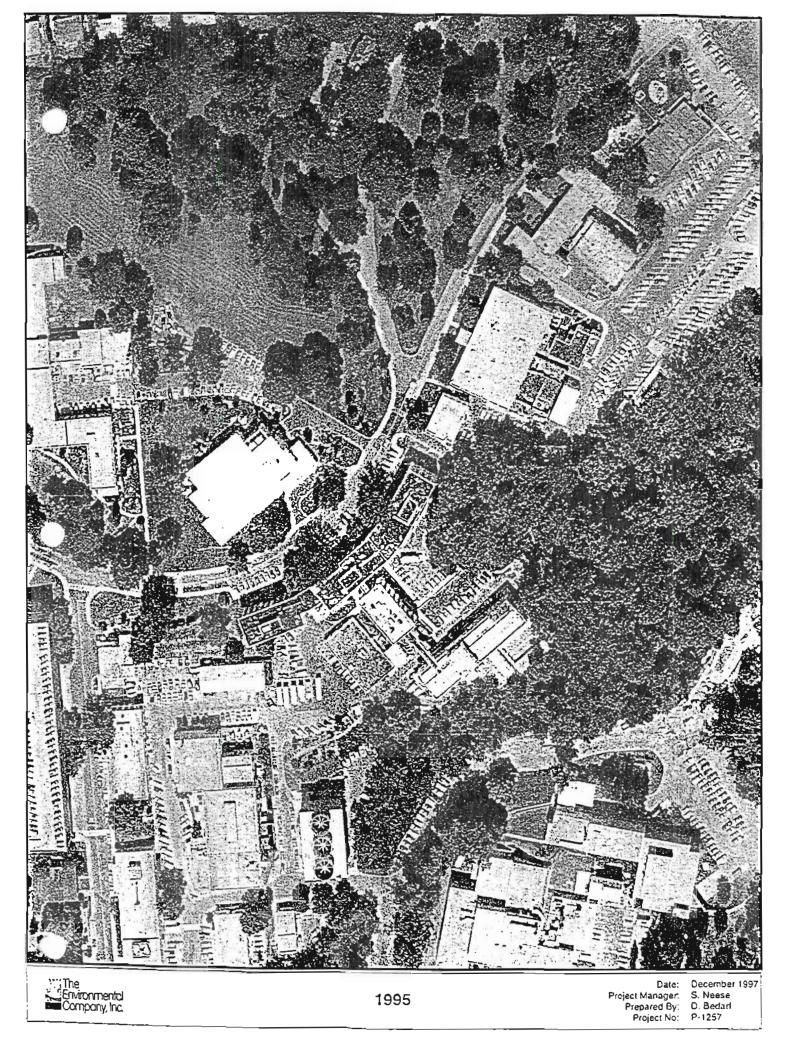
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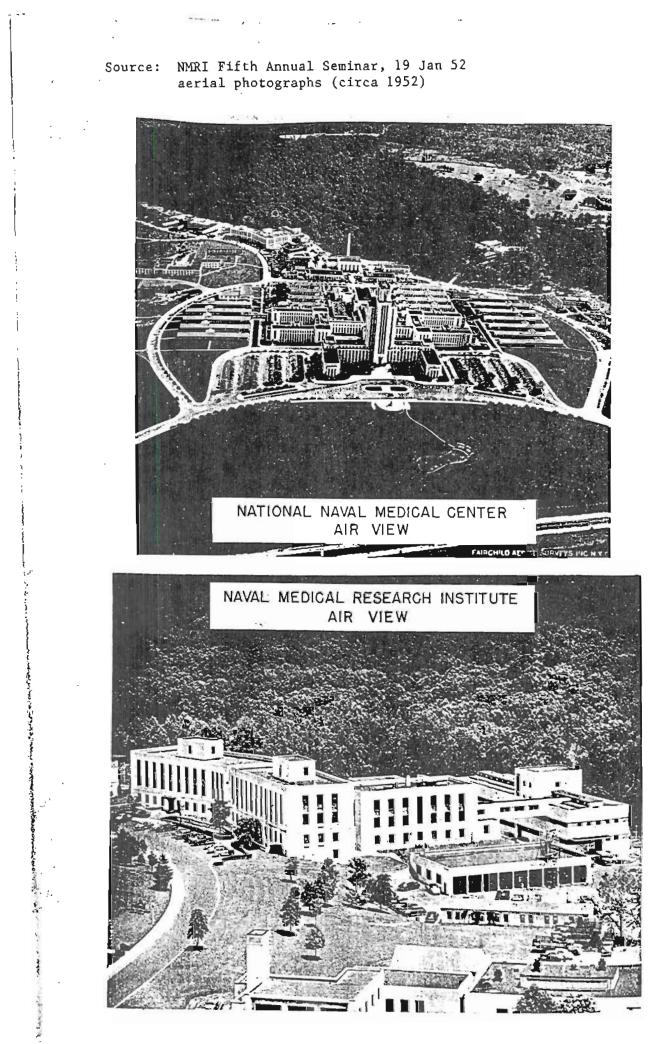








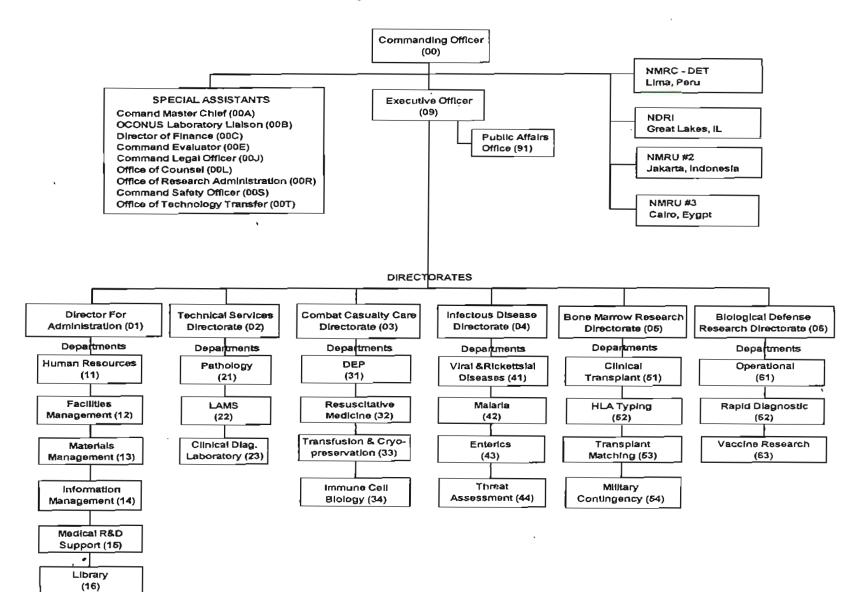
1952



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13

NAVAL MEDICAL RESEARCH CENTER Organizational Chart



D-01 NMRC NRMP Information - Rockville Annex





IN REPLY REFER TO

Ser 21/0077 18 February 1987

6470/1

FIRST ENDORSEMENT on NAVMEDCOM NATCAPREG 6471 37 ltr of 09 February 1987

From: Commander, Naval Medical Command

To: Medical Licensing, Radioisotope License Branch, Division of Fuel Cycle & Material Safety, Office for Material Safety and Safeguards, U. S. Nuclear Regulatory Commission, Washington, D. C. 20555

Subj: AMENDMENT REQUEST TO MATERIALS LICENSE 19-02891-05

Ref: (a) Phoncon LT Kerschner (MEDCOM-2122) and CDR DeCicco (NAVMEDCOM NATCAPREG) of 31 Jan 87

1. Forwarded, recommending approval. As discussed in reference (a) the Licensee's Radiation Safety Committee will impose all necessary safety requirements for radioisotope use at the Rockville location, as well as addressing any issues we may have about their intended use. My point of contact is LT H. F. Kerschner, MSC, USN (MEDCOM-2122) at 653-1182.

NELSON

Deputy Commander for Fleet Readiness and Support

Copy to: NAVMEDCOM NATCAPREG Bethesda, MD NAVENVIRHLTHCEN, (ATTN: LCDR Synder)



DEPARTMENT OF THE NAVY NAVAL MEDICAL COMMAND NATIONAL CAPITAL REGION BETHESDA, MARYLAND 20814

IN REPLY REFER TO

6471 37 09 February 1987

From: Commander

- To: Radiolsotope License Branch, Division of Fuel Cycle and Material Safety, Office for Material Safety and Safeguards, U.S. Nuclear Regulatory Committee, Washington, DC 20555
- Via: Commander, Naval Hedical Command (MEDCOM 212) Washington, DC 20372
- SUBJ: AMENDMENT REQUEST TO MATERIALS LICENSE 19-02891-05
- Ref: {a} Minutes of Radiation Safety Committee NMCNCR dated 10 DEC 86

Encl: {L} NMRI |tr Ser IDL/TDL/8180 dtd 05 FEB 87 .

1. Enclosure $\{1\}$ is a request for amendment of subject license to allow the use of radioisotopes in leased laboratory space off the NMCNCR grounds. The Radiation Safety Committee has approved it by reference $\{a\}$. The committee also considers that this requires an amendment to the license.

2. Enclosure {1} is forwarded requesting an amendment to subject license to allow the use of radiolsotopes by NMCNCR in rental spaces located at 12300 Washington Ave., Rockville, MD.

y direction



DEPARTMENT OF THE NAVY

NAVAL MEDICAL RESEARCH INSTITUTE NAVAL MEDICAL COMMAND, NATIONAL CAPITAL REGION

BETHESDA, MD 20814-5055

IN REPLY REFER TO

5100 Ser ID1/8183

5 FEB 1987

- Subj: AMENDMENT TO RADIOACTIVE ISOTOPE LICENSE #19-02891-05
- Ref: (a) Title 10 Code of Federal Regulations, Part 35
 (b) NMCNCRINST 6470.1A
 (c) NMRIINST 6470.1G
- Encl: (1) Updated Authorized User Forms
 - Radioactive Material Control at 12300 Washington Avenue, Rockville, Maryland (hereafter referred to as leased spaces)
 - (3) Floor plan of leased spaces
 - (4) Memo of 14 Oct 86 designating LT D. Martin as NMRI Radiation Safety Officer responsible for leased spaces
 - (5) Free Release Procedures

1. In accordance with references (a) through (c), an amendment to Naval Medical Command National Capital Region (NMCNCR) License #19-02891-05 Condition 10A is requested to include spaces leased by the Infectious Diseases Department (IDD), Naval Medical Research Institute (NMRI) located at 12300 Washington Avenue, Rockville, Maryland.

2. Approximately 40 individuals from IDD will relocate from NMRI to leased spaces in Rockville due to renovations scheduled for the 3rd floor of NMRI. Research and development efforts in leased spaces in Rockville include investigators and technicians from the Malaria Divison, the Biotechnology Division and the Enterics Division. Efforts are focused on development of rapid methods for field diagnosis of infectious agents and vaccine development for infectious agents of military relevance.

3. Enclosure (1) contains updated Authorized User Forms and enclosure (2) forwards information concerning proposed isotope delivery, control, and disposal of radioactive waste materials as well as facility radiation safety considerations.

4. Enclosure (3) is a floor plan of the 1st and 2nd floors of the leased spaces. Spaces where radioactive materials will be utilized are designated as Laboratories, 1, 2, 4, and 8.

5. Enclosure (4) designates LT D. Martin, the NMRI Radiation Safety Officer, as responsible for radiation safety at the Rockville facilities.

Subj: AMENDMENT TO RADIOACTIVE ISOTOPE LICENSE #19-02891-05

6. Enclosure (5) provides information for methods to be utilized in free releasing both the NMRI spaces being vacated and the leased spaces upon expiration of the lease.

7. This amendment specifically addresses a change in location for several members of our department. Protocols will not require modification and usage of radioactive material will not be increased. All radiation safety aspects of the move and location have been thoroughly reviewed and approved by the NMCNCR Radiation Safety Committee.

NMCNCR(059) 6470/124 (3/81

1.	Authorized User:		Isotope Control Person:
	name: Bourgeois, August L.		name: Bourgeois, August L.
	phone: 295-0004 Training date: Dec, 1984		phone: 295-0004

3. Supervised Users:

name	training date	name	training date
LT D. Burr LT J. Oprandy	Mar 86 Apr 86		

4. Persons authorized to pick up radioisotopes: Bourgeois, A. L. Burr, D. Oprandy, J.
5. Authorized for iodinations? <u>NO</u> YES, give name, bldg/room Authorized to use isotopes in animals? <u>NO</u> YES, give species/isotope

6. List of authorized protocols

³H NMRI: MLM: db 6470 dtd 4 Jan 83
¹⁴C NMRI: MLM: db 6470 dtd 4 Jan 83
³²P NMRI: MLM: db 6470 dtd 4 Jan 83
¹²⁵I NMRI: MLM: db 6470 dtd 4 Jan 83
⁵S NMRI: MLM: db 6470 dtd 4 Jan 83

Authorization limits		8. Authorized bldg/room numbers:
isotope	max. mCi	12300 Washington Avenue Rockville, Maryland 20850
З _Н	50	
¹⁴ c	15	Lab #1, 2nd Floor
32 _P	10	
125 _I	0.500	
35 ₅	10.	

NMCNCK(059) 6470/124 (3/81

1. Authorized User: name: Patricia Guerry-Kopecko phone: 295-0315 Training date: May, 1986
2. Isotope Control Person: name: Patricia Guerry-Kopecko phone: 295-0315

3. Supervised Users:

name	training date	name	training date
O. Majam M. Buesing G. Long J. Campbell	13 Dec 84, 6 May 86 10 Jul 85 (USUHS); 6 19 Jun 86 Aug 86	May 86	

4. Persons authorized	to pick up	radi	loisotopes:				
P. Guerry-Kopecko O. Majam			Buesing Long	J.	Campbell	-	

5. Authorized for iodinations? NO YES, give name, bldg/room

Authorized to use isotopes in animals? NO YES, give species/isotope

6. List of authorized protocols

Ref: a) CO, NMRI 1tr 6470 OHSB/MC dtd Sept 10, 1984

- b) Commander, NMCNCR ltr 6470 37 dtd Sept 25, 1984
 - 1. Enzymatic labelling of nucleic acids
 - 2. Labelling of proteins in vitro and in vivo in bacteria
 - 3. Antigen detection
 - 4. Metabolic labelling of malaria parasites in vitro

7. Authorization limits

isotope	max. mCi
32 _P	18
³⁵ s	14
³ H ⁻	10
125 ₇	1.

8. Authorized bldg/room numbers:

12300 Washington Avenue Rockville, Maryland 20850

Lab #2, 2nd Floor

NMCNCK(059) 6470/124 (3/83)

...

1.	Authorized Usor:	ż.	Isotope Control Person:
	name: Pavlovskis, Olgerts R.		name: Pavlovskis, Olgerts R.
	phone: 295-4642	1	phone: 295-4642
	Training date: July, 1986		

. ′

3. Supervised Users:

name	training date	name	training date
Donna Sieckmann Edward Benigno	Nov 85 Nov 85		

4.	Persons authorized to pick up radioisotopes:
	Donna Sieckmann Edward Benigno Olgerts Pavlovskis
· 5,	Authorized for iodinations? XVX YES, give name, bldg/room O. Pavlovskis, D. Sieckmann, E. Benigno: 17A-326; 18-231 Authorized to use isotopes in animals? XQx YES, give species/isotope

D.	Sieckmann,	Ε.	Benigno:	125 _I	mice.	Bldq	17-34
----	------------	----	----------	------------------	-------	------	-------

List of authorized protocols 6.

1.

Dr. O. R. Pavlovskis, letter dtd 9 Jul 82 NMRI ID-4DG; db, 6470 dtd 12 July 82 O. R. Pavlovskis, letter dtd 26 Mar 85 2.

3.

7. Authorizati	lon limits	8. Authorized bldg/room numbers:
isotope 14 _C 35 _S	<u>max. mCi</u> 15	12300 Washington Avenue Rockville, Maryland 20850 Lab #1, 2nd Floor
3 _H 125 _I 59 _{Fe}	30 60 20	Naval Medical Research Institute Building 17A, Rooms 34 and 38
re	5	Enclosure (1)

NMCNCK(059) 6470/124 (3/83)

1.	Authorized User:	2.	Isotope	Control Person:
	name: YUAN, L.		name:	YUAN, L.
	phone: 295-1445 Training: Mar, 1984		phone:	295-1445

3. Supervised Users:

name	training	date	name	training	date
Leef, M. I Rogers, P. Sedegah, I	L. Sep 8	3			

Persons authorized to pick up radioisotopes: 4. Yuan, L. Leef, M. F. Authorized for iodinations? NO YES, give name, bldg/room 5. Authorized to use isotopes in animals? NO YES, give species/isotope Mice/Cr51 Mosquitoes H3 List of authorized protocols 6. NMRI-OHO-ARP-1s, 6470, dtd 14 Dec 79 NMRI-ID3-JV-bl, 6470, dtd 18 Aug 81 NMRI-ID3-JV-bl, 6470, dtd 28 May 81

7. Authorization limits	8. Authorized bldg/room numbers:				
isotopemax.mCiH-3100.0C-1410.0P-3210.0Cr-5110.0I-12520.0S-355.0	12300 Washington Avenue Rockville, Maryland 20850 Labs #4 and #8, lst Floor Lab #2, 2nd Floor				

RADIOACTIVE MATERIAL CONTROL FOR 12300 WASHINGTON AVENUE, ROCKVILLE, MD

1. DELIVERY OF RADIOACTIVE MATERIALS

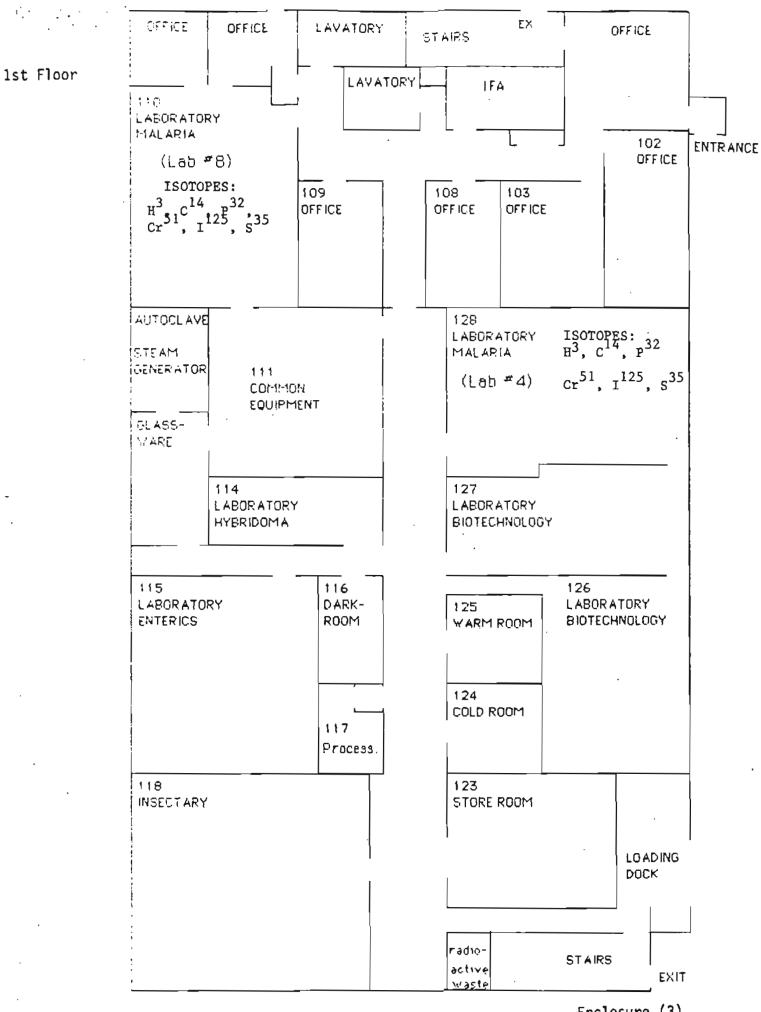
- a. Direct delivery of radioactive materials to 12300 Washington Ave., Rockville, MD, will be arranged on a contract basis.
- b. Materials will be received, inventoried, and quality controlled in accordance with references (b) and (c).
- c. A primary individual and an alternate individual from IDD will be designed as IDD Radiation Control Inventory Officers. These individuals will be responsible for receiving materials and maintaining the logs and inventories necessary to account for all radioactive materials in accordance with references (b) and (c). The NMRI Radiation Safety Officer will provide guidance and training to ensure compliance with all applicable references.

2. QUALITY CONTROL OF FACILITIES

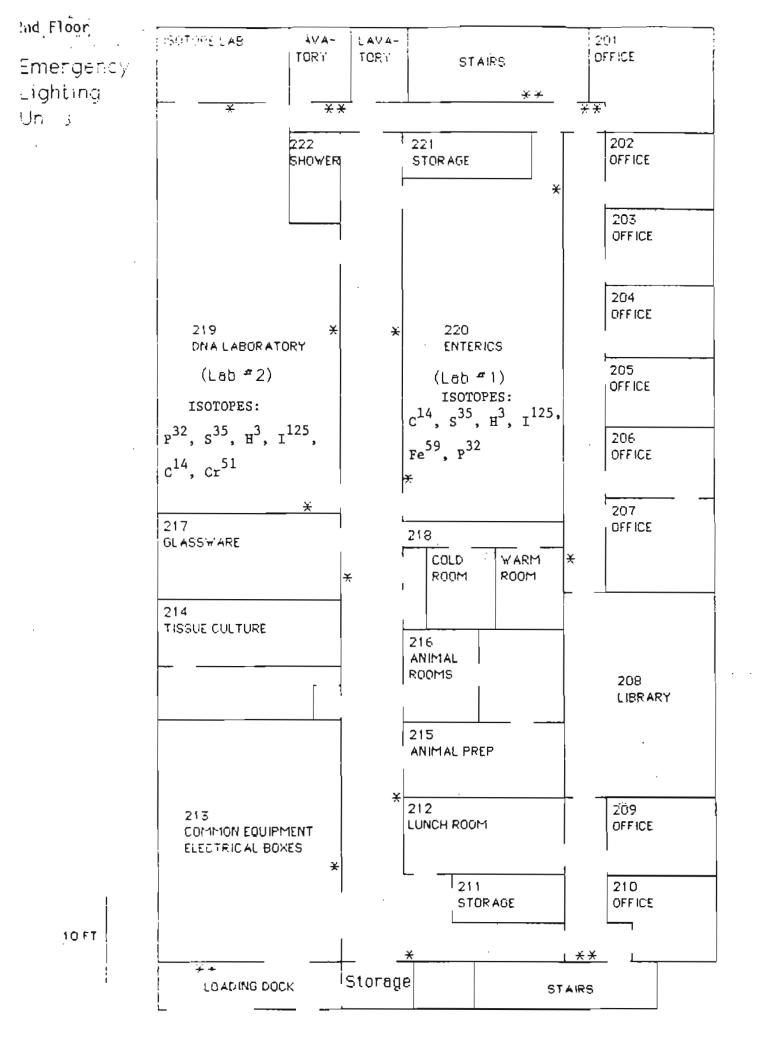
- a. Periodic quality control checks will be made by the IDD Radiation Control Inventory Officer and the IDD Radiation Safety Officer to ensure compliance with references (b) and (c).
- Quality control checks will be conducted on a monthly basis by the NMRI Radiation Safety Officer to ensure IDD compliance with references

 (a) through (c). Type III badge exchange will occur at this time.
 Finger ring change over will also be available.
- c. Chemical hoods will be certified by NMRI Radiation Safety Officer. Biological hoods will be certified by licensed agent.
- d. Spill kits and iodination kits will be provided by NMRI Radiation Safety Officer.
- e. NMRI Radiation Safety Officer will provide protocols for transport of radioactive materials and waste between the first and second floor as well as other protocols which may be necessary to address issues unique to the facilities at 12300 Washington Avenue.
- 3. DISPOSAL OF RADIOACTIVE WASTE MATERIALS
 - a. Responsibility for proper disposal of radioactive waste materials will rest with the IDD Radiation Inventory Control Officer. He/she will ensure that waste materials are logged, separated, and disposed/decayed in accordance with references (b) and (c).
 - b. Guidance and training in the proper disposal of waste material will be provided by the NMRI Radiation Safety Officer and references (b) and (c). NMRI Radiation Safety Officer will provide access to storage/decay barrels. Waste materials will be stored on-site until removal by a licensed contractor in a limited access facility which is secured with a lock and hasp. The key to the lock will be in the possession of the IDD Radiation Safety Officer.

- c. Upon request, the NMRI Radiation Safety Officer will arrange for a licensed contractor to remove radioactive waste materials.
- d. A locked-limited access room will be provided for storage of radioactive waste. The specifications for this room will be defined by the NMRI Radiation Safety Officer.



Enclosure (3)





DEPARTMENT OF THE NAVY N° VAL MEDICAL RESEARCH INSTIT NAVAL MELICAL COMMAND, NATIONAL CAPI , AL REGION BETHEEDA, HD. 20014-5053

IN REPLY REPER TO

5100 Ser ID1/8143 14 OCT 1986

MEHORANDUM

From: Commanding Officer, Naval Medical Research Institute To: LT Martin, NMRI Radiation Safety Officer

- SUBJ: CONTROL OF RADIOACTIVE MATERIALS IN LEASED SPACES (12300 WASHINGTON AVENUE, ROCKVILLE, MD)
- Ref: (a) IDD request for designation of NMRI Radiation Safety Officer of 3 Oct 86
 - (b) Memo 5420 A0 of 29 Jul 86

1. Per references (a) and (b), you are hereby designated as NMRI Radiation Safety Officer responsible for leased spaces in Rockville, MD. Your responsibilities and duties will remain the same as for the Infectious Diseases Department (IDD) spaces located at NMRI. IDD points of contact will be:

General information and coordination: LT Sherry White IDD Radiation Safety Officer: LT Sarah Kirtland Alternate, IDD Radiation Safety Officer: Hr. David Rollins IDD Radiation Control Inventory Officer: LT Sarah Kirtland Alternate, IDD Radiation Control Inventory Officer: Mr. David Rollins

SORENSER

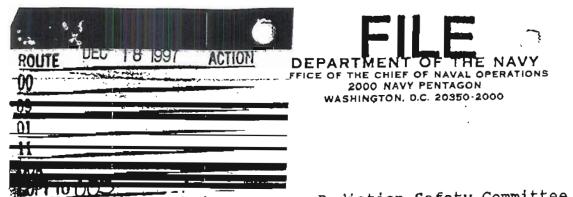
Copy to: LT White LT Kirtland Mr. Rollins Research Support Department

NOTE: LT KIRTLAND WAS UNEXPECTEDLY TRANSFERRED FROM NMRI AFTER THE DATE OF THIS LETTER. HER DUTIES WERE ASSUMED BY LT J. OPRANDY.

Stractin LT MSC USNE

(Enel 4)

D-02 NMRC NRMP Information - Bone Marrow Registry Program at the Nicholson Building



IN REPLY REFER TO 6470 Ser N455C/7U5953 15 Dec 97

From: Chairman, Lavy Radiation Safety Committee To: Commanding Officer, Naval Medical Research Institute, 8901 Wisconsin Avenue, Bethesda, MD 20889-5607

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) RENEWAL

Ref: (a) Your 1tr 6470 Ser 09A/35818 of 11 Mar 97 (b) Your 1tr 6470 Ser 09A/35524 of 5 Dec 96

Encl: (1) NRMP Number 19-64223-41NP

1. As requested by reference (a), your NRMP Number 19-64223-41NP has been renewed, with a new expiration date of 31 December 2002.

2. The following revisions are made to your permit by this renewal:

a. Based on statements contained in references (a) and (b), you are authorized to possess and use radioactive materials authorized by this NRMP for in-vitro laboratory research in Room 337, Nicholson Research Building A, 5516 Nicholson Lane, Kensington, Maryland 20895.

b. Permit Condition 13 revises the radiation safety staff members resposible for supervising use of the gamma irradiators.

c. Permit Condition 19 is added to stipulate that experimental animals administered radioactive materials shall not be used for human consumption.

d. Permit Condition 21 is revised to authorize disposal of radioactive material with a physical half-life of less than 100 days by decay-in-storage.

e. This NRMP renewal deletes the previous authorization to dispose of iodine-125 waste by decay-in-storage for five halflives. That authorization has been determined to be inconsistent with current Nuclear Regulatory Commission policies. Therefore, all waste being disposed of by decay-in-storage procedures must be held for a minimum of ten half-lives.

f. Permit Condition 23 is added to require a six month physical inventory of all radioactive sources, sealed and unsealed.

FILE

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) RENEWAL

g. Permit Condition 24 is added to require the Radiation Safety Officer or qualified designee to approve all transfers of radioactive material.

3. I am forwarding enclosure (1) as your new authorization for the use of radioactive material. Please review the enclosed NRMP carefully and be sure that you understand all conditions. For additional information, please contact Paul Tveten, Navy Environmental Health Center, at (757)363-5584, DSN 864-5584, Fax (757)444-3672, or E-mail at tvetenp@nehc.med.navy.mil.

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Blake

P. K. BLAKE By direction

copy to: BUMED (MED-211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA



DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH INSTITUTE NATIONAL NAVAL MEDICAL CENTER 8901 WISCONSIN AVENUE BETHESDA, MARYLAND 20889-5607

> 6470 ^{IN REPLY REFER TO:} Ser 09A/35534 JAN 17 1997

- From: Commanding Officer, Naval Medical Research Institute, 8901 Wisconsin Avenue, Bethesda, MD 20889-5607
- To: Commanding Officer, Navy Environmental Health Center (Code NEHC OMPDT), 2510 Walmer Avenue, Norfolk, VA 23513-2617
- Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL
- Ref: (a) Paul Tveten, NEHC memorandum of 26 Dec 96

Encl: (1) Additional information for subject amendment request

1. Per reference (a), additional information is provided as enclosure (1) to support the request to amend our NRMP to add the Nicholson Building as a location of use of radioactive materials.

2. If additional information is required, my point of contact is LCDR S. L. Gaiter, MSC, USN, who can be reached on DSN 295-0002, or commercial (301) 295-0002.

2.1

1. In support of the requested amendment to our NRMP for authorized use of radioactive materials by the NMRI Bone Marrow Registry Program for non-human medical research protocols at the Nicholson Research Building in Kensington, Maryland, the following additional information concerning the facilities and intended use is provided as required so that you can complete the review of the amendment request.

a. Please describe the use and control of the Nicholson Building. Is this leased space? Does NMRI occupy the entire building? If not, what is the use of the rest of it?

RESPONSE: The NMRI Bone Marrow Registry Program (BMRP) will occupy leased space at 5516 Nicholson Lane in the Nicholson Research Center Project. The Project is located at 5501-5516 Nicholson Lane in Kensington, Montgomery County, Maryland in an urban commercial area, and the general vicinity of the Project consists of retail malls, an automobile mall, and Montgomery County Metrobus Garage (parking). The Project consists of 4.4507 acres of land. Project improvements consist of two structures (built in three phrases), one ancillary building utilized for a storage shed, and the remaining land in macadam and landscaping. The Project is currently utilized as a research facility. The current tenants are the NMRI Bone Marrow Registry Program, Corbel Corporation, NCI Biomarkers & Prevention Research Branch, TSI Washington Laboratories, Advance Bioscience Laboratories, Inc., and U. S. Public Health Service Food & Drug Administration.

Structural components of the building consist of concrete block foundations, metal stud interior framing, concrete block with brick veneer perimeter walls, and concrete floor decks. The Project utilizes flat-style roofs. Roofing materials consist of rubber membranes. The Project is serviced by public water and sanitary sewer systems. Building B-1 of the Project was built in 1965, Building B-2 in 1967, Building A in 1974, and Building C in 1973 with several modifications including, but not necessarily limited to, a complete renovation of Building B-1 and B-2 in 1988 and retrofitting tenant laboratory needs. During the renovation in 1988 of Building B-1, two wastewater treatment tanks and an on-site incinerator were removed from the Project.

The NMRI BMRP occupies the third and fourth floors of Building A. Building A is not open to public access; onboard security personnel restrict access to the building and permit only authorized personnel to enter; security badges are required; visitors must log in at front desk and be escorted during their visit in the Nicholson Building.

Enclosure (1)

1

Tab A provides photographic records of Building A (the main building) and the storage shed where low-level radioactive materials are stored for the other tenants. Also included in Tab A is a site diagram of the Project and surrounding businesses and current land use. The source of the photographic records and supporting documentation of the Project is the Phase I, Environmental Site Assessment of Nicholson Research Park, 5501-5516 Nicholson Lane, Kensington, Maryland; EMG Project Number: 00510001.95B; date of report: June 19, 1995; prepared by EMG, EMG Corporate Center, 11011 McCormick Drive, Baltimore, Maryland 21031, (410) 785-6200, (410) 785-6220 (fax); prepared for Signet Bank, 7 St. Paul Street, Mail Code 22001-0605, Baltimore, Maryland 21201, Mr. Richard McCarter.

b. You stated that radioisotopes have been used by other non-Navy groups in the building, although none are being used presently. Was that use in the areas currently being occupied by NMRI, in the spaces where you intend to use radioactive material? If so, who was the user and do you have any information concerning decommissioning surveys and release of the spaces? You want to be sure that the laboratories do not have residual contamination for which you are now going to be responsible.

RESPONSE: There is currently at least one other non-Navy group in the Project that is using radioactive materials. Radioactive materials are used in research and development at Advanced BioScience Laboratory. Small quantities are used in the biological studies. Advanced BioScience is licensed (License # MD 3124701) to utilize radioactive materials with the State of Maryland. A point of contact for Advanced BioScience Laboratories is Ken Mann, Facilities Manager, 5510 Nicholson Lane, Kensington, Maryland 20895-1078, (301) 881-5600, (301) 984-3608 (fax).

Tab B provides a copy of license # MD 3124701 and an attachment describing interim storage plans and waste disposal information.

There was use of radioactive materials in the areas currently being occupied by the NMRI BMRP. The user was a former tenant, Litton Bionetics. The areas previously used for radiation work have been identified as the following Building A rooms and laboratories: 302, 303, 304, 336, 337, and 338. The NMRI BMRP will utilize radioactive materials in room 337. No specific

decommissioning data is readily available. The Phase I Environmental Site Assessment of the Nicholson Research Park (June 1995) revealed acceptable results for the assessment components of hazardous materials (low-level radioactive materials and spent chemicals) and waste generation [and disposal].

The NMRI Radiation Safety Officer conducted a confirmatory radiological survey on 13 January 1997 of the Building A laboratories listed above. As per NUREG/CR-5849 (12/93), a confirmatory survey is performed to confirm the adequacy and accuracy of the licensee's final status survey. The confirmatory survey develops radiological data of the same type as that performed by the licensee, but is usually limited in scope to spot-checking conditions of selected site locations. Although the scope may vary, a confirmatory survey typically addresses 1 to 10 percent of the site, but may be extended if questions or anomalies develop or are identified. The confirmatory survey involved performing measurements at select locations in the laboratories. These laboratories were currently being used to temporarily store or stage equipment, supplies and materials to support NMRI BMRP's move into the Nicholson building. The radioisotopes of interest were H-3, C-14, P-32, S-35, Cr-51, and I-125. The confirmatory survey revealed no residual radioactive contamination in the locations examined. Portable equipment and a liquid scintillation counter (LSC) were used to evaluate the radiological status of the selected areas.

A portable radiation detection meter was utilized to perform cursory surveys of the Building A laboratories listed above and adjacent hallways. All meter readings taken in the identified rooms were at background radiation levels. The portable meter information is as follows: Ludlum Model 3, serial number 132946; calibrated by RSO, Inc., Laurel, Maryland, (301) 953-2482; calibrated on 10/22/96; calibration efficiencies: C-14, 6%; P-32, 26%; S-35, 6%; Cr-51, 1%; and, I-125, 24%.

Radiological swipes were performed in select areas in each of the identified Building A laboratories. The swipe results revealed no residual radioactive contamination. Tab C provides a summary of the LSC swipe locations and results. The liquid scintillation counter information is as follows: Packard Tricarb 2500 TR, serial number 403848; calibrated by Packard Instruments, Inc. on 5/24/96; calibration efficiencies: H-3, 63% (background at 12 dpm); and C-14, 96% (background at 16 dpm).

c. Please describe the facilities and equipment (e.g., storage containers, shielding, fume hoods) to be made available at each location where radioactive material is used. Submit a description of the areas assigned for the receipt, storage, preparation, and measurement of licensed materials. Submit a diagram showing the locations of shielding, the proximity of radiation sources to unrestricted areas, and other items related to radiation safety. Diagrams should be drawn to scale, or dimensions should be indicated.

RESPONSE: The NMRI BMRP will utilize radioactive materials at Building A in laboratory 337. Radioisotope orders for use at the Nicholson building will be received and checked in by the NMRI Radiation Safety Office. After successful receipt of radioactive materials (RAM), the RAM will be delivered to authorized personnel at the Nicholson building.

The Nicholson laboratory (#337) will be equipped with a centrifuge, refrigerator/freezer unit(s), a biosafety hood/cabinet, and sufficient counter/cabinet space. The portable leaded shields will be provided for use in conjunction with the fume hood. Vials of chromium-51 will be stored in a secure, leaded container that will sufficiently attenuate the gamma radiation to background levels. Segregated low-activity radioactive liquid and solid wastes will be generated at the hood and stored in remote areas of the laboratories until staged for disposal. Millicurie quantities of tritium and chromium-51 will be used in accordance with approved protocols. The proximity of the radioactive materials to unrestricted areas can not result in non-radiation workers receiving a dose that exceeds regulatory limits.

Tab D provides a diagram that depicts the laboratory layout in which radioactive materials will be used at the Nicholson Building by the NMRI BMRP. This diagram also shows the proximity of radiation sources to unrestricted areas and other items related to radiation safety.

Calibrated portable radiation detection equipment will be provided to radioisotope users at the Nicholson building. If a liquid scintillation counter is not readily available for the analysis of swipes for tritium monitoring, the NMRI Radiation safety Office will perform the counting for the researchers at the Nicholson building.

d. Will radioactive material be used in animals at the Nicholson Building? If so, please submit a description of the animal housing facilities, and procedures provided to animal caretakers for the handling of animals, animal waste carcasses, and cleaning and decontamination of animal cages.

RESPONSE: Radioactive materials will not be used in animals at the Nicholson Building.

e. Do you plan to relocate any of your cesium-137 gamma irradiators to the Nicholson Building?

RESPONSE: NMRI will not relocate any of its cesium-137 gamma irradiators to the Nicholson Building.

f. Please describe your procedures for handling radioactive waste at the Nicholson Building. Will liquid wastes be released to the sanitary sewer? If so, indicate on the lab diagrams the location of disposal sinks and describe the route of the drain run to the sewer system. Particularly for joint occupancy buildings, you need to know where your radioactive disposal drains go. Please describe the facility for storage of waste being held for decay-in-storage or being held for shipment.

RESPONSE: Quantities of both liquid and solid radioactive wastes will be generated at the Nicholson Building. No radioactive wastes will be disposed at the Nicholson Building.

All radioactive wastes (solids and liquids) will be properly packaged or containerized and transported by government vehicle in accordance with environmental regulations to the NMRI storage facility at the NNMC complex.

Solid radioactive materials with half-lives of 65 days or less will be held for decay-in-storage at NMRI and subsequently monitored before disposal as biohazardous waste by a commercial contractor. Solid wastes containing longer-lived radioisotopes will be properly packaged and further transported to the NNMC for proper disposal.

All liquid radioactive wastes will be collected and transported to NMRI at the NNMC complex for disposal into the sanitary sewer in accordance with current procedures to ensure appropriate documentation and strict environmental compliance.

TABS

- A: Photographic Records of the Nicholson Building A and storage shed
- B: Site Diagram of the Nicholson Project and surrounding land use
- C: State of Maryland Radioactive Material License # MD 3124701, Advanced BioScience Laboratories
- D: Summary of Confirmatory Radiological Survey (Swipe Locations and Results)
- E: Diagram of Nicholson Laboratory #337

- Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL
- TAB A: Photographic Records of the Nicholson Building A and storage shed

Enclosure (1)

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PHOTOGRAPHIC RECORD

Project No.: 00510001.95B

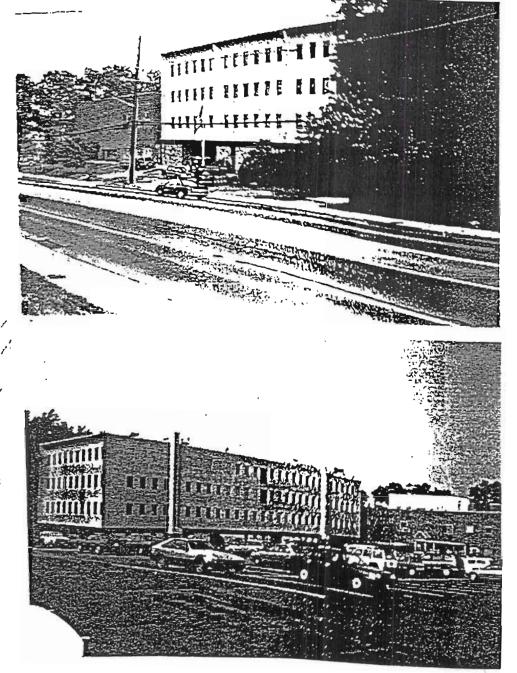
Project Name: Commercial Park

Photo No: 1

Description: Front of building — main entrance

Photo No: 2

Description: Back entrance - rear of Building A



-EPICLIETERS EMG CORPORATE CENTER 11011 MECORMICK ORIVE BALTMORE, MARYLAND 2122 CV. 121460, FAX 410 785 6220 BALTIMORE + ATLANTA + BOSTON + CHICAGO + CALLES + DENVER + 45 ALLE + MALALES MILWAUKEE + MINNEAPOLIS + NEW YORK + PHOENX + SAN FRANCISCO + SLUTT + MALALES BALTIMORE + MINNEAPOLIS + NEW YORK + PHOENX + SAN FRANCISCO + SLUTT + MALALES Enclosure (1)





PHOTOGRAPHIC RECORD

Project No.: 00510001.95B

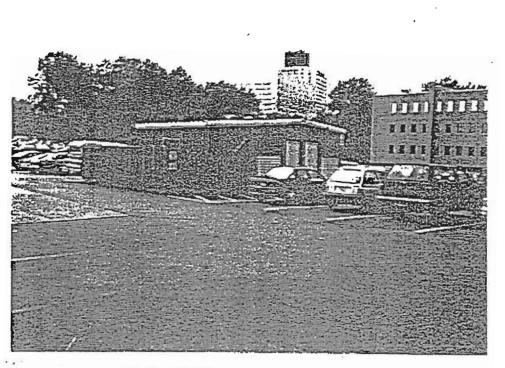
Project Name: Commercial Park

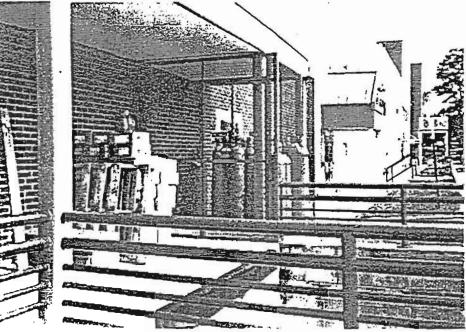
Photo No: 11

Description: Storage shed where low level radiation is stored

Photo No: 12

Description: Fencing in area for storage of ASTs.





TRAL ARTERS STUG CORPORATE DEVICER MODIL MECORMUCK DHUE SALTMORE, MARYLAND 20031 BOD 733 D660 FAX 410 785 6220 BALTMORE + LTLANTA + EDBION + DHUD20 + DALLAS + DENVER + LAS LEDAS + LOS ANGELES MUNALTEE + MINISTERCUS + NEW YORK - EHDENY + SAN FRANC SEC + SELÉTLE + WASHINGTON 10

TAB B: Site Diagram of the Nicholson Project and surrounding land use

. No: 0051000	01.95B	Name: NKHO	SON RESE	With CENTER	- Date: 6/7/95
	Noland Plump	1 1 1	{		
Jiffy				MetroBus	Garage
		Nicholson Lan	e	_	
		Iding A			
			Building	-	
	Nicholson Res		B-2-B	Road	
	р		 89		Retail Mall
	Road	12	Building	Access	
	JJnH		i	Flint	
			C	White F	
itzgerald			Building	<u> </u>	
Mall Office					
	Tyler & Asso				
······		White Flint Acc	ess Road		
		White Fl	int Mall		· · · · · · · · · · · · · · · · · · ·

Identify location of huildings, structures, adjacent properties, street names, property boundaries and easements.

Key:

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- 2. UST
- 3. AST
- 4. Spills, releases, stressed vegetation •
- 5. Dumping/fill area 6.

Transformers

- Septic tank, lift station 7.
- Well
- 8. Powerline, rail line, pipe line 9.
- Controlled waste storage 10.
- Wetlands/flood plain 11. Other AUXILORY GENERATOR
 - 12

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Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL

TAB C: State of Maryland Radioactive Material License # MD 3124701, Advanced BioScience Laboratories

Enclosure (1)

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Page 1 of ____ pages

Pursuant to the Maryland Radiation Act, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. This license is subject to all applicable rules, regulations and orders of the Maryland State Department of the Environment, now or hereinafter in effect and to any conditions specified below.

1. Name	LICENSEE Advanceò BioScience Iaboratories,		3. License No. Inc.	MD-31-247-01
	5510-C Nicholson Lane Kensington, Maryland	20895-1078	4. Amendment No.	NEW
2. Address	•		5. Expiration Date	June 30, 2000
6. Radioact (ber)	tive material (element and mass	7. Chemica	l and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Hydro	xgen-3	A. Any		A. 500 millicuries
B. Carbon-14		B. Any		B. 50 millicuries
C. Phos	chorus-32	C. Any		C. 25 millicuries
D. Sulfu	ur-35	D. Any		D. 100 millicuries
E. Chromium-51		E. Any		E. 50 millicuries
F. Iodine-125		F. Any		F. 50 milicuries
G. Iodine-131		G) Any		G. 35 millicuries

9. Authorized Use

A-G. For use in <u>in vitro</u> research and development procedures. No animal or human use authorized.

H, K, N. For use in Tricarb model 1900A gas chromatograph.

I, L, Q. For use in Beckman model 5000 TD scintillation counter.

J For use in IKB Rack-Beta model 1218 liquid scintillation counter.

M. For use in Beckman model 1277 Gamma Master counter.



Page ____ of ____ pages

Supplementary Sheet

- Li	cense No. MD-31-	-247-01	Amendr	nent No. NEW	
_	Radicactive materia (element and mass number)	l 7. Chemical form	and/or physical	8. Maximum amount o which licensee m one time	f radioactivity my possess at any
н.	Hydrogen-3	H. Sealed sour	rca (Packard)	H. No source to exceed	d 0.2 microcuries
I.	Hydrogen-3	I. Sealed sour	rce (Beckman)	I. No source to exceed	3 0.05 microcuries
J.	Carbon-14	J. Sealed sou	rce (LKB)	J. No source to exceed	1 0.05 microcuries
к.	Carbon-14	K. Sealed sou	urce (Packard)	K. No source to exce	ed 0.1 microcuries
L.	Carbon-14	L. Sealed so	urce (Beckman)	L. No source to exce	ed 0.1 microcuries
м.	Icline-129	M Sealed sour	ce (LKB)	M. No source to excee	d 0.03 microcuries
N.	Barium-133	N. Sealed sou	rce (Packard)	N. No source to excee	d 18.8 microcuries
о.	Barium-133	0. Sealed so	urce (Packard)	0. No source to exc	eed 20 microcuries
P.	Cesium-137	P. Sealed so	urce (Beckman)	P. No source to exc	eed 30 microcuries
Q.	Cesium-137	Q. Sealed so	ource (Beckman)	Q. No source to exc	eed 40 microcuries
R.	Radium-226	R. Sealed so	ource (LKB)	R. No source to exc	eed 10 microcuries

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FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date .

RADIOLOGICAL HEALTH PROGRAM MANAGER II

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MDER-L1 (supp) (11/90)

– Enclosure (Í)



Page ____3 of ___6 pages

Supplementary Sheet

License No. MC	-31-247-01	j Amendme	nt No.	NEW
6. Radioactive mat (element and ma number)	erial 7. Chemical a ss form	and/or physical	8.	Maximum amount of radioactivity which licensee may possess at ar one time as interim storage
S. Hydrogen-3	S. Any		s.	50 millicuries
T. Carbon-14	T. Any		T.	0.005 millicuries
6. Radioactive mat (element and ma number)	erial 7. Chemical a ss form	and/or physical	8.	Maximum amount of radioactivity which licensee may possess at an one time for decay in storage
1. Phosphorus-32	U. Any		U.	5 millicuries
v. Sulfur-35	V. Any		v.	37 millicuries
W. Chromium-51	W. Any		₩.	60 millicuries
X. Iodine-125	X. Any		х.	150 millicuries
Y. Iodine-131	Y. Any		¥.	5 millicuries
	ard model 1500 Trica	-		
R. For use in LKB	nodel 1214 Rack-Beta	a Flexivial liqu	uid sc	intillation counter.
S&T. For in	terim storage prior	to burial.		
Uto Y. For de	ecay to background p	rior to disposal		
		FOR THE MARY	YLAND	DEPARTMENT OF THE ENVIRONMENT

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Enclosue (1)

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State of Maryland

Page _____ of ____ pages

Supplementary Sheet

License No.	MD-31-247-01		Amendment No.	NEW	
		A			

CONDITIONS

- 10. The authorized place of use is the licensee's address stated in Item 2. The licensee must notify the Radiological Health Program 30 days prior to vacating a permanent use address as is required by Section D.407 of COMAR 26.12.01.01.
- 11A. The radiation protection program shall be under the supervision of Cheryl 5. Gardner assisted by Nancy Karaszkiewicz.
- 11B. Radioactive material shall be used by, or under the supervision of Cheryl S. Gardner, Nancy Karaszkiewicz, Tadeo Aoki, M.D., Ph.D., Anthony DeVico, Ph.D., V.S. Kalyramaraman, Ph.D., Philip Markham, Ph.D., Ranajit Pal, Ph.D., Joseph Romano, Ph.D., M.G. Sarngadharan, Ph.D. and/or Sue Tondreau.
- 1 The licensee shall comply with provisions of Part D, "Standards for Protection Against Radiation" and Part J, "Notices, Instructions and Reports to Workers; Inspections" of the Maryland Regulations 26.12.01.01 "Regulations for Control of Ionizing Radiation".
- 13. The licensee shall not use radioactive material in or on human beings or in field applications where activity is released except as provided otherwise by specific conditions of this license.
- 14. Radioactive material shall not be used in or on human beings or in products distributed to the public.
- 15. Individuals involved in operations which utilize at any one time, more than 100 millicuries of Hydrogen-3 in a noncontained form other than metallic foil, shall have bioassays performed within one week following a single operation and at weekly intervals for continuing operations.
 - (1) Tritium shall not be used in such a manner as to cause any individual to receive a radiation exposure such that urinary excretion rates exceed 28 microcuries of

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

RADIOLOGICAL HEALTH PROGRAM MANAGER II

Date _

MDER-L1 (supp) (11/90)

Enclosure (1)

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Page 5 of 6 pages

Supplementary Sheet

License No.	MD-31-247-01	}	Amendment No.	NEW	•	
					-	

CONDITIONS CONT'D

tritium per liter when averaged over a calendar guarter.

- (2) Urinalysis shall be performed at weekly intervals on all individuals who work in the restricted areas of facilities in which tritium is used. If the average concentration of tritium in urine for any single individual during a calendar quarter is less than 10 microcuries per liter, urinalysis may be performed on that individual at monthly intervals for the following calendar quarter and may continue at monthly intervals so long as the average concentration in the calendar quarter remains below 10 microcuries per liter. The urine specimen shall be collected on the same day of the week insofar as possible.
- (3) A report of an average concentration in excess of the limit specified in B(1) above for any individual shall be filed, in writing, within thirty (30) days of the end of the calendar quarter with the Administrator, Radiological Health Program, 2500 Broening Highway, Baltimore, Maryland 21224. The report shall contain the results of the urinalyses for the individual during the calendar quarter, the cause of the excessive concentrations, and the corrective steps to be taken or planned to assure against a recurrance.
- (4) Any single urinalysis which discloses a concentration of greater than 50 microcuries per liter shall be reported, in writing, within seven (7) days of the licensee's receipt of the results, to the Administrator, Radiological Health Program, 2500 Broening Highway, Baltimore, Maryland 21224.
- 16. Interim waste storage requires packaging in DOT approved containers suitable for disposal, quarterly inspection of storageareas, and disposal as soon as authorized disposal sites become available.
- 17. Interim waste storage plans may be changed only upon Agency approval. Such changes may include but are not limited to waste processing and handling procedures, relocation or

FOR THE MARYLAND DEPARTMENT OF THE ENVIRONMENT

Date _____

RADIOLOGICAL HEALTH PROGRAM MANAGER II

MDER-L1 (supp) (11/90)

Enclosure (1)

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Page		of	6	pages
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Supplementary Sheet

License No.	MD-31-247-01	Amendment No.	NEW
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CONDITIONS CONT'D

expansion of storage areas and possession limits or type of waste.

- 18. Long term interim storage, prior to disposal, shall be in accordance with USNRC Information Notice 90-09, "Extended Interim Storage of Low-Level Radioactive Waste by Fuel Cycle and Materials Licensees" dated February 5, 1990, submitted interim procedures and all applicable regulations.
- 19. Food and beverage containers shall not be discarded in radioactive or normal trash containers in licensee's areas utilizing radioactive materials.
- 20A. The licensee shall not make any false statement, representation, or certification in any application, record, report, plan, or other document regarding radiation levels, tests performed or radiation safety conditions or practices. Nor shall the licensee falsify, tamper with, or render inaccurate any monitoring device or method.
- 20B. Violation of any term, condition, or regulation could subject the licensee to administrative or civil penalty or criminal prosecution, as specified in Title 8, Radiation, of the Article Environment of the Annotated Code of Maryland.
- 21. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material authorized by this license in accordance with statements representations, and procedures contained in application dated March 13, 1995, and letter dated April 28, 1995. COMAR 26.12.01.01 "Regulations for Control of Ionizing Radiation" shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

FOR THE MARKAND DEPARTMENT OF THE ENVIRONMENT

RADIOLOGICAL HEALTH PROGRAM MANAGER II

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MDER-L1 (supp) (11/90)

19

Enclosure (1)

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ATTACHMENT 10

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ITEM 15: WASTE DISPOSAL COMPANIES

RSO, INC. P.O. BOX 1526 5204 MINNICK ROAD LAUREL, MD 20707

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(301) 953-2482

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Advanced Laboratories, Inc.

Interim Storage Plan

Identification of Waste to be Stored

Request for interim storage possession limit for the maximum amount of LLRW to be added as follows:

<u>Maximum LLRW</u>	Isotope, Activity, Volume, Physical Characteristics, Class, Type of Waste Processing, and any Radiological Properties
3H	50 mCi; twenty-five 7.5 cu. ft. drums; solid class-A waste utilizing volume reduction and compaction.
¹⁴ C	0.005 mCi; one 7.5 cu. ft. drum; solid class-A waste utilizing volume reduction.
³² P	5 mCi; two 7.5 cu. ft. drums; solid class-A waste utilizing volume reduction and decay-in-storage.
35S	37 mCi; thirty 7.5 cu. ft. drums; solid class-A waste utilizing volume reduction and decay-in-storage.
⁵¹ Cr	60 mCi; one 7.5 cu. ft. drums; solid class-A waste utilizing volume reduction and decay-in-storage.
1251	140 mCi; four 7.5 cu. ft. drums; solid class-A waste utilizing volume reduction and decay-in-storage.
1251	10 mCi; one 7.5 cu. ft. drum; liquid class-A utilizing volume reduction and decay-in-storage.
1 <u>3</u> 1]	5 mCi; one 7.5 cu. ft. drum; solid class-A waste utilizing volume reduction and decay-in-storage.

Currently, four 7.5 cu. ft. drums of LLRW are being stored or being held for decay-instorage. At this time, additional permits or approvals will not be necessary for the storage of Mixed Waste.

Plans for Final Disposal

Advanced BioSciencie Laboratories, Inc. will use the Pennsylvania A.C.U.R.I. LLRW disposal facility for ultimate disposal of our waste. The disposal facility is expected to begin accepting LLRW in 2005. Shipment of LLRW from our facility will begin as soon as the Pennsylvania disposal site is opened; however, the transferring of our waste will be dependent on our radioactive waste haulers' routing schedule.

Physical Description of Storage Area(s)

Advanced BioScience Laboratories, Inc. Storage Area: The maximum volume is 1,650 cu. ft. The maximum storage volume for interim storage is 514 cu. ft.. The storage room is located outside and constructed of an explosion proof material with a cement floor. Adjustable metal louvers for ventilation are located on two sides of the shed. Access to the area is controlled by the Facilities and Safety Department. The shed is secured by a metal door with a keyed dead bolt lock. The fire suppression system consists of an ABC fire extinguisher. The room and the storage containers will be subject to ambient temperatures ranging from -10°F to 110°F. If a container(s) becomes compromised, the contents of the container will either be transferred to another container or overpacked. Given the geographical location and past weather conditions for the Kensington area, risk from tornados, hurricanes, and floods are extremely unlikely. If in the event an industrial accident does occur, emergency procedures will be implemented according to our Contingency Plan.

Packaging and Integrity

7.5 cu. ft. drums, nalgene or nalgene type plastic containers will be used to store LLRW. The LLRW is innocuous to metal and plastic: therefore, the storage life of the containers is the same as the manufacture's warranty.

The LLRW will be surveyed for compromises in integrity on a weekly basis. Any compromised LLRW container will be repacked by the Safety Department or by a licensed outside contractor and recorded.

Radiation Protection

The LLRW storage area is posted in accordance with 10 CFR 20.203. Area and employee dosimetry monitoring are reviewed on a monthly basis and the storage rooms are swiped and recorded on a weekly basis.

Area monitoring exposures are expected to increase as the amount of stored LLRW increases; however, personnel exposures are not expected to change. If in the event personnel exposure rates do increase, ALARA principles will be updated.

In the event of an emergency, emergency procedures will be implemented according to our Contingency Plan.

Our radioactive inventory tracking system is based on assigned inventory record of use (IRU) numbers, isotope, and date of disposal. The LLRW is picked up, labeled, dated, and transferred to the storage area by the Radiation Safety Officer (RSO) or designate. Inventory records are kept on file in the Radiation Safety Lab.

Training

The RSO, designate, or licensed outside contractor is responsible for repacking, handling, placement, inspection, surveying, and emergency response for LLRW storage. Training for the RSO or designate has been successfully completed by an outside contractor.

Financial Assurance

Finance assurance is given for successful decommissioning our license operation, handling, transportation, and disposal of all LLRW stored on-site, if necessary.

Emergency Preparedness

Proposed maximum possession limits do not exceed specified limits in subsections 30.32(i)(1), 40.31(j)(1) or 70.22(i)(3); however, in the event of an emergency, our Contingency Plan will be implemented.

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Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL

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TAB D: Summary of Confirmatory Radiological Survey (Swipe Locations and Results) [SWIPE ACTION LEVEL: 900 DPM]

DATE	BUILDING / ROOM	SAMPLE NUMBER	H-3 DPM (BACKGROUND @ 22 DPM)	C-14 DPM (BACKGROUND @ 12 DPM)	LOCATION DESCRIPTION
1/13/97	A/302	1	30	21	FLOOR @ ENTRANCE
		2	13	12	SINK
		3	47	13	FLOOR @ SINK
		4	26	10	FLOOR @ BENCHES
	A/303	1	25	1'5	FLOOR @ ENTRANCE
		2	9	13	SINK
		3	25	12.	FLOOR @ SINK
	A/303A	1	23	11	FLOOR @ ENTRANCE
		2	19	13	FLOOR @ LEFT BENCH
		3	19	17	FLOOR @ RT BENCH
	A/304	1	51	17	FLOOR @ ENTRANCE
		2	27	18	FLOOR @ RIGHT WALL
		3	21	14	FLOOR @ L BENCHES
	<u> </u>	4	55	17	FLOOR @ L BENCHES
	A/336	1	39	. 14	FLOOR @ ENTRANCE
		2	21	26	SINK
		3	36	11	FLOOR @ SINK
		. 4	32	15	FLOOR @ BENCHES
	A/337	1	19	10	FLOOR @ ENTRANCE
		2	24	2	SINK
		3	35	10	FLOOR @ SINK
		4	34	14	FLOOR @ BENCHES
	338	1	12	15	FLOOR @ ENTRANCE
		2	34	5	SINK
		3	21	8	FLOOR @ SINK
-		4	26	20	FLOOR @ BENCHES

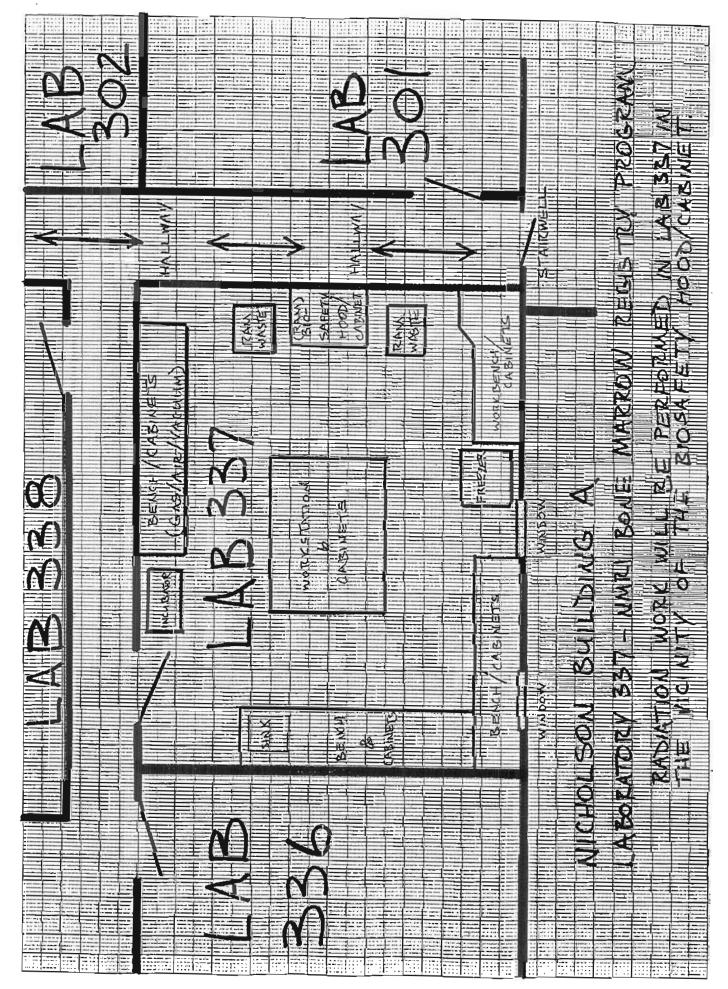
Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL

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TAB E: Diagram of Nicholson Laboratory #337

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26 December 1996

MEMORANDUM

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From: Paul Tveten, Navy Environmental Health Center To: LCDR S. L. Gaiter, MSC, USN, Radiation Safety Officer, Naval Medical Research Institute, Bethesda, MD

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL

Ref: (a) Your ltr 6470 Ser 09A/35524 of 5 Dec 96

1. In reference (a) you requested amendment of your NRMP to authorize use of radioactive materials by your Bone Marrow Registry Program for non-human medical research protocols at the Nicholson Research Building in Kensington, Maryland. Additional information concerning the facilities and intended use is required before we can complete review of the amendment request.

2. Please address the following items by command correspondence which will augment reference (a):

a. Please describe the use and control of the Nicholson Building. Is this leased space? Does NMRI occupy the entire building? If not, what is the use of the rest of it?

b. You stated that radioisotopes have been used by other non-Navy groups in the building, although none are being used presently. Was that use in the areas currently being occupied by NMRI, in the spaces where you intend to use radioactive material? If so, who was the user and do you have any information concerning decommissioning surveys and release of the spaces? You want to be sure that the laboratories do not have residual contamination for which you are now going to be responsible.

c. Please describe the facilities and equipment (e.g., storage containers, shielding, fume hoods) to be made available at each location where radioactive material is used. Submit a description of the areas assigned for the receipt, storage, preparation, and measurement of licensed materials. Submit a diagram showing the locations of shielding, the proximity of radiation sources to unrestricted areas, and other items related to radiation safety. Diagrams should be drawn to scale, or dimensions should be indicated.

d. Will radioactive material be used in animals at the Nicholson Building? If so, please submit a description of the animal housing facilities, and procedures provided to animal caretakers for the handling of animals, animal waste carcasses, and cleaning and decontamination of animal cages.

e. Do you plan to relocate any of your cesium-137 gamma irradiators to the Nicholson Building?

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST FOR ADDITIONAL LOCATION OF USE OF RADIOACTIVE MATERIAL

 \sqrt{f} . Please describe your procedures for handling of radioactive waste at the Nicholson Building. Will liquid wastes be released to the sanitary sewer? If so, indicate on the lab diagrams the location of disposal sinks and describe the route of the drain run to the sewer system. Particularly for joint occupancy buildings, you need to know where your radioactive disposal drains go. Please describe the facility for storage of waste being held for decay-in-storage or being held for shipment.

3. Upon receipt of this information, we will promptly proceed with review of your NRMP amendment request. For additional information, please contact me at DSN 864-5584 or (757) 363-5584 or by e-mail at twetenp@ehc50.med.navy.mil

PAUL TVETEN

D-03 NMRC Letter, Command's Name and UIC Change from NMRI to NMRC



DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH CENTER NATIONAL NAVAL MEDICAL CENTER 8901 WISCONSIN AVENUE BETHESDA, MARYLAND 20889-5607

IN REPLY REFER TO:

5110 037302 Ser 113/ OCT 26 1998

From: Commanding Officer, Naval Medical Research Center 8901 Wisconsin Avenue Bethesda, MD 20889-5607

To: Distribution

Subj: CHANGE OF COMMAND NAME AND UIC

1. Effective 01 October 1998 the Naval Medical Research Institute, NMRI, UIC 64223, changed it's name to the Naval Medical Research Center, NMRC, UIC 32398, 8901 Wisconsin Avenue Bethesda, MD 20889-5607.

2. My point of contact in this matter is HMC D. Horn-Cruder who can be reached at Commercial (301) 295-0179, DSN 295-0179 or e-mail at <u>Horn-CruderD@nmrcpo.nmrc.navy.mil</u>.

W. J. Washington, JR. By direction

D-04

Leased facility - NMRC Rockville Annex; lease to expire on 30 November 1999



DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH CENTER NATIONAL NAVAL MEDICAL CENTER 8901 WISCONSIN AVENUE BETHESDA, MARYLAND 20889-5607

IN REPLY REFER TO:

11011 ser 00c/037374 NOV 19 1998

From: Commanding Officer, Naval Medical Research Center To: Commanding Officer, Engineering Field Activity-Chesapeake, 901 M Street, SE, Building 212, Code 24, Washington, DC 20374-5018

Via: Chief, Bureau of Medicine and Surgery (MED-33) 2300 E Street, NW, Washington, DC 20372-5300

Subj: REQUEST RENEWAL OF LEASES

Encl: (1) Move Schedule as of 28 September 1998

1. Request that Engineering Field Activity-Chesapeake take action to renew U.S. Government Leases N6247796RP00044 and N6247796RP00056 which provide for first and second floors at 12300 Washington Avenue, Rockville, Maryland, respectively.

2. Based on moving schedule provided by enclosure (1), request that Lease N6247796RP00044 be renewed for a term of six (6) months beginning 1 June 1999 and expiring 30 November 1999. Request that Lease N6247796RP00056 be renewed for a term of three (3) months beginning 1 September 1999 and expiring 30 November 1999.

3. My point of contact is Mr. P. Cheng who can be reached at COM. (301) 295-1049 or DSN 295-1049 and/or FAX: (301) 295-1361.

D. ALEXANDER By direction

Blind Copy to: CO XO DFA Dr. C. G. Hayes CAPT S. L. Hoffman Mr. D. Chandler Dr. G. A. Dasch Mrs. S. Hawkins VLCDR S. L. Gaiter LT S. Krauz Mr. M. O'Hare Mr. K. Johnson UTC L. Wilson HM1 Henderson



Maryland Department of Natural Resources - Threatened and Endangered Species

D-05



Partis N. Glendening Governor Maryland Department of Natural Resources Forest, Wildlife and Heritage Service Tawes State Office Building Annapolis, Maryland 21401

John R. Griffin Secretary

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Carolyn D. Davis Deputy Secretary

November 20, 1997

Ms. Lesley Hamilton The Environmental Company, Inc. 1230 Cedars Court, Suite 100 P.O. Box 5127 Charlottesville, VA 22905

RE: Naval Medical Research Institute, Bethesda, Montgomery County, Maryland.

Dear Ms. Hamilton:

The Wildlife and Heritage Division has no records for Federal or State rare, threatened or endangered plants or animals within this project site. This statement should not be interpreted as meaning that no rare, threatened or endangered species are present. Such species could be present but have not been documented because an adequate survey has not been conducted or because survey results have not been reported to us.

ER# 97.2919.mo

D-06 U. S. Department of Interior - Biological Assessment and Endangered Species



United States Department of the Interior

FISH AND WILDLIFE SERVICE Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401

November 17, 1997

Ms. Lesley Hamilton The Environmental Company, Inc. 1230 Cedars Court, Suite 100 Post Office Box 5127 Charlottesville, VA 22905

> RE: Naval Medical Research Institute (NMRI) Closure and Transfer to National Naval Medical Center (NNMC) Montgomery County, MD

Dear Ms. Hamilton:

This responds to your November 12, 1997, request for information on the presence of species which are Federally listed or proposed for listing as endangered or threatened in the above referenced project area. We have reviewed the information you enclosed and are providing comments in accordance with Section 7 of the Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no proposed or Federally listed endangered or threatened species are known to exist in the project impact area. Therefore, no Biological Assessment or further Section 7 Consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to Federally protected threatened or endangered species under our jurisdiction. For information on other rare species, you should contact Ms. Lori Byrne of the Maryland Heritage and Biodiversity Conservation Program at (410) 260-8570.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if construction in wetlands is proposed, the U.S. Army Corps

of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Andy Moser at (410) 573-4537.

Sincerely,

John P volflin / Supervisor

Supervisor Chesapeake Bay Field Office

Maryland Department of Housing and Community Development - National Register of Historic Places

D-07



December 16, 1997

Maryland Department of Housing and Community	Ms. Lesley Hamilton The Environmental Company, Inc. 1230 Cedars Court, Suite 100 P.O. Box 5127
Development	Charlottesville, Virginia 22905
	RE: Architectural Investigations National Naval Medical Center Bethesda, Maryland
Division of Historical and	
Cultural Programs	Dear Ms. Hamilton:
100 Community Place	Thank you for your inquiry about historic properties located at the National Naval Medical Center (NNMC) in Bethesda, Maryland.
Crow Je, Maryland 21032	
	As you may know, the NNMC hospital building, the tower block (M-35-8) is listed on the
410-514-7600	National Register of Historic Places. Otherwise, no other architectural resources have been determined eligible for or listed in the National Register of Historic Places. However,
1-800-756-0119	NNMC is currently working with historic preservation consultants and the Trust to identify
Fix +10-987-4071	and evaluate the entire campus for its eligibility for the National Register in accordance with
Maryland Relay for the Deat	Section 110 of the National Historic Preservation Act of 1966, as amended. Current research indicates that there is a much larger historic district than just the main hospital
1 800-733-2738	building. From the submitted map, it appears that some of the buildings within the Naval
http://www.dbcd.statr.ind.us	Medical Research Institute fall within this larger district. The Navy has not yet officially submitted the documentation to the Trust for its concurrence on the eligibility of this district. Therefore for any further information about the boundaries of the district, this office recommends that you contact the Navy directly or Ms. Judith Robinson of Robinson &
Partis N. Clendening Governor	Associates, the consultant who is directing the historic site survey efforts at the hospital. She can be reached at (202) 234-2333
Der aus 1.4	Should you have any further questions, please feel free to call me at (410) 514-7637.
Patricia J. Paynie Securiacy	Sincerely
Ray:nond A. Skinner Deputy Secretary	Thurn Fisen -

Proservation Officer Project Review and Compliance

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Cost Estimate - NMRC Radiological Decontamination and Decommissioning



Document D-08. COST ESTIMATE FOR THE RADIOLOGICAL DECONTAMINATION AND DECOMMISSIONING

02 Jun 99

- From: NMRC Radiation Safety Officer
- To: Commanding Officer
- Via: (1) Director for Administration
 - (2) Executive Officer
- Subj: POINT PAPER COST ESTIMATE FOR THE RADIOLOGICAL DECONTAMINATION AND DECOMMISSIONING OF NMRC BETHESDA AND NMRC ANNEX BUILDINGS DURING CALENDAR YEARS 1999 AND 2000
- This point paper provides an estimate of the funding and manpower requirements to accomplish the required radiological decontamination and decommissioning efforts in order to satisfy the U. S. Nuclear Regulatory Commission's release criteria for unrestricted use.
- 2. Cost Estimate A (Ideal Situation) provides a cost estimate if commercial contracts would be let to fulfill all decommissioning efforts, including supervision, manpower, surveys, documentation, equipment and materials. In this instance, the current NMRC RSO would assume oversight responsibilities. Estimated cost: \$628,000.
- 3. Cost Estimate B (Workable Situation) provides a cost estimate if the NMRC Radiation Safety Officer (RSO), Assistant RSO (ARSO), and some equipment are provided for the 6-month decommissioning effort. Commercial contracts would be let to fulfill all other decommissioning efforts, including manpower, surveys, documentation, equipment and materials. Estimated cost: \$380,000. Savings: \$248,000.
- 4. Cost Estimate C (Least Desirable Situation) provides a cost estimate if the NMRC Radiation Safety Officer (RSO), Assistant RSO (ARSO), three full-time technicians and some equipment are provided for the 6-month decommissioning effort. Commercial contracts would be let to fulfill all other decommissioning efforts, including some surveys, documentation, equipment and materials. Estimated cost: \$180,000. Savings: \$448,000.

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Table 1. Cost Estimate A (Contract for all labor and services)

ITEM	COST
(1) Project Manager and QA Coordinator	96,000
[40 hour/week * 24 weeks * \$100/hour]	
(2) Assistant Project Manager and Alternate QA Coordinator	r 52,800
[40 hour/week * 24 weeks * \$55/hour]	
(3) Technicians (surveys, area preparation, sample analyses)	110,000
[216 survey units * 8 hour/unit * 1.15 (leave factor)] = 2000 hour (rounded)	3
[2000 hours * (work week/30 hour/person)/ 24 work weeks] = 3 persons	
[\$55/hour * 2000 hour]	
(4) Radioactive waste disposal costs and decontamination efforts	50,000
(5) Radiation monitoring equipment, services and supplies	60,000
(6) Per Diem Expenses, if necessary, for 5 persons	90,000
[5 persons * \$150/day * 24 week * 5 day/week]	
(7) Third-party Confirmatory (Final Status) Survey	64,800
[216 survey units * 3 hour/unit * \$100/hour]	
(8) Contingency, 20% of \$523,600	104,720
Total	628,320
Rounded Total	628,000

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Table 2. Cost Estimate B (Contingent that the NMRC RSO, ARSO and some equipment are provided; contracts are let for all other manpower, materials and services)

ITEM	COST
(1) Technicians (surveys, area preparation, sample analyses)	110,000
<pre>[216 survey units * 8 hour/unit * 1.15 (leave factor) = 2000 hour (rounded)</pre>]
[2000 hours * (work week/30 hour/person)/ 24 work weeks] = 3 persons	
[\$55/hour * 2000 hour]	
(2) Radioactive waste disposal costs and decontamination efforts	50,000
(3) Radiation monitoring equipment, services and supplies	40,000
(4) Per Diem Expenses, if necessary, for 3 persons	54,000
[3 persons * \$150/day * 24 week * 5 day/week]	
(5) Third-party Confirmatory (Final Status) Survey	64,800
[216 survey units * 3 hour/unit * \$100/hour]	
(6) Contingency, 20% of \$318,800	63,760
Total	382,560
Rounded Total	380,000

Table 3. Cost Estimate C (Contingent that all manpower requirements are provided, including the RSO, ARSO, and 3 technicians for a 6-month period. A contract is let to cover the Third party survey. Funds are required to cover costs for equipment, materials, and services.

ITEM	COST
(1) Radioactive waste disposal costs and decontamination efforts	50,000
(2) Radiation monitoring equipment, services and supplies	40,000
(3) Third-party Confirmatory (Final Status) Survey	64,800
[216 survey units * 3 hour/unit * \$100/hour]	
(4) Contingency, 20% of \$154,800	30,960
Total	185,760
Rounded Total	180,000

Plymouth: (508) 746-6464

BARTLETT NUCLEAR INC.

TO: NMRC

1-800-225-0385

PO BOX 1800 MAIN OFFICE: 60 INDUSTRIAL PARK ROAD PLYMOUTH INDUSTRIAL PARK PLYMOUTH, MA 02360

April 5, 1999

Naval Medical Research Center 8901 Wisconsin Avenue Bethesda, Maryland 20889-5607

Attn: LCDR Schleurious L. Gaiter, MSC, USN

Re: Decommissioning Cost Estimate for Building 150

Dear Commander Gaiter:

Thank you for the opportunity to discuss Decontamination and Decommissioning (D/D) strategies for the bio-medical research facilities at the Naval Medical Research Center (NMRC). Thorough D/D contains many facets such as characterization, decontamination, final status surveys, and Independent Verification Contractor Surveys (IVC) as we discussed on March 30th.

Of particular interest to the NMRC is the possibility of preparing a Radioactive Materials Permit amendment as opposed to a formal Decommissioning Plan. A permit amendment could be approved by the local regulating agency in lieu of a formal Decommissioning Plan that would have to be approved by the Nuclear Regulatory Commission Headquarters. The permit amendment would be less costly and considerably faster to obtain than a formal D/D Plan. Because the permit amendment would be an addendum to the existing Radioactive Material Permit, the amendment would apply to all buildings to undergo decommissioning.

Although formal D/D cannot begin until a permit amendment is in place, health and safety issues for Building 150 can be addressed. Health and safety issues would include hazard stabilization, PCB survey, free mercury removal, established safe access for personnel, and initial grounds preparation. The Radiation Safety Committee should be consulted prior to beginning the preparation activities.

Bartlett Nuclear, Inc. has the professional and technical staff to support all phases of D/D including material license and permit applications, OSHA, RCRA, and TSCA compliance, as well as asbestos abatement. Bartlett also has considerable experience in radioactive and hazardous waste packaging and certification.

LCDR Schleurious L. Gaiter April 5, 1999 Page 2



Enclosed is the cost estimate to prepare the Radioactive Materials Permit amendment and perform the Building 150 D/D. The estimate is based on 40 hours per work week and travel and living expenses are provided. Radioactive and hazardous waste disposal will be provided by NMRC.

If you have questions or require additional information, please contact Bill Nevelos at (800) 225-0385, x311, or me at (614) 891-4598.

Very truly yours,

BARTLETT NUCLEAR, INC.

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Cort N. Horton Senior Engineer

CNH/BN/tk Attachment .

Building 150 Decommissioning Cost Estimate

Naval Medical Research Center

ACTIVITY	DURATION		<u>ços</u> t
Prepare Radioactive Material Permit Amendment Travel Expenses	4 Weeks Subtotal	\$ \$	12,000.00 2,500.00 14,500.00
Building 150 D/D Mobilization Historical Review Procedures On-Site Training Quality Assurance Project Plan	2 Weeks 1 Week		
Employee Physicals/Fitness For Duty Instrument Set-Up/Background Documentation	1 Week Subtotal	\$	28,800.00
Building 150 inside Survey Grid (1m2) Building 150 Housekeeping Floor Scans and Static Measurements Wall Scans and Static Measurements Exposure Rate Measurements Floor and Wall Swipes H-3 and C-14 Swipes Drain Sampling Spot Decontamination Data Documentation	5 Weeks	\$	37,500.00
Building 150 Grounds Survey 12 Soll Samples (1 foot depth) Soll Sample Analyses Drain/Effluent Sampling Walk-Over Nal Survey Background Determination Documentation	2 Weeks	\$	9,600.00
Instrumentation Portable Survey Instruments (8) 3x3 Nai Detector (1) Floor Monitor (1) Computers (2) Printer (1)	Subtotal	\$ \$ \$ \$ \$ \$	14,900.00 6,000.00 350.00 1,000.00 1,000.00 300.00 8,650.00

ACTIVITY	DU	RATION	COST
Final Report Report Preparation and Duplication	1 We	eek Subtotal \$	4,400.00
Independent Verification Contractor Surve	y Technical Support 1 We	sek Subtotal \$	3,000.00
Supplies Personal Protective Equipment Office Supplies Copying Services Miscellaneous Travel and Living Expenses 2 Senior Health Physics Technician 63 days 1 Junior Health Physics Technician 63 days 1 Senior Engineer/Project Manager 77 days 1 Full Size Van 1 Full Size Car		Subtotal \$	3,800.00
		Subtotal \$	36,550.00
Demobilization		Subtotal \$	3,000.00
Contingency			
TOTAL		\$	155,100.00

Note: This estimate does not include soil remediation or sub-surface drain line removal. Radioactive and hazardous waste disposal will be provided by NMRC.

"It is customary to provide contingency based on the type of D/D work performed and the level of confidence in available historical data. Contingency is for budget purposes only and at the discretion of the Client. Contingency can typically range from between 25-45%, depending on the "discovery phase" survey results.

BARTLETT NUCLEAR, INC. Post Office Box 1800 60 Industrial Park Road Plymouth, MA 02360

TO: NMRC

The information contained in this fax is CONFIDENTIAL information intended ONLY for the addressee as identified below. Dissemination or distribution of this communication to anyone other than the addressee is STRICTLY PROHIBITED. If you have received this communication in error, please notify the sender immediately by telephone and return the communication to us via U.S. Postal Service. Your cooperation is greatly appreciated. If any of these fax copies are illegible, or you do not receive the number of pages stated below, please contact us at the number listed below. Yankee Atomic Power Company

DATE: April 5, 1999

то	Naval Medical Research Center	
ATTN	LCDR S. L. Gaiter	,
FAX #	(301) 295-2720	
FROM	Cort Horton	

NUMBER OF PAGES SENT: 5 (INCLUDING COVER PAGE)

PHONE: 800-225-0385, Ext. 311 / FAX: 508-830-0997

TD: DOR-ROC-OARL

D-10 Price Quote - Radiation Monitoring Equipment



Radiation Service Organization

Price Quotation via Facsimile

Page 1 of 2

- TO: Petty Officer Ahmad NMRC Fax (301)295-2720 Ph (301)295-0002
- FR: Steve McDaniel RSO, Inc./Radiation Service Organization Fax (301)498-3017 Ph (301)953-2482
- RE: Radiation Detection and Decommissioning Equipment

We appreciate your request concerning your decommissioning needs. We suggest the following equipment to assist in meeting your requirements.

ltem 1. 1 ea	Floor Monitor, cart mounted gas flow proportional detector system, active area 425 cm ²	\$4,750.00
ltem 2 1 ea	Contamination Monitor, handheld gas flow proportional detector system active area 100 cm ²	3,100.00
item 3 1 ea	Exposure Rate Survey Meter microR/hr, tissue equivalent organic scintillator	2,110.00
ltem 4 1 ea	Countrate Survey Meter, low-level 2"x2" Nal Scintillator	1,700.00
Item 5 1 ea	Digital Alarming Personnel Dosimeter	375.00
	Total	\$12,035.00
	FOB: Destination Delivery: 30 days	

Please feel free to call for any additional information.

Stehn Damil

Washington (301) 953-2482

P.O. Box 1526, Laurel. Maryland 20725-1526 Fax (301) 498-3017

Baltimore (410) 792-7444

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Equipment Descriptions

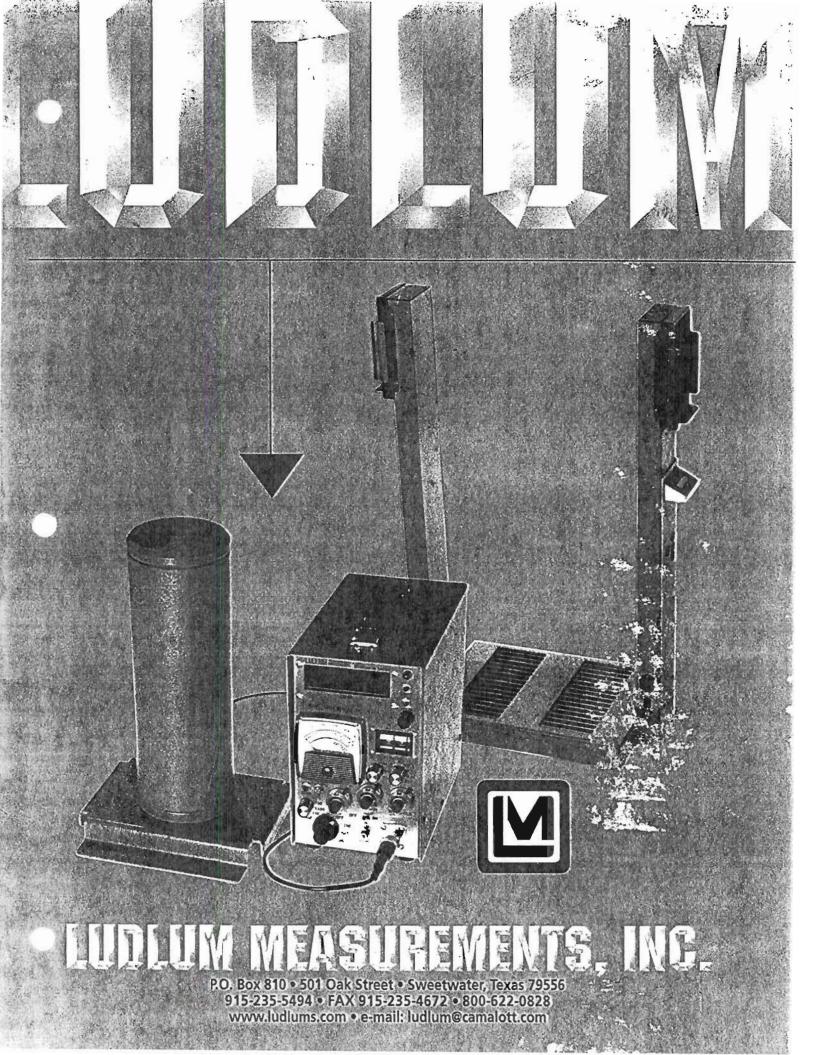
Item 1 Ludlum Model 239-1F Cart, Model 2221 Scaler/Ratemeter, 2 ea Model 43-37 gas proportional detector with 425 cm² open area, 0.8 mg/cm² aluminized mylar window, Model 2750 gas flow control box, two stage regulator, quick disconnects, tubing, delivery, Initial setup and calibration

> Does Not Include: P-10 gas supply, recommended bottle size is Matheson Size 2 or Linde Q

Item 2 Ludium Model 2221 Scaler/Ratemeter, Series "C" connectors and cable; 2 ea Model 43-68 gas proportional detectór, 100 cm² open area, 0.8 mg/cm² aluminized mylar window, Model 2750 gas flow control box, two stage regulator, quick disconnects, tubing, delivery, initial setup and calibration

> Does Not Include: P-10 gas supply, recommended bottle size is Matheson Size 2 or Linde Q

- Item 3 Bicron MicroREM Tissue Equivalent Survey Meter, 0-20 uR/hr to 0-200 mR/hr in 5 ranges, with audio option, with low energy (17keV) option, delivery and calibration
- Item 4 Ludlum Model 12 Ratemeter, Model 44-10 gamma scintillator, 2" diameter x 2" thick Nal crystal, 202-356 meterface 0-500 cpm, delivery and calibration
- Item 5 Panasonic ZP141, Electronic Digital Dosimeter, with dose and dose rate setable alarms, delivery and calibration



Floor Monitor

Specifications

- INDICATED USE: Floor Monitoring for Alpha, Beta-Gamma
- DETECTOR: Gas proportional
- **RECOMMENDED COUNTING GAS:** P-10 (10% methane; 90% argon)
- **BOTTLE SIZE:** Typically used with Matheson size 2 or Linde Q
- **WINDOW:** 0.8 mg/cm² aluminized mylar (window thicknesses of 0.4, 3.9, or 7.9 mg/cm² are available)

ACTIVE AREA: Approximately 582 cm²

OPEN AREA: Approximately 425 cm²

- EFFICIENCY (4pi): Typically 17%-239Pu; 25%-90Sr/ 90Y; gamma - less than 1%
- GAS RECHARGE: Will operate on static charge for over 2 hours
- compatible instruments: Typically used with Model 12, 2221, 2224, or 2350-1
- DETECTOR HEIGHT: Adjustable from 0.125" (0.32cm) - 3" (7.6cm) from surface
- **CETECTOR OPERATING VOLTAGE:** Alpha: Typically 1000 - 1200 volts Beta-gamma: Typically 1600 - 1800 volts

THRESHOLD: Typically 2 - 4mV

FLOW METER: IN - Adjustable from 0 - 100 cc/ min

OUT - Flow indicator from 0 - 100 cc/min GAS CONNECTORS: Double end quick discon-

- nect for 0.25" (0.6cm) OD tubing
- GAS CONSUMPTION: Typically 50 cc/min CONSTRUCTION

DETECTOR: Anodized aluminum housing with stainless stee! hex protective screen (79% open)

regulator and flow meter . (Pictured gas bottle not included. Contact your local gas distributor for bottle.)

Note: This unit includes a two stage

Model 239-1F

FLOOR MONITOR

CART: 1" square tubular steel and aluminum with beige polyurethane enamel paint, 7.5" (19.1cm) diameter rear wheels, and 4" (10.2cm) diameter swivel casters

SIZE

DETECTOR: 0.8" (2cm)H X 6.3" (16cm)W X 18.3" (46.5cm)L

CART ASSEMBLY: 42" (106.7cm)H X 16" (40.6cm)W X 27.5" (69.9cm)L (excluding detector) WEIGHT: 25 lbs (11.4kg), excluding gas bottle and counting instrument

Model 1239-1F with	Part Number	Instrument Specs
iM12	48-1702	Page 8
M2221	48-2085	Page 19
M2224	48-2650	Page 20
M2350-1	48-2594	Page 22
M2360	48-2922	Page 21

Accessories

MODEL 2750 SPECIFICATIONS

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- INDICATED USE: Gas flow control for gas proportional detectors
- FLOW METERS: (others available)
 - IN Adjustable flow control from 0 100 cc/min OUT - Flow indicator from 0 - 100 cc/min
- **CONNECTIONS:** 4 ea. double end quick disconnect **CONSTRUCTION:** Aluminum housing with beige polyurethane enamel paint
- SIZE: 10.3" (26.2 cm)H X 4.5" (11.4 cm)W X 4" (10.2 cm)D
- WEIGHT: 2.8 lbs (1.3kg)

MODEL T1031 SPECIFICATIONS

INDICATED USE: Timed gas flow control **GAS FLOW:** Controlled by 2 solenoids with adjustable

- timers from 1 99 minutes (when power is OFF gas flow control will close stopping gas flow)
- FLUSH: Push-button to override control and allow constant gas flow (indicated by GAS ON, and GAS OFF indicators lighting simultaneously)
- **RESET:** Push-button to reinitiate timer function **GAS ON:** Green LED indicates when gas is flowing **GAS OFF:** Red LED indicates when gas is not flowing
- **POWER:** 12 volts DC (provided by 115 volts AC transformer)
- **CONSTRUCTION:** Aluminum housing

SIZE: 2" (5.1 cm)H X 3.4" (8.6 cm)W X 7.9" (20.1 cm)L WEIGHT: 0.7 lbs (0.3kg)

MODEL T1031-1 SPECIFICATIONS

INDICATED USE: Timed gas flow control

GAS FLOW: Controlled by 2 solenoids with adjustable timers from 1 - 99 minutes (when power is OFF gas flow control will open allowing gas to flow)

FLUSH: Push-button to override control and allow constant gas flow (indicated by GAS ON, and GAS OFF indicators lighting simultaneously)
 RIESET: Push-button to reinitiate timer function
 GAS ON: Green LED indicates when gas is flowing
 GAS OFF: Red LED indicates when gas is not flowing
 POWER: 12 volts DC (provided by 115 volts AC trans-

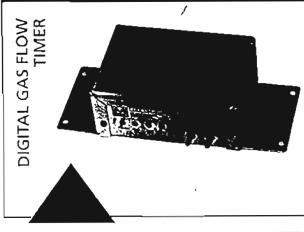
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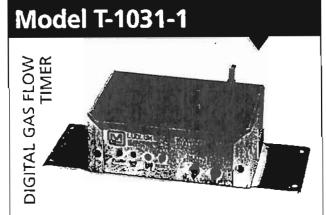
CONSTRUCTION: Aluminum housing SIIZE: 2" (S.1 cm)H X 3.4" (8.6 cm)W X 7.9" (20.1 cm)L MEIGHT: 0.7 lbs (0.3kg)

Model 2750



Model T-1031





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viodel 2221

Scalers/Ratemeters

Specifications

SCALER/RATEN SINGLE C

- **INDICATED USE:** Field analysis COMPATIBLE DETECTORS: G-M, proportional,
- scintillation AUDIO: Built in unimorph speaker with volume control
- AUDIO DIVIDE: Toggle switch for 1, 10, or 100 events-per-click

AUDIO JACK: For optional headset

METER DIAL: 0 - 500 cpm; 50 - 500k cpm logarithmic scale (others available)

MULTIPLIERS: X1, X10, X100, X1k, and LOG for logarithmic scale

DIGITAL DISPLAY: 6 digit LCD display with 0.5" (1.3cm) high digits

LCD BACKLIGHT: Activated by LAMP switch

DIGITAL RATEMETER: Provides a digital display of count rate when selector switch is in Dig. Rate position

SCALER: Used in conjunction with timer to allow for gross counting. Range from 0 - 999999 counts when selector switch is in Scaler position (controlled by COUNT and HOLD buttons) **NOTE:** Scaler or digital ratemeter is active when not selected, allowing for concurrent use

MER: Switch selectable divisions of 0.1, 0.5, 1, 2, 5, 10 minutes or CONT (continuous) for manual timing **JH VOLTAGE:** Adjustable from 200 - 2400 volts (can be checked on display)

THRESHOLD: Adjustable from 100 - 1000 (can be checked on display)

WINDOW: Adjustable from 0 - 1000 above threshold setting (can be turned on or off)

GAIN: Adjustable from 1.5 - 100 mV at a threshold setting of 100

OVERLOAD: Senses detector saturation. Indicated by "----" on LCD display and meter going to full scale (adjustable depending on detector selected)

POWER: 4 each "D" cell batteries

BATTERY LIFE: Typically 250 hours with alkaline batteries (battery condition can be checked on digital display)

SIZE: 9"(22.9cm)H X 4.3"(10.9cm)W X 10"(25cm)L including handle WEIGHT: 5.5 lbs (2.5kg) including batteries



Specifications

- **INDICATED USE:** Field analysis
- **COMPATIBLE DETECTORS:** G-M, proportional, scintillation
- AUDIO: Built in unimorph speaker with volume control
- AUDIO DIVIDE: Toggle switch for 1, 10, or 100 events-per-click

AUDIO JACK: For optional headset

- METER DIAL: 0 500 cpm; 50 500k cpm logarithmic scale (others available)
- MULTIPLIERS; X1, X10, X100, X1k, and LOG for logarithmic scale
- DIGITAL DISPLAY: 6 digit LCD display with 0.5" (1.3cm) high digits

LCD BACKLIGHT: Activated by LAMP switch

DIGITAL RATEMETER: Provides a digital display of count rate when selector switch is in Dig. Rate position

SCALER: Used in conjunction with timer to allow for gross counting. Range from 0 - 999999 counts when selector switch is in Scaler position (controlled by COUNT and HOLD buttons)

Scaler or digital ratemeter is active when not selected, allowing for concurrent use

MER: Switch selectable divisions of 0.1, 0.5, 1, 2, 5, 10 minutes or CONT (continuous) for manual timing HIGH VOLTAGE: Adjustable from 200 - 2400 volts (can be checked on display)

If RESHOLD: Adjustable from 100 - 1000 (can be checked on display)

TINDOW: Adjustable from 0 - 1000 above threshold setting (can be turned on or off)

Adjustable from 1.5 - 100 mV at a threshold setting of 100

EXAMPLOAD: Senses detector saturation. Indicated by "---" on LCD display and meter going to full scale (adjustable depending on detector selected)

WER: 4 each "D" cell batteries

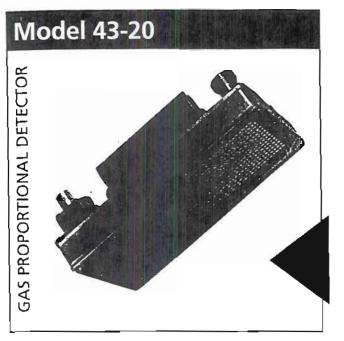
Model 2221

CITERY LIFE: Typically 250 hours with alkaline batteries (battery condition can be checked on digital display)

5748.9" (22.9cm)H X 4.3" (10.9cm)W X 10" (25cm)L including handle

IEIGHT: 5.5 lbs (2.5kg) including batteries

Alpha Beta Proportional





Common Specifications

INDICATED USE: Alpha beta survey

RECOMMENDED COUNTING GAS: P-10 (10% methane, 90% argon)

GAS RECHARGE: Will operate on static charge for at least 15 hours with 39" cable; 5 hours in alpha/beta mode

WINDOW: Typically 0.8 mg/cm² aluminized mylar (other thicknesses available)

EFFICIENCY (4pi): Typically 20%-239Pu; 15%-14C; 30%-99Tc; 30% - 90Sr/90Y less than 1% - gamma

Simultaneous Alpha/Beta Counting: 17.5%-²³⁹Pu; 20%-⁹⁹Tc; 20%⁹⁰Sr/⁹⁰Y BACKGROUND:

Alpha - Less than 7 cpm (when operating at Alpha only plateau region) Beta-Gamma - Typically 350 cpm (*10µR/hr field*)

COMPATIBLE INSTRUMENTS: Models 12, 16, 18, 2000, 2200, 2221, 2224, 2225, 2241, 2350-1, 2360, 2929

OPERATING VOLTAGE:

Alpha - Typically 1100 - 1400 volts Beta-Gamma - Typically 1600 - 1800 volts COUNTER THRESHOLD SETTING: Typically 2 - 5 mV GAS CONNECTORS: Double end quick disconnect

1	43-20	43-68
WINDOW AREA	181 cm² active 143 cm² open	126 cm² active 100 cm² open
SIZE	3* (7.6cm)H 5* (12.7cm)W 8* (20.3cm)L	3.9* (10cm)H 4.6* (11.7cm)W 7.8* (19.8cm)L
WEIGHT	2 lbs (0.9kg)	2 lb (0.9kg)

Accessories

MODEL 2750 SPECIFICATIONS

INDICATED USE: Gas flow control for gas proportional detectors

FLOW METERS: (others available)

IN - Adjustable flow control from 0 - 100 cc/min OUT - Flow indicator from 0 - 100 cc/min

CONNECTIONS: 4 ea. double end quick disconnect **CONSTRUCTION:** Aluminum housing with beige polyurethane enamel paint

SIZE: 10.3" (26.2 cm)H X 4.5" (11.4 cm)W X 4" (10.2 cm)D

WEIGHT: 2.8 lbs (1.3kg)

MODEL T1031 SPECIFICATIONS

INDICATED USE: Timed gas flow control

- GAS FLOW: Controlled by 2 solenoids with adjustable timers from 1 - 99 minutes (when power is OFF gas flow control will close stopping gas flow)
- FLUSH: Push-button to override control and allow constant gas flow (indicated by GAS ON, and GAS OFF indicators lighting simultaneously)

RESET: Push-button to reinitiate timer function **GAS ON:** Green LED indicates when gas is flowing **GAS OFF:** Red LED indicates when gas is not flowing

POWER: 12 volts DC (provided by 115 volts AC transformer)

CONSTRUCTION: Aluminum housing

SIZE: 2" (5.1 cm)H X 3.4" (8.6 cm)W X 7.9" (20.1 cm)L WEIGHT: 0.7 lbs (0.3kg)

MODEL T1031-1 SPECIFICATIONS

INDICATED USE: Timed gas flow control

GAS FLOW: Controlled by 2 solenoids with adjustable timers from 1 - 99 minutes (when power is OFF gas flow control will open allowing gas to flow)

FLUSH: Push-button to override control and allow constant gas flow (indicated by GAS ON, and GAS OFF indicators lighting simultaneously)

RESET: Push-button to reinitiate timer function **GAS ON:** Green LED indicates when gas is flowing **GAS OFF:** Red LED indicates when gas is not flowing **POWER:** 12 volts DC (provided by 115 volts AC trans-

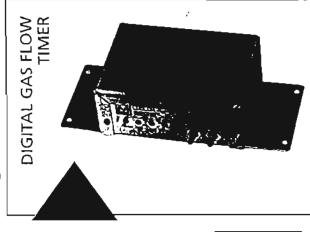
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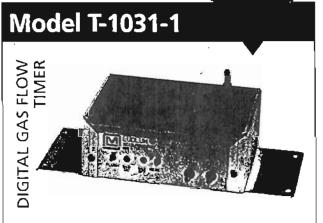
CONSTRUCTION: Aluminum housing

SIZE: 2" (5.1 cm)H X 3.4" (8.6 cm)W X 7.9" (20.1 cm)L WEIGHT: 0.7 lbs (0.3kg)

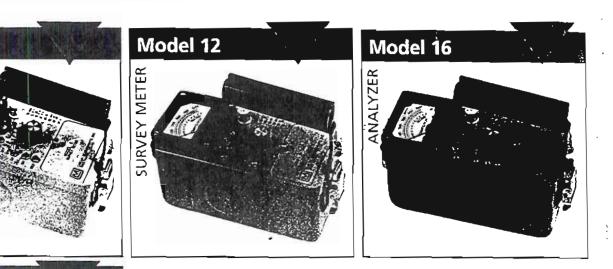


Model T-1031





General Purpose Survey Meters



Model 18

Model 4

METER

SURVEY

Common Specifications

COMPATIBLE DETECTORS: G-M, proportional, scintillation METER DIAL: 0 - 500 cpm, 0 - 2.5 kV, BAT TEST (others available) MULTIPLIERS: X1, X10, X100, X1000 SIZE: 6.5" (16.5 cm)H X 3.5" (8.9 cm)W X 8.5" (21.6 cm)L WEIGHT: 3.5 lbs (1.6 kg) including batteries

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	MODEL 4	MODEL 12	MODEL 16	MODEL 18
HIGH VOLTAGE	Ad	justable from 200 - 2500 vol	ts	3 independant settings, each adjustable from 200 - 2500 volts
THRESHOLD	Adjustable from ' 2 - 40 mV		Adjustable from 2 - 60 mV	
WINDOW	N/4	λ	Adjustable from 0 - 6	50 mV above threshold
OVERLOAD	Indicated by red lamp and full scale meter reading	Indicated by red lamp N/A and full scale meter reading		N/A
DEAD TIME	Adjustable to compensate for detector dead time (can be turned ON or OFF)	N/A		
PULSE WIDTH DISCRIMINATOR	Enhances gamma rejection of alpha scintillators	N/A		

DETECTORS

Gamma Scintillation

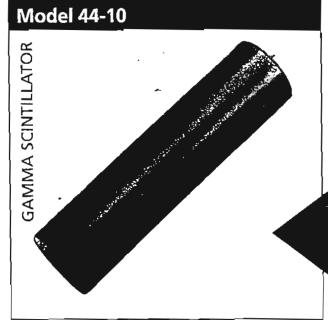


Common Specifications

INDICATED USE: High energy gamma detection

ENERGY RESPONSE: Energy dependant COMPATIBLE INSTRUMENTS: General purpose survey meters, ratemeters, and scalers

OPERATING VOLTAGE: 500 - 1200 volts



Model 44-62

	44-2	44-10	44-62
SCINTILLATOR	1"(2.5cm) diameter	2"(5.1cm) diameter	0.5"(1.3cm) diameter
	1"(2.5cm) thick Nal	2"(5.1cm) thick Nal	1"(2.5cm) thick Nal
SENSITIVITY	Typically 175 cpm/µR/hr	Typically 900 cpm/µR/hr	Typically 49 cpm/µR/hr
	(¹³⁷ Cs gamma)	(¹³⁷ Cs gamma)	(13)Cs gamma)
TUBE	1.5" (3.8cm) diameter	2" (5.1cm) diameter	0.5" (1.3cm) diameter
	magnetically shielded	magnetically shielded	magnetically shielded
	photomultiplier	photomultiplier	photomultiplier
DYNODE STRING RESISTANCE	100 megohm	60 megohm	100 megohm
SIZE	2"(5.1cm) diameter	2.6" (6.6cm) diameter	0.9"(2.3cm) diameter
	7.3"(18.5cm)L	11" (27.9cm)L	7.8"(19.7cm)L
WEIGHT	1 lbs (0.5kg)	2.3 lb (1.1kg)	0.3 lbs (0.1kg)

Meter Dials

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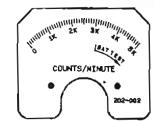
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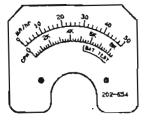
VALA A



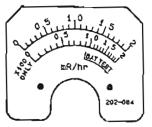
202-2 for Models 2,3 with any detector 0-5k cpm



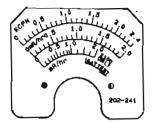
202-666 for Model 3 with 44-2 0-50 µR/hr



202-654 for Model 3 with 44-2, Dual Scale 0-50 µR/hr, 0-8.4k cpm



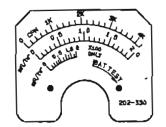
202-084 for Models 3, 14C with 44-6, 44-38 0-2 mR/hr



202-241 for Models 3, 14C with 44-6, 44-38 Dual Scale 0-2 mR/hr, 0-2.4k cpm



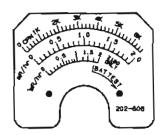
202-085 for Models 3, 14C with 44-7 0-2 mR/hr



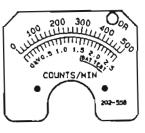
202-330 for Models 3, 14C with 44-7, Dual Scale 0-2 mR/hr, 0-4.2k cpm



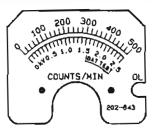
202-627 for Models 3, 14C with 44-9 0-2 mR/hr



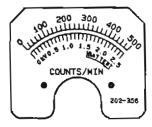
202-608 for Models 3, 14C with 44-9 Dual Scale 0-2 mR/hr, 0-6.6k cpm



202-558 for Model 4 with any detector 0-500 cpm, 0-2.5kV OR (overrange)

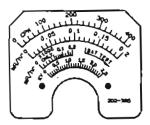


202-643 for Model 16 with any detector 0-500 cpm, 0-2.5 kV OL (overload)



202-356 for Models 12, 18 with any detector 0-500 cpm, 0-2.5 kV

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202-365 for Models 12, 18 with 44-7, Dual Scale 0-0.2 mR/hr, 0-420 cpm 0-2.5 kV



202-618 for Models 12, 18 with 44-9 Dual Scale 0-0.2 mR/hr, 0-660 cpm 0-2.5 kV

The meter dials on this page are the most common.

Others are available on request.



MOVE PLANNING Information as of 15 April 1999

Week Number		Division/Department	ivision/Department Move Week Beginning		2. Comment	
1			2/15/99	2/19/99		
6		Gen'l Support (LOG, Safety), Neuro Psych	3/22/99	3/26/99	Bldg 101, 186,	
7	17	Blood Research	3/29/99		Gillette Bldg vacated (by 5/31	
7	24C	Transfusion & Cryo. NMRC (partial)	3/29/99		Gillette Bldg vacated (by 5/31	
8	12	Experimental Therapeutics (12A & 12D)	4/5/99	4/9/99		
9		Experimental Therapeutics	4/12/99	4/16/99	Bldg 500 vacated	
10		no move	4/19/99	4/23/99		
11	04E	Library Services	4/26/99	4/30/99		
12		no mové	5/3/99	5/7/99	· ·	
13		по точе	5/10/99	5/14/99		
14	12B	ET Parasitology	5/17/99	5/21/99	Gude Dr. vacated	
15	01	HQWRAIR	5/24/99	5/28/99		
15	04F	Med. A/V Services	5/24/99	5/28/99		
16	20	HQNMRC	5/31/99	6/4/99		
16	10	Vet.Sc./ 05H Enteric (misc testing)	5/31/99	6/4/99		
17	07F	Respiratory Research	6/7/99			
18	25C	Enterics NMRC	6/14/99		From NNMC	
18	24C	Transfusion & Cryo. NMRC (partial)	6/14/99		From NNMC	
19	25C	Enterics NMRC	6/21/99		From Rockville	
19	25E	Threat Assessment, NMRC	6/21/99		From Rockville	
20	25E	Viral/ Rickettsial Diseases, NMRC	6/28/99	7/2/99		
	201		7/5/99	7/9/99		
21	-	misc.WRAIR & NMRC				
22	06	Biochemistry	7/12/99	7/16/99		
22	12	Experimental Therapeutics (Bldg 40)	7/12/99	7/16/99		
23	06	Biochemistry	7/19/99	7/23/99	-	
24	05E	Viral Diseases	7/2/3/99	7/30/99		
25	05A	Bacterial Diseases	8/2/99	8/6/99	and the second second second	
26	05A	Bacterial Diseases	8/9/99	8/13/99		
27	05H	Enteric Infections	8/16/99			
28	05D	Immunology (Malaria Research)	8/23/99	8/27/99		
29	05D	Immunology (Malaria Research)	8/30/99	9/3/99		
30	10	Veterinary Science WRAIR	9/6/99	9/10/99		
31	05B	Entomology (majority)	9/13/99	9/17/99		
32	09	Neurosciences	9/20/99	9/24/99		
33		No move Scheduled	9/27/99	10/1/99		
34	07	Medicine & Surgery	10/4/99	10/8/99		
35	07	Medicine & Surgery		10/15/99		
36	13	Pathology		10/22/99		
37	1	Tech Services, NMRC		10/29/99		
37	25B	Malaria Research, NMRC		10/29/99		
38	2:5B	Malaria Research, NMRC		11/5/99		
39	05F	Clinical Trials		11/12/99		
39	114	Preventive Medicine		11/12/99		
40	08	Neuropsychiatry		11/19/99		
41	27	Bio Defense Research Dir. NMRC		11/26/99		
42	27	Bio Defense Research Dir. NMRC	11/29/99			
42	23B	Diving / Environmental, NMRC		12/10/99		
43	23B			12/10/99		
43	29A	Combat Casualty Care		12/17/99		
44		Misc WRAIR & NMRC	12/13/99	12/17/99		
	01	Director WRAIR (balance)	2/7/00	2/11/00	Needs Bldg 500 completion	
	20	HQ NMRC (balance)	2/7/00		Needs Bldg 500 completion	
	21A	Purchasing Branch, NMRC	2/7/00		Needs Bldg 500 completion	
	21A	MID, NMRC (Bidg 500)	2/7/00		Needs Bldg 500 completion	
		All moves delayed. HQ and Biochemistry ch	21100		Tuesda pied one comhistion	

NAVAL MEDICAL RESEARCH INSTITUTE (NMRI) RELOCATION/MOVE PLANNING

Date: 14 Aug 98

Note: NMRI WILL BECOME THE NAVAL MEDICAL RESEARCH CENTER (NMRC) ON 1 OCT 98

The attached document is a Move Planning document prepared by a commercial contractor involved with the FY-99 move/relocation of the Naval Medical Research Institute and Walter Reed Army Institute of Research (WRAIR) to various sites, including the new facility at Forest Glen, Maryland.

NMRI Building	Building Description and Use	Estimated "Complete" Vacancy
17	concrete building constructed in 1942; five stories; 30,000 square feet (SF); biomedical	January 2000
	labs and offices	
17A	concrete building constructed in 1945; five stories; 27,000 square feet (SF); biomedical	January 2000
	labs and offices	
17B	concrete building constructed in 1955; five stories; 27,000 square feet (SF); biomedical	January 2000
	labs and offices	
18	masonry building constructed in 1942; three stories; 14,300 square feet (SF);	October 1999
	biomedical labs and offices; incinerator removed in 1947.	
21	masonry building constructed in 1947; four stories; 86,400 square feet (SF); animals	October 1999
	and biomedical labs and offices; incinerator in service until about 1980.	

The move schedule is revised periodically; the next significant schedule revision will be available on 29 September 1998.

NM Bul.Jing(s)	Move Division/Department Order indicates changes since last ESC meeting	Scenario Comment	NMRI Organiza-
	Orders changes price rectars through		tional Code(s)
	Current Scheduled BOD	2/15/99	
	Possible Move Starting Date (BOD+3 1/2 weeks)	3/13/99	
17,21.:.	1 IGen'i Support (LOG, Vet, Safety)	3/13/99	00S, 01, 02
	2 117 Blood Research	3/20/99 Gillette Bldg vacated (by 5/31)	
	2124C [Transfusion & Cryopreservation NMRI (partial)	3/20/99 Gillette Bldg vacated (by 5/31)	06
	3 12 Experimental Therapeutics	3/27/99	
	412 Experimental Therapeuticsi*	4/3/99	1
	5 12 Experimental Therapeutics	4/10/99 Bldg 500 vacated	1
	6 04E Library Services	4/17/99] .
	7 07F Respiratory Research	4/24/99 Trailer@511, Bldg @506	
	8 106 Biochemistry	5/1/99	
	9 106 Blochemistry	5/8/99 Bidg 40 Loading Dock vacated	
	10 01 HQ WRAIR	5/15/99	
	10 04F !Med. AN Services ;	5/15/99	01
17	11 20 HQ NMRI	5/22/99	01
	11 10 Vet. Sc. / 05H Enteric (misc)	5/22/99	
	12 :05E Viral Diseases	5/29/99	
	12!12 Experimental Therapeutics (Bldg 40)	5/29/99	
	13 IOSA IBacterial Diseases	6/5/99	
	14 05A Bacterial Diseases	6/12/99	
17,18	15 125F Viral/ Rickettsial Diseases. NMRI	6/19/99	
17,18	15125C Enteric Diseases, NMRI	6/19/99	
ROCKVILLE	16 25C Enteric Diseases, NMRI	7/3/99 From Rockville	04
ROCVVILLE	16 25E Threat Assessment, NMRI	7/3/99 From Rockville	_ 04
	17 :05H Enteric Infections	7/10/99	_
	18 105D (Immunology (Malaria Research)	7/17/99	_
	19 iOSD ¦Immunology (Malaria Research) !	7/24/99	_
	20 10 Veterinary Science WRAIR	7/31/99	_
	21 j058 (Enternology (majority)	8/7/99	_
	22 i09 Neurosciences 23 i07 Medicine & Surgery	8/14/99	_
		8/21/99	_
	24 07 Medicine & Surgery	8/28/99	-
17,21	26 : Tech Services, NMRI	9/4/99	02
ROCKVILLE	26 25B Malana Research, NMRI	9/11/99	- 04
ROCKVILLE	27 258 Malana Research, NMRI	9/18/99	- 04
KOCKVILLE	28 :05F ¡Clinical Trials		\neg
	28 14 Preventive Medicine	9/25/99	
	29 108 Neuropsychiatry	10/2/99	
17,18,21	30 248 Immune Cell Biology NMRI	10/9/99	06
17,18,21	31 248 Immune Cell Biology NMRI	10/16/99	06
.,,,	31 24C !Transfusion & Cryopreservation NMRI	10/16/99	06
53	32 23B (Diving / Environmental, NMR)	10/23/99	03
17,18,21	33 Misc WRAIR & NMR	10/30/99	00,01,02,04,0
17,10,21			
	Later 101 Director WRAJR (balance)	-1/15/00 Needs bldg 500 completion	
17	20 HQ NMRI (balance)	1/15/00 Needs bldg 500 completion	00,01
17 .	21A Purchasing Branch, NMRI	1/15/00 Needs bldg 500 completion	01
17	22A (MID, NMRI (6ldg 500)	1/15/00 Needs bldg 500 completion	01
			-
	Scenario based upon BOD of		
	NOTES 2/15/99		
	No moves are scheduled for the week of Building G	mod C (24 lune 1000)	

MOVE FLANNING Information as of 14 August 1998

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MOVE PLANNING Information as of 28 September 1998

NAME	Division/Depan	ment		
MOVE	Changes since last ESG me	eting	Scenario	1 Comment 2
Order		Constraint, March		
12121		20.220		
	Current Scheduled BOD		2/15/99	
	Possible Move Starting Date (BOD+3 1/2 wee	<u>ks}</u>	3/13/99	
			3/13/99	
1	Gen'l Support (LOG, Vet, Safety)			Gillette Bidg vacated (by 5/31)
2	17 Blood Research	artial)		Gillette Bidg vacated (by 5/31)
2	24C Transfusion & Cryopreservation NMRI (p	aruarj	3/27/99	
	12 Experimental Therapeutics		4/3/99	
4	12 Experimental Therapeutics			Bidg 500 vacated
5	12 Experimental Therapeutics		4/17/99	
6	04E ILbrary Services			Trailer@511, Bldg @506
	07F Respiratory Research		5/1/99	
-	06 Blochemistry			Bidg 40 Loading Dock vacated
	106 Biochemistry			
	01 HQ WRAIR		5/15/99	
	04F Med. AN Services			
	20 HQ NMRI		5/22/99	
	10 Vet. Sc. / 05H Enteric (misc)			
12	105E Viral Diseases		5/29/99	
12	12 Experimental Therapeutics (Bldg 40)		5/29/99	
	105A IBacterial Diseases		6/5/99	
14	05A Bacterial Diseases		6/12/99	
15	25F Viral/ Rickensial Diseases, NMRI		6/19/99	
15	25C IEnteric Diseases, NMRI		<u>£/19/99</u>	
16	25C [Enteric Diseases, NMR]			From Rockville
16	25E Threat Assessment, NMRI			From Rockville
17	105H Enteric Infections		7/10/59	
18	105D (Immunology (Malaria Research)		7/17/99	
19	105D Immunology (Malaria Research)		7/24/99	
20	10 Veterinary Science WRAIR		7/31/59	
21	05B [Entomology (majority)		8/7/99	
22	C9 Neurosciences	• •	8/14/99	
23	07 Medicine & Surgery		8/21/99	
	107 Medicine & Surgery		8/28/99	
	13 Pathology		9/4/99	
25			9/11/99	
26	25B IMalaria Research, NMRI I		9/11/99	
27	1258 IMalaria Research, NMRI I	•	9/18/99	
28	1057 Clinical Trials		9/25/99	
	114 Preventive Medicine		9/25/99	
29	08 Neuroesvchiatry		10/2/99	
30	248 (BORP) or (Immune Cell Biology) NMRI	•	10/9/99	
31	248 (BORP) or (Immune Cell Biology) NMRI	•	10/16/99	
31	24C Transfusion & Cryopreservation NMRI		10/16/99	
32	236 Diving / Environmental, NMR!		10/23/99	·
	Misc WRAIR & NMRI		10/30/99	
			<u> </u>	
Later	101 Director WRAIR (balance)			Needs bldg 500 completion
	20 HQ NMRI (balance)			Needs bidg 500 completion
	21A Purchasing Branch, NMRI			Needs bidg 500 completion
	22A [MID, NMRI (81d 500)		1/15/00	Needs bidg 500 completion
			1	
NOTE	S Scenario based upon BOD of 2/15/99			
	No moves are scheduled for the week of Built	ding G	rand Openi	ng (24 Juna 1999)
L				

ENCLOSURE (1)

printed: 9/28/98 FILE: presonauts

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BRIEFING DATA

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OCTOBER 1966

WAVAL MEDICAL RESEARCH INSTITUTE

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BRIEFING DATA OCTOBER 1966

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NAVAL MEDICAL RESEARCE INSTITUTE NATIONAL NAVAL MEDICAL CENTER

BRIEFING DATA

A. ORGANIZATION

COMMANDING OFFICER: EXECUTIVE OFFICER: ADMINISTRATIVE OFFICER: CAPTAIN H. C. Sudduth, MC USN CAPTAIN P. D. Doolan, MC USN CDR F. B. Essman, MSC USN

EXTERNAL COMMAND RELATIONSHIP

COMMAND: Commanding Officer, National Naval Medical Center SUPPORT: Bureau of Medicine and Surgery AREA COORDINATOR: Commandant, Naval District Washington

MISSION AND TASKS (BUMED INST. 5450.53A)

<u>Mission</u>. To conduct basic and applied research and development concerned with the health, safety, and efficiency of naval personnel.

Tasks. The following tasks are assigned to accomplish the mission:

a. Provide a basic and applied research competence in biomedical areas directly related to military requirements and operational needs.

b. Provide a source of scientific advisers and consultants readily available to the operational commands.

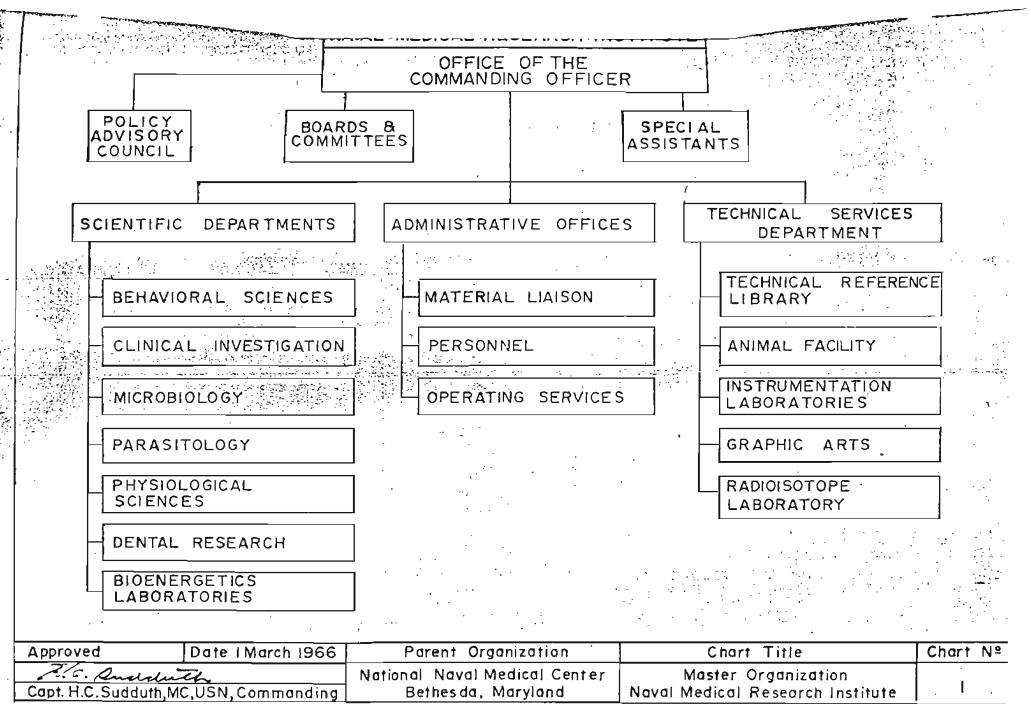
c. Provide support to the field laboratories, naval hospitals, and activities on problems beyond the local research capabilities.

d. Maintain a program of fundamental research in areas of military importance to develop skills and knowledge in anticipation of future weapons.

e. Provide a scientific potential for the application of military knowledge to new operational situations and demands.

f. To cooperate with the Naval Hospital, National Naval Medical Center, Bethesda, Maryland in supporting clinical investigation, laboratory examinations, and residency training.

g. Provide or undertake such other appropriate functions as may be authorized or directed by higher authority.



NMRI is housed in a complex of eleven buildings, some of which are permanent and others of temporary construction. The total area is approximately 167,000 square feet.

BUILDING 17. This, the main building, consisting of three wings, with a partial sub-basement and four floors is a permanent type structure. The three wings were constructed at differentetimes. Building 17, the main building, was the original NMRI structure built in 1942. Wing 17A was erected in 1945-46 as an annex to the main building and Wing 17B was added in 1955-56 as an annex to the opposite ended the main structure. The total area of this building is 84,398. square feet. The sub-basement houses utility machinery and storage areas. A project for the installation of six specially constructed, acoustically treated "deep-isolation laboratories" by the Industrial Acoustics Corporation was completed in 1964. These laboratories provide complete control of visual and auditory stimulation from external sources when fully instrumented. Soon to be provided with closed-circuit television, and already equiped with two-way communication systems, task programming and recording equipment, these laboratories will permit studies of small groups in isolation under conditions varying from routine activities in isolation to vitual immobilization in darkness, silence and temperature extremes. These facilities are assigned to the Behavioral Sciences Department. The basement floor of Eldg. 17 accommodates laboratories for Biochemistry, an Insectarium, a Low Pressure Chamber with its machinery and supporting work spaces, Instrumentation Leb, the NMRI Auditorium, and facilities for duplicating and report preparation.

The first floor houses the Institute's Technical Reference Library, the Administrative Offices (Offices of the Commanding Officer, Executive Officer, Administrative Officer, Personnel Officer, Maintenance Liaison Officer, Operating Services Officer, the Officer of the Day's Office) and spaces for files, records, for administrative support functions. The Administrative Office also has equipment to render such services to the Institute as reprography, offset lithography, and collating. Also located on the first floor are laboratories, workrooms and offices of the Experimental Medicine Division, the Physical Biochemistry Division, and the Dental Research Department.

The second floor houses the laboratories and work-spaces of the Chemistry Division, the Parasitology Department and the Microbiology Department. Located on this floor also are special facilities for the study of LASER induced injuries, the laboratories of Nutritional Biochemistry Division, the Hematology and Radioisotope Division of the Clinical Investigation Department, and the Medical Illustrating Laboratory.

The third floor, Building 17, is occupied by the Biophysics laboratories and work rooms with facilities for study of effects of short-wave electromagnetic radiations, mechanical and electrical aspects of nerve and muscle action. Unique facilities exist for the study of Cryobiology with emphasis on freezing and reconstituting frozen specimens and freeze-drying. X-ray facilities to serve the entire Institute are available in this area. The photo-lab is also located on this deck. The remainder of the third floor is occupied by laboratories and work-spaces of the Microbiology Department. A new, specially designed laboratory for the study of meningcocccic meningitis was constructed in this area in 1964. Equipped to process specimens isolated and forwarded to it from military installations throughout the United States, the laboratory is constructed in such a manner as to facilitate handling of highly infectious material.

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BUILDING 18. A permanent-type structure with basement and two floors; total area 13,953 square feet. This building was constructed in 1942 and utilized as the animal facility until 1946, when it was converted to laboratory space and model shops. A consolidation of the maintenance and shop facilities of the NNMC resulted during 1961 in the physical transfer of NNRI's modelmaking, construction and repair shops. The spaces vacated by the removal of these facilities were assigned to the Department of Behavioral Sciences. Isolated observation rooms and workrooms are available, in the Basement, and office space for Director of the Department and his office staff on the first floor. The Fiscal Liaison Officer is located on this floor. The remainder of the first floor is occupied by the Pathology Branch of the Clinical Investigation Department. In addition to standard facilities for pathology, a Phillips 100 Electron Microscope obtained as surplus from Pensacola has recently been installed. The second floor of Building 18 is occupied by laboratories and work-spaces of Department of Parasitology.

BUILDING 119. A frame building of temporary construction, built in 1943 for High Pressure Research. Total area assigned to NMRI is 8,669 square feet. In 1959, 3.700 square feet of space in this building was made available for the facilities of the Navy Toxicology Unit, which still occupies the area. This two-story building houses facilities for research in support of submarine and diving operations, complementing the work and facilities of the Experimental Diving Unit, Navy Yard, Washington, D. C., and the Submarine Medical Center, New London, Connecticut. NMRI pressure facilities were very active in the years 1943 to 1950. With decreased interest in diving problems the program gradually deteriorated to a point of nearly total inactivity by 1958. Recent resurgence of interest, particularly with the initiation of the Deep Submergence System Program by the Navy has brought about a renewal of activity at NMRI. Present facilities consist of the two original pressure chambers and ancillary equipment. One chamber was criginally designed to sustain pressure equivalent to 1,000 feet of sea water, and the second. larger chamber, for an. equivalent pressure of 750 feet of sea water. This air-conditioned chamber includes a "wet pot" which can be used for conducting simulated dives in water. Both chambers are in need of repairs and cannot reach their rated depth. The Bureau of Ships has provided funds for the rehabilitation of these chambers. A water immersion tank, 10 feet in diameter and 12 feet deep, containing filtration, heating and cooling systems, is also available and presently utilized for studies on effects of immersion and evaluation of wet suits for underwater swimming. Also located in this building are facilities for studies in stress physiology, including a simulated ship's compartment, and weather rooms with constant temperature and humidity controls.

BUILDING 28. A semi-permanent building, constructed in 1952, with an area of 5,856 square feet. This building houses the Bioenergetics Laboratories, containing unique facilities for a study of human and molecular energetics, including a human gradient calorimeter.

BUILDING 139. This building, constructed in 1944, originally served as the NIMC Bus Garage. It was later converted to laboratory and work rooms for MRI and included facilities for studies in aviation medicine, and a laboratory and specialized equipment for the studies of effects of shock and vibration. NMRI occupies 1371 square feet of this building now for the vibration laboratories. In 1962 Biophysics Division acquired high speed X-ray motion picture equipment for studies on the motion of internal organs of man and animals subjected to shock and vibrations.

BUILDING 142. This is a wood frame Barracks building with a basement and two floors. The total area is 13,104 square feet. The east end is utilized as the NMRI enlisted Barracks. Upon vacation of the west end by the dental enlisted personnel in 1964 it was assigned to NMRI, and has been converted to work rooms, laboratories and office space for Behaviroal Sciences research. Observation and testing rooms are equipped with closed-system television.

BUILDING 165. A cinder block, one-story structure with an area of 1,536 square feet. The Building serves as an annex for the Environmental Stress Division as a location for additional facilities for high-pressure research.

<u>BUILDING 21.</u> A permanent construction building erected in 1946, with a total area of 35,828 square feet, contains a basement and three floors. Operating rooms and work-spaces of the Experimental Surgery Division are located on the second floor. The remainder of Building 21 houses the Institute's Animal Breeding and Management Facility.

BUILDING 146 is a frame, temporary building, constructed in 1947 to house experimental animals utilized in the atomic bomb tests. It is now utilized as a dog kennel. Total area 11025 agare feet.

AUIIDING 156. This temporary building, constructed in 1951 as an aviary, now also houses dogs for research. Total area--600 square feet.

<u>BUILDING T-11</u> is a quonset hut, total area 754 square feet and is used for storage of cages and other animal facility equipment.

27



REF

COMMAND HISTORICAL REPORT



1991

COMMAND MISSION

The mission of the Naval Medical Research Institute, as assigned by the Secretary of the Navy, and the tasks to be performed to accomplish this mission, as assigned by the Commander, Department of the Navy, Bureau of Medicine and Surgery, are to:

Conduct research, development, tests, and evaluations to enhance the health, safety, and readiness of Navy and Marine Corps personnel in the effective performance of peacetime and contingency missions and to perform such other functions or tasks as many be directed by higher authority.

The functions of the Naval Medical Research Institute are to:

a. Provide basic and applied research competence in infectious diseases, tissue transplantation, diving and hyperbaric medicine, casualty care, environmental medicine, and human factors directly related to military requirements and operational needs.

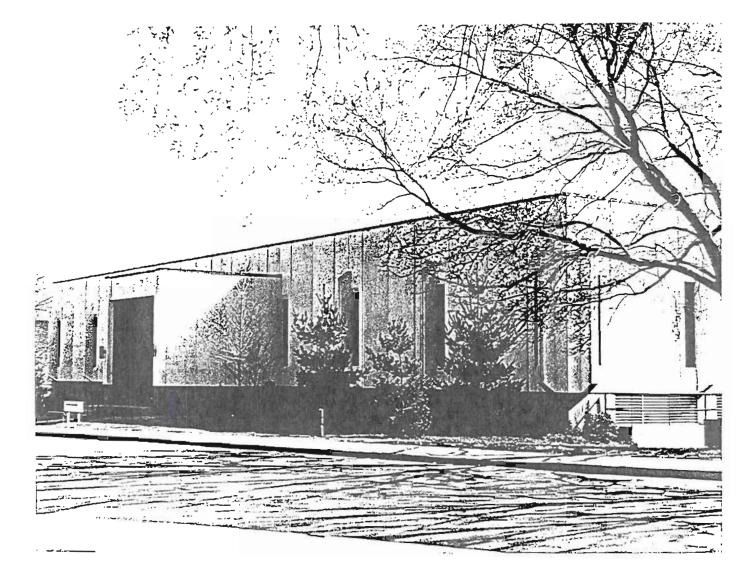
b. Maintain a program of basic biomedical research in areas of military importance to develop knowledge in anticipation of future problems.

c. Provide a scientific potential for the application of new biomedical knowledge to operational problems and requirements.

d. Provide a source of scientific advisors and consultants readily available to the operational commands.

e. Provide biomedical research capabilities to support field laboratories, naval hospitals, and other naval activities in problems beyond their capabilities.

f. To the extent it is in consonance with the Institute's mission, provide support to the National Naval Medical Center; Naval Health Sciences Education and Training Command; and the Uniformed Services University of the Health Sciences.



Hyperbaric Facility Building 53

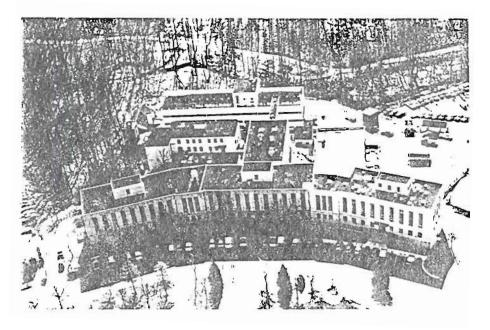
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Maval Medical Research Institute Building 17, 17A, 17B



HYPERBARIC RESEARCH FACILITY COMMISSIONED, JULY 1981



NAVAL MEDICAL RESEARCH INSTITUTE AERIAL VIEW - CIRCA 1953

D-14 Memorandum of Understanding between NNMC and NIH

MEMORANDUM OF UNDERSTANDING BETWEEN NATIONAL NAVAL MEDICAL CENTER AND NATIONAL INSTITUTES OF HEALTH

Recognizing the National Performance Review mandates that government agencies become more business like and cooperate through interservice support agreements; and

Recognizing that the transfer of Naval Medical Research Institute functions from the National Naval Medical Center complex will cause a surplus of research laboratory space on said facility that exceeds the needs of National Naval Medical Center; and

Recognizing that improved health care delivery efficiency with the National Capital Region has created the opportunity to open up clinical spaces within the National Naval Medical Center; and

Recognizing the public and congressional mandate to the National Institutes of Health to increase the volume of intramural and extramural biomedical research; and

Recognizing that the National Institutes of Health is in need of research laboratory, clinical, and administrative space in close proximity to its Bethesda, MD complex; and

Recognizing that the National Institutes of Health is prepared to assume responsibility on a reimbursable basis to the National Naval Medical Center for use of available space in such a way as to augment the medical mission of both the Navy and the NIH;

It is therefore agreed that a partnering relationship be established between the National Institutes of Health and the National Naval Medical Center under such terms and conditions as are mutually agreed upon.

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MICHAEL GOTTESMAN, M.D. Deputy Director for Intramural Research National Institutes of Health DATE: <u>XIZ</u>GX

BONNIE B. POTTER RADM, MC, USN Commander. National Naval Medical Center DATE: <u>S(1)</u>S

D-15 Letter of Agreement between USUHS and NMRI/NMRC

29

Letter of Agreement Between The Uniformed Services University of the Health Sciences (USUHS) and The Naval Medical Research Institute / The Naval Medical Research Center (NMRI/NMRC)

Agreement

- A. USUHS which is working in cooperation with the National Alliance for the Mentally III (NAMI) Research Institute accepts responsibility for 66 percent of the direct overhead charges (charged on a square foot basis) for Building 53, not to exceed \$200,000 per year, beginning at the time the NAMI Research Institute freezens are transferred to Building 53. This payment will include access to and costs incurred to the NMRI/NMRC telephone system (not to exceed 10 telephone lines) and network cable plant services.
- B. USUHS through the NAMI Research Institute accepts responsibility for all costs incurred in the renovation of Building 53, as a result of this agreement, including costs incurred renovating space for the present occupants of Rooms 12 and 13.
- C. All personnel will abide by all NMRI/NMRC and Departmental scarrity, laboratory and safety regulations, including those involving radioactive substances and hazardous materials.
- D. NMRI/NMRC will allow all personnel assigned duties related to this agreement access to Building 53 using ID badges and will provide parking permits for the E lot.
- E. All producement of supplies and delivery under this agreement will go through USUHS not through NMRI/NMRC.
- F. For purposes of the Brain Research Laboratory only, the primary contact person for the USUHS, Department of Psychiatry, NAMI Research Institute Brain Research Laboratory will be Marse Webster, PhD, Director of the Laboratory. Alternative contact persons are Linda Bobo, PhD and E. Fuller Terrey, MD.
- G. USUHS agrees to reimburse NMRI/NMRC for costs outlined in Paragraph A, on a quarterly basis. Each reimbursement will be documented by USUHS on a DD Form 448, Military Interdepartmental Purchase Request (MIPR), and will reference this agreement.
- H. This Letter of Agreement will become effective when signed by all parties. NMRI will execute this Agreement until 30 September 1998, at which time NMRI shall change to the Naval Medical Research Center (NMRC). Thereafter NMRC will assume the duties and obligations of NMRI under this agreement and will continue until terminated by the parties.

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Approvals and Acceptances

For USUHS 3 James A. Zimble, MD 9-11 President

For NMRI/NMRC

Thomas Contreras, PhD CAPT, USN Commanding Officer

Raviewed and acknowledged For NAMI Research Institute

17 Jam

E. Fuller Torrey, MD Executive Directol

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DEPARTMENT OF THE NAVY OFFICE OF THE CHIEF OF NAVAL OPERATIONS 2000 NAVY PENTAGON WASHINGTON, D.C. 20350-2000

IN REPLY REFER TO 6470 Ser N455C/9U595174 08 Feb 99

From: Chairman, Naval Radiation Safety Committee
To: Commanding Officer, Naval Medical Research Center,
8901 Wisconsin Avenue, Bethesda, MD 20889-5607

Subj: NAVAL RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT

Ref: (a) NAVMEDRSCHCEN Bethesda ltr 6470 ser OOS/037525 of 28 Jan 99

Encl: (1) NRMP Number 19-32398-41NP, Amendment No. 01

1. As requested by reference (a), your NRMP has been amended to specifically address residual cobalt-60 contamination in Building 150 at Naval Medical Research Center, Bethesda, MD.

2. The remains of Building 150 shall be incorporated into your Radiological Decontamination and Decommissioning Plan as indicated in reference (a). As stated in Permit Condition 12, access to the building shall be restricted and remain under the control of the Radiation Safety Officer until the Naval Radiation Safety Committee has authorized release of the building.

3. I am forwarding enclosure (1) as your new permit for the use of radioactive material. Changes to your NRMP are printed in bold typeface. Please review the enclosed NRMP carefully and be sure that you understand all conditions. For additional information, please contact Mr. Paul Tveten, Navy Environmental Health Center, at DSN 253-5584 or (757) 462-5584, facsimile (757) 445-9481 or E-mail at tvetenp@nehc.med.navy.mil.

K. Blake

P. K. BLAKE By direction

copy to: BUMED (MED~211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA

OPNAVINST 6470.3 NAVAL RADIOACTIVE MATERIAL PERMIT -

1 - COMMAND		5/GNED 08 FEB99 2 - PERMIT NO. 19-32398-41NP Former ly 19-64223-41NP
COMMANDING OFFIC NAVAL MEDICAL RE 8901 WISCONSIN A BETHESDA, MD 20	Formerly 19-64223-41NP 3 - AMENDMENT NO. 01 4 - DOCKET NO.	
(FORMERLY NAVAL MEDICAL RESEARCH INSTITUTE)		
		5 - EXPIRATION DATE
		31 DECEMBER 2002
- RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED
Hydrogen-3	Any	3 Curies
Carbon-14	Алу	500 Millicuries
Phosphorus-32	Алу	200 Millicuries
. Phosphorus-33	Any	70 Millicuries
. Sulfur-35	Any	200 Millicuries
. Calcium-45	Any	150 Millicuries
. Chromium-51	Алу	500 Millicuries
. Iodine-125	Any	500 Millicuries
. Cesium-137	Sealed Sources	9000 Curies
. Cesium-137	Sealed Sources	300 Curies

9. Authorized Use: a.- h. Laboratory research, including animal studies

UNITED STATES NAVAL RADIATION SAFETY COMMITTEE

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

i. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

j. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

k. Storage only pending decommissioning and release.

PERMIT CONDITIONS

- 10. The Command's Naval Radioactive Material Permit (NRMP) is amended and reprinted in its entirety. Changes to your permit are printed in bold typeface. Your permit amendment request and other correspondence as listed in Permit Condition 30 are considered an integral part of this Naval Radioactive Material Permit and shall be maintained on file with the permit.
- 11. Radioactive material authorized by this Permit shall be stored and used only at Naval Medical Research Center, Bethesda, MD; Naval Medical Research Center, Rockville Annex, 12300 Washington Avenue, Rockville, MD; and Naval Medical Research Center Bone Marrow Registry, 5516 Nicholson Lane, Kensington, MD.
- 12. The remains of Building 150 at Naval Medical Research Center, Bethesda, MD shall be incorporated into the Command's Radiological Decontamination and Decommissioning (D&D) Plan. Access to the building shall be restricted and remain under the control of the Radiation Safety Officer until the Naval Radiation Safety Committee has authorized release of the building.
- The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LCDR S. L. Gaiter, MSC, USN.
- 14. Radioactive material authorized by this permit shall be used by, or under the supervision of, individuals designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by, or under the supervision of, LCDR S. L. Gaiter, MSC, USN; HM1 J. Howe, USN; or HM3 S. A. Ahmad, USN.
- 15. a. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

microcuries of alpha emitting material shall be tested for leakage at intervals not to exceed six months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

b. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

c. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

d. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Nuclear Regulatory Commission regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Chief, Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addressees.

e. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

- 16. This permit does not authorize repairs or alterations of the gamma irradiators involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.
- 17. Written procedures submitted in the permit application for use of the gamma irradiators shall be followed and a copy of

United States Naval Radiation Safety Committee

<u>Radioactive Material Permit</u>

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

these procedures shall be made available to each individual using or having responsibility for use of the device.

- 18. The command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark 1 irradiator.
- 19. Radioactive material shall not be used in or on human beings or in field applications where activity is released.
- 20. Experimental animals, or the products from experimental animals, that have been administered radioactive material shall not be used for human consumption.
- 21. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersible form, shall have their thyroid burden measured at least quarterly.
- 22. The command is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures of 10 CFR 35.92.
- 23. An amendment request to this Permit is required for a change in Radiation Safety Officer, authorized users, additional types of use of radioactive material, or a new location of use of radioactive material.
- 24. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with the Bureau of Medicine and Surgery (MED-21) and Navy Environmental Health Center (NAVENVIRHLTHCEN) as information addressees for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20.1906).

(2) Theft or loss of radioactive material (10 CFR 20.2201).

United States Naval Radiation Safety Committee

<u>Radioactive Material Permit</u>

PERMITNO. 19-32398-41NP AMENDVENTNO. 01

(3) Radiation incidents as defined by 10 CFR 20.2201 10 CFR 30.50.

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N48 within 15 days with an information copy to Navy Environmetric) Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 18 day for the following:

(1) Overexposure and excessive levels and concentrations(10 CFR 20.2203).

- 25. The command shall conduct a physical inventory every six months to account for all sealed and unsealed sources, including waste, received and possessed under this permits Records shall be maintained for five years from the date of the inventory and shall include the quantities and kinds of radioactive material, manufacturer's name and model/lot number, location of use or storage and the date of the inventory and shall be signed by the Radiation Safety Officer.
- 26. The Radiation Safety Officer or a qualified designed will personally approve all transfers of radioactive material covered by this Permit. This includes a review of the packaging, labeling, and documentation of each outgoing shipment as well as the receipt process for each invoming shipment.
- 27. The permittee is authorized receipt and transfer of any permitted material in accordance with the provisions of L. CFR Part 20 and 10 CFR Part 71.
- 28. All personnel involved in the receipt, handling, propagation or transfer/shipment of radioactive material shall be trained in accordance with 49 CFR Subpart H. Documentation of training and testing shall be maintained for through and
- 29. The command shall comply with and maintain current copies of the following:

a. Title 10, Code of Federal Regulations, Farme and 71 and 30, 35 and 71; and 49 CFR Parts 170-173.

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

Page 6 of 6 pages

- b. BUMEDINST 6470.20.
- c. OPNAVINST 6470.3.
- d. NAVMED P-5055.
- 30. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with statements, representations, and procedures contained in the following correspondence:
 - a. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/35524 of 5 Dec 96.
 - b. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/35818 of 11 Mar 97.
 - c. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/36478 of 1 Dec 97.
 - d. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/36517 of 16 Dec 97.
 - e. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/37181 of 25 Aug 98.
 - f. NAVMEDRSCHCEN Bethesda ltr 6470 Ser OOS/037525 of 28 Jan 99.
- 31. The Command shall maintain records for review by the Naval Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

DATE: \$8 Feb 99

Blake

P. K. BLAKE Captain, MSC, USN Executive Secretary Naval Radiation Safety Committee

D-17 NMRC NRMP, No. 19-32398-41NP; also includes the termination of NMRI NRMP, No. 19-64223-41NP



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DEPARTMENT OF THE NAVY OFFICE OF THE CHIEF OF NAVAL OPERATIONS WASHINGTON, DC 20350-2000

> N REPLY REFER TO 6470 Ser N455C/8U589162 25 Nov 98

- From: Chairman, Naval Radiation Safety Committee
 To: Commanding Officer, Naval Medical Research Center,
 8901 Wisconsin Avenue, Bethesda, MD 20889-5607
- Subj: NAVAL RADIOACTIVE MATERIAL PERMIT (NRMP) TERMINATION AND REISSUE
- Ref: (a) OPNAVNOTE 5450 Ser 09B22/8U509654 of 11 Sept 98
- Encl: (1) NRMP Number 19-32398-41NP (2) NRMP Number 19-64223-41NP

1. In response to reference (a), your NRMP No. 19-32398-41NP has been issued with an expiration date of 31 December 2002.

2. This NRMP replaces NRMP No. 19-64223-41NP which was previously issued to the Naval Medical Research Institute, Bethesda and is hereby terminated. All records pertaining to the terminated permit shall be retained with the new permit.

3. Permit Condition 22 is added to address circumstances that require a permit amendment.

4. The periodicity of Permit Condition 24 is changed to six months for the physical inventory of sealed and unsealed sources.

5. Enclosure (1) has been approved by the Naval Radiation Safety Committee and is forwarded as your authorization for the use of radioactive material. Enclosure (2) is provided to terminate NRMP No. 19-64223-41NP.

6. For additional information, please contact Mrs. Dorothy M. Clark, Navy Environmental Health Center, at DSN 253-5574 or (757) 462-5574, facsimile (757) 445-9481 or e-mail at clarkd@nehc.med.navy.mil.

P. K. BLAKE By direction

copy to: BUMED (MED-211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA

OPNAVINST 6470.3

_NAVAL RADIOACTIVE MATERIAL PERMIT

Pursuant to the authority stated in OPNAVINST 6470.3, Naval Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

1 - COMMAND COMMANDING OFFICER NAVAL MEDICAL RESEARCH CENTER 8901 WISCONSIN AVENUE BETHESDA, MD 20889-5607 (FORMERLY NAVAL MEDICAL RESEARCH INSTITUTE)		2 - PERMIT NO. 19-32398-41NP Formerly 19-64223-41NP 3 - AMENDMENT NO. 4 - DOCKET NO.
		31 DECEMBER 2002
- RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED
. Hydrogen-3	Any	3 Curies
. Carbon-14	Any	500 Millicuries
. Phosphorus-32	Any	200 Millicuries
. Phosphorus-33	Any	70 Millicuries
. Sulfur-35	Any	200 Millicuries
. Calcium-45	Any	150 Millicuries
. Chromium-51	Any	500 Millicuries
. Iodine-125	Any	500 Millicuries
. Cesium-137	Sealed Sources	9000 Curies
. Cesium-137	Sealed Sources	300 Curies

9. Authorized Use:

a.- h. Laboratory research, including animal studies.

i. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

UNITED STATES NAVAL RADIATION SAFETY COMMITTEE

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO.

j. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

PERMIT CONDITIONS

10. The Command's Radioactive Material Permit is reissued and reprinted in its entirety. Changed conditions are denoted by (A for additions and (R for revisions. Your permit applications and other correspondence as listed in Permit Condition 28 are considered an integral part of this Naval Radioactive Material Permit and shall be maintained on file with the permit.

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- 11. Radioactive material authorized by this Permit shall be stored and used only at Naval Medical Research Institute, Bethesda, MD; Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD; and Naval Medical Research Institute Bone Marrow Registry, 5516 Nicholson Lane, Kensington, MD.
- 12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LCDR S. L. Gaiter, MSC, USN.
- 13. Radioactive material authorized by this permit shall be used by, or under the supervision of, individuals designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by, or under the supervision of, LCDR S. L. Gaiter, MSC; USN; HM1 J. Howe, USN; or HM3 S. A. Ahmad, USN.
- 14. a. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage at intervals not to exceed six months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

b. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

OPNAVINST 6470.3

Page 3 of 6 pages

SUPPLEMENTARY SHEET

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO.

c. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

d. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Nuclear Regulatory Commission regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Chief, Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addressees.

e. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

- 15. This permit does not authorize repairs or alterations of the gamma irradiators involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.
- 16. Written procedures submitted in the permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.
- 17. The command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark 1 irradiator.
- Radioactive material shall not be used in or on human beings or in field applications where activity is released.
- 19. Experimental animals, or the products from experimental animals, that have been administered radioactive material shall not be used for human consumption.

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO.

(A)

20. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersible form, shall have their thyroid burden measured at least quarterly.

21. The command is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures of 10 CFR 35.92.

22. An amendment request to this Permit is required for a change in Radiation Safety Officer, authorized users, additional types of use of radioactive material, or a new location of use of radioactive material.

23. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with the Bureau of Medicine and Surgery (MED-21) and Navy Environmental Health Center (NAVENVIRHLTHCEN) as information addressees for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20.1906).

(2) Theft or loss of radioactive material (10 CFR 20.2201).

(3) Radiation incidents as defined by 10 CFR 20.2202 and 10 CFR 30.50.

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 15 days for the following:

(1) Overexposure and excessive levels and concentrations(10 CFR 20.2203).

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO.

- 24. The command shall conduct a physical inventory every six months to account for all sealed and unsealed sources, including waste, received and possessed under this permit. Records shall be maintained for five years from the date of the inventory and shall include the quantities and kinds of radioactive material, manufacturer's name and model/lot number, location of use or storage and the date of the inventory and shall be signed by the Radiation Safety Officer.
- 25. The Radiation Safety Officer or a qualified designee will personally approve all transfers of radioactive material covered by this Permit. This includes a review of the packaging, labeling, and documentation of each outgoing shipment as well as the receipt process for each incoming shipment.
- 26. The permittee is authorized receipt and transfer of any permitted material in accordance with the provisions of 10 CFR Part 20 and 10 CFR Part 71.
- 27. All personnel involved in the receipt, handling, preparation or transfer/shipment of radioactive material shall be trained in accordance with 49 CFR Subpart H. Documentation of training and testing shall be maintained for three years.
- 28. The command shall comply with and maintain current copies of the following:

a. Title 10, Code of Federal Regulations, Parts 19, 20, 21, 30, 35 and 71; and 49 CFR Parts 170-173.

- b. BUMEDINST 6470.20.
- c. OPNAVINST 6470.3.
- d. NAVMED P-5055.

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United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO.

29. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with statements, representations, and procedures contained in the following correspondence:

- a. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/35524 of 5 Dec 96.
- b. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/35818 of 11 Mar 97.
- c. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/36478 of 1 Dec 97.
- d. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/36517 of 16 Dec 97.
- e. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/37181 of 25 Aug 98.

30. The Command shall maintain records for review by the Naval Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

DATE: 25 Nov 98

P. K. BLAKE Captain, MSC, USN Executive Secretary Navy Radiation Safety Committee

OL NAVIN'ST 6470.3 NAVAL RADIOACTIVE MATERIAL PERMIT -

Pursuant to the authority stated in OPNAVINST 6470.3, Naval Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

1 - COMMAND		2 - PERMIT NO. 19-64223-41NP
COMMANDING OFFI NAVAL MEDICAL F 8901 WISCONSIN BETHESDA, MD 2	ESEARCH INSTITUTE AVENUE	3 - AMENDMENT NO. 03
		4 - DOCKET NO.
		5 - EXPIRATION DATE 31 DECEMBER 2002
6 - RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED

- 9. This Naval Radioactive Material Permit (NRMP) is terminated.
- 10. No historical radiological assessment or termination surveys are required. The facilities and materials authorized by this permit remain in use under NRMP No. 19-64223-41NP issued to Naval Medical Research Center, Bethesda, MD.
- 11. All records pertaining to this permit shall be retained with NRMP No. 19-32398-41NP.

DATE: 25 Nov 98

P. K. BLAKE Captain, MSC, USN Executive Secretary Navy Radiation Safety Committee

UNITED STATES NAVAL RADIATION SAFETY COMMITTEE



DEPARTMENT OF THE NAVY OFFICE OF THE CHIEF OF NAVAL OPERATIONS 2000 NAVY PENTAGON WASHINGTON. D.C. 20350-2000

IN REPLY REFER TO 6470 Set N455C/8U589031 01 Oct 98

From: Chairman, Naval Radiation Safety Committee
To: Commanding Officer, Naval Medical Research Institute,
8901 Wisconsin Avenue, Bethesda, MD 20889-5607

Subj: NAVAL RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT

Ref: (a) Your ltr 6470 Ser 09A/037181 of 25 August 1998

Encl: (1) NRMP Number 19-64223-41NP, Amendment 02

1. As requested by reference (a), your NRMP has been amended to delete the Best Industries Gammaradiator which was removed by J. L. Shepherd and Associates on 3 August 1998.

2. The following changes to your permit have also been made:

a. Permit condition 23 requiring physical inventory of both sealed and unsealed sources, is revised to add radioactive waste and to change the inventory frequency to every three months.

b. The format of permit conditions 10, 27 and 28 is revised to clarify references to federal regulations and correspondence integral to the permit.

c. Permit Conditions 25 and 26 are added to address training and transportation requirements for receipt and transfer of permitted material.

3. I am forwarding enclosure (1) as your amended authorization for the use of radioactive material. Please review the enclosed NRMP carefully and be sure that you understand all conditions. For additional information, please contact Mr. Paul Tveten, Navy Environmental Health Center, at DSN 253-5584, (757) 462-5584, Fax to (757) 444-3672, or by E-mail at tvetenp@nehc.med.navy.mil.

P. K. BLAKE By direction

copy to: BUMED (MED-211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA

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OPNAVINST 6470.3 NAVAL RADIOACTIVE MATERIALS PERMIT-

Pursuant to the authority stated in OPNAVINST 6470.3, Naval Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit. $\Im(GAED) = O(CC798)$

	1 - COMMAND		2 - PERMIT NO. 19-64223-41NP
	COMMANDING OFFICE NAVAL MEDICAL RES 8901 WISCONSIN AN BETHESDA, MD 200	SEARCH INSTITUTE VENUE	3 - AMENDMENT NO. 02
			4 - DOCKET NO.
			5 - EXPIRATION DATE
			31 DECEMBER 2002
6 -	RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED
a.	Hydrogen-3	Any	3 Curies
b.	Carbon-14	Any	500 Millicuries
c.	Phosphorus-32	Any	200 Millicuries
d.	Phosphorus-33	Any	70 Millicuries
e.	Sulfur-35	Any	200 Millicuries
f.	Calcium-45	Any	150 Millicuries
g.	Chromium-51	Any	500 Millicuries
h.	Iodine-125	Any	500 Millicuries
i.	Cesium-137	Sealed Sources	9000 Curies
j.	Cesium-137	Sealed Sources	300 Curies

9. Authorized Use:

a.- h. Laboratory research, including animal studies.

i. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

UNITED STATES NAVAL RADIATION SAFETY COMMITTEE

OPNAVINST 6470.3

- SUPPLEMENTARY SHEET -

United States Naval Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO. 02

j. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

PERMIT CONDITIONS

- 10. The Command's Radioactive Material Permit is amended and reprinted in its entirety. Changed conditions as a result of this amendment are denoted by (A for additions and (R for revisions. Your permit applications and other correspondence as listed in Permit Condition 28 are considered an integral part of this Naval Radioactive Material Permit and shall be maintained on file with the permit. (R
- 11. Radioactive material authorized by this Permit shall be stored and used only at Naval Medical Research Institute, Bethesda, MD; Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD; and Naval Medical Research Institute Bone Marrow Registry, 5516 Nicholson Lane, Kensington, MD. (R
- 12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LCDR S. L. Gaiter, MSC, USN.
- 13. Radioactive material authorized by this permit shall be used by, or under the supervision of, individuals designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by, or under the supervision of, LCDR S. L. Gaiter, MSC, USN or HM3 S. A. Ahmad, USN.
- 14. a. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage at intervals not to exceed six months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

b. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

United States Naval Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO. 02

c. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Naval Radiation Safety Committee.

d. If Ehe test reveals the presence of 0.005 microcuries or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Nuclear Regulatory Commission regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Chief, Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addressees.

e. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

- 15. This permit does not authorize repairs or alterations of the gamma irradiators involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.
- 16. Written procedures submitted in the permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.
- 17. The command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark 1 irradiator.
- 18. Radioactive material shall not be used in or on human beings or in field applications where activity is released.

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United States Naval Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO. 02

- 19. Experimental animals, or the products from experimental animals, that have been administered radioactive material shall not be used for human consumption.
- 20. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersible form, shall have their thyroid burden measured at least quarterly.
- 21. The command is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures of 10 CFR 35.92.
- 22. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with the Bureau of Medicine and Surgery (MED-21) and Navy Environmental Health Center (NAVENVIRHLTHCEN) as information addressees for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20.1906).

(2) Theft or loss of radioactive material (10 CFR 20.2201).

(3) Radiation incidents as defined by 10 CFR 20.2202 and 10 CFR 30.50.

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 15 days for the following:

(1) Overexposure and excessive levels and concentrations
(10 CFR 20.2203).

United States Naval Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO. 02

- 23. The command shall conduct a physical inventory every three months to account for all sealed and unsealed sources, including waste, received and possessed under this permit. Records shall be maintained for five years from the date of the inventory and shall include the quantities and kinds of radioactive material, manufacturer's name and model/lot number, location of use or storage and the date of the inventory and shall be signed by the Radiation Safety Officer. (R
- 24. The Radiation Safety Officer or a qualified designee will personally approve all transfers of radioactive material covered by this Permit. This includes a review of the packaging, labeling, and documentation of each outgoing shipment as well as the receipt process for each incoming shipment.
- 25. The permittee is authorized receipt and transfer of any permitted material in accordance with the provisions of 10 CFR Part 20 and 10 CFR Part 71.
- 26. All personnel involved in the receipt, handling, preparation or transfer/shipment of radioactive material shall be trained in accordance with 49 CFR Subpart H. Documentation of training and testing shall be maintained for three years. (A
- 27. The command shall comply with and maintain current copies of the following: (R
 - a. Title 10, Code of Federal Regulations, Parts 19, 20, 21, 30, 35 and 71; and 49 CFR Parts 170-173.
 - b. BUMEDINST 6470.20.
 - C. OPNAVINST 6470.3.
 - d. NAVMED P-5055.
- 28. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with statements, representations, and procedures contained in the following correspondence: (R
 - a. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/35524 of 5 Dec 96.
 - b. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/35818 of 11 Mar 97.

OPNAVINST 6470.3

— SUPPLEMENTARY SHEET –

United States Naval Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO. 02

- c. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/36478 of 1 Dec 97.
- d. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/36517 of 16 Dec 97.
- e. NAVMEDRSCHINSTUTUTE Bethesda ltr 6470 Ser 09A/37181 of 25 Aug 98.
- 29. The Command shall maintain records for review by the Naval Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

DATE: <u>\$1</u> Oct 1998

P.J. Blake

P. K. BLAKE Captain, MSC, USN Executive Secretary Naval Radiation Safety Committee

IN REPLY REFER TO 6470 Ser N455C/70595337 15 Dec 97

Chairman, Lavy Radiation Safety Committee From: Commanding Officer, Naval Medical Research Institute, To: 8901 Wisconsin Avenue, Bethesda, MD 20889-5607

O OFFICE OF THE CHIEF OF NAVAL OPERATIONS 2000 NAVY PENTAGON WASHINGTON, D.C. 20350-2000

THE NAVY

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) RENEWAL

(a) Your 1tr 6470 Ser 09A/35818 of 11 Mar 97 Ref: (b) Your ltr 6470 Ser 09A/35524 of 5 Dec 96

DEPARTMENT

Encl: (1) NRMP Number 19-64223-41NP

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1. As requested by reference (a), your NRMP Number 19-64223-41NP has been renewed, with a new expiration date of 31 December 2002.

The following revisions are made to your permit by this 2. renewal:

a. Based on statements contained in references (a) and (b), you are authorized to possess and use radioactive materials authorized by this NRMP for in-vitro laboratory research in Room 337, Nicholson Research Building A, 5516 Nicholson Lane, Kensington, Maryland 20895.

b. Permit Condition 13 revises the radiation safety staff members resposible for supervising use of the gamma irradiators.

c. Permit Condition 19 is added to stipulate that experimental animals administered radioactive materials shall not be used for human consumption.

d. Permit Condition 21 is revised to authorize disposal of radioactive material with a physical half-life of less than 100 days by decay-in-storage.

e. This NRMP renewal deletes the previous authorization to dispose of iodine-125 waste by decay-in-storage for five halflives. That authorization has been determined to be inconsistent with current Nuclear Regulatory Commission policies. Therefore, all waste being disposed of by decay-in-storage procedures must be held for a minimum of ten half-lives.

f. Permit Condition 23 is added to require a six month physical inventory of all radioactive sources, sealed and unsealed.



Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) RENEWAL

g. Permit Condition 24 is added to require the Radiation Safety Officer or qualified designee to approve all transfers of radioactive material.

3. I am forwarding enclosure (1) as your new authorization for the use of radioactive material. Please review the enclosed NRMP carefully and be sure that you understand all conditions. For additional information, please contact Paul Tveten, Navy Environmental Health Center, at (757)363-5584, DSN 864-5584, Fax (757)444-3672, or E-mail at tvetenp@nehc.med.navy.mil.

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P. K. BLAKE By direction

copy to: BUMED (MED-211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA

OPNAVINST 6470.3 NAVY RADIOACTIVE MATERIALS PERMIT -

Pursuant to the authority stated in OPNAVINST 6470.3, Navy Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

1-COMMAND COMMANDING OFFICER NAVAL MEDICAL RESEARCH INSTITUTE 8901 WISCONSIN AVENUE BETHESDA, MD 20889-5607		2 - PERMIT NO. 19-64223-41NP 3 - AMÉNDMENT NO. 4 - DOCKET NO. 5 - EXPIRATION DATE
6 - RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	31 DECEMBER 2002 8 - MAXIMUM QUANTITY AUTHORIZED
a. Hydrogen-3	Any	3 Curies
b. Carbon-14	Any	500 Millicuries
c. Phosphorus-	Any Any	200 Millicuries
d. Phosphorus-3	33 Any	70 Millicuries
e. Sulfur-35	Any	200 Millicuries
f. Calcium-45	Any	150 Millicuries
g. Chromium-51	Any	150 Millicuries
h. Iodine-125	Any	500 Millicuries
i. Cesium-137	Sealed Sources	9000 Curies
j. Cesium-137	Sealed Sources	2600 Curies
k. Cesium-137	Sealed Sources	300 Curies

9. Authorized Use:

a.- h. Laboratory research, including animal studies.

UNITED STATES NAVY RADIATION SAFETY COMMITTEE

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Enclosure (1)

United States Navy Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NÓ.

i. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

j. For use in Best Industries Gammaradiator 100 irradiator for irradiation of materials, including small animals.

k. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

PERMIT CONDITIONS

- 10. The Command's Radioactive Material Permit is renewed and reprinted in its entirety. Changed conditions as a result of this renewal are denoted by (A for additions and (R for revisions. Your permit applications dated 5 December 1996 and 11 March 1997, along with submitted information and procedures, are considered an integral part of this Radioactive Material Permit and shall be maintained on file with the permit. (R
- 11. Radioactive material authorized by this Permit shall be stored and used only at Naval Medical Research Institute, Bethesda, MD; Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD; and Naval Medical Research Institute Bone Marrow Registry, 5516 Nicholson Lane, Kensington, MD. (R
- 12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LCDR S. L. Gaiter, MSC, USN.
- 13. Radioactive material authorized by this permit shall be used by, or under the supervision of, individuals designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by, or under the supervision of, LCDR S. L. Gaiter, MSC, USN; HM1 J. Howe, USN; or HM3 S. A. Ahmad, USN. (R
- 14. a. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage at intervals not to exceed six months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

b. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

United States Navy Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO.

c. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

d. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Nuclear Regulatory Commission regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Chief, Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addressees.

e. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

- 15. This permit does not authorize repairs or alterations of the gamma irradiators involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.
- 16. Written procedures submitted in the permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.
- 17. The command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark 1 irradiator.
- 18. Radioactive material shall not be used in or on human beings or in field applications where activity is released.
- 19. Experimental animals, or the products from experimental animals, that have been administered radioactive material shall not be used for human consumption. (A

United States Navy Radiation Safety Committee

Radioactive Materials Permit

PERMIT NO. 19-64223-41NP AMENDMENT NO.

- 20. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersible form, shall have their thyroid burden measured at least quarterly.
- 21. The command is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures of 10 CFR 35.92.
 (R)
- 22. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with the Bureau of Medicine and Surgery (MED-21) and Navy Environmental Health Center (NAVENVIRHLTHCEN) as information addressees for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20.1906).

(2) Theft or loss of radioactive material (10 CFR 20.2201).

(3) Radiation incidents as defined by 10 CFR 20.2202 and 10 CFR 30.50.

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 15 days for the following:

(1) Overexposure and excessive levels and concentrations (10 CFR 20.2203).

23. The command shall conduct a physical inventory every six months to account for all sources (sealed and unsealed) and/or devices received and possessed under this permit. Records shall be maintained for five years from the date of the inventory and shall include the quantities and kinds of radioactive material, manufacturer's name and model/lot number, location of use or

United States Navy Radiation Safety Committee

<u>Radioactive Materials Permit</u>

PERMIT NO. 19-64223-41NP AMENDMENT NO.

storage and the date of the inventory and shall be signed by the Radiation Safety Officer. (A

- 24. The Radiation Safety Officer or a qualified designee will personally approve all transfers of radioactive material covered by this Permit. This includes a review of the packaging, labeling, and documentation of each outgoing shipment as well as the receipt process for each incoming shipment. (A
- 25. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with:

a. Statements, representations, and procedures contained in the Command's applications dated 5 December 1996 and 11 March 1997. (R

b. Code of Federal Regulations, BUMEDINST 6470.20, OPNAVINST 6470.3 and NAVMED P-5055.

c. The Command shall maintain records for review by the Navy Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

date: <u>15 Dec 97</u>

Blake

P. K. BLAKE Captain, MSC, USN Executive Secretary Navy Radiation Safety Committee

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NAVY RADIOACTIVE MATERIALS PERMIT

Pursuant to the authority stated in OPNAVINST 6470.3, Navy Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

SIGNED 24 AUG 93

1 - COMMAND		2 - PERMIT NO.			
Commanding Officer Naval Medical Research Insti Bethesda, MD 20889-5055	tute	19-64223-41NP 3 - AMENDMENT NO. 01			
, ,		4 - DOCKET NO.			
		5 - EXPIRATION DATE			
		31 March 1997			
6 - RADIOACTIVE MATERIAL	7 -CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED			
a. Hydrogen-3	Any	3 Curies			
b. Carbon-14	Any	500 Millicuries			
c. Phosphorus-32	Any	200 Millicuries			
d. Phosphorus-33	Any	70 Millicuries			
e. Sulfur-35	Any	200 Millicuries			
f. Chromium-51	Any	150 Millicuries			
g. Iodine-125	Any	500 Millicuries			
h. Cesium-137	Sealed S	ources 9000 Curies			
i. Cesium-137	Sealed S	ources 2600 Curies			
j. Cesium-137	Sealed S	ources 300 Curies			

United States Navy Radiation Safety Committee

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

01

k. Cesium-137

Sealed Sources

5 Millicures per Source (not to exceed 20 Millicuries total)

9. AUTHORIZED USE:

a. - g. Laboratory research, including animal studies.

h. For use in J. L. Shepard and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

i. For use in Best Industries Gammaradiator 100 irradiator for irradiation of materials, including small animals.

j. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

k. For use in Ohmart Corporation Model SR-A level gauge source holder.

PERMIT CONDITIONS:

10. The Command's Radioactive Material Permit is reprinted in its entirety. The permit application dated 26 March 1992, letter dated 9 June 1992, and ammendment application dated 2 June 1993, including submitted information and procedures, are considered an integral part of this Radioactive Material Permit and shall be maintained on file with the permit. (R

11. Radioactive material authorized by this Permit shall be used only at Naval Medical Research Institute, Bethesda, MD and Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD.

12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LT B. K. Holland, MSC, USNR. Assistant Radiation Safety Officer is John J. Ryan, Ph. D.

United States Navy Radiation Safety Committee

OPNAV 6470/1 (4-86)

Page <u>2</u> of <u>6</u> pages

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

01

13. Radioactive material authorized by this Permit shall be used by or under the supervision of personnel designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by or under the supervision of Dr. J. J. Ryan or LT B. K. Holland.

14. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

A. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with NRC regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addresses.

D. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

United States Navy Radiation Safety Committee

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-6<u>4223-41NP</u>

AMENDMENT NO.

01

15. This Permit does not authorize repairs or alterations of the gamma irradiator involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.

16. Written procedures submitted in the Permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.

17. Command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark I irradiator.

18. Radioactive material shall not be used in or on human beings or in field applications where activity is released.

19. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersable form, shall have their thyroid burden measured at least quarterly. (R

20. The Command is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures in 10 CFR 35.92.

21. Radioactive waste containing Iodine-125 may be disposed of in ordinary trash after being held for decay for a minimum of five (5) half-lives. Prior to disposal, these wastes must be monitored in accordance with procedures described in 10 CFR 35.92.

22. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

United States Navy Radiation Safety Committee

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

01

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addresses for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20,1906).

> (2) Theft or loss of radioactive material (10 CFR 20.2201). (R

> (3) Radiation incidents as defined by 10 CFR 20.2202 and 10 CFR 30.50. (R

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 15 days for the following:

Overexposure and excessive levels and concentrations (10 CFR 20.2203). (R

23. The Command may make minor changes in radiation safety procedures after obtaining approval of the Command's Radiation Safety Officer, as long as compliance with NRC regulations is maintained. No formal amendment request is required but an information copy of any such approval should be forwarded to the Navy Environmental Health Center. An amendment request to this Permit is required for a change in Radiation Safety Officer, additional types of use of radioactive material, or changes in location of use of radioactive material.

24. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with:

a. Statements, representations, and procedures contained in the command's application dated 29 March 1992, letter dated 9 June 1992, and ammendment request dated 2 June 1993. (R

United States Navy Radiation Safety Committee

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SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

01

b. Code for Federal Regulations, BUMEDINST 6470.20, OPNAVINST 6470.3 and NAVMED P-5055.

c. The command shall maintain records for review by the Navy Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

Date 24 Aug 93

J. W. MALINOSKI By direction

United States Navy Radiation Safety Committee

OPNAV 6470/1 (4-86)

Page <u>6</u> of <u>6</u> pages



DEPARTMENT OF THE NAVY OFFICE OF THE CHIEF OF NAVAL OPERATIONS WASHINGTON, DC 20350-2000

> 5470 Ser 455C/20602089 18 Aug 92

- From: Chairman, Navy Radiation Safety Committee To: Commanding Officer, Naval Medical Research Institute, Bethesda, MD 20889-5055
- SUBJ: NAVY RADIOACTIVE MATERIAL PERMIT RENEWAL
- Ref: (a) NAVMEDRSCHINSTITUTE Bethesda 1tr 6470 OSHO of 26 Mar 92 (b) NAVMEDRSCHINSTITUTE Bethesda 1tr 6470 OSHO of 9 Jun 92
- Encl: (1) Navy Radioactive Material Permit Number 19-64223-41NP

1. As requested by reference (a) and modified by reference (b), your Navy Radioactive Material Permit has been renewed, with a new expiration date of 31 March 1997.

2. Enclosure (1) is forwarded as your new authorization to use radioactive material. All previous correspondence pertaining to your Navy Radioactive Material Permit shall be kept on file until disposition is authorized by the Navy Radiation Safety Committee.

By direction

Copy to: BUMED (MED-211) NRC Region II NAVENVIRHLTHCEN Norfolk VA NAVY RADIOACTIVE MATERIALS PERMIT

Pursuant to the authority stated in OPNAVINST 6470.3, Navy Radiation Safety Committee, and 1 reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

1 - COMMAND		2 - PERMIT NO.			
Naval Medical Research Ins Bethesda, MD 20889-5055	titute	19-64223-41NP 3 - AMENDMENT NO.			
		4 - DOCKET NO.			
		5 - EXPIRATION DATE			
		31 March 1997			
6 - RADIOACTIVE MATERIAL	7 -CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED			
a. Any byproduct or accelerator produce material with atomic number 3-83 inclusio	C	100 millicuries of each radionuclide, total not to exceed 2 curies			
b. Hydrogen – 3	Any	2 curies			
c. Carbon - 14	Any	500 millicuries			
d. Phosphorus - 32	Any	200 millicuries			
e. Iodine - 125	Any	500 millicuries			
f. Xenon - 127 or 133	Free g. solu				

SUPPLEMENTARY SHEET _____

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

g.	Cesium - 137	Sealed Sources	9000 curies
h.	Cesium - 137	Sealed Sources	2600 curies
1.	Cesium - 137	Sealed Sources	300 curies
j.	Krypton – 85m	Free gas or solution	200 millicuries
k.	Krypton - 83m	free gas or solution	4 curies
1.	Molybdenum-99 -	any	3.5 curies
m .	Technetium-99M	any	3.5 curies
п.	Sulfur-35	any	150 millicuries
٥.	Chromium-51	any	150 millicuries

9. Authorized use:

a. - f. Laboratory research including animal studies

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g. For use in J. L. Shepherd and Associates MKI Model 68 irradiator for irradiation of materials including small animals.

h. For use in Best Industries Gammaradiator 100 irradiator for irradiation of materials including small animals.

i. For use in Isomedix Gammator B irradiator for irradiation of materials including small animals.

j. - o. Laboratory research including animal studies

PERMIT CONDITIONS:

10. The Command's Radioactive Material Permit is reprinted in its entirety. The permit application dated 26 March 1992 and letter dated 9 June 1992 including

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

submitted information and procedures, are considered an integral part of this Radioactive Material Permit and shall be maintained on file with the permit.

11. Radioactive material authorized by this Permit shall be used only at Naval Medical Research Institute, Bethesda, MD and Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD.

12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LTJG B. K. Holland, MSC, USNR. Assistant Radiation Safety Officer is John J. Ryan, Ph. D.

13. Radioactive material authorized by this Permit shall be used by or under the supervision of personnel designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by or under the supervision of Dr. J. J. Ryan or LTJG B. K. Holland.

14. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

A. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shal cause it to be decontaminated and repaired or to be disposed of in accordance with NRC regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addresses.

SUPPLEMENTARY SHELT ____

Page 4 of 5 pag

United States Navy Radiation Safety Columittee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

D. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

15. This Permit does not authorize repairs or alterations of the gamma irradiator involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.

15. Written procedures submitted in the Permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.

17. Command shall comply with conditions of NRC "Order Modifying Certain Licenses" datec 3 July 1984 for the J. L. Shepherd Mark I irradiator.

18. Radioactive material shall not be used in or on human beings or in field applications where activity is released.

19. Containers holding more than 0.1 millicurie of I-125 or I-131 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 or I-131 should be performed in a hood. Individuals handling unsealed quantities of I-125 or I-131 greater than 1 millicurie, in volatile or dispersable form, shall have their thyroid burden measured at least quarterly

20. The Command is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures in 10 CFR 35.92.

21. Radioactive waste containing Iodine-125 may be disposed of in ordinary trash after being held for decay for a minimum of five (5) half-lives. Prior to disposal, these wastes must be monitored in accordance with procedures described in 10 CFR 35.92.

22. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-211) and Navy Environmental Healt Center as information addresses for the following:

SUPPLEMENTARY SHEET

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

(1) Excessive radiation levels or contamination on packages (10 CFR 20.205).

- (2) Theft or loss of radioactive material (10 CFR 20.402).
- (3) Radiation incidents as defined by 10 CFR 20.403 and 10 CFR 30.50.
- (4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (OP-45) within 15 days with ar information copy to Navy Environmental Health Center. An advance copy and/or telephone report to OP-45 should also be made to ensure notification within 15 days for the following:

Overexposure and excessive levels and concentrations (10 CFR 20.405).

23. The Command may make minor changes in radiation safety procedures after obtaining approval of the Command's Radiation Safety Officer, as long as compliance with NRC regulations is maintained. No formal amendment request is required but an information copy of any such approval should be forwarded to the Navy Environmental Health Center. amendment request to this Permit is required for a change in Radiation Safety Officer, additional types of use of radioactive material, or changes in location of use of radioactive material.

24. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with:

a. Statements, representations, and procedures contained in the command's application dated 29 March 1992 and letter dated 9 June 1992.

b. Code for Federal Regulations, BUMEDINST 6470.20, OPNAVINST 6470.3 and NAVMED P-5055.

c. The command shall maintain records for review by the Navy Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

Date 12 Car. 97

2/1 J. MALINOSKI

By direction



1

IN REPLY REFER TO 6470 Ser 455C/2U601878 27 May 92

- From: Executive Secretary, Navy Radiation Safety Committee To: Commanding Officer, Naval Medical Research Institute, National Naval Medical Center, 8900 Wisconsin Avenue, Bethesda, MD 20889-5055
- Subj: AMENDMENT OF NAVY RADIOACTIVE MATERIAL PERMIT NUMBER 19-64223-41NP, Amendment No. 06
- Ref: (a) NAVMEDRSCHINSTITUTE Bethesda ltr 6470 RSO 10734 of 24 Sept 91 (b) NAVMEDRSCHINSTITUTE Bethesda ltr 6470 RSO of 27 Feb 92

1. As requested by reference (a) and modified by reference (b), Navy Radioactive Material Permit (NRMP) No. 19-64223-41NP is amended to increase the possession and use limit for molybdenum-99 and technetium-99m to 3.5 curies and for sulfur-35 and chromium-51 to 150 millicuries.

2. All personnel handling technetium-99m and/or the experimental animals after being injected with technetium-99m shall be monitored with extremity dosimetry.

3. Enclosure (1) is forwarded as your amended authorization for the use of radioactive material under NRMP No. 19-64223-41NP.

Copy to: CHBUMED (MED 211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA

MALINOSKA

CAPT MSC USN Exacutive Secretary Navy Radiation Safety Committee

NAVY RADIOACTIVE MATERIALS PERMIT

irsuant to the authority stated in OPNAVINST 6470.3, Navy Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

1~COMMAND				2 - PERMIT NO. 19-64223-41NP
	Naval Medical	Pasaarch I	ostituto	3 - AMENDMENT NO. 06
Naval Medical Research Instit Bethesda, MD 20889-5055				4 - DOCKET NO.
				5 - EXPIRATION DATE 31 March 1992
6 - RADIOA MATER		7 - CHEMIC PHYSI	CAL/ ICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED
a.	Any byproduc accelerator material wit number 3-83	produced h atomic	Any	100 millicuries of each radionuclide, total not to exceed 2 curies
b.	Hydrogen - 3		Any	2 curies
с.	Carbon - 14		Any	500 millicuries
d.	Phosphorus -	32	Any	200 millicuries
e.	Iodine - 125	i i	Any —	500 millicuries
f.	Xenon - 127	or 133	Free gas or solution	r 4 curies
g.	Cesium - 137	,	Sealed Sour	rces 9000 curies
h.	Cesium - 137		Sealed Sour	rces 2600 curies
i.	Cesium - 137	,	Sealed Sour	rces 300 curies
j.	Krypton - 85	m	Free gas or solution	

UNITED STATES NAVY RADIATION SAFETY COMMITTEE

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-4	INP
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AMENDMENT NO.

06

k.	Krypton - 83m	Free gas or solution	4 curies	
1.	Molybdenum-99	any	3.5 curies	(A
m.	Technetium-99M	any	3.5 curies	(A
ח.	Sulfur-35	any	150 millicuries	(A
Ο.	Chromium-51	any	150 millicuries	(A

9. Authorized use:

a. - f. Laboratory research including animal studies

g. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials including small animals.

h. For use in Best Industries Gammaradiator 100 irradiator for irradiation of materials including small animals.

i. For use in Isomedix Gammator B irradiator for irradiation of materials including small animals. -

j. - o. Laboratory research including animal studies

(R

PERMIT CONDITIONS:

10. The Command's Radioactive Material Permit is reprinted in its entirety. Additions and revisions to the permit conditions as a result of this amendment are denoted by (A and (R respectively. The permit application dated 29 January 1988, letters dated 27 April 1988 and 14 June 1988, and amendment request dated 20 September 1988, 7 August 1990, 11 December 1990, 17 June 1991, 24 September 1991, 8 October 1991, and 27 February 1992 including submitted information and procedures, are considered an integral part of this Radioactive Material Permit and shall be maintained on file with the permit. (R

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

06

11. Radioactive material authorized by this Permit shall be used only at Naval Medical Research Institute, Bethesda, MD and Naval Medical Research Institute, Rockville Annex, 12300 Washington Avenue, Rockville, MD.

12. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LTJG B. K. Holland, MSC, USNR. Assistant Radiation Safety Officer is John J. Ryan, Ph. D.

13. Radioactive material authorized by this Permit shall be used by or under the supervision of personnel designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by or under the supervision of Dr. J. J. Ryan or LTJG B. K. Holland.

14. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10 microcuries of alpha emitting material shall be tested for leakage and/or contamination at intervals not to exceed 6 months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

A. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

B. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

C. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with NRC regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-381) and Navy Environmental Health Center as information addresses.

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

06

D. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

15. This Permit does not authorize repairs or alterations of the gamma irradiator involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.

16. Written procedures submitted in the Permit application for use of the gamma irradiators shall be followed and a copy of these procedures shall be made available to each individual using or having responsibility for use of the device.

17. Command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark I irradiator.

18. Radioactive material shall not be used in or on human beings or in field applications where activity is released except as provided otherwise by a specific condition of this Permit.

19. Containers holding more than 0.1 millicurie of I-125 or I-131 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 or I-131 should be performed in a hood. Individuals handling unsealed quantities of I-125 or I-131 greater than 1 millicurie, in a volatile or dispersable form, shall have their thyroid burden measured at least quarterly.

20. The Command is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures in 10 CFR 35.92.

21. Radioactive waste containing Iodine-125 may be disposed of in ordinary trash after being held for decay for a minimum of five (5) half-lives. Prior to disposal, these wastes must be monitored in accordance with procedures described in 10 CFR 35.92.

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

06

22. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Bureau of Medicine and Surgery (MED-3B1) and Navy Environmental Health Center as information addresses for the following:

Excessive radiation levels or contamination on packages (10 CFR 20.205).

(2) Theft or loss of radioactive material (10 CFR 20.402).

- (3) Radiation incidents as defined by 10 CFR 20.403 and 10 CFR 30.50.
- (4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (OP-45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to OP-45 should also be made to ensure notification within 15 days for the following:

Overexposure and excessive levels and concentrations (10 CFR 20.405).

23. The Command may make minor changes in radiation safety procedures after obtaining approval of the Command's Radiation Safety Officer, as long as compliance with NRC regulations is maintained. No formal amendment request is required but an information copy of any such approval should be forwarded to the Navy Environmental Health Center. An amendment request to this Permit is required for a change in Radiation Safety Officer, additional types of use of radioactive material, or changes in location of use of radioactive material.

24. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with:

a. Statements, representations, and procedures contained in the command's application dated 29 January 1988, letters dated 27 April 1988 and 14 June 1988, and amendment request dated 20 September 1988, 7 August 1990, and 11 December 1990, 17 June 1991, 24 September 1991, 8 October 1991, and 27 February 1992. (R

United States Navy Radiation Safety Committee

RADIOACTIVE MATERIALS PERMIT

PERMIT NO.

19-64223-41NP

AMENDMENT NO.

06

b. Code for Federal Regulations, BUMEDINST 6470.20, OPNAVINST 6470.3 and NAVMED P-5055.

c. The command shall maintain records for review by the Navy Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

Date 28 1/100 92

-lel

J. W. MALINOSKI CAPT MSC USN Executive Secretary Navy Radiation Safety Committee

D-23 USNRC License Renewal Application, No. 19-02891-06

37



DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH INSTITUTE NAVAL MEDICAL COMMAND, NATIONAL CAPITAL REGION BETHESDA, MD 20814-5055

IN REPLY REFER TO 6470 OSHB 2m 25/56

From: Commanding Officer, Naval Medical Research Institute
 To: Material Licensing Branch, Division of Fuel Cycle and Material
 Safety, U. S. Nuclear Regulatory Commission, Washington, D.C. 20555
 Via: Commander, Naval Medical Command (MED 212), Washington, D.C. 20372-5120

Subj: RENEWAL OF NUCLEAR REGULATORY COMMISSION LICENSE (NRC) #19-02891-06

Encl: (1) Application for Material License

- (2) Radioactive Material
- (3) Purpose for which License will be used
- (4) Individual responsible for Radiation Safety Program and their training and experience
- (5) Training for individuals working in or frequenting restricted areas
- (6) Facilities and equipment
- (7) Radiation Safety Program
- (8) Waste Management

1. Naval Medical Research Institute's NRC License #19-02891-06 expires 31 March 1986. Enclosures (1) through (8) are forwarded for your review and approval.

R. L. SPHAR

NAC FORM 313 (1-84) 10 CFR 30, 12, 33, 34,	-					U.S. NUCLEAF	A REGULATORY COMMISSION APPROVED BY OMB 3150-0120		
36 and 40			APPLIC	ATION FOR N	ATERIAL LICENSE		Expires: 6-31-87		
				ION GUIDE FOR DET	AILED INSTRUCTIONS FOR COMPLETIN	IG APPLICATI	ON. SEND TWO COPIES		
FEDERAL AGENCIES		ATIONS WIT	' H:		IF YOU ARE LOCATED IN:				
U.S. NUCLEAR REG DIVISION OF FUEL	ULATORY	COMMISSION D MATERIAL	SAFETY, NMSS		ILLINOIS, INDIANA, IOWA, MICHIGAN, MINN WISCONSIN, SEND APPLICATIONS TO:	IESOTA, MISSOL	IRI, OHIO, OR		
WASHINGTON, OC ALL OTHER PERSONS LOCATED IN:		CATIONS AS	FOLLOWS, IF YOU ARE	ì	U.S. NUCLEAR REGULATORY COMMISSION MATERIALS LICENSING SECTION 799 ROOSEVELT ROAD	DN, REGION III			
CONNECTICUT, DELA MASSACHUSETTS, NE OR VERMONT, SEND	W JERSEY, I	NEW YORK,	LUMBIA, MAINE, MARY PENNSYLVANIA, RHODI	LAND, E ISLAND,	GLEN ELLYN, IL 60137 ARXANSAS, COLORADO, IDAHO, KANSAS, L NEW MEXICO, NORTH DAKOTA, OKLANOM GR WYDMING, SEND APPLICATIONS TO:				
U.S. NUCLEAR REC NUCLEAR MATERI 631 PARK AVENUE KING OF PRUSSIA,	PA 19405	NØ			U.S. NUCLEAR REGULATORY COMMISSI MATERIAL RADIATION PROTECTION SE 611 AYAN PLAZA DRIVE, SUITE 1000 ARUINGTON, TX 76011				
ALABAMA, FLORIDA, PUERTO RICO, SOUTH WEST VIRGINIA, SENI	I CAROLINA	I, TENNESSE	MISSISSIPPI, NORTH CA	ROLINA, LANDS, OR	ALASKA, ARIZONA, CALIFORNIA, HAWAII, AND U.S. TERRITORIES AND POSSESSIONS	NEVADA, OREG	ON, WASHINGTON, SEND APPLICATIONS		
U.S. NUCLEAR REG MATERIAL RADIA 101 MARIETTA STI ATLANTA, GA 303	TION PROT	ECTION SEC			TO: U.S. NUCLEAR REGULATORY COMMISSI MATERIAL RADIATION PROTECTION SE 1450 MARIA LANE, SUITE 210 WALNUT CREEK, CA 94595				
			SEND APPLICATIONS TO		GULATORY COMMISSION ONLY IF THEY WIS	n to possess a	NO USE LICENSED MATERIAL		
1. THIS IS AN APPLIC					2. NAME AND MAILING ADDRESS OF APPLIC	ANT (Include Zig	Code)		
A. NEW LICENS	5E				Commanding Officer				
d. AMENDMEN	T TO LICEN	SE NUMBEA	19-02891-06		Naval Medical Resea		itute		
C. RENEWAL O	FLICENSE	NUMBER			Bethesda, MD 20814-	5055			
J. ADDRESS(ES) WHE	AE LICENSE	DMATERIA	L WILL BE USED OR PO	SSESSED.					
			esearch Inst	itute	-				
Bet	hesda,	MD 20	814-5055						
						•			
		-	OUT THIS APPLICATION			TELEPHONE	295-0914		
		Ryan, F		COPE OF INFORMATION	TO BE PROVIDED IS DESCRIBED IN THE LIC	(/			
S. RADIOACTIVE MA	TERIAL	chemical and	s/or physical form, and c,		6. PURPOSEIS) FOR WHICH LICENSED MAT				
	ESPONSIBLE	E FOR RADI	ATION SAFETY PROGRA	M AND THEIR	8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.				
9. FACILITIES AND	EQUIPMENT		nclosure (6)		10. RADIATION SAFETY PROGRAM enclosure (7)				
11. WASTE MANAGE	MENT.				12. LICENSEE FEES (See 10 CFR 170 and Section 170.31) AMOUNT FEE CATEGORY Exempt ENCLOSED \$ 000.00				
		empleted by a	<u>nclosure (8)</u> pp/kant) THE APPLICAN	T UNDERSTANDS THAT	ALL STATEMENTS AND REPRESENTATIONS				
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WARNING 18 U	S.C. SECTIO	N 1001 ACT	OF JUNE 25, 1948, 62 51		IMINAL OFFENSE TO MAKE A WILLFULLY FA	LSE STATEMEN	T OR REPRESENTATION		
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< \$250K		-3.5M	entire facility excludin	g oursion contractors)	ON THE ECONOMIC IMPACT OF CURRENT PROPOSED NRC REGULATIONS THAT MA it to protect confidential commercial or flowing	Y AFFECT YOU	? (NRC regulations permit		
\$250K - 500K \$600K - 750X		M-7M -10M	C. NUMBER OF BEDS		the agency in confidence)				
750K-1M	>\$1	-			YES		NO		
TYPE OF FEE	FEE LOG		EFE CATEGODY	FOR NRC	USE ONLY		APPROVED BY		
			FEE CATEGORY	COMMENTS					
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D-24 USNRC Materials license, No. 19-02891-05, Amendment 29

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NF(C Form 3 (_2-8 ')	174	U.S. NU	CLEAR REGUL	ATORY COMMISSION	P	AGE OF PAGES
	Venis Copy is For Your Flac	I	MATERIAL	S LICENSE	Am	endment No. 29
of I hererofor source, an deliver or import su Atomic I	to the Atomic Energy Act of 1954, a Federal Regulations, Chapter 1, Parts e made by the licensee, a license is h nd special nuclear material designate r transfer such material to persons at ach byproduct and source material. Energy Act of 1954, as amended, a ion now or hereafter in effect and to	as amena s 30, 31 ereby is ed below uthorize This lic and is s	ded, the Energ , 32, 33, 34, 3 ssued authoriz v; to use such ed to receive it conse shall be ubject to all	gy Reorganization Act 35, 36, 40 and 70, and ing the licensee to rece material for the purpo t in accordance with the deemed to contain the applicable rules, regula	in reliand ive, acqu se(s) and e regulat e conditi	te on statements and representations lire, possess, and transfer byproduct. I at the place(s) designated below; to ions of the applicable Part(s); and to ions specified in Section 183 of the od orders of the Nuclear Regulatory
	Licensee			In accordance	with	SIGNED & DEC 82 application dated
				July 22, 1982		
1. Depai Natio	rtment of the Navy onal Naval Medical Center			3. License numbel9 its entirety		-05 is amended in d as follows:
2. Beth	esda Maryland 20014			4. Expiration date	Dece	mber 31, 1987
				 Docket or Reference No. 		
6. Bypro specia	duct, source, and/or I nuclear material		Chemical and form			8. Maximum amount that licensee may possess at any one time
A.	Any byproduct material with Atomic No. 3-83, inclusive	Α.	Any		Α.	l curle ^{histicense} ch radio- nuclide, total not to exceed 35 curies
в. С.	Hydrogen 3 Strontium 90	в. С.	Any Sealed s eye appl	sources as Licator	в. С.	5 curies 100 millícuries total
D.	Cobalt 60	D.	Sealed s	Sources	D.	20 curies total - no single source to exceed 5 curies
	Cesium 137	E.	Sealed s	sources	Е.	30 curies total - no single source to exceed 5 curies
F.	Molybdenum 99	F.	Any		F.	10 curies
G. H.	Technetium 99m Xenon 133	G. H.	Any Free ga: solution		G. Н.	10 curies 4 curies
F. G. H. I. 9. A.	Americium 241	Ι.	an EG&G 4820 th (Source doubly	sources for ORTEC Model yroid scanner s Model MRC 2704 encapsulated in 005 SS-302 windo	1 SS-30	of 20 nominal l curie source
9.	Authorized use		_			
A.	through I. Purpose of us and developme		dical res	earch, diagnosis	s and ·	therapy, and research
	for Transport and Transport Conditions."	rtati	ion of Rad	lioactive Materi	al Und	er Certain

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((-8,,)	MATERIALS LICENSE SUPPLEMENTARY SHEET	License number 19-02891-05 5 Docket or Reference number 6								
		Amendment No. 29								
	CONDITIONS									
10.	A. Except as provided in paragraph B, licent at the National Naval Medical Center, Bet									
	B. Carbon 14 in BACTEC vials may also be used at the Naval Regional Medical Clinics at Annapolis, Maryland and Quantico, Virginia and at the Naval Hospital, Patuxent River, Maryland.									
11.	The licensee shall comply with the provisions of Federal Regulations, Part 19, "Notices, In Inspections" and Part 20, "Standards for Prot	structions and Reports to Workers;								
11.	A. Detector cells containing titanium tritic conjunction with a properly operating te prevents foil temperatures from exceeding	mperature control mechanism which								
	B. Detector cells containing scandium tritic conjunction with a properly operating te prevents foil temperatures from exceeding	mperature control mechanism which								
13.	In lieu of using the conventional radiation of on yellow background) as provided in Section of Federal Regulations, Part 20, the licensee detector cells and cell baths, containing lic chromatography devices, with conspicuously et symbols without a color requirement.									
	-									
15.	Patients containing Iodine 131 for the treatm patients containing therapeutic quantities of until the residual activity is 30 millicuries	nent of thyroid carcinoma or 5 Gold 198 shall remain hospitalized 5 or less.								
CONCINCTION OF CONCINCTICONCINCTICONCINCTUCAL OF CONCINCTUCAL OF CONCINCTUCALO OF CONCINCTUCAL OF CONCINCTUCAL OF CO		ensed material and used in gas ched or stamped radiation caution Iridium 192 implants shall remain a made with an appropriate radiation its have been removed. The results hine& for inspection by the Commission a are removed. Thent of thyroid carcinoma or E Gold 198 shall remain hospitalized a or less. or deliver licensed material in the provisions of Title 10, ging of Radioactive Material ive Material Under Certain								

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NRC Form 3/4A (8-82)	U.S. N		PAGE	3	OF	4	PAGES
((**62)		License number					
	MATERIALS LICENSE SUPPLEMENTARY SHEET	19-02891-05 Docket or Reference number					
		Amendment No. 29					
	CONDITIONS						

- 17. Licensed material shall be used by, or under the supervision of, individuals designated by Medical Isotope Committee or the Radiation Safety Committee.
- 18. A. (1) Each sealed source acquired from another person and containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, a sealed source received from another person shall not be put into use until tested.
 - (2) Notwithstanding the periodic leak test required by this condition, any licensed scaled source is exempt from such leak tests when the source contains 100 microcuries or less of beta and/or gamma emitting material or 10 microcuries or less of alpha emitting material.
 - (3) Except for alpha sources, the periodic leak test required by this condition does not apply to sealed sources that are stored and not being used. The sources excepted from this test shall be tested for leakage prior to any use or transfer to another person unless they have been leak tested within six months prior to the date of use of transfer.

- B. Each sealed source fabricated by the licensee shall be inspected and tested for construction defects, leakage, and contamination prior to use or transfer as a sealed source. If the inspection or test reveals any construction defects or 0.005 microcurie or greater of contamination, the source shall not be used or transferred as a sealed source until it has been repaired, decontaminated and retested.
- C. Each sealed source containing licensed material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.
- D. The test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. The test sample shall be taken from the sealed source or from the surfaces of the device in which the sealed source is permanently or semipermanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission.

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NRC F rm 374A	U.S. Na. 24	REGULATORY COMMISSION		<i>′</i>	PAGE	4	OF	$\Delta_{\mathbf{r}}$	PAGES
(8 92)			License numb	e r					
-	IATERIALS LICE		19-02 Docket or Re						
			Amendr	ient	No. 2	9			

CONDITIONS

- 18. continued
 - E. If the test required by Subsection A. or C. of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five (5) days of the test with the U. S. Nuclear Regulatory Commission, Region I, Office of Inspection and Enforcement, 631 Park Avenue, King of Prussia, Pennsylvania 19406, describing the equipment involved, the test results, and the corrective action taken.
- 19. The licensee is authorized to hold radioactive material with a physical half-life of less than 65 days for decay-in-storage before disposal in ordinary trash provided:
 - A. Radioactive waste to be disposed of in this manner shall be held for decay a minimum of ten (10) half-lives.
 - B. Prior to disposal as normal waste, radioactive waste shall be monitored to determine that its radioactivity cannot be distinguished from background with typical low-level laboratory survey instruments. All radiation labels will be removed or obliterated.
 - C. Generator columns shall be segregated so that they may be monitored separately to ensure decay to background levels prior to disposal.
- 20. Except as specifically provided otherwise by this license, the licensee shall possess and use licensed material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated July 22, 1982; and letter dated September 25, 1981. The Nuclear Regulatory Commission's regulations, shall govern the licensee's statements in applications or letters, unless the statements are more restrictive than the regulations.

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Date

FOR THE/U.S. NUCLEAR REGULATORY, COMMISSION Material Licensing Branch. By Division of Auel Cycle and

Material Safety Washington, D. C. 20555 D-25

US Atomic Energy Commission Byproduct Material License, No. 19-2891-3; superseded Authorization Number 25285 issued April 16, 1954. Form ABC-374 (9-55)

(

U. S. ATOMIC ENERGY COMMISSION BYPRODUCT MATERIAL LICENSE This sopy is for your files

Pursuant to the Atomic Energy Act of 1984 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This licensee shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

	Licensee						
L Name Department of the Navy Naval Medical Research Institute			3. License number				
			19-2891-3				
2. Address	2 Address Radiation Technology Division National Naval Medical Center Bethesda 14, Maryland			4. Expiration date October 31, 1962			
	Domosta Iti, Mar		5. Reference No.		to	31 March	63
6. Byproduct material (element and mass number) Cobalt 60		7. Chemical and/or	physical form		enace 1	nt of radioactivi may possess at	ty
		Custom sealed sources (Diagram 3, Research Report Project NM 006 012.04.64)		2,500	curie	3	

9. Authorized use

October

· • •

Date

For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

11. Byproduct material to be used by, or under the supervision of, F. W. Chambers, Jr.

- 12. This License supersedes Authorization Number 25285 issued April 16, 1954.
- 13. Written administrative instructions covering appropriate radiological protection phases of operational procedures and establishing responsibility for radiological protection, control, and security of the byproduct material shall be supplied individuals using or having responsibility for use of such material.
- 11. During presence of Cobalt 60 in Radiation Room No. 2, a guard shall be posted to preclude personnel from entering the high radiation area outside Building 150.

2. 1957	for the U.S. Atomio Frency Countiescut
	Dy

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Director, Isotopes Extension Division of Civilian Application Oak Ridge, Tennessee FORM AEC-374A (12-87)

U. S. ATOMIC ENERGY COMMISSY BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

- 5X

This co	Py 1a	for your end
License	Number.	for your file <u>19-2891-3</u> (J62)

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Page

AMENDMENT NO. 1

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Department of the Navy Naval Medical Research Institute Radiation Technology Division National Naval Medical Center Bethesda 14, Maryland

In accordance with letter dated April 29, 1959 from Naval Medical Research Institute, License No. 19-2891-3 is amended as follows:

Item 9 shall read:

9. Authorized use

For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64.

Total body radiation of humans for therapeutic purposes.

Condition 11 shall read:

11. Byproduct material for non-human use shall be used by, or under the direct supervision of, F. W. Chambers, Jr.

Byproduct material for human use shall be used by, or under the direct supervision of, Captain E. R. King.

L.T. BLOWN.

upervision	
vision of,	

For the U.S. Atomic Energy Commission

Division of Licensing and Regulation Washington 25, D.,C.

Date May 6, 1959

🕼 J. S. Atomic Energy Commission 🕅 BYPRODUCT MATERIAL LICENSE Page 1 of 1 Pages

Supplementary Sheet

License Number<u>19-2891-3</u> (C63)

THIS COPY IS FOR YOUR FILES

AMENDMENT NO. 3

Department of the Navy Naval Medical Research Institute Radiation Technology Division National Naval Medical Center Bethesda 14, Maryland

In accordance with application dated October 2, 1962, License No. 19-2891-3 is amended as follows:

Item 4. The expiration date is extended from October 31, 1962 to March 31, 1963.

Item 9 is amended to read:

9. Storage only.

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Y

Condition 11 is amended to read:

11. Byproduct material shall be stored under the supervision of individuals designated by the Commanding Officer.

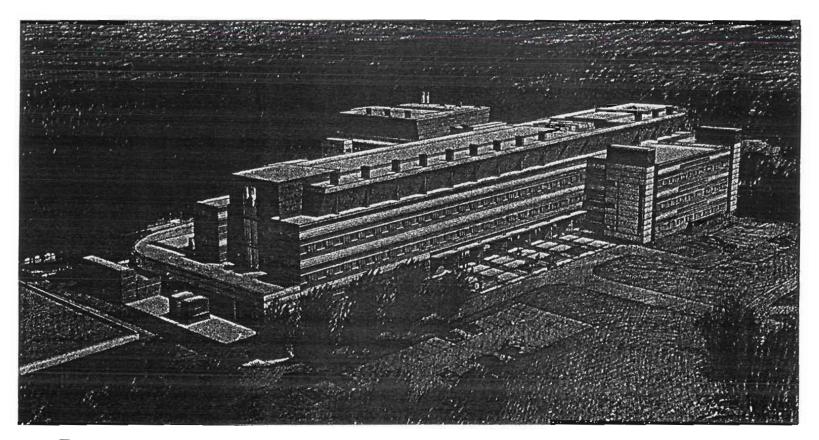
OCT 15 1962 Date

For the U. S. Atomic Energy Commission /s/ Nathan Bassin By ______Isotopes Branch

> Div.of Lic. & Reg'n Wash., 25, D. C.

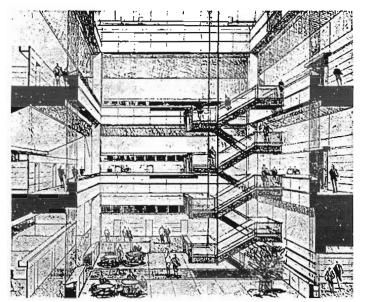
D-26 NMRC/WRAIR Historical Information and New Facility Information

MILITARY MEDICINE ON THE THRESHOLD OF TOMORROW





THE WALTER REED ARMY INSTITUTE OF RESEARCH THE NAVAL MEDICAL RESEARCH INSTITUTE WALTER REED ARMY MEDICAL CENTER, FOREST GLEN, MD



The dramatic atrium is one of the many architectural features designed to encourage an atmosphere of openness so important to successful collaborative research.

Welcome to the future! This 474,000 square foot building is the New Home of one of the oldest medical research communities in America, WRAIR — the Walter Reed Army Institute of Research. WRAIR, a subordinate laboratory of the U.S. Army Medical Research and Materiel Command, has been leading the field of military medical research and graduate medical education since 1893. Now embarked on its second century, WRIAR, and its co-tenant, the Naval Medical Research Institute (NMRI) will move from multiple locations in Washington, D.C. and Nearby Maryland.

Established in 1942, during the war years, NMRI's initial investigations were focused on immediate operational problems. These Navy-supported medical research efforts have influenced the military and civilian practices of medicine, assisted ministries of health in developing nations, and provided technology for other federal initiatives.

DETAILS OF THE NEW BUILDING

Designed by Haines Lundberg Waehler, a New York Architectural and Engineering firm noted for its innovative and successful research facilities, and built by manhattan construction company of fairfax, va, the structure represents many hours of input from current and past staff members, as well as comparison studies of other recently constructed laboratories around the country. The building is sited on the grounds of the Walter Reed Army Medical Center's historic Forest Glen Annex, to make optimal use of five recently renovated buildings that already support biomedical research functions.

This will really be WRAIR's first research building built from the ground up, not converted from a school or warehouse structure. The final product represents the best and most useful ideas in work-center design, internal communication, biomedical laboratory design, and interfaces between scientific disciplines and technologies. The ideas that went into the building design reflect not only the best in lab layout, but a new approach to conducting research: Emphasis on interaction between disciplines, and on technological advances. In addition there are highly visible concepts in building design that reflect respect for the people who will give the building its life.

IN 1893, ARMY SURGEON GENERAL GEORGE M. STERNBERG CREATED THE ARMY MEDICAL SCHOOL, TO TEACH THE UNIQUE ASPECTS OF MILITARY MEDICINE, AND TO EXPLORE BETTER WAYS OF DELIVERING HEALTH CARE TO AMERICA'S SOLDIERS. MAJOR WALTER REED WAS A MEMBER OF THE FIRST FACULTY. IN ADDITION TO HIS TEACHING DUTIES, HE SERVED AS FACULTY SECRETARY, AND CURATOR OF THE ARMY MEDICAL MUSEUM (NOW THE NATIONAL MUSEUM OF HEALTH AND MEDICINE). WRAIR'S FIRST HOME WAS ON THE SECOND FLOOR OF THE MUSEUM, THEN LOCATED IN DOWNTOWN WASHINGTON, DC.

HISTORY

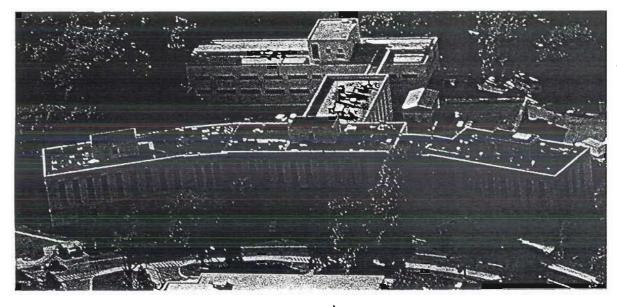
In 1900, while a member of the faculty, Major Reed was named president of the board investigating yellow fever in Cuba. There he and his colleagues proved the theory that mosquitos were the determining link in the transmission of yellow fever. Working where the problems were to be found, Major Reed defined forever the role of soldier/scientist. From that time to this, the Walter Reed Army Institute of Research has continued to conduct research which has advanced the quality of health care for service men and women around the world.



"The Schoolhouse" - WRAIR's first purpose-built facility, was constructed between 1923 and 1932. In 1933 it was dedicated as the Army Medical School. It was known as the Army Medical Service Graduate School from 1950 until 1955, when it was renamed in honor of Walter Reed.

BEFORE THE CONSTRUCTION OF THIS MOST MODERN FACILITY, THE WRAIR OCCUPIED MORE THAN 20 BUILDINGS, RANGING FROM A 100-YEAR OLD FORMER SUMMER HOTEL AND SCHOOL, TO PREFABRICATED, LEASED FACILITIES IN THREE MARYLAND COUNTIES AND THE DISTRICT OF COLUMBIA. THE COMBINED MILITARY AND CIVILIAN RESEARCH AND TEACHING STAFF HAVE MADE UNPARALLELED CONTRIBUTIONS TO MILITARY AND INTERNATIONAL HEALTH. THIS HAS BEEN ACCOMPLISHED DESPITE WORKING IN DIVERSE LOCATIONS, AND UNDER LESS-THAN-IDEAL CONDITIONS.

CONCRETE USED TOTALED 24, 325 CUBIC YARDS, EQUAL TO 3,040 TRUCK LOADS: TWO SOLID LANES OF TRUCKS BETWEEN FOREST GLEN AND THE MAIN CAMPUS



The central portion of the main building was NMRI's first home. The work now accomplished in this multiwing complex will soon be housed in the new research center to be shared with WRAIR.

The Naval Medical Research Institute, the flagship of Navy medical research, was established in Bethesda, MD, on a site selected by President Franklin D. Roosevelt. The institute was commissioned on Navy Day, 27 October, 1942, under the command of Rear Admiral (select) William L. Mann (MC)USN. The position of research executive was assigned to Captain Albert R. Behnke (MC)USN, who, as a young medical officer stationed in the Pacific, envisioned what was to become the Naval Medical Research Institute.

IN 1945, NMRI was commissioned to study the Japanese survivors of the atomic bomb and develop methods for use in treatment of radiation exposure. Under the direction of Dr. George Hyatt, the first tissue bank in the world was established in 1950, which led to freeze-drying techniques for the preservation of human tissue for grafting. With the assistance of Charles A. Lindbergh in the 1960s, NMRI scientitsts redesigned a heart-lung machine and pioneered advances in the use of hypothermia for open heart surgery.

WRAIR'S CO-TENANT

IN 1981, NMRI CONSOLIDATED ITS ROLE AS AN INTERNATIONAL CENTER FOR DIVING RESEARCH WITH COMPLETION OF THE ALBERT R. BEHNKE HYPERBARIC RESEARCH CENTER. LATER THE NATIONAL BONE MARROW REGISTRY WAS ESTABLISHED IN NMRI, AND HAS BEEN INSTRUMENTAL IN SAVING THE LIVES OF COUNTLESS CANCER PATIENTS. DURING OPERATION DESERT SHIELD/DESERT STORM, NMRI ESTABLISHED THE NAVY FORWARD LABORATORY IN SAUDI ARABIA, FOR IDENTIFICATION OF ENDOGENOUS INFECTIOUS DISEASE THREATS AND POTENTIAL BIO-WARFARE AGENTS.

NMRI has been a partner in the nation's space flight program, beginning with primate and astronaut training. This legacy continues today with NMRI experiments in space shuttle missions that are designed to determine the cause of anemia among astronauts after prolonged space flight. The Naval Medical Research Institute continues a heritage of world-class medicine which will evolve into the 21st century.

THERE ARE 1,600 DOORS AND 636 EXTERIOR WINDOWS

THE PRODUCT. OF THE PAST

NMRI

- 1943 A method was developed for desalination of sea water.
- 1944 Advanced Navy protective clothing: immersion and exposure suits, flight goggles, and safety belts.
- 1955 DEVELOPED PHYSIOLOGICAL TELEMETRY TECHNOLOGY.
- 1956 HIGH FREQUENCY DENTAL DRILL DEVELOPED.
- 1968 Advanced survival in Harsh Environments.
- 1986 ELUCIDATED THE BIOCHEMICAL FUNCTION OF THE T-CELL COSTIMULATORY RECEPTOR, CD28, REFERRED TO AS THE "HOLY GRAIL" OF IMMUNOLOGY
- 1992 DISCOVERED COSTIMULATORY RECEPTOR-BASED TECHNIQUE FOR GROWING HUMAN T-CELLS.
- 1993 PATENTED TECHNIQUES FOR GROWING HUMAN BONE MARROW STEM CELLS.
- 1996 DETERMINED THE THREAT OF HEPATITIS C AND E FOR U.S. MILITARY POPULATION.
- 1996 DEVELOPED AND DEPLOYED "HAND-HELD ASSAYS" FOR IDENTIFICATION OF BIOLOGICAL WARFARE AGENTS.
- 1997 PATENTED DNA PRIMER SET FOR PCR-BASED DIAGNOSIS OF CAMPYLOBACTER ENTERITIS.
- 1997 DOCUMENTED SAFETY AND IMMUNOGENICITY OF FIRST CANDIDATE ORAL ANTI-CAMPYLOBACTER VACCINE.
- 1998 DEMONSTRATED FIRST INDUCTION OF CYTOTOXIC T-LYMPHOCYTES IN HUMANS BY A DNA VACCINE; COMPLETED FIRST GENOMIC SEQUENCE OF MALARIA CHROMOSOME.

WRAIR

- 1898 Typhoid Board showed poor sanitation as cause of transmission.
- 1900 Yellow Fever Board proved mosquito as mode of transmission.
- 1910 MAJ. C. R. DARNALL DEVELOPED CHLORINE TO PURIFY DRINKING WATER.
- 1925 COL. CALVIN H. GODDARD FOUNDED THE SCIENCE OF FORENSIC BALLISTICS.
- 1933 Atabrine was introduced as a substitute for quinine in combating malaria.
- 1940-45 Work by CPT. D. B. Kendrick developed systems for blood collection, rapid typing, storage, shipment and use; used albumin to treat shock.
- 1955 JET INJECTOR DEVELOPED FOR MASS IMMUNIZATION.
- 1957 INFLUENZA VIRUS ISOLATED AND USED TO MAKE THE FIRST VACCINE.
- 1962 RUBELLA VIRUS ISOLATED.
- 1970 VACCINE DEVELOPED AGAINST TYPE C MENINGITIS.
- 1972 MEFLOQUINE INVENTED FOR TREATMENT OF DRUG-RESISTANT MALARIA.
- 1983-86 HIV SCREENING AND SERUM REPOSITORY BEGUN.
- 1986 VACCINE DEVELOPED AGAINST HEPATITIS A.
- 1993 DISCOVERED PATTERN OF BRAIN ACTIVITY UNDERLYING MENTAL PERFORMANCE DEFICITS DURING SLEEP LOSS.
- 1996 DEVELOPED SELF-CONTAINED, WRIST-WORN DEVICE TO MEASURE SLEEP, AND PREDICT PERFORMANCE CAPACITY IN THE FIELD.
- 1997 PROMISING CANDIDATE IDENTIFIED FOR FIRST TRULY EFFECTIVE MALARIA VACCINE.

THE REFERENCE THE BUILDING CONTAINS 5,500 TONS OF STRUCTURAL STEEL, 360,000 CONCRETE BLOCKS AND 380,000 FACE BRICKS

EXTERNALLY, THE BUILDING FEATURES RED BRICK WITH PRE-CAST CONCRETE TRIM, CONSISTENT WITH THE WALTER REED ARMY MEDICAL CENTER INSTALLATION DESIGN GUIDE. THE CONSTRUCTION COSTS PER UNIT AREA ARE BELOW NATIONAL NORMS. USABLE SPACE WILL BE AN ABOVE AVERAGE FRACTION OF THE TOTAL AREA. AS AN OVERALL RESPONSE TO THE GOAL OF MEDICAL DESIGN STANDARDS, THE BUILDING PRESENTS A MIXTURE OF CONSERVATION MEASURES IN HEATING, VENTILATION, AIR CONDITIONING, ELECTRICAL AND MECHANICAL SYSTEMS, AND IN THE USE OF ARCHITECTURAL FEATURES THAT INCLUDE A PASSIVE SUN SCREENING SYSTEM TO REDUCE GLARE AND HEAT GAIN THROUGH THE PERIMETER WINDOWS.

The use of glass is both structural and architectural, as here in the front corridor. In addition to admitting light, the windows frame dramatic views of the site.

Better By Design

The New Building Will have a below-ground, self-contained animal facility; three above-ground floors for laboratories, offices and research activities; and a full-filtered, non-recirculating air system. Laboratories and research offices will be organized in standard-sized modules that, combined with a between-floors utility distribution system, will provide maximum flexibility to accommodate current and future military medical research and development as program evolution and consolidation continue.

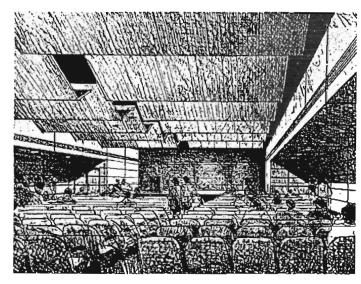
> At the heart of the new building, both in purpose and in plan, are the laboratories. These are designed to put the latest technologies at the service of the best minds and most skilled hands.



THERE ARE 85 MILES OF PLUMBING PIPE, 126 MILES OF ELECTRICAL CONDUIT, 611 MILES OF WIRE AND 26,000 ELECTRONIC CONTROL POINTS IN A DEPENDENT OF

The building is designed to accommodate the operations of five major research areas, INCLUDING INFECTIOUS DISEASE, COMBAT CASUALTY CARE, OPERATIONAL MEDICINE, CHEMICAL DEFENSE, AND BIOLOGICAL DEFENSE, IT CONTAINS SUPPORT SERVICES THAT INCLUDE LOGISTICS AND AUDIO-VISUAL, A DINING ROOM, AND THE ADMINISTRATIVE OFFICES OF WRAIR AND NMRI.

WITH SEATING FOR 306 PEOPLE, THE AUDITORIUM HAS A LEVEL FLOOR AND EASILY REMOVABLE SEATS ALLOWING FOR MULTIPLE USES BY THE WRAIR, NMRI AND THE LOCAL COMMUNITY.

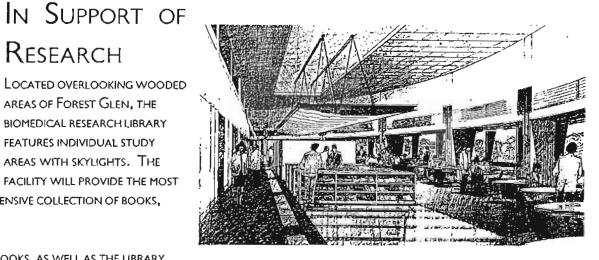


The latest in presentation technology will help project WRAIR's leadership in research.

CURRENT ADVANCES IN INFORMATION TECHNOLOGY, AND AN EXTENSIVE COLLECTION OF BOOKS, JOURNALS, AND MICROFILM.

THE LIBRARY WILL HOUSE THE INSTITUTE'S COLLECTION OF RARE BOOKS, AS WELL AS THE LIBRARY MATERIALS FROM THE GORGAS LABORATORY IN PANAMA.

The new dining room will provide an environment conducive to discussions, as well as refreshment.



The new library will provide access to information from world-wide resources.

1,600,000 POUNDS OF SHEET METAL DUCTWORK CIRCULATE 2,268,000 CUBIC FEET OF AIR PER MINUTE

STATE-OF-THE-ART AUDIOVISUAL AND TELECOMMUNICATIONS CAPABILITIES ARE PROVIDED IN THIS ROOM AND IN

FIVE ADJOINING CLASS AND

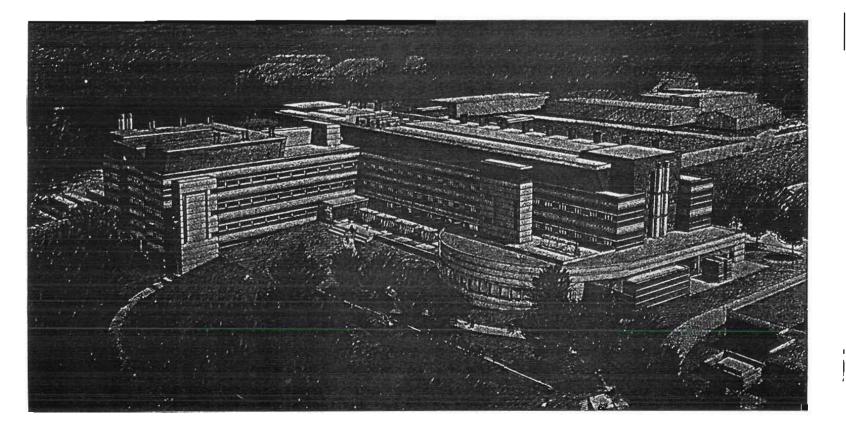
CONFERENCE ROOMS.

Research

AREAS OF FOREST GLEN, THE BIOMEDICAL RESEARCH LIBRARY FEATURES INDIVIDUAL STUDY

AREAS WITH SKYLIGHTS. THE

The Walter Reed Army Institute of Research and the Naval Medical Research Institute conduct research and development of products, procedures and practices which protect the American military from infectious diseases, combat injuries, operational medical problems, chemical and biological threats.



WRAIR AND NMRI WILL CONTINUE THE TRADITION OF RESEARCH AT HOME AND ABROAD, AND COLLABORATIVE WORK WITH ACADEMIA AND INDUSTRY. THE NEW RESEARCH LABORATORY CENTER WILL SERVE AS THE FOCAL POINT FOR COMBINED ARMY-NAVY MEDICAL RESEARCH.



OFFICE OF THE CHIEF OF NAVAL OPERATIONS 2000 NAVY PENTAGON WASHINGTON, D.C. 20350-2000

> IN REPLY REFER TO 6470 Ser N455C/9U595174 08 Feb 99

From: Chairman, Naval Radiation Safety Committee To: Commanding Officer, Naval Medical Research Center, 8901 Wisconsin Avenue, Bethesda, MD 20889-5607

Subj: NAVAL RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT

Ref: (a) NAVMEDRSCHCEN Bethesda ltr 6470 ser OOS/037525 of 28 Jan 99

Encl: (1) NRMP Number 19-32398-41NP, Amendment No. 01

1. As requested by reference (a), your NRMP has been amended to specifically address residual cobalt-60 contamination in Building 150 at Naval Medical Research Center, Bethesda, MD.

2. The remains of Building 150 shall be incorporated into your Radiological Decontamination and Decommissioning Plan as indicated in reference (a). As stated in Permit Condition 12, access to the building shall be restricted and remain under the control of the Radiation Safety Officer until the Naval Radiation Safety Committee has authorized release of the building.

3. I am forwarding enclosure (1) as your new permit for the use of radioactive material. Changes to your NRMP are printed in bold typeface. Please review the enclosed NRMP carefully and be sure that you understand all conditions. For additional information, please contact Mr. Paul Tveten, Navy Environmental Health Center, at DSN 253-5584 or (757) 462-5584, facsimile (757) 445-9481 or E-mail at tvetenp@nehc.med.navy.mil.

J. K. Blake

P. K. BLAKE By direction

copy to: BUMED (MED-211) NRC Region II Atlanta GA NAVENVIRHLTHCEN Norfolk VA OPNAVINST 6470.3

_NAVAL RADIOACTIVE MATERIAL + _RMIT

Pursuant to the authority stated in OPNAVINST 6470.3, Naval Radiation Safety Committee, and in reliance on statements made by the applicant, permission is hereby granted for the acquisition, receipt, possession, use, storage and disposal of radioactive materials listed below subject to the conditions listed in this permit.

	1-COMMAND COMMANDING OFFICER NAVAL MEDICAL RESEARCH CENTER 8901 WISCONSIN AVENUE BETHESDA, MD 20889-5607 (FORMERLY NAVAL MEDICAL RESEARCH INSTITUTE)		2 - PERMIT NO. 19-32398-41NP Formerly 19-64223-41NP 3 - AMENDMENT NO. 01 4 - DOCKET NO. 5 - EXPIRATION DATE 31 DECEMBER 2002	
6 - 1	RADIOACTIVE MATERIAL	7 - CHEMICAL/ PHYSICAL FORM	8 - MAXIMUM QUANTITY AUTHORIZED	
a.	Hydrogen-3	Any	3 Curies	
b.	Carbon-14	Any	500 Millicuries	
c.	Phosphorus-32	Any	200 Millicuries	
d.	Phosphorus~33	Any	70 Millicuries	
e.	Sulfur-35	Any	200 Millicuries	
f.	Calcium-45	Any	150 Millicuries	
g.	Chromium-51	Any	500 Millicuries	
h.	Iodine-125	Any	500 Millicuries	
i.	Cesium-137	Sealed Sources	9000 Curies	
j.	Cesium-137	Sealed Sources	300 Curies	
k.	Cobalt-60	As residual low-level con Building 150	tamination in and around	
9. 3	Authorized Use:	a h. Laboratory research, in	ncluding animal studies	

UNITED STATES NAVAL RADIATION SAFETY COMMITTEE

- SUPPLEMENTARY SHEET -

Page 2 of 6 pages

United States Naval Radiation Safety Committee

<u>Radioactive Material Permit</u>

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

i. For use in J. L. Shepherd and Associates MK1 Model 68 irradiator for irradiation of materials, including small animals.

j. For use in Isomedix Gammator B irradiator for irradiation of materials, including small animals.

k. Storage only pending decommissioning and release.

PERMIT CONDITIONS

- 10. The Command's Naval Radioactive Material Permit (NRMP) is amended and reprinted in its entirety. Changes to your permit are printed in bold typeface. Your permit amendment request and other correspondence as listed in Permit Condition 30 are considered an integral part of this Naval Radioactive Material Permit and shall be maintained on file with the permit.
- 11. Radioactive material authorized by this Permit shall be stored and used only at Naval Medical Research Center, Bethesda, MD; Naval Medical Research Center, Rockville Annex, 12300 Washington Avenue, Rockville, MD; and Naval Medical Research Center Bone Marrow Registry, 5516 Nicholson Lane, Kensington, MD.
- 12. The remains of Building 150 at Naval Medical Research Center, Bethesda, MD shall be incorporated into the Command's Radiological Decontamination and Decommissioning (D&D) Plan. Access to the building shall be restricted and remain under the control of the Radiation Safety Officer until the Naval Radiation Safety Committee has authorized release of the building.
- 13. The Radiation Safety Officer for the use of radioactive material authorized by this Permit is LCDR S. L. Gaiter, MSC, USN.
- 14. Radioactive material authorized by this permit shall be used by, or under the supervision of, individuals designated by the Command's Radiation Safety Committee. The gamma irradiators shall be used by, or under the supervision of, LCDR S. L. Gaiter, MSC, USN; HM1 J. Howe, USN; or HM3 S. A. Ahmad, USN.
- 15. a. Each sealed source containing more than 100 microcuries of beta and/or gamma emitting material or more than 10

SUPPLEMENTARY SHEET -

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

microcuries of alpha emitting material shall be tested for leakage at intervals not to exceed six months. Any source received from another person which is not accompanied by a certificate indicating that a test was performed within 6 months before the transfer shall not be put into use until tested.

b. Any source in storage and not being used need not be tested. When the source is removed from storage for use or transfer to another person, it shall be tested before use or transfer.

c. The test shall be capable of detecting the presence of 0.005 microcuries of radioactive material on the test sample. The test sample shall be taken from the source or from the surfaces of the device in which the sealed source is permanently mounted or stored on which one might expect contamination to accumulate. Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Navy Radiation Safety Committee.

d. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the command shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired by a person appropriately licensed to make such repairs or to be disposed of in accordance with the Nuclear Regulatory Commission regulations. An immediate voice/message notification will be made by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with Chief, Bureau of Medicine and Surgery (MED-211) and Navy Environmental Health Center as information addressees.

e. Tests for leakage and/or contamination shall be performed by the command or by other persons specifically licensed by the NRC or an Agreement State to perform such services.

- 16. This permit does not authorize repairs or alterations of the gamma irradiators involving the removal of shielding or access to the radioactive material. Removal, replacement and disposal of sealed sources in the irradiator shall be performed by the manufacturer or by a person specifically licensed by the NRC or an Agreement State to perform such services.
- 17. Written procedures submitted in the permit application for use of the gamma irradiators shall be followed and a copy of

- SUPPLEMENTARY SHEET -

United States Naval Radiation Safety Committee

Radioactive Material Permit

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

these procedures shall be made available to each individual using or having responsibility for use of the device.

- 18. The command shall comply with conditions of NRC "Order Modifying Certain Licenses" dated 3 July 1984 for the J. L. Shepherd Mark 1 irradiator.
- 19. Radioactive material shall not be used in or on human beings or in field applications where activity is released.
- 20. Experimental animals, or the products from experimental animals, that have been administered radioactive material shall not be used for human consumption.
- 21. Containers holding more than 0.1 millicurie of I-125 shall be opened initially within laboratory hoods having adequate face velocities of 0.5 m/sec or more. Operations involving the routine use of I-125 should be performed in a hood. Individuals handling unsealed quantities of I-125 greater than 1 millicurie, in a volatile or dispersible form, shall have their thyroid burden measured at least quarterly.
- 22. The command is authorized to hold radioactive material with a physical half-life of less than 100 days for decay-in-storage before disposal as ordinary trash in accordance with the procedures of 10 CFR 35.92.
- 23. An amendment request to this Permit is required for a change in Radiation Safety Officer, authorized users, additional types of use of radioactive material, or a new location of use of radioactive material.
- 24. The notifications specified in subparagraphs (a) and (b) will be made in lieu of Nuclear Regulatory Commission reporting requirements of 10 CFR.

a. Immediate voice/message notification by OPREP-3 NAVY BLUE report per OPNAVINST 3100.6 series with the Bureau of Medicine and Surgery (MED-21) and Navy Environmental Health Center (NAVENVIRHLTHCEN) as information addressees for the following:

(1) Excessive radiation levels or contamination on packages (10 CFR 20.1906).

(2) Theft or loss of radioactive material (10 CFR 20.2201).

SUPPLEMENTARY SHEET

United States Naval Radiation Safety Committee

<u>Radioactive Material Permit</u>

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

(3) Radiation incidents as defined by 10 CFR 20.2202 and 10 CFR 30.50.

(4) Defect or failure to comply (10 CFR 21).

b. Written notification to Chief of Naval Operations (N45) within 15 days with an information copy to Navy Environmental Health Center. An advance copy and/or telephone report to N45 should also be made to ensure notification within 15 days for the following:

(1) Overexposure and excessive levels and concentrations
(10 CFR 20.2203).

- 25. The command shall conduct a physical inventory every six months to account for all sealed and unsealed sources, including/waste, received and possessed under this permit. Records shall be maintained for five years from the date of the inventory and shall include the quantities and kinds of radioactive material, manufacturer's name and model/lot number, location of use or storage and the date of the inventory and shall be signed by the Radiation Safety Officer.
- 26. The Radiation Safety Officer or a qualified designee will personally approve all transfers of radioactive material covered by this Permit. This includes a review of the packaging, labeling, and documentation of each outgoing shipment as well as the receipt process for each incoming shipment.
- 27. The permittee is authorized receipt and transfer of any permitted material in accordance with the provisions of 10 CFR Part 20 and 10 CFR Part 71.
- 28. All personnel involved in the receipt, handling, preparation or transfer/shipment of radioactive material shall be trained in accordance with 49 CFR Subpart H. Documentation of training and testing shall be maintained for three years.
- 29. The command shall comply with and maintain current copies of the following:

a. Title 10, Code of Federal Regulations, Parts 19, 20, 21, 30, 35 and 71; and 49 CFR Parts 170-173.

- SUPPLEMENTARY SHEET -

United States Naval Radiation Safety Committee

<u>Radioactive Material Permit</u>

PERMIT NO. 19-32398-41NP AMENDMENT NO. 01

- b. BUMEDINST 6470.20.
- c. OPNAVINST 6470.3.
- d. NAVMED P-5055.
- 30. Except as specifically provided otherwise by this Permit, the command shall possess and use radioactive material described in this Permit in accordance with statements, representations, and procedures contained in the following correspondence:
 - a. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/35524 of 5 Dec 96.
 - b. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/35818 of 11 Mar 97.
 - c. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/36478 of 1 Dec 97.
 - d. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/36517 of 16 Dec 97.
 - e. NAVMEDRSCHINSTITUTE Bethesda ltr 6470 Ser 09A/37181 of 25 Aug 98.
 - f. NAVMEDRSCHCEN Bethesda ltr 6470 Ser OOS/037525 of 28 Jan 99.
- 31. The Command shall maintain records for review by the Naval Radiation Safety Committee sufficient to document operational compliance with the above requirements and other conditions of this Permit.

DATE: \$8 Feb 99

Blake

P. K. BLAKE Captain, MSC, USN Executive Secretary Naval Radiation Safety Committee



DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH CENTER NATIONAL NAVAL MEDICAL CENTER 8901 WISCONSIN AVENUE BETHESDA, MARYLAND 20889-5607

IN REPLY REFER TO:

6470 037525 Ser OOS/

JAN 28 1999

From: Commanding Officer, Naval Medical Research Center, 8901 Wisconsin Avenue, Bethesda, MD 20889-5607 To: Commanding Officer, Naval Environmental Health Center, 2510 Walmer Avenue, Norfolk, VA 23513-2617

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST

- Ref: (a) OPNAVINST 6470.3
 - (b) NRMP Number 19-32398-41NP (formerly 19-64223-41NP)
- Encl: (1) NRMP Application
 - (2) Additional Information (Inclusion of Building 150 in NMRC's Fiscal Years 1999 and 2000 Decontamination and Decommissioning Plan)

1. Per references (a) and (b), an amendment to our existing Navy Radioactive Material Permit (NRMP), NRMP Number 19-32398-41NP, formerly 19-64223-41NP, is requested.

2. A permit application is provided as enclosure (1^{\prime}) . Additional information is provided in enclosure (2) to support the request to amend our NRMP to reflect the inclusion of building 150 on NMRC's Radiological Decontamination and Decommissioning (D&D) Plan.

3. If additional information is required, my point of contact is LCDR S. L. Gaiter, MSC, USN, who can be reached at DSN 295-0002/3653 or commercial (301) 2953653/0002.

RICHARD B. OBERST Acting

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST

 Naval Medical Research Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889-5606

NRMP Number 19-32398-41NP (formerly 19-64332-41NP)

January 25, 1999

1. Additional information is provided to support the requested amendment of our NRMP to include building 150 on NMRC's Radiological Decontamination and Decommissioning (D&D) Plan. Building 150 is located at the Naval Medical Research Center (NMRC) on the National Naval Medical Center (NNMC) campus in Bethesda, Maryland. The upper levels and roof of building 150 were removed and discarded during the 1960's. The remaining portions of this building include an elevator shaft, concrete staircase, basement walls and floor. The basement walls were constructed using reinforced concrete. Building 150 is positioned adjacent to NMRC building 21.

2. NMRC will submit its radiological decontamination and decommissioning plan to the Naval Environmental Health Center for review and approval. Conditions will be included to specify those actions that will be or have been taken to ensure that the radiological status of building 150 and surrounding grounds meet or exceed the U.S. Nuclear Regulatory Commission's unrestricteduse release criteria.

3. <u>Background Information</u>. Building 150 was constructed in the early 1950's to irradiate animals and determine the effects of exposure to ionizing radiation on organ and cellular systems. This was done as an economical alternative to transporting animals to the Bikini Islands atomic (weapons) testing area.

The radiation source was 2,500 curies of cobalt-60 in ceramic slugs arranged in two circles to provide a dose rate of up to 200 Rem per minute. There were several minor contamination incidents during routine maintenance between 1951 and 1962 (probably due to cracks in the ceramic slugs). Workers were routinely monitored for internal deposition of radionuclides (particularly cobalt-60).

On 18 April 1962 while undergoing routine internal monitoring, a significant internal deposition was identified in an individual. During 1962 to 1963, building 150 operations were suspended, the cobalt-60 sources were removed and extensive decontamination efforts were completed. The custody of building

Enclosure (2)

1 .

Subj: NAVY RADIOACTIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST

Naval Medical Research Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889-5606

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January 25, 1999

150 was transferred for radioactive-material use from NMRC to the Armed Forces Radiobiology Research Institute (AFRRI), Bethesda in 1963. The custody of building 150 was transferred from AFRRI back to NMRC in 1967. Documentation describing the extent of decontamination efforts is not readily available. There is documentation that describes much of the efforts undertaken and planned. Provided below are selected correspondence from NMRC building 150 files.

4. <u>Requirements</u>. A site evaluation and confirmatory sampling and surveys will be necessary to ensure that the residual radiological contamination levels do not exceed regulatory limits for release for unrestricted use. The remnants of building 150, the drain system and surrounding grounds are the targeted areas. Cursory radiological survey monitoring results indicate that there is detectable residual radiological contamination in some areas on the basement concrete floor and on the grounds immediately adjacent to an existing staircase.

5. List of Attachments (provided in reverse chronological order).

Attachments

A: NMRI RSO list of building 150 radiological-activities documents (prepared in June 1998)

B: NMRI RSO email message of 29 May 98; subject: Building 150 radiological status update

C: NMRI RSO memorandum of 18 Apr 95; subject: Building 150 radiological status update

D: NMRI RSO memorandum of 30 Mar 95; subject: Building 150 radiological status update

Attachments (continued)

Enclosure (2)

2 .

Subj: NAVY RADIOACLIVE MATERIAL PERMIT (NRMP) AMENDMENT REQUEST

Naval Medical Research Center, 8901 Wisconsin Avenue, Bethesda, Maryland 20889-5606

NRMP Number 19-32398-41NP (formerly 19-64332-41NP)

January 25, 1999

Attachments (continued)

E: NMRI RSO memorandum of 15 Mar 89; subject: Building 150 radiological status update

F: NMRI RSO memorandum of 16 Mar 87; subject: Building 150 radiological status update

G: NMRI Assistant RSO memorandum of 28 Nov 69; subject: Radiation survey of building 150

H: NNMC RSO letter (with Endorsement of 19 Oct 67; subject: Evaluation and clearance of building 150 and transfer from AFRRI custody to NMRI custody

I: NNMC Notice 11000 of 9 Aug 63; subject: Transfer of building 150 from NMRI custody to AFRRI custody

J: NNMC RSO memorandum of 17 Jul 63; subject: Soil sample results for vicinity of building 150

K: NMRI CO letter of 03 Jul 63; subject: Transfer of building 150 from NMRI custody to AFRRI custody

L: NNMC RSO memorandum of 29 May 63; subject: removal of contaminated soil in the vicinity of building 150

M: NMRI CO memorandum 26 Jul 62; subject: meeting to discuss the decontamination of building 150

N: U.S. Atomic Energy Commission license of 2 Oct 57; amended on 6 May 59 and 15 Oct 62; expired 31 Mar 63.

Enclosure (2)

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N RI BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998) N. J. Topics: Radiological personnel monitoring, air monitoring, survey a swipe results, cobalt-60 sources, decontamination efforts, photographs, 4 drawings,

DATE KEY WORDS SUBJECT TAB

SORTED ACCORDING TO PROMINENT DATE ON THE DOCUMENT

1		FACILITY DESCRIPTION	RADIOCOBALT LARGE ANIMAL IRRADIATOR BLDG 150; CONSTRUCTION FEATURES SOURCE SPECIFICS AND SAFETY FEATURES. SUMMARY: 2500 Curies (Ci) of Cobalt-60 (Co-60), produced by the nuclear pile at ORNL from Co-59, was divided into 60 encapsulated portions, 40 of which were of 50 Ci strength, and 20 of which were of 25 Ci strength. Each of these capsules was contained within a pneumatic capsule that was further contained in a pneumatic carrier tube. The tube system, through application of either positive or negative pressure, connected two radiation chambers separated by a radiation shield. This arrangement permitted either of the two chambers to be entered whenever the RAM was pneumatically transferred to the other. The equipment and sources were housed in a reinforced concrete building that was divided by a heavy radiation shield into two radiation exposure rooms and a control room. The building is constructed of reinforced concrete one foot thick. It is covered with an overhead reinforced concrete slab of concrete 10 inches thick. The control room is separated from the two radiation rooms by a massive radiation shield 3 feet 10 inches thick, constructed of reinforced barite concrete which is 45 pounds heavier per cubic foot than ordinary concrete. This aggregate was used to decrease the size, hence the cost, of the building. Two periscopes pierce the radiation shield, one for each radiation room. The radiation shield between rooms 1 and 2 consisted of a loose fill of barite and scrap iron surrounding the center portion of the tubes of the pneumatic tube transfer system. A 3 feet barite concrete shield, in addition to the ordinary reinforced concrete building walls further protected the radiation room 1, in which the cobalt capsules were stored. Loading and changing of capsules was accomplished in room 1 through the use of a robot carried on a monorali, with visual control conducted through the periscope. Transfer of capsules was completed between rooms in about 6 seconds. Operator safety features included a warning gong
2	9/15/51	DRAWINGS	TECHNICAL DRAWINGS; IRRADIATOR MECHANISM (9/15/51); TRANSFER TUBING (1/16/51); GAMMA RAY GENERATOR MONORAIL (1/25/51); GAMMA RAY GENERATOR BUILDING.
3	6/6/58	AIR AND WIPE SURVEY DATA	RADIATION SURVEY REPORT OF BLDG 150; CONSISTS OF AIR AND SURFACE WIPE RESULTS.
4	6/13/58	REMOVABLE CONTAMINATION	AIR AND SWIPE SURVEY DATA RELATING A CONTAMINATION EVENT AT BLDG 150.
5	7/22/58	BLDG 150 CONTAMINATION	COLLECTION OF MEMORANDA (6/58 - 7/58) RELATING THE GAMMA RAY BUILDING CONTAMINATION
			Summary: Urine studies made on two persons revealed one of the two spikes associated with the presence of

"RI BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998)

k...Jor Topics: Radiological personnel monitoring, air monitoring, survey swipe results, cobalt-60 sources, decontamination efforts, photographe d drawings.

TAB DATE KEY WORDS SUBJECT

			Co-60 in concentrations of less than 0.001 microcuries.	
6	10/5/59	SAFETY PRECAUTIONS	RADIOLOGICAL SAFETY PRECAUTIONS SUBSEQUENT TO REPAINTING BLDG 150; MEASURES NOT RELATED TO PERSONNEL HAZARDS BUT TAKEN BECAUSE OF THE EXTREME SENSITIVITY OF EQUIPMENT PROPOSED FOR THE LOW BACKGROUND COUNTING BUILDING.	
7	12/20/60	PERSONAL CONTAMINATION	REPORT OF CO-60 CONTAMINATION IN THE CASE OF J.H. FLINT; NOTED DURING INTERNAL MONITORING ON THE EVENT OF HIS TRANSFER FROM NMRI; ESTIMATED INTERNAL CO-60 ACTIVITY WAS 0.3 MICROCURIES.	
8	1/12/61	SAFETY MEASURES	INSTITUTION OF NEW RADIOLOGICAL SAFETY MEASURES IN BLDG 150; ROOM 1 WAS DESIGNATED AS A CONTAMINATED AREA; NEW PROCEDURES AND USE OF PERSONAL EQUIPMENT AND MATERIALS WERE IMPLEMENTED.	
9	3/26/62	WIPE RESULTS	ROUTINE WIPE RESULTS FOR REMOVABLE CONTAMINATION AT BLDG 150 FOR 6/58 TO 3/62.	
10	4/17/62	INSPECTION DISCREPANCIES	U.S. ATOMIC ENERGY COMMISSION LETTER DESCRIBING THE FINDINGS OF THEIR INSPECTION OF NNMC'S LICENSE FOR THE OPERATION OF NMRI BLDG 150.	
11	4/18/62	RADIATION INCIDENT	NOTES AND LETTERS RELATING TO THE CO-60 CONTAMINATION EVENT AT BLDG 150 DURING 1962; INTERNAL MONITORING RESULTS ON 4/18/62 OF W.I. ROSS INITIATED THE INVESTIGATIONS AND DECONTAMINATION EFFORTS.	
12	4/20/62	AIR SAMPLE DATA	AIR SAMPLE DATA FOR BLDG 150 FOR 9/59 TO 4/62	
13	4/30/62	CONTAMINATED FURNITURE	RADIATION SURVEY REPORT. CONTAMINATED FURNITURE REMOVED FROM ROSS' HOME WAS STORED AT NMRI TRAILER T-10.	
14	5/5/62	AEC LICENSE INSPECTION	NMRI REPLY LETTER TO THE ATOMIC ENERGY COMMISSION (AEC) REGARDING AEC'S LETTER OF 4/17/62.	
15	5/8/62	GAMMA SURVEY	GAMMA SURVEY RESULTS OF BLDG 150 AND ATTACHED CHAIN LINK FENCE	
16	5/9/62	EXTERIOR RADIATION LEVELS	REGARDING THE USE OF CO-60 IN ROOM 2 OF BLDG 150, THIS RADIATION SURVEY REPORT ESTABLISHED RADIATION LEVELS IN THE VICINITY OF THE CREEK, STONE LAKE ROAD, THE SOUTH PICNIC AREA, AND AFRRI.	
17	5/14/62	OPERATING PROCEDURES	NMRI AND NNMC LETTERS BEGARDING THE RADIATION PROTECTION OPERATING PROCEDURES.	
18	5/18/62	RESTRICTED USE STATUS	BLDG 150 WAS PLACED IN A RESTRICTED USE STATUS, LIMITING ACCESS TO THE FACILITY TO THOSE WITH SPECIFIC AUTHORITY TO ENTER.	
19	5/23/62	FILM BADGE DATA FOR ROSS	AN EXAMINATION OF ROSS' EXPOSURE RECORD SHOWED NO FILM BADGE REPORTS FOR PERIODS IN 1961 AND 1962.	
20	5/23/62	PERSONNEL CONTAMINATION	RSO LOG OF PERSONNEL CONTAMINATION IN THE CASE OF ROSS FROM 4/62 TO 5/62.	
21	5/23/62	SURVEY OF RESTRICTED AREA	EXTERIOR SURVEY OF BUILDING 150 RESTRICTED AREA; DATA REPRESENTS EXPOSURE RATES AT THE PERIMETER WHEN 1100 CURIES ARE IN USE IN BLDG 150 EXPOSURE ROOM 2.	

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N' RI BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998)

N. or Topics: Radiological personnel monitoring, air monitoring, survey swipe results, cobalt-60 sources, decontamination efforts, photographs. 1 drawings.

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TAB DATE KEY WORDS SUBJECT

22	5/24/62	INTERNAL	SURVEY FOR RADIOISOTOPE CONTAMINATION IN THE CASE OF W.I. ROSS, HM2, USN.
23	5/24/62	RADIATION LEVELS	RADIATION LEVEL PERIPHERAL TO BLDG 150 AND ITS RADIATION AREA; EXISTING LEVELS WHEN 1100 CURIES OF CO-60 ARE IN USE IN EXPOSURE ROOM 2.
24	5/25/62	SUSPENSION OF OPERATIONS	IN RESPONSE TO RADIATION LEVELS AT THE PERIMETER OF THE FENCE SURROUNDING THE BLDG 150 RADIOLOGIC RESTRICTED AREA, BLDG 150 OPERATIONS USING THE CO-60 SOURCES WERE SUSPENDED UNTIL A SATISFACTORY SOLUTION WAS FOUND.
25	6/7/62	LIMITED ACCESS TO BLDG 150	BLDG 150 ACCESS WAS ALLOWED ONLY FOR THE PURPOSE OF OBTAINING DATA FOR REQUIRED REPORTS, DECONTAMINATION, AND REMOVAL OF CO-60 SOURCES.
26	6/21/62	CO-60 IRRADIATOR	CO, NMRI LETTER TO DIR, AFRRI AND OIC, NMRI-TOXDET REGARDING THE REHABILITATION AND RETURN TO OPERATION OF THE CO-60 IRRADIATOR; NMRI PROPOSES THE TRANSFER OF BLDG 150 TO ANOTHER NNMC COMPONENT COMMAND BECAUSE OF A LACK OF COMPETENT PERSONNEL TO OPERATE THE FACILITY.
27	6/27/62	WHOLE BODY COUNTING DATA	U.S. ATOMIC ENERGY COMMISSION LETTER RELATING SOME WHOLE BODY COUNTING DATA ON COBALT 60.
28	7/2/62	REMOVAL OF CO-60	RSO, NNMC MEMORANDUM REGARDING ATLANTIC RESEARCH CORP'S INTEREST IN NMRI'S BLDG 150 SITUATION
29	7/12/62	RAM SHIPMENT DATA REQUEST	THE U.S. ATOMIC ENERGY COMMISSION REQUESTED INFORMATION RELATING TO SHIPMENTS FROM NMRI DURING 10/61 TO 3/62 AS PART OF A DATA COLLECTION EFFORT FROM ALL RAM USERS TO REVISE RAM TRANSPORTATION TECHNICAL STANDARDS; NMRI RESPONSE IS ATTACHED.
30	7/13/62	AEC LICENSE	RSO, NNMC LETTER TO AEC REGARDING THE STATUS OF BUILDING 150 AND THE REMOVAL OF THE CO-60 SOURCES.
31	7/13/62	CO-60 REMOVAL	NMRI LETTER TO BUMED VIA NNMC REGARDING PLANS TO DISPOSE OF THE CO-60 SOURCES.
32	7/26/62	CO-60 IRRADIATOR	AFRRI LETTER TO NMRI VIA NNMC EXPRESSED INTEREST IN ASSUMING CUSTODY OF BLDG 150; BIDS WERE INVITED FROM TWO COMMERCIAL FIRMS FOR THE COST OF REHABILITATING THE FACILITY; BIDS WERE EXPECTED IN AUGUST 1962.
33	7/27/62	CO-60 REMOVAL	BUMED GRANTED NMRI AUTHORITY TO DISPOSE OF THE CO-60 SOURCES IN BLDG 150.
34	7/31/62	DECONTAMINATION PROPOSAL	TRACERLAB PROPOSAL SUBMITTAL FOR DECONTAMINATING BLDG 150 AND PERFORMING RELATING SERVICES.
35	8/2/62	AECLETTER	AEC LETTER AMENDING NNMC'S LICENSE FOR THE OPERATION OF NMRI'S BLDG 150.
36	8/6/62	TRANSFER OF BLDG 150	IN VIEW OF THE ESTABLISHMENT OF AFRRI AND DEPLETION OF COMPETENT PERSONNEL AT NMRI, IT WAS RECOMMENDED PERSONNEL BILLETS AS WELL AS THE FACILITY BE TRANSFERRED TO AFRRI. THIS TRASFER WAS CONTINGENT UPON COMPLETION OF THE REMOVAL OF THE CO-60 LOAD AND DECONTAMINATION OF THE PREMISES TO MEET AEC REQUIREMENTS FOR MAXIMUM PERMISSIBLE RESIDUAL LEVELS OF RADIATION.
37	8/10/62	PERSONNEL DATA	RADIATION EXPOSURE AND INTERNAL MONITORING DATA FOR W.I. ROSS FOR 7/57 TO 8/10/62

1 RI BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998)

M. , or Topics: Radiological personnel monitoring, air monitoring, survey . swipe results, cobalt-60 sources, decontamination efforts, photographs 1 drawings.

TAB DATE KEY WORDS SUBJECT

38	8/13/62	BIDS ON REHAB OF	NNMC ENDORSEMENT (8/21/62) OF AFRRI'S LETTER TO NMRI. ATTACHED WERE TWO BIDS
	5,10,02	BLDG 150	ONE FROM TRACERLAB AND ONE FROM ATLANTIC RESEARCH CORP.
39	8/20/62	NMRI RSO MEMO	RSO MEMORANDUM TO CO, NMRI PROVIDING ANSWERS TO THE CO'S QUESTIONS (ATTACHED
			MEMO OF 7/26/62); ALSO ATTACHED IS A MEMORANDUM CONFIRMING ARRAGEMENTS FOR
	Ì		KEY PLAYERS (NMRI, NNMC, AFRRI, AEC, PWO OF NNMC, YARDS AND DOCKS, ET AL) TO
			DISCUSS BLDG 150 DECONTAMINATION.
40	8/24/62	CONTRACT FOR	STATUS REPORT OF THE CONTRACT TO REMOVE THE CO-60 SOURCES FROM BLDG 150 BY
		REMOVAL OF CO-60	ATLANTIC RESEARCH CORP FOR ULTIMATE DISPOSAL AT ORNL.
41	9/10/62	PLANS TO REDESIGN	DIR, AFREI AND CO, NMRI LETTERS ADDRESSED THE POSSIBILITY OF REDESIGNING THE BLDG
		CO-60 IRRADIATOR	150 FACILITY
42	11/28/62	REMOVAL OF CO-60	THE CONTRACT FOR REMOVAL OF CO-60 FROM BLDG 150 WAS DELAYED PENDING
	, ,		AVAILABILITY OF A SOURCE GRIPPING TOOL AND THE PUBLIC WORKS GRADING OF AN
			ACCESS ROAD.
43	12/17/62	REMOVAL OF CO-60	LETTERS (12/1762 - 2/27/63) DOCUMENTED PLANS FOR THE ATLANTIC RESEARCH CORP TO
			REMOVE CO-60 SOURCES FROM NMRI, TRANSPORT THE SOURCES TO THEIR ALEXANDRIA
			FACILITY THEN SUBSEQUENT TRANSFER TO ORNL FOR DISPOSAL. THE FIRM CONTRACTED TO
			REMOVE THE CO-60 SOURCES FROM BLDG 150 REQUESTED REVISION OF THEIR RAM LICENSE;
			THE U.S. ATOMIC ENERGY COMMISSION REQUESTED ADDITIONAL INFORMATION; THE
			INFORMATION WAS PROVIDED; THENNMC RSO CONTROLLED ACCESS TO BLDG 150 DURING
			THE REMOVAL OPERATIONS.
44	2/19/63	CONTRACT TO	CONTRACT HAS BEEN RECEIVED FROM NNMC SUPPLY AND FISCAL DEPARTMENT FOR THE
		REMOVE CO-60	REMOVAL OF CO-60 FROM BLDG 150 BY ATLANTIC RESEARCH CORP WITHIN 60 DAYS,
			PENDING RECEIPT OF A GOVERNMENT-SUPPLIED SOURCE GRIPPING TOOL.
45	2/26/63	WIPE SURVEY	WIPE SURVEY REPORT OF BLDG 150
46	3/8/63	REMOVAL OF CO-60	STATUS REPORT OF PLANS TO REMOVE THE CO-60 AND DECONTAMINATE BLDG 150.
47	3/21/63	REMOVAL OF CO-60	LOGBOOK OF THE REMOVAL OF THE CO-60 SOURCES FROM BLDG 150; PERSONS FROM THE
			ATLANTIC RESEARCH CORP ARRIVED AT 1030 ON 3/21/63 AND STARTED PREPARATIONS FOR
	2		THE REMOVAL OF THE 20 CO-60 SOURCES FROM BLDG 150; THE LAST AND FINAL LOAD OF
			SOURCES WERE REMOVED ON 3/26/63.
48	4/2/63	REMOVAL OF CO-60	LETTER FROM CO, NMRI TO CO, NNMC ADVISED THAT THE ATLANTIC RESEARCH CORP HAD
			INITIATED ACTION ON THE CONTRACT TO REMOVE THE CO-60 FROM BLDG 150; THE ACTUAL
			REMOVAL OF THE CO-60 COMMENCED DURING THE WEEK OF 18 MARCH, AND WAS
			CONCLUDED ON 28 MARCH 1963; NMRI'S LICENSE FOR POSSESSION OF THE CO-60 EXPIRED ON
			31 MARCH; THE PUBLIC WORKS OFFICE, NNMC HAS BEEN REQUESTED TO ARRANGE,
			THROUGH THE BUREAU OF YARDS AND DOCKS, FOR THE DECONTAMINATION OF BLDG 150.
49	4/2/63	GAMMA SURVEY	RESULTS (WITH SKETCH) OF GAMMA SURVEY OF INTERIOR OF BLDG 150
50	4/4/63	SOIL SAMPLES	SOIL SAMPLES RESULTS FOR BLDG 150
51	4/5/63	PHOTOGRAPHS	PRE-DEMOLITION PHOTOGRAPHS OF BLDG 150 EXTERIOR, INTERIOR AND GROUNDS.

ATTACHMENT A

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N' 31 BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998)

Mujor Topics: Radiological personnel monitoring, air monitoring, survey a swipe results, cobalt-60 sources, decontamination efforts, photographs, drawings.

TAB DATE KEY WORDS SUBJECT

8/9/63	150 FROM NMRI TO AFRRI TRANSFER OF BLDG	NMRE TO AFREE ENDORSEMENT LETTERS FROM AFREE AND NIME ARE ATTACHED
		T NART TO A REPUT FRIDORSEMENTED FEETERS FROM A FRRIAND NNIME A REATTACHED
8/5/63	TRANSFER OF BLDG	BUMED LETTER TO NNMC GRANTING AUTHORITY TO TRANSFER CUSTODY OF BLDG FROM NMRI TO AFRRI. ENDORSEMENT LETTERS FROM AFRRI AND NNMC ARE ATTACHED
		VALUES RANGED FROM 9.4 E-06 TO 6.7 E-03 MICROCURIE CO-60 PER GRAM OF EARTH.
7/17/63	SOIL SAMPLES	SOIL SAMPLES ANALYZED FOR CO-60 CONTAMINATION IN THE VICINITY OF BLDG 150.
		PERMISSIBLE RESIDUAL LEVELS OF RADIATION. THE BUILDING IS READY FOR TRANSFER.
		DECONTAMINATED TO THE EXTENT THAT IT MEETS AEC REQUIREMENTS FOR MAXIMUM
		THE CO-60 HAS BEEN DISCOSED OF AND THE BLDG 150 PREMISES HAVE BEEN
7/3/63	TRANSFER OF BLDG	NMRI LETTER TO BUMED ADVISING BUMED THAT THEIR CONTINGENCIES HAVE BEEN MET.
	,	OF SOIL REMOVAL AND SUBSEQUENT REPLACEMENT OF 2 TO 3 FEET OF CLEAN FILL.
5127105		SURFACE SOIL (4 TO 6 INCHES) IN THE VICINITY OF BLDG 150; LETTER DETAILED THE EXTENT
		NNMC RSO LETTER TO CO, NMRI RECOMMENDING THE REMOVAL OF CONTAMINATED
5/15/63	MONITORING DATA	PRE-DECONTAMINATION, AIR, SURVEY AND SWIPE MONITORING DATA FOR 3/63 TO 7/63
1		EFFORTS STILL IN PROGRESS; LOGBOOK ENDS.
1		AREA; ALL CONTAMINATED WASTE PLACED IN BOXES; DURING 6/13-14/63, BLDG 150 DECON
1		TREES FROM THE HILL ADJACENT TO BLDG 150 CUT DOWN AND REMOVED TO NNMC DUMP
		FOUR INCHES OF DIRT FROM THE FRONT OF BLDG 150 AT THE REMOVED FENCE AREA; ALL
	KEMOVAL	MOVED TO NNMC DUMP SITE; ON 5/31/63, COMMENCED TO REMOVE AND PLACE IN BARRELES
		AND SURVEYS WERE RECORDED DURING THIS EVOLUTION; SEABLES REMOVED THE ROOF; ALL STEEL AND DEBRIS REMOVED FROM THE TOP OF BLDG 150; NON-CONTAMINATED DEBRIS
5/14/63		NMRI STAFF COMMENCED DECONTAMINATION OF INTERIOR OF BLDG 150; AIR SAMPLING
		CONTAMINATED MATERIALS FROM BLDG 150.
5/10/63	EXPOSURE DATA	DOSIMETRY FILM READINGS FOR PERSONS PARTICIPATING IN THE REMOVAL OF
		MEMO RELATING POCKET DOSIMETER READINGS FOLLOWING DECON EFFORTS AT BLDG 150
L		CONTAMINATED MATERIALS FROM NMRI BLDG 150.
		REQUESTING EMERGENCY ASSISTANCE IN THE REMOVAL OF RADIOACTIVELY
5/7/63		RSO, NNMC REQUEST TO U.S. ARMY TECHNICAL ESCORT UNIT, EDGEWOOD ARSENAL, MD
		U.S. ARMY EDGEWOOD ARSENAL, MD.
		(FROM ROSS' HOME) FROM BLDG T-10 AND AREA AROUND BLDG 150. MATERIAL TAKEN TO
5/3/63		MONITORING RECORD FOR THE REMOVAL OF RADIOACTIVELY CONTAMINATED MATERIALS
		DAY)
4/26/63	SURVEY DATA	SURVEY DATA (WITH SKETCH) AFTER REMOVAL OF MATERIALS AND VACUUMING (FIRST
		NMRI'S AEC RAM LICENSE FOR CO-60 USE IN BLDG 150.
4/22/63	AEC RAM LICENSE	CONTAINS & COPY OF THE NMRI RAM LICENSE AND VARIOUS LETTERS (2/62 TO 4/63) REVISING
		DECONTAMINATING THE AREA.
	SURVEY	NNMC LETTER TO CHIEF, BUREAU OF YARDS AND DOCKS REQUESTING A SURVEY OF BLDG 150 TO DETERMINE THE EXTENT OF CONTAMINATION AND OUTLINE A PROCEDURE FOR
	4/26/63 5/3/63 5/7/63 5/8/63 5/10/63 5/10/63 5/14/63 5/14/63 5/15/63 5/29/63 7/3/63 7/17/63	SURVEY4/22/63AEC RAM LICENSE4/26/63SURVEY DATA5/3/63REMOVAL OF CONTAMINATED FURNITURE5/7/63REMOVAL OF CONTAMINATED MATERIALS5/8/63PERSONNEL DATA5/10/63EXPOSURE DATA5/14/63LOGBOOK OF REMOVAL OF ATTIC REMOVAL5/15/63MONITORING DATA5/29/63SOIL REMOVAL7/3/63TRANSFER OF BLDG IS0 FROM NMRI TO AFRRI7/17/63SOIL SAMPLES

N' I BUILDING 150 HISTORICAL RADIATION FILES (Compiled by the NMRI RSO, June 1998)

Major Topics: Radiological personnel monitoring, air monitoring, survey as. wipe results, cobalt-60 sources, decontamination efforts, photographs, a drawings.

TAB DATE KEY WORDS SUBJECT

		150 FROM NMRI TO AFRRI	(CO-60 IRRADIATOR FACILITY) FROM NMRI TO AFRRI.
66	10/1/63	PHOTOGRAPHS	PHOTOGRAPHS OF BLDG 150 INTERIOR AFTER REMOVAL OF MATERIALS (DATE OF PHOTOGRAPHS UNKNOWN)
67	10/21/63	PERSONNEL DATA	INTERNAL MONITORING RESULTS FOR L.J. BODENLOS, SHANNON ROSS (CHILD), W.I. ROSS, C.R. BILES, J.H. FLINT, W. CARTER, HENDERSON, AND R.E. SEVERANCE.
68	10/22/63	SOIL SAMPLES	SOIL SAMPLES RESULTS FOR BLDG 150
69	8/15/65	EXPOSURE DATA	EXPOSURE DATA FOR C.R. BILES 9/50 TO 6/65; FOR WI ROSS 7/57 TO 4/62; FOR RF HENDERSON 5/60 TO 4/62; FOR L.J. BODENLOS 12/58 TO 4/62; FOR C. CARTER 6/57 TO 4/62.
70	10/19/67	EVALUTION AND CLEARANCE	COLLECTION OF MEMORANDA AND SURVEY DATA WHICH SERVED TO ALLOW NNMC TO ENDORSE AFRRI'S REQUEST TO RETURN THE CUSTODY OF BLDG 150 FROM AFRI TO NMRI. AIR, WIPE, AND SURVEY DATA INDICATED THAT FIXED RADIATION LEVELS IN SPECIFIC AREAS IN RADIATION ROOMS 1 AND 2 WERE ABOVE THE MAXIMUM PERMISSIBLE ALLOWED BY THE AEC FOR UNRESTRICTED AREAS. THE CONTROL ROOM MET THE CRITERIA DESIGNATED FOR UNRESTRICTED AREAS. ON 10/13/67, AIR SAMPLES REVEALED NO AIRBORNE CONTAMINATION.
71	5/5/68	CO-60 REMOVAL	LETTER FROM ATLANTIC RESEARCH CORP. ACKNOWLEDGING THE COMPLETION OF THE CONTRACT TO REMOVE THE CO-60 FROM BLDG 150.
72	11/28/69	RADIATION SURVEY MAP OF BLDG 150	ON 11/14/69, A RADIATION SURVEY OF BLDG 150 WAS CONDUCTED TO DETERMINE THE FEASIBILITY FOR FUTURE USE. THE RESULTS INDICATED THAT LOOSE CO-60 CONTAMINATION EXISTS (BACKGROUND TO 4.5 TO 1995 MICROCURIES; <0.1 TO 3.4 mR/h) AND BACKGROUND IS ABOVE THE CURRENT SPECIFICATION FOR A NON-RADIATION AREA.
73	3/16/87	NMRI RSO MEMORANDUM	STATUS OF BLDG 150
74	3/15/89	NMRI RSO MEMO	STATUS OF NMRI BLDG 150
75	3/30/95	NMRI RSO MEMORANDUM	STATUS OF BLDG 150
76	4/18/95	NMRI RSO MEMORANDUM	STATUS OF BLDG 150
77	5/29/98	NMRI RSO MEMORANDUM	STATUS OF BLDG 150
78	6/98	NMRI RSO EMAIL MESSAGE	STATUS OF BLDG 150

ATTACHMENT A

Gaiter, Schleurious

From: Sint:	Gaiter, Schleurious Friday, May 29, 1998.6:18 PM farrand_david_e_cdr@hq.navsea.navy.mil; jdgeorge@bth12.med.navy.mil; kmendenhall@navdoscen.med.navy.mil; malinoski@mx.afmi.usuhs.mil; rllafontaine@us.med.navy.mil; tvetenp@ehc50.med.navy.mil; wolffs@ehc50.med.navy.mil; Gaiter, Schleurious; blakep@N4.OPNAV.NAVY.MIL
Cc:	Commanding Officer, Lissner, Christopher, Washington, W. Ahmad, Saifeddin; mibush@nehc.med.navy.mil
Subject:	RÉ; Bldg. 150

CAPT Blake, CDR Farrand

Per our conversations on 27 and 28 May 1998 regarding raditiation monitoring at NMRI building 150, the following information is provided:

a. Per CAPT Blake's arrangement with CAPT Mendenhall, on 28 May, 1 borrowed a radiation detector unit from the Naval Dosimetry Center to perform measurements at building 150 (the remaining sub-level; 28 feet by 42 feet, 2 inch foot print). The instrument is a IM-253/PD radiacmeter (S/N C114) with a DT-640/PD gamma probe (S/N C114) (calibrated 12 Jan 98; due for recalibration 12 Jul 98). LT Woodruff gave me some training on using the unit and interpreting the readings. We evaluated two cobalt-60 check sources to confirm that the energy range mode (PHA, HV1) was indeed cobalt-60. The check sources data is as follows:

	Source#1	Source#2
Activity(microCi):	0.108	0.010
Date:	11/17/95	11/17/95
Corrected Activity (microCi):	0.078	0.007
CPM @ 1 cm:	6500	1250
mR/hr;	0.013	0.0025
(see note (4))		

otes: (1) The background reading was 200-250 cpm; the check source data above was not background corrected. (2) May 1998 corrected activity = Ao exp(-0.693*2.5y/5.26y). (3) The instrument settings for the cobalt-60 check source readings were PHA as the range mode and high voltage selection HV1. (4) Instrument sensitivity in the technical manual is listed on page 1-3 as approximately 500,000 CPM per mr/hr.

b. The background reading in building was 200-250 CPM. The above-background readings detected in building 150 for measurements taken on 5/29/98 during 1045-1130 were as follows:

	Area (cm2)	CPM	mr/hr
(1) Area 1 in Exposure Room (ER) #2	150	7500	0.015
(2) Area 2 in ER #2	100	7500	0.015
(3) Area 3 in ER #1	100	5500	0.011
(4) Area 4 in ER #1	150	3500	0.007
(5) Area 5 in ER #1	100	3000	0.006
(6) Area 6 in ER #1	100	3000	0.006

Notes: (1) the area represents the approximate area for the hot spot, (2) in addition to CPM values recorded using the PHA setting, CPM values for the GROSS setting were observed and were on the order of twice that for the PHA setting; (3) CPM values were not background corrected; (4) the mr/hr values were calculated using the instrument sensitivity relationship 500,000 cpm per mr/hr.

No concrete or removable contamination samples were taken from the areas.

There is standing water in the only two floor drains in Exposure Rooms #1 and 2. There are two other drains in the opposite side of this room. The floor drains are documented (NMRI RSO memo of 16 Mar 87) as having been "plugged". During my visit on 29 May 1998, a stick measuring approximately 24 inches was inserted into each Exposure Room drain. No obstructions were encountered. The four floor drains empty into one 6-inch-diameter pipe (approx. length: 172.5 feet) that empties into the sanitary sewer at manhole # 428.

c. I am currently compiling an index (dates, general topics, keywords) of the building 150 historical files I found. This index might shed some light on what has been done and possible points of contacts for obtaining hardcopies of documents.

ATTACHMENT B

V/R LCDR Gaiter

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ATTACHMENT B PAGE 2 OF 3

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Gaiter, Schleurious

From:	blakep@N4.OPNAV.NAVY.MIL[SMTP:blakep@N4.OPNAV.NAVY.MIL]
Sent:	Wednesday, May 27, 1998 3:47 PM
0:	farrand_david_e_cdr@hq.navsea.navy.mil; jdgeorge@bth12.med.navy.mil;
	kmendenhall@navdoscen.med.navy.mil; malinoski@mx.afm.usuhs.mil;
	rllafontaine@us.med.navy.mil; tvetenp@ehc50.med.navy.mil; wolffs@ehc50.med.navy.mil;
	gaiters@nmripo.nmri.nnmc.navy.mil
Subiect:	Bidg. 150

CAPT's George, Malinoski & Mendenhall: I request your assistance in obtaining a portable Nal detector with a SCA/Gross setting (or equivalent) for verifying Co-60 contamination. The NRSC is moving to take direct action on decommissioning Bldg. 150 behind NMRI, since the NMRI complex is scheduled for BRAC at the end of CY 1999. This original two story building was contaminated with Co-60 in the early 60's and closed. What now remains is a concrete cellar that we suspect may have two small, fixed Co-60 contamination areas and potentially contaminated waste lines that have been capped for many years. The most recent data we have on this site is from an AN/PDR-27 survey in 1995. Our plan of attack is to first verify this is Co-60 and then measure activity levels. We may or may not need to decontaminate. If we need to decontaminate, CDR Farrand's staff will obtain a cost quote from appropriate contractors. Please contact me if you have equipment that LCDR Gaiter (NMRI) could use over a one day period. As always your thoughts are most appreciated. Thanks! -Paul Blake-

MEMORANDUM FOR THE RECORD

From: NMRI Radiation Safety Officer

Subj: BUILDING 150 RADIATION MONITORING

1. Building 150 was revisited by LT Gaiter and HM2 Celeste on 4/18/95 for additional radiation monitoring and painting the perimeter of the radiologically contaminated areas with white lacquer aerosol paint.

As of 4/18/95, contamination was detected on paper swipes wiped over the two contaminated areas. The contaminated areas were located in Radiation Rooms 1 and 2 on the concrete floor of the remaining subsurface level of building 150. No soil removal was attempted. As was previously indicated, two areas on the concrete floor were found to be radiologically contaminated. The approximate boundaries of the contaminated areas are indicated as hashed rectangular areas on the NMRI RSO memorandum dated 30 March 1995.

The dimensions of the marked boundaries for the contaminated areas are:

Area #1: Radiation Room 1; 5 feet by 6.5 feet, near wall in soil on floor the maximum exposure rate was 0.12 mR/h at 1 cm (using a meter, AN PDR-27 calibrated for Cs-137).

Area #2: Radiation Room #2; 4 feet by 6 feet (maximum exposure rate ranging from 0.11 to 0.15 mR/h at 1 cm).

S. L. GAITER

MEMORANDUM FOR THE RECORD

From: Radiation Safety Officer, Naval Medical Research Institute, Bethesda, MD 20889-5607

Subj: RADIOLOGICAL STATUS OF BUILDING 150

Encl: (1) Radiation Levels seen on 02 MAR 87 (circled) and 30 Mar 95 (rectangled)

1. On 30 March 1995, Building 150 of the Naval Medicl Research Institute (NMRI) was entered by CAPT J.D. George (NAVDOSCEN), CDR L.F. Parr (NNMC), LT S. L. Gaiter (NMRI RSO), LT B.K. Holland (AFRRI), and HM2 H. Celeste (NMRI ARSO).* The following information is presented:

Background:

Building 150 was constructed in the early 1950's to irradiate animals and determine the effects, of exposure to ionizing radiation on organ and cellular systems. This was done as an economical alternative to transporting animals and attendants to teh Bikini Islands atomic testing areas.

The radiation source was 2500 curies of Cobalt-60 in ceramic slugs arranged in two circles, providing a dose rate of 200 rem per minute. There were several minor contamination incidents during routine maintenance between 1951 and 1962. This contamination was probably due to cracks in the ceramic slugs. Workers were routinely monitored for the internal deposition of radionuclides.

On April 18, 1962 while undergoing routine internal monitoring, significant internal deposition was identified on HM2 W. Ross. Levels ranged from 0.06 to 0.12 mR/hr internal dose rate. An investigation revealed levels of 0.6 to 32 mR/hr within Building 150 with widespread loose and fixed surface contamination. Contamination was also identified in the Ross home, yard, and on his family. Decontamination was conducted and the Cobalt-60 source and contaminated materials were removed at a cost of \$150,000. The building was sealed until November 1969.

Status of Building 150:

- Source last replaced January 1961

- Cobalt-60 half life = 5.26 years

- As of 01 Mar 87,

Elapsed half lives = 4.75 (residual fixed contamination would have decayed to about 3.7 % of that present following decontamination efforts at or about Apr 62)

ATTACHMENT D PAGE 1 OF 4

Highest level of fixed surface gamma contamination: A 14 mrem/hr on contact above cockground; the levels in Building 150 could from 0.02 mR/hr to 0.14 mR/hr on contact measured with an AN/PDR-27 meter. The levels obtained from samples of water taken from two drains were 22-30 dpm (disintegrations per minute) above background. It was noted that the drains were plugged.

No airborne contamination was found.

No loose surface contamination was found.

- Levels of fixed surface gamma contamination found were consistent with decaycorrected measurements of Nov 69.
- Building 150 was sound, but open to the elements; the only door to the building was secured; however, access to the building was possible through an opening in the ceiling.

As of 30 Mar 95,

Elapsed half lives = 6.27 (residual fixed contamination would have decayed to about 1.3 % of that present following decontamination efforts in 1962)

Highest level of fixed surface gamma contamination: 0.11 mrem/hr above background (measured with an AN/PDR-27S with the probe held 1 to 2 cm from surfaces); the levels in Building 150 ranged from 0.01 mR/hr to 0.11 mR/hr. Only two areas showed levels above background. See enclosure (1) for survey results. These areas were located in portions of the building which were formerly designated as radiation rooms 1 and 2. One of these contaminated areas (~ 0.02 mrem/hr - 0.08 mrem/hr) was located on the floor in the vicinity of a motorized system suspended from the ceiling in the former radiation room 1. The other contaminated area (~0.02 mrem/hr - 0.11 mrem/hr) was located near a floor drain in the former radiation room 2. Debris and discarded materials litters the concrete floor. Background levels were obtained when montoring the two floor drains and upper surfaces within the building. Standing water was present in both drains. The AN/PDR-27S meter was calibrated using a Cs-137 source on 21 Oct 94, Serial Number G1423, by RSO Inc., Laurel, Maryland.

No loose surface contamination was found.

Building 150 was sound, but open to the elements; the only door to the building was secured; access to the building was possible through an opening in the ceiling.

Recommendations:

Post the area as dangerous (not radioactive).

Restrict access to the building by posting a sign, "Authorized Personnel Only".

Because the contamination appears to be limited to two relatively small areas (total surface-contaminated area on the concrete floor inside Building 150 is approximately 10 square feet), efforts should be undertaken to fully understand the extent of the contamination. If warranted, contaminated portions of the concrete floor should be removed and properly discarded: Building 150 would then be free of all radioactive contamination.

2. As was determined during the 1987 monitoring, Building 150 does not pose a radiologic hazard to personnel working in its vicinity. As of March 30, 1995 using an AN/PDR-27S Radiac (calibrated using a ¹³⁷Cs source), the highest readings obtained were 0.11 mR/hr (open window) and 0.08 mR/hr (closed window). Using the 0.11 mR/h reading, calculations shown that a person in this area would receive no more than approximately 0.11 mrem in any one hour nor more than 18 mrem in any seven consecutive days. A person working a 40-hour week for 52 weeks during a year on that spot would receive no more than 229 mrem. No special radiation precautions nor radiation posting is required (as per Title 10 Code of Federal Regulations Section 20.105(a.-c.)) if the radiation levels in an unrestricted area are such that an individual continuously present would not receive a whole-body dose in excess of (a) 0.5 rem in any period of one calendar year, (b) 2 mrem in any one hour, and (c) 100 mrem in seven consecutive days.

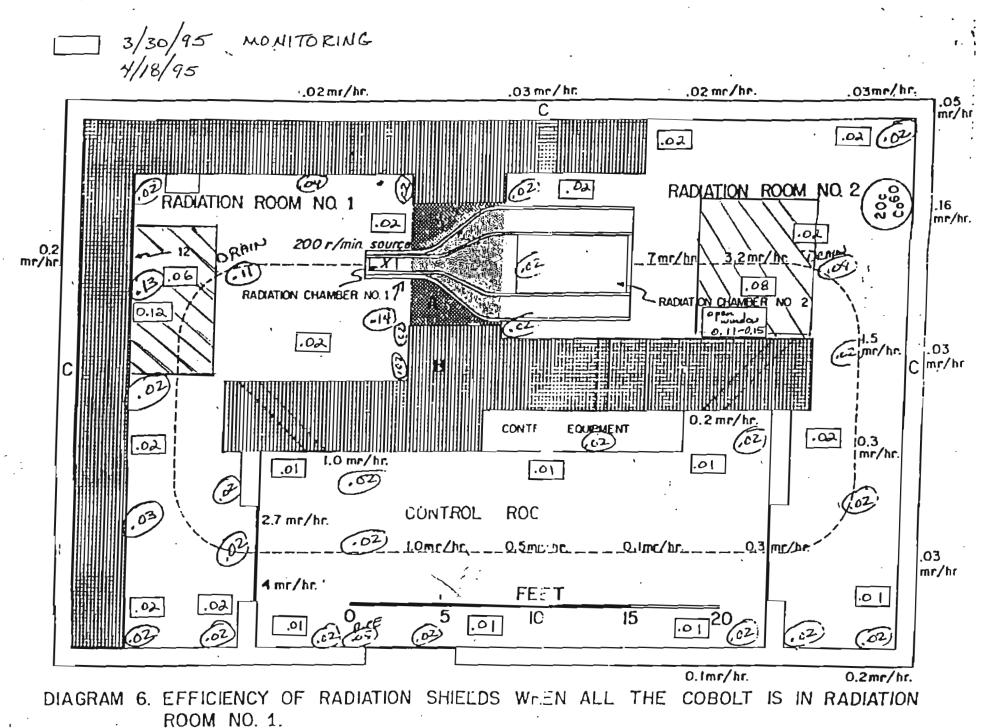
. GAITER

PAGE 3 OF 4

LT MSC USN

ATTACHMENT D

Copy to: CAPT J. D. George CDR L. F. Parr LT B. K. Holland HM2 H. Celeste



NO. 1,

ATTACHMENT D

PAGE 4 OF 4

6470 15 March 1989

MEMORANDUM

From: Radiation Safety Officer, Naval Medical Research Institute To: Radiation Safety Committee

Subj: STATUS OF NAVMEDRSCHINSTITUTE BUILDING 150 "

Encl: (1) Radiation Levels seen on Ol MAR 89 (circled).

1. On 01 March 1989, Building 150 of the Naval Medical Research Institute (NAVMEDRSCHINSTITUTE) was entered by LTJG K. E. RIDER, NAVMEDRSCHINSTITUTE Radiation Safety Officer with the assistance of HM2 L. A. HINTSALA, Radiation Health Technician from Naval Dosimetry Center, National Naval Medical Center. The following information is presented:

Background:

Building 150 was constructed in the early 1950's to irradiate animals and determine the effects of exposure to ionizing radiation on organ and cellular systems. This was done as an economical alternative to transporting animals and attendants to the Bikini Islands atomic testing range?

The radiation source was 2500 curies of Cobalt-60 in ceramic slugs arranged in two circles and provide a dose rate of 200 Rem per minute. There were several minor contamination incidents during routine maintenance between 1951 and 1962. (probably due to cracks in the ceramic slugs). Workers were routinely monitored for internal deposition of radio-nuclides.

On 18 April 1962 while undergoing routine internal monitoring, significant internal deposition was identified on HM2 W. Ross. Levels ranged from .06-.12 mr/hr <u>internal</u> dose rate. An investigation revealed levels of .6-32 mr/hr within building 150 with widespread loose and fixed surface contamination. Contamination was also identified in the Ross home, yard and on his family. Decontamination was conducted and the Cobalt-60 source and contaminated materials were removed at a cost of \$150,000. The building was sealed until November 1969.

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Status of Building 150:

- Source last replaced JAN 1961
- Cobalt-60 half life 5.26 years (as of MAR 89, 5.37 half lives have elapsed).
- Remainder would be 2.4% of the original amount left in the building.
- Highest level fixed surface gamma contamination seen on 01 MAR 89, .12 mrem/hr on contact above background at location of source (range in building .02 mr/hr-.12 mr/hr

ATTACHMENT E

PAGE 1 OF 5

on contact). Measured with ANPDR-27 (enclosure 1)

- Samples of water from 2 drains read a maximum of 30 disintegrations per minute (dpm) gamma above background (range 22-30 dpm above background). The drains are plugged.
- No airborne contamination found.

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- No loose surface contamination found.
- Levels of fixed surface gamma contamination found are consistent with measurements of NOV 69 figuring for decay.
- Structure is sound, but open to the elements; mineral deposits are present and a tree has grown rooted under the floor, around pipes, and through the ceiling.

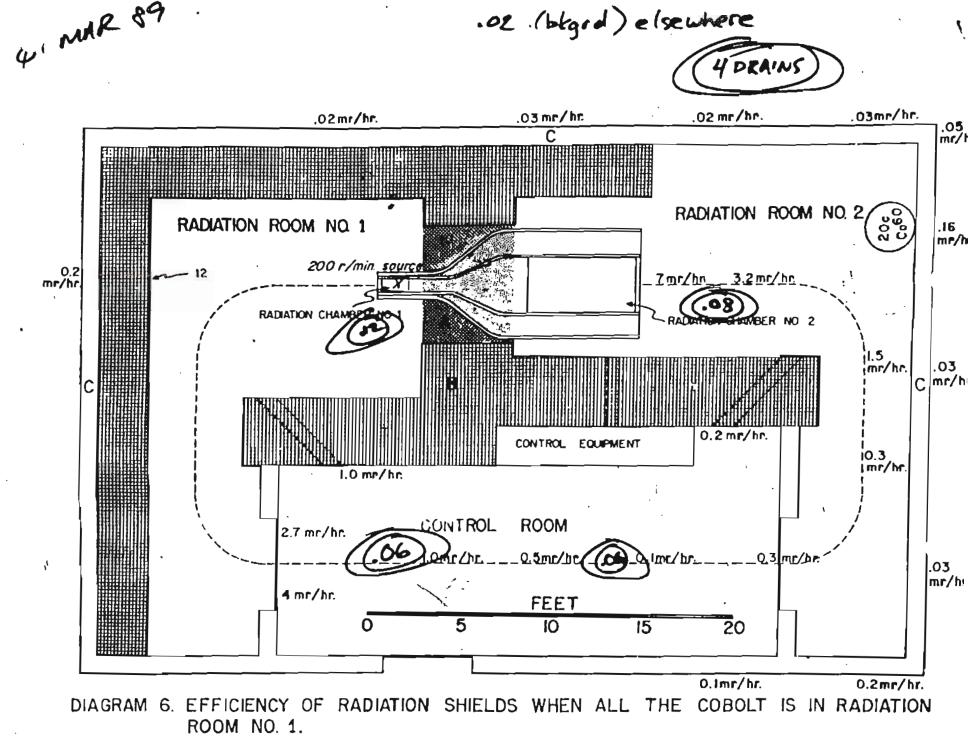
Recommendations:

- Drain water from the two drains. -
- Dispose of drain cups and drain covers IAW 10 CFR 20.301; the only sites of fixed contamination remaining.
- Go forward with planned demolition.

2. Building 150 as it stands does not pose a radiologic hazard to personnel working around it. At the highest dose rate (.12 mr/hr) seen, a person working a forty hour work week for 52 weeks on that spot would only receive 250 mrem which does not require special radiation precautions or radiation posting (as per 10 CFR 20.105(a)).

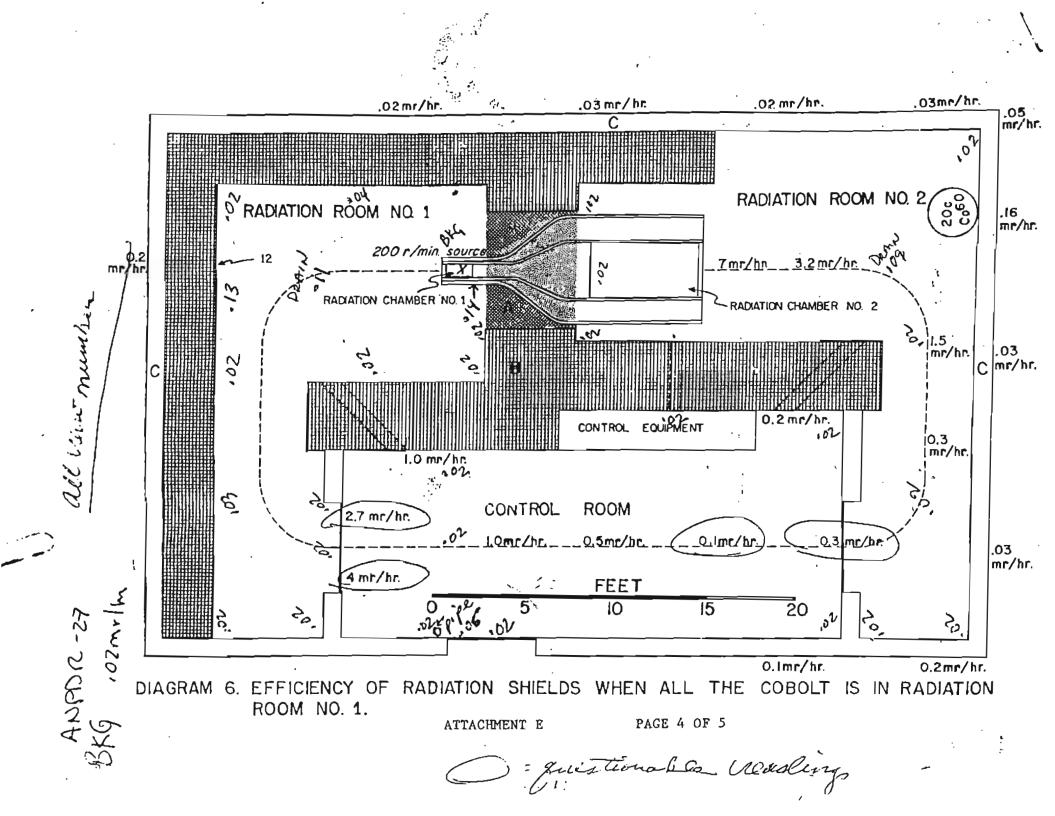
Very respectfully,

K. E. RIDER LTJG MSC USNR



ATTACHMENT E

PAGE 3 OF 5



Assumption: ripe completely ruled 2 000 22 PIPE VOLUME BULLDING 150 -> San. Sever MH # 428 Length = 172,5' = 2070" = 5257.8 cm Diameter = 6" Rodice = 3" = 7,62 cm R2 = 58.06 an2 V = Mr2L = (3,14) (58,06 cm2) (52578 cm) = 958,54 liter = 253,19 gal ave/isample 27 dpm /7 ml sample (gamma) total over length 3.69×106 dpm

ATTACHMENT E

6470

16 March 1987

MEMORANDUM

From: Radiation Safety Officer, Naval Medical Research Institute To: Radiation Safety Officer, Naval Medical Command, National Capital Region, Bethesda, MD.

Subj: STATUS OF NMRI BUILDING 150

Encl: (1) Radiation Levels seen on 02 MAR 37 (circled) (2) Levels seen 14 NOV 1969

1. On 02 March 1987, Building 150 of the Naval Medical Research Institute (NMRI) was entered by LT D. L. Martin, NMRI Radiation Safety Officer with the assistance of the Radiation Safety Office from Naval Medical Command, National Capital Region (NMCNCR). The following information is presented:

Background:

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Building 150 was constructed in the early 1950's to irradiate animals and determine the effects of exposure to ionizing radiation on organ and cellular systems. This was done as an economical alternative to transporting animals and attendants to the Bikini Islands atomic testing areas.

The radiation source was 2500 curies of Cobalt-60 in ceramic slugs arranged in two circles and provide a dose rate of 200 Rem per minute. There were several minor contamination incidents during routine maintenance between 1951 and 1962. (probably due to cracks in the ceramic slugs). Workers were routinely monitored for internal deposition of radio-nuclides.

On 18 April 1962 while undergoing routine internal monitoring, significant internal deposition was identified on HM2 W. Ross. Levels ranged from .06-.12 mr/hr internal dose rate. An investigation revealed levels of .6-32 mr/hr within building 150 with widespread loose and fixed surface contamination. Contamination was also identified in the Ross home, yard and on his family. Decontamination was conducted and the Cobalt-60 source and contaminated materials were removed at a cost of \$150,000. The building was sealed until November 1969.

Status of Building 150: ---

- ~ Source last replaced JAN 1961
- Cobalt-60 half life 5.26 years (as of 01 MAR 87, 4.79 half lives have elapsed).
- Remainder would be 3.9% of the original amount left in the building.
- Highest level fixed surface gamma contamination seen on MAR 87, .14 mrem/hr on contact above background at

ATTACHMENT F

location of source (range in building .02 mr/hr-.14 mr/hr on contact). Measured with ANPDR-27 (enclosure 1) Samples of water taken from 2°drains read a maximum of

- 30 disintegrations per minute (dpm) gamma above background (range 22-30 dpm above background). The drains are plugged.
- No airborne contamination found.
- No loose surface contamination found.
- Levels of fixed surface gamma contamination found are consistent with measurements of NOV 69 figuring for decay. (enclosure (2)).
- Structure is sound, but open to the elements.
- Large hole in ceiling without barrier.

Recommendations:

- Drain water from the two drains.
- Cover large ceiling hole.
- Post the area as dangerous (not radioactive) "Authorized Personnel Only"
- Tear building 150 down as a piggyback to the planned demolition of building 119 and 165 slated for calendar year 87.

2. Building 150 as it stands does not pose a radiologic hazard to personnel working around it. At the highest dose rate (.14 mr/hr) seen, a person working a forty hour work week for 52 weeks on that spot would only receive 291.2 mrem which does not require special radiation precautions or radiation posting (as per Title 10 Code of Federal Regulations Section 20.105(a)). The cover over the ceiling hole is a safety measure as is the recommendation for a safety sign.

3. I respectfully request that this memorandum be presented to the NMCNCR Radiation Safety Committee for review.

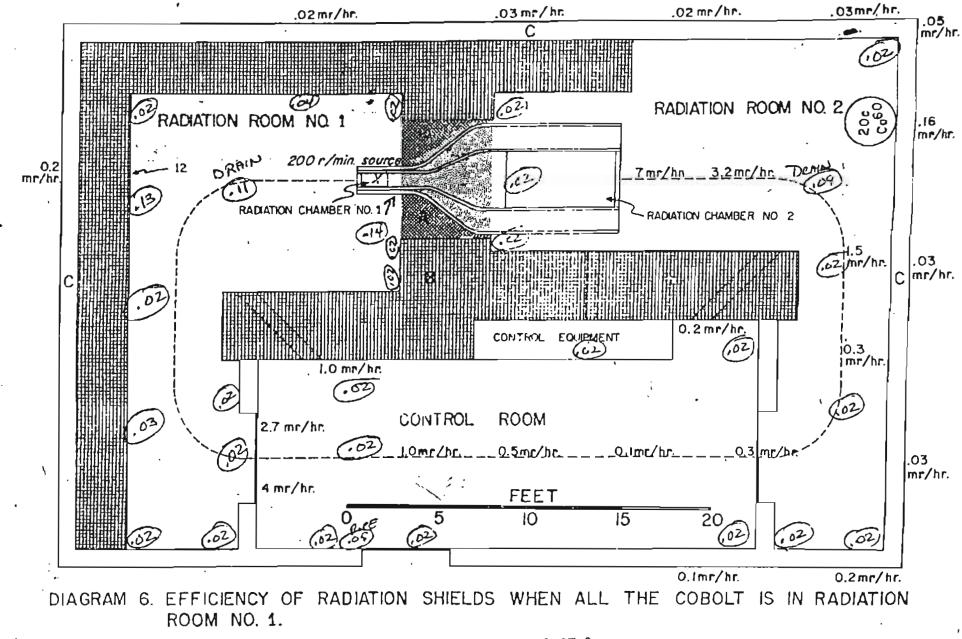
Very respectfully,

D. L. MARTIN LT MSC USNR

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ATTACHMENT F

PAGE 2 OF 3



ATTACHMENT F

PAGE 3 OF 3

Inalagion 1.

28 November 1969

Ltjg David L. Odor; Assistant Radiation Safety Officer

Lt Terry Sallee

Survey of Building 150

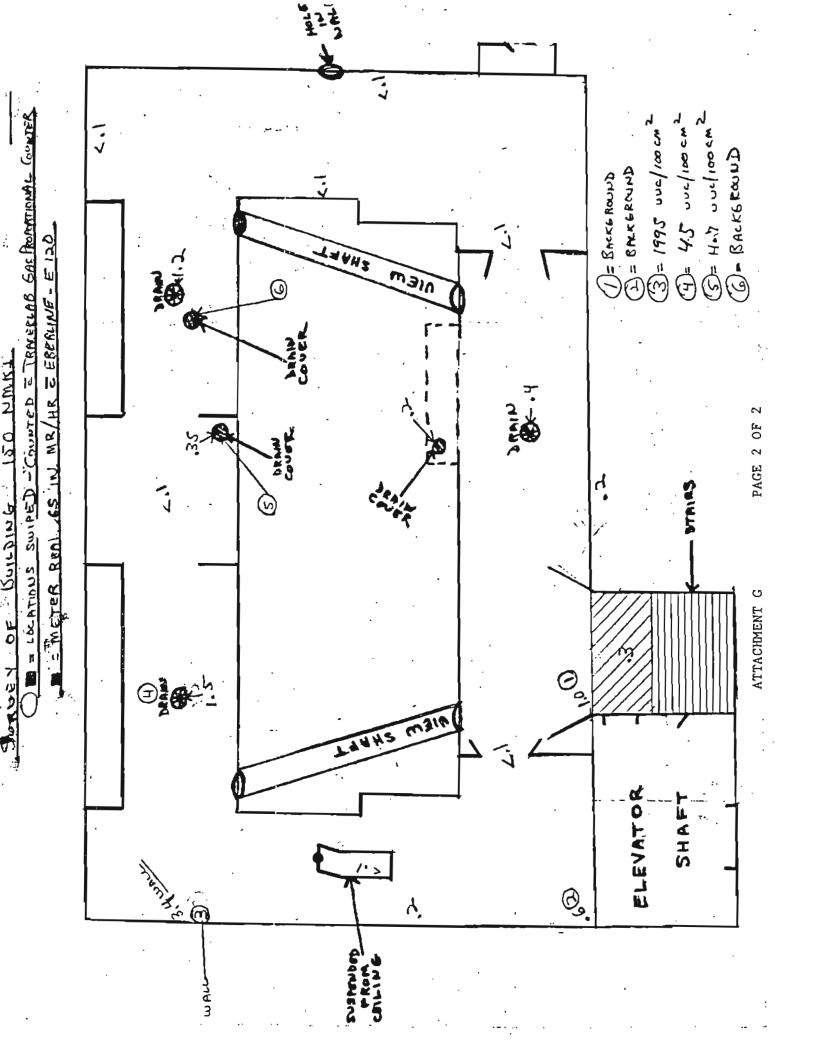
ENCL : (1) Radiation Survey Map of Building 150

1. On 14 November 1969 a survey of Building 150 was conducted to determine the feasibility for future use. Enclosure (1) shows areas of contamination determined by monitoring instruments and swipes. The Eberline Survey Instrument El20 was used for survey and all swipes were counted on a Tracer Lab gas flow proportional counter.

2. The results of the survey indicate that loose contamination of 60Co still exists and background is above specification for a non-radiation area.

3. If the building is decontaminated to the extent that all areas are less than .6 mr/hr it could be utilized as a non-radiation area. Also if loose contamination was reduced to less than 100 uuci/100cm² the building could be utilized as a controlled area.

D. L. ODOR



NNAC:C-11:RKS:rug 6470 19 September 1967 October

1:

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From: Radiological Safety Officer, National Maval Medical Center To: Commanding Officer, Naval Medical Research Institute

- Subj: Building 150 (Cobalt Irradiation Facility); evaluation and clearance of
- Ref: (a) FIRST ENDORSEMENT by CO, NUC 1tr: NEW-C-O2:cb; 11000 of 3 October 1967 on Director, AFREI 1tr: 10150 of 28 September 1967

1. Beference (a) provides for the return of Bldy. 150 to the custody and use of the Naval Medical Research Institute after evaluation and clearance by the Radiological Safety Officer. NGC.

2. An initial survey of Bldg. 150 conducted on 29 September revealed no significant removable surface contamination present in any roca. However, fixed radiation levels in specific areas of Radiation Rooms 1 and 2 are, at present, above the maximum permissable allowed by the AEC for unrestricted areas. The Control Room meets the criteria designated for unrestricted areas.

3. A more detailed follow-up survey was conducted on 13 October and substantiated the findings of the initial survey. In addition, air samples taken at this time indicated the absence of any airborns contamination.

4. It is recommended that all inside surfaces of Bidg. 150 be given one or two coats of a thick latex paint. This would tend to preclude the dispersal of any loose surface contamination. Tiling may be placed on the deck in lieu of paint, if desired.

5. At the present time, it is recommended that only the Control Room be made available for use and the doors to Radiation Rooms 1 and 2 secured. This is based on the considerations stated in paragraph 2., concerning requirements for restricted and unrestricted areas. Radiation Rooms 1 and 2 could be made available for use by the installation of spot lead shielding, at a minimal cost.

6. The Radiological Safety Department, NEW will maintain a radiation surveillance during any renovations, in the event unforescen radiation problems arise.

> a. K. Skoh Capt MSC USN

Copy to: CU, NNMC HD, MICRO, NMRI

ATTACHMENT H

NNMC-CO2:cb - 11000 3 October 1967

FIRST ENDORSEMENT on Director, AFRRI 1tr 10150 of 28 September 1967

From: Commanding Officer, National Naval Medical Center, Bethesda, Maryland

To: Commanding Officer, Naval Madical Research Institute

Subj: Transfer of Bldg. 150 (Cobalt Irradiator Facility)

1. Forwarded. Upon completion of evaluation and clearance by the Radiological Safety Officer, National Naval Medical Center, Bldg. 150 is returned to the custody and use of Naval Medical Research Institute.

G. M. DAVIS

Copy to: Director, AFRRI

NATIONAL NAVAL MEDICAL CENTER BETHESDA, MARYLAND

NNMCNOTE 11000 ' C-00:APC:cs 9 August 1963

NNAC NOTICE 11000

AFRRI (8)

From: Commanding Officer To: Distribution List

Subj: Transfer of Certain Buildings within the National Naval Medical Center, Bethesda, Maryland

Ref: (a) NNMC NOTICE 11000 of 13 May 1963 (b) BuMed ltr BUMED-4123-jar of 5 Aug 1963

1. Purpose. To disseminate information concerning the transfer of Building 150 (Cobalt 60 Irradiator Facility from the Naval Medical Research Institute to the Armed Forces Radiobiology Research Institute, National Naval Medical Center, Bethesda, Maryland.

2. Background. In compliance with reference (b), the immediate transfer of the operational custody and responsibility of Building 150 from the Naval Medical Research Institute to the Armed Forces Radiobiology Research Institute, National Naval Medical Center, is approved provided that the Armed Forces Radiobiology Research Institute continues under the military command of the National Naval Nedical Center.

3. Action. All Commands are to take notice of the above and correct their records accordingly.

4. Cancellation. This Notice and reference (a) are cancelled when action is completed, and on 8 February 1964 for record purposes.

DISTRIBUTION LIST II	AUTHENTICA TED:
NNMC (88)	
NH (95)	Thered
NMS (60)	B. H. HUNT, CDR, MSC, USN
NMRI (50)	Administrative Officer
NDS (12)	·
NSEA (8)	
ISU (S) UTN	

C. B. GALLONAY

ATTACHMENT I

- TRRI

UNITED STATES GOVERNMENT

Memorandum

TO : CDR Skow

OPTIONAL FORM NO. 10 3010-104

> H27-0303-p1 4700 DATE: 17 July 1963

FROM : Sydney W. Porter, Jr.

SUBJECT: Co⁶⁰ Contamination in the Vicinity of Building 150

1. Enclosed is a copy of the activity of ten soil samples taken in the vicinity of Building 150. The specific areas where the samples were taken are marked in pen on the actual survey sheet which is also enclosed.

2. The survey sheet contains numbers which are multiples of average instrument background for the Medical Center. Three Victoreen Thyac II portable survey detectors with NaI crystal photomultiplier tube detectors were used for this survey. The average backgrounds of these three instruments were respectively 0.2, 0.08, 0.1 mr/hr. Since the backgrounds vary so much in the instruments, we have used the criteria that readings greater than five times background constitute a significant Co contamination condition. Unfortunately, some of the readings greater than background are to be found on porous cement and cracks between cement areas. I have no suggestions as to what can be done with these areas.

SYDNEY W. PORTER, JR

Chief Radiological Safety Officer

Encl: (1) Activity of soil samples (2) Survey sheet

Copy to: (1) CDR Bodenlos

ATTACHMENT J

SOIL	SAM	PLES
Build	ling	150

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Sample Number	uc Co ⁸⁰ /gm earth
1	$9,4 \times 10^{-4}$
2	2.3×10^{-8}
3	2.5×10^{-5}
4	8.76.7 x 10 ⁻³
5	9.2 x 10 ⁻⁴
6	1.9×10^{-4}
7	1.1×10^{-3}
8	2.0×10^{-4}
9	1.5 x 10 ⁻⁴
10	1.2 x 10 ⁻³

Samples taken and counted on 2 July 1963 with the Victoreen multi-channel analyzer using Co³⁰ in the same geometry configuration as the sampled.

orles

SYDNEY W. PORTER, JR. Chief Radiological Safety Officer

Soil Sample # 's in 1stre 5 ZS 8 7 20 23 Ø ++-в ٠, . В (\mathbf{G}) 25 23 Ś 15 62 20/320 দ্য Ø ч <u>38</u> 27; 127; 5m 4 mr 8Kg Zismy 27 3 10 ms Bldg. 150 Ζ 2mr BKG 27; \cap ${}^{\mathsf{S}}$ PAGE 3 OF 3 ለጥጥለ በሀለፍ እነጥ ፲

Weehington, D. C. 20014

MRI-013-eb 11150 2604

JUL 3 1963

From: Commanding Officer, U. S. Maval Medical Research Institute, National Mayal Medical Center, Washington, D. C. 20014 To: Chief, Bureau of Medicine and Surgery

Via: (1) Director, Armed Forces Rediobiology Research Institute (2) Commanding Officer, National Neval Medical Center

Subj: Cobalt⁶⁰ Irradiator Facility (Eldg 150); transfer to AFRRI of

Ref: (a) CO NMRI 1tr to Ch BUNCED ME-1-geb 6470 Ser 3179 of 6 Aug 1962 (b) Ch Bunned 1tr to CO MBMC BUNCED-4123-jar of 16 Oat 1962 (c) NUMC MUTICE 11000 of 13 May 1963

1. Reference (a) recommended transfer of the subject facility from this Command to the operational sustody and responsibility of the Armed Forces Radiobiology Research Institute, contingent upon resoval of the Cobalt^{CO} load and decontamination of the premises. References (b) and (c) requested that this activity advise the Bureau of Medicine and Burgery when the decontamination procedures had been completed and the building was ready for transfer.

2. The Cobalt⁶⁰ load has been removed and disposed of, and the president have been decontaminated to the extent that it meets the ANC requirements for maximum permissible residual levels of rediation. The building is therefore ready for transfer.

JOEN R. SEAL

ATTACHMENT K

PAGE 1 OF 1

1000-C-14-183-0 6170

MAY 29 1993

. Front Rediclogical Safety Officer, National Neval Medical Center. Bethesda 14. Maryland Commanding Officer, HERI, Attention: CDR MSC USH, BODERLOS, L.J. 201 Subj: Contaminated soil in vicinity of Bldg. 150, removal of 1. It is recommended that the surface soil, 4 to 6 inches in depth. be recoved from the following ereast (1) The entire area from the fence to the stairs loading down to the enterence of building 150. (2) An area cost of shove fence extending 150 feet east and 30 feet north. (3) The surface coil in paregraph (1) must be packaged for disposal. The soil at base of Bldg 150 inside the fence, extending 6 feet south must clso be packaged for disposel, (4) Soil from other areas will be evaluated as to contarination level as recoved. It is expected that this surface coil can be distributed to the lovel areas enclosed by the security 10360. <u>ت</u> . Jon's Tel authit (5) The ontire level area enclosed by the socurity fonce will later be covered by two to three feet of clean fill removed from AFREI construction. and the second Earlier Chrowieal Depot marghand for Sarlier Grocenal 21158 for Solgeneed Ward at 789 for Solgeneed Ward at 789 R.E. SAW CC: CO SHOWC

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MEMORANDUM

From: Commanding Officer, Naval Medical Research Institute To: Radiologic Safety Officer, National Naval Medical Center

Subj: Decontamination of Building 150

Ref: (a) Meeting with EDDC Indian Head representatives of 24 Jul 62
 (b) Telcon CO, EODC Indian Head of 25 July 1962

1. As a result of reference (a), reference (b) suggested that the next step in the procedure would be a conference between representatives of NMRI, NNMC, Public Works, EODC, and the Atomic Energy Commission to develop answers to the following questions.

(a) When will the present Cobalt load be removed and what disposition will be made of it?

(b) What will be the Atomic Energy Commission requirements for the disposition of contaminated materials removed from Building 150? This will include roofing exhaust ducts, pneumatic ducts, etc.

(c) What are the Atomic Energy Commission requirements for the maximum permissible dosage levels in personnel conducting the decontamination?

(d) What will be the Atomic Energy Commission requirements in connection with the maximum permissible residual radiation levels in Building 150 as a whole?

(e) What will be the Atomic Energy Commission requirements in terms of maximum permissible residual levels in hot areas in Building 150?

2. You are requested to contact the Atomic Energy Commission in terms of having appropriate representatives who can provide answers to the above questions meet with us at the Naval Medical Center. If you will then inform this Command as to when these representatives can meet with us, the Command will make arrangements with Cdr. Fay, the Commanding Officer of EDDC at Indian Head, to have their representatives present. If for any reason there is need to contact his office the telephone number is Code 135, Ext 848 or 849.

3. You are requested to expedite action and empowered to call upon Cdr. Bodenlos for any assistance which you may require in making arrangements with the Atomic Energy Commission.

/s/ JOHN R. SEAL

Copy to: CO,NNMC Col. J.T.Brennan Cdr. Bodenlos Cdr. Blevins Capt. J. S. Burkle

ATTACHMENT M

Re: 'nce: H8-1-geb 6470 Ser: 3018 26 July 1962

20 August 1962

ANSWERS TO QUESTIONS IN REFERENCED NMRI MEMORANDUM

- (a) Removal is pending our request to Oak Ridge for container shipment.
- (b) Materials to Oak Ridge for burial, or can bury at NNMC without permission if only 1 mc of cobalt-60 per burial site, and not more than twelve sites per year. Must be four feet deep and six feet apart (Section 20.304, 10 CFR 20). Special burial of larger amounts may be granted by application to AEC, under Section 20.302, 10 CFR 20.
- (c) 10 CFR 20 requirements (this will be easy to comply with). Mainly concerns not over 1.25 R in three month's period.
- (d) √(1) Removable contamination:

- <u>.</u> ' .

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Bestricted area: 10,000 d/M/100 square cms Unrestricted area: 200 d/M/100 square cms

(2) Fixed contamination:

Unrestricted area not to exceed 0.2 mr/br gamma average measured at 1 cm from source, not to exceed 1 mr/hr beta and gamma, measured with 7 mg/cm² absorber.

(e) Must comply with 10 CFR 20.

Could be 5 mrem in any one hour or 100 mrem in five consecutive days.

"A local decision on the use of the "hot area" would decide this point. I would recommend that local hot spots in a designated radiation area not exceed 2 mrem measured at 1 centimeter.

> R. K. SKOW CDR MSC USN Radiological Safety Officer

ATTACHMENT M

Licensee L Name Department of the Navy Naval Medical Research Institute 2. Address Radiation Technology Division National Naval Medical Center Bethesda IL, Maryland 3. License number 19-2891-3 4. Expiration date October 31, 1962 5. Reference Na Extended to 3 March 63 6. Byproduct material (element and mass number) Cobalt 60 Custom sealed sources (Diagram 3, Research Report Project NM 006 012.0L.6L) 9. Authorized use For use in radiobiological research with, lower animals as described in Research Report Project NM 006 012.0L.6L. CONDITIONS 4. Unless otherwise specified the authorized place of use is the licensee's address stated in Item 2 above.	Pursuant to the Atomic Energy Act of 1954 and Title 10. Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretolore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material sted below; and to use such byproduct material for the purpose (s) and at the place (s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.				
Naval Medical Research Institute 2. Address Radiation Technology Division National Naval Medical Center Bethesda IL, Maryland 6. Byproduct material (element and mass number) Cobalt 60 Custom sealed sources (Diagram 3, Research Report For use in radiobiological research with lower animals as described in Research Report Project NM CO6 012.04.64.		Licensee			
(element and mass number) Custom sealed sources which licensee may possess at any one time Cobalt 60 Custom sealed sources 2,500 curies 9. Authonized use For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64. Search Research with lower animals as described in Research CONDITIONS 40. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.	·	Naval Medical Res Radiation Technol National Naval Me	search Institute logy Division edical Center	19-2891-3 4. Expiration date October 31	, 1962
Cobalt 60 Custom sealed sources (Diagram 3, Research Report Project NM 006 012.04.64) 2,500 curies 9. Authorized use For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64. CONDITIONS 40. Unless otherwise specified the authorized place of use is the licensee's address stated in Item 2 above.			7. Chemical and/or	physical form	which licensee may possess at
For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64. ONDITIONS 40. Unless otherwise specified the authorized place of use is the licensee's address stated in Item 2 above.	Cobal	.t 60	(Diagram 3, Resea	rch Report	
CONDITIONS 40. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.	9. Authoriz	ad use			
10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.			012.04.64.	_	as described in Research
11. Byproduct material to be used by, or under the supervision of, F. W. Chambers, Jr.		-	authorized place of use i	a the licensee's ad	

- 12. This license supersedes Authorization Number 25285 issued April 16, 1954.
- 13. Written administrative instructions covering appropriate radiological protection phases of operational procedures and establishing responsibility for radiological protection, control, and security of the byproduct material shall be supplied individuals using or having responsibility for use of such material.
- 11. During presence of Cobalt 60 in Radiation Room No. 2, a guard shall be posted to preclude personnel from entering the high radiation area outside Building 150.

ate October 2, 1957	by
	Director, Isotopes Extension Division of Civilian Application Oak Ridge, Tennessee
ATTACHMENT N	PAGE 1 OF 3

TORM ALC-3744

8. ATOMIC ENERGY COMMISSI

Supplementary	Sheet
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Page_		1	Poce
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State of the state

This copy is for your

License Number 19-2891-3

AMENDMENT NO. 1

Department of the Navy Naval Medical Research Institute Radiation Technology Division National Naval Medical Center Bethesda 14, Maryland

In accordance with letter dated April 29, 1959 from Naval Medical Research Institute, License No. 19-2891-3 is amended as follows:

Item 9 shall read:

9. Authorized use

For use in radiobiological research with lower animals as described in Research Report Project NM 006 012.04.64.

Total body radiation of humans for therapeutic purposes.

Condition 11 shall read:

11. Byproduct material for non-human use shall be used by, or under the direct supervision of, F. W. Chambers, Jr.

Byproduct material for human use shall be used by, or under the direct supervision of, Captain E. R. King.

L.T. BLOWN.

For the U.S. Atomic Energy Commission	
A Providence of the second sec	È
Roma K. Mason	
HOUSE THE THOSE PAR DITURNE	
Division of Licensing and Regulation	
Washington 25, D. C.	•

Date May 6, 1959

ATTACHMENT N

PAGE 2 OF 3

J. S. Atomic Energy Commission BYPRODUCT MATERIAL LICENSE Page 1 of 1 Pages

Supplementary Sheet

License Number 19-2891-3

(C63)

THIS COPY IS FOR YOUR FILES

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AMENDMENT NO. 3

Department of the Navy Naval Medical Research Institute Radiation Technology Division National Naval Medical Center Bethesda 14, Maryland

In accordance with application dated October 2, 1962, License No. 19-2891-3 is amended as follows:

Item 4. The expiration date is extended from October 31, 1962 to March 31, 1963.

Item 9 is amended to read:

9. Storage only.

Date

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Condition 11 is amended to read:

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11. Byproduct material shall be stored under the supervision of individuals designated by the Commanding Officer.

	For the U.S. Atomic Energy Commission
OCT 15 1962	/s/ Nathan Bassin
	ByIsotopes Branch
ATTACHMENT N	Div.of Lic. & Reg'n Wash., 25, D. C.

From:

To:

Subject: Radiation incident at the Gamma Ray Exposure facility, Building 150, NMRL, report on

1. At 08:30 18 April 1962 William I. Ross Jr., HM2, was given a routine body count at the REEL Building. At 11:00 this date LCDR Jordon informed me Ross showed an extremely high cobalt 60 spectrum which he "estimated" to be between 10 and 200 microcuries. Ross stated he had taken a 45 minute shower prior to reporting for the total body count. He was therefore not showered at the REEL building.

2. My action following the information was to inform Capt. Chabers. He was unavailable, so I proceeded to organize a Rad Safe task force to evaluate the radiological safety condition of Building 150.

3. Col. Brennen gave permission to use AFREI Ead Safe personnel. While equipment and protective clothing was being collected I requested Ross to report to AFERI where his clothing and body was found to be contaminated. Ross was provided new clothing and shoes. His clothing was later found to contain in excess of 10 μ c of cobalt 60.

4. We then porceeded to Building 150 and completed a survey including external gamma radiation, air samples and wipe samples. The gamma radiation survey indicated nothing unusual for this facility.

5. The air samples ranged from a factor of 100 to 1000 below restricted area maximum permissable concentrations.for a 40 hour work week.

6. The wipe samples which in this case indicate whether or not contamination disbursed through the air has settled out on bulkheads, decks or other surfaces were found to be much higher than previous routine wipe tests of this facility. The range of activity was from 0.001 to 4.0 Ac per sample. Removable Contamination Found In Cobalt Irradiation Area, Room 2, Bldg. 150.

}

Sample # Locatéon	cc/m (- bkg)	microcuries
1. Deck below front end.	1236	1.483 x 10 ⁻³
2. Deck at exit to control room.	47	5.64 x 10 ⁻⁵
3. Surface of beam a' ceiling.	240	2.88 X 10-4
4. East wall 3 feet from deck.	0	٥ ح
5. Fluorescent light shade.	128	1.54 X 104
6. Floor drain.	_ 628	7.53 X 10-4
7. Work table surface.	3145	2.77 X 10 ⁻³
8. Upper surface exposure chamber.	11271	1.35 X 10 ⁻²
9. Deck below work table.	327	3.92 x 10 ⁻⁴
10. Deck center of room.	202	2.42 X 10-4
11. Deck SW corner of room.	1877	2.252 X 10 ⁻³
12. Deck NW corner of room.	326	3.91 x 10 ⁻⁴
13. Deck center of entrance passage.	266	3.19 x 10 ⁻⁴
14. Rate meter Calif, Holder Base.	158	1.89 X 10-4
15. Chair seat.	216	2.59 X 10-4
16. Exppsure chamber inside surface.	143	1.71 X 10 ⁻⁴
17. Periscope port hole.	27	3.2 X 10 ⁻⁵
18. Plyers.	7517	9.02 X 10 ⁻³
19. Room 1, Permatic Cylinder Robot Control.	16945	2.03 × 10 ⁻²
STD.	307853	3.69 X 10 ⁻¹
STD.	307498	3.69 X 10 ⁻¹

Co Irradiation Facility, Bld, 150 Removable Contamination Obtained With Wipe Samples

Control Room Area:

Sample #	Location	c/m	microcuries
1.	Above exhaust mufflers	933	1.1 X 10 ⁻³
2.	Fuse box, top south wall	327	3.9 X 10 ⁻⁴
3∙	Periscope port to Rm. #2	243	2.9 X 10 ⁻⁴
4.	Air conditioner intake	302	3.6 X 10-4
5.	from control. Inside rubber gloves	1221	1.5 X 10 ⁻⁵
6.	Top E-A recorder comp. close	t 713	8.5 X 10-4
7.	Deck, under work bench, vice	2 85	3.4 x 10-4
8.	Deck, under wash sink	901	1.0 x 10 ⁻³
9.	Flourescent lamp shade	1782	2.1 X 10 ⁻³
10	Deck, under tech desk	352	4.2 X 10
11.	Electric fan blade	900	1.0 X 10 ⁻³

5 Min. Bkg. was 141 c/m

All samples were counted at two minute intervals.

Std. equals 313,961 c/m for 0.38 uc

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Cobalt Storage Area Ra 1 Cond.

Sample #	location	c/#	elcroouries
20	Story drain at main entrance	493	1.1×10^{-3}
21	Cidef Bild's shoe soles	40 0	9.2 x 10
22	Soles of paper boctles	713	· 1.6 x 10 ⁻³
23	Total activity from three pair of paper booties.	1.3 x 10 ⁻⁶	3.0 x 10°

To: RADIOLOGICAL SAFETY OFFICER, NNMC DATE: 25 JUNE 1963 FROM: DECONTAMINATION DIVISION, RADIOLOGICAL SAFETY NNMC SUBJ: SWIPES TAKEN IN GOAT HOUSE, RESULTS OF

1. The following are the results of swipes taken in the Goat House ON 24 JUNE 1963, WHERE CONTAMINATED GEAR WAS STORED TEMPORARYLY FROM BLDG. 150. ENCLOSURE 1 SHOWS THE APPROXIMATE LOCATION OF THE SWIPES, WITH THE NUMBER INDICATED CORRESPONDING TO THE SWIPE NUMBER. STANDARD USED FOR CALCULATIONS WAS 5.35x10³UUC OF Co⁶⁰ WHICH YEILDED 927 CC/M. CONTAMINATION WAS DUE TO CO⁶⁰: UUC/FT2 1 MIN/CTS CC/M No. 3 MIN/CTS 8ĸg 1. 110 11 - 26 150 37 2. 41 14 11 3 17.3 3. 32 11 11 0 0 4. 38 13 11 2 11.5 41 14 5. 11 3 17.3 6. 11 30 10 0 0 7. 41 14 17.3 11 3 8. 34 11 11 0 0 42 14 17.3 9. 11 3 10. 39 13 11 2 11.5

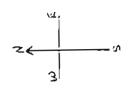
SUBMITTED: "M. D. HUBER HM2CL

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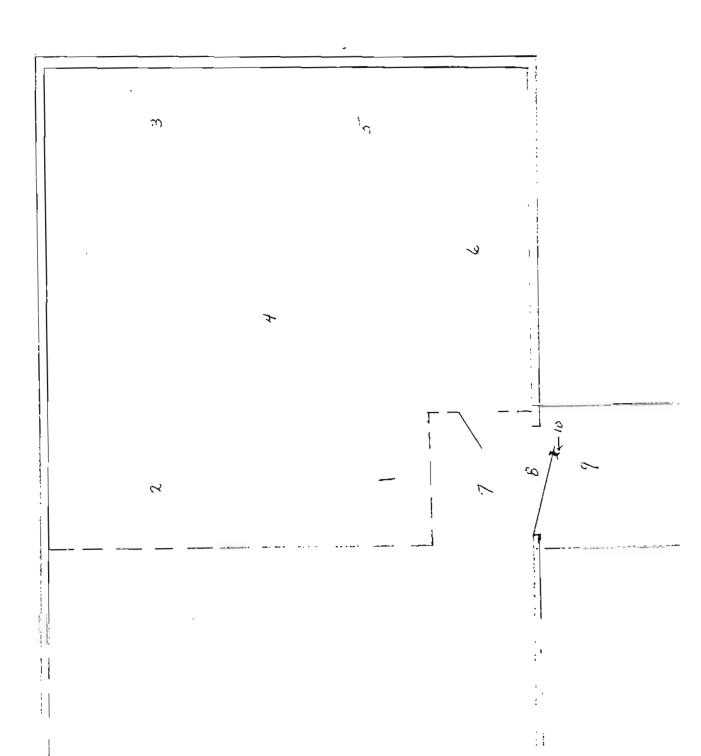
6-27-63

Mr Otto, in charge of the Annimal House and this building was notified that the activity in the Grat house was below background they are to scrub the room down and then they can take it over as their storage room for unused animal capes as it was originally used for.

LOCATION OF SWIPES TAKEN 24 JUNE 1963 WHERE CONTAMINATED GEAR HAD BEEN STORED BEFORE REMOVAL FROM AREA. BUILDING IS GOAT HOUSE LO-CATED FIFTY FEET NORTH OF BLDG. 150.



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NNMC-C-14-FKS-fa 6470/29-3

MAY 7 1963

From: Radiation Safety Officer, National Naval Medical Center, Bethesda 14, Md.

To: Commanding Officer, U.S. Army Technical Escort Unit, Edgwood Arsnel, Nd. Atten: Captain J.J. Ward USA

Subj: Subj: Request for

Encl: (1) By product Material Transfer Receipt.

and the second second

1. This is to confirm a telephone request for emergency assistance in the removal of radioactively contaminated material. The incident resulting in this contamination has been reported to the Atomic Inergy Commission and the Surgeon General of the U.S. Navy.

2. The contamination was Cobalt 60 oxide released by some sixty cobalt sources used in a multicurie irradiation facility.

3. The contaminent material consisted of electronic equipment, pipes, vacuum wastes, pneumatic source transfer tubes, control room office furniture and some household effects of one of the facility operators.

4. Enclosure (1) is a byproduct material transfer receipt listing the package number, isotope contents, and measured or estimated curie content of Cobalt 60. It is requested that one copy be signed and returned to the Radiation Safety Officer, National Naval Medical Center, Bethesda 14, Md. for record purposes.

5. If further information is required it will be submitted upon request.

R.K. SKOW CDR MSC USN

Copy to:

CO, NMMC CO, NMRI BUMED Code 74 Hu-Product storist Travifar inceita

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र एत कर 1969		Trensferror hr:	an tini sheki asi	
AFC Decense No.		110 License No. <u>19-2891-1</u>		
2000		Dete: 2 /mr 1969		

Inclosure / 1

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Removal of Radioactive Material from Building T-10 and area around Building 150. Material Taken to U.S. Army Edgewood Arsenal, Edgewood Arsenal, Maryland.

PACKAGE MONOTORING RECORD

PACKAGE NO.	ISOTOPE	CONTENTS	SURF READING MR/HR	METER READING MR/HR
l	Co 60 58C	Co 60	250	20
2	Co 60 3C	Co 6 0	30	4
3	Co 60 100	Co 60	100	1
4	Co 60 Trace	Furniture	0.05	0.05
5	Co 60 Trace	Furniture	1	0.1
6	Co 60 Trace	Furniture	l	0.05
7	Co 60	Pipe	15	4
8	Co 60	Pipe	5	2
9	Co 60	Misc.	3	2
10	Co 60	Misc.	9	5
11	Co 60	Office Furnitur	e 20	5
12	Co 60	Office Furnitur	re 5	0.1
13	C o 60	Waste	1	0.1
14	5 and 14 are	the same package	2.	
15	Co 60	Waste	0.1	0.05

Survey of Truck Carrier after loading.

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Left Side: 13 mr. Right Side: 15 mr. 0.05. Instrument Used AN/PDR 27 # 2107. Cab: 3 mr. Background reading

). R. King Jr. J.R. KING JR HMI(SS)

R.K.S.

Waste Disposal File.

NAVAL MEDICAL RESEARCH INSTITUTE NATIONAL NAVAL MEDICAL CENTER BETHESDA 14, MARYLAND

NMRI-013-geb 6470 Ser,1357 2 APR 1963

MEMORANDUM

From: Commanding Officer, Naval Medical Research Institute To: Commanding Officer, National Naval Medical Center

Subj: Bldg. 150; removal of Cobalt 60 from

Ref: (a) CO, NMRI Memo 6470 Ser 826 of 19 Feb 1963 7 (b) AEC By Product Material (Radioisotope) License No. -29-2891-3

1. Reference (a) advised that the Atlantic Research Corporation had initiated action on the contract to remove the Cobalt 60 from Bldg. 150.

2. The actual removal of the cobalt commenced during the week of 18 March, and was concluded on 28 March.

3. The AEC license for possession of this material by NMRI expired on 31 March, 1963. By copy of this memo, it is requested that the office (). of the Rad Safe Officer, NNMC, take the necessary action to notify AEC // Show of the removal of the cobalt, since the general license for all radio- // Show

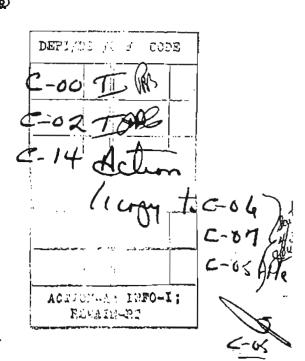
4. The Public Works Office, NNMC has been requested to arrange, through the Bureau of Yards and Docks, for the decontamination of Bldg. 150.

aguer

H. G. WAGNÉR Acting

Copy to: AFRRI NMS(Tissue Bank) USNH(REEL) NNMC Rad-Saf Off. NNMC PWO

CONMRI Preparel Hr to AEC Deted 12 April GB, Notifying AEC that CO Transfer Was completed on 30 mouch



Ltjg David L. Odor; Assistant Radiation Safety Officer

Lt Terry Sallee

Survey of Building 150

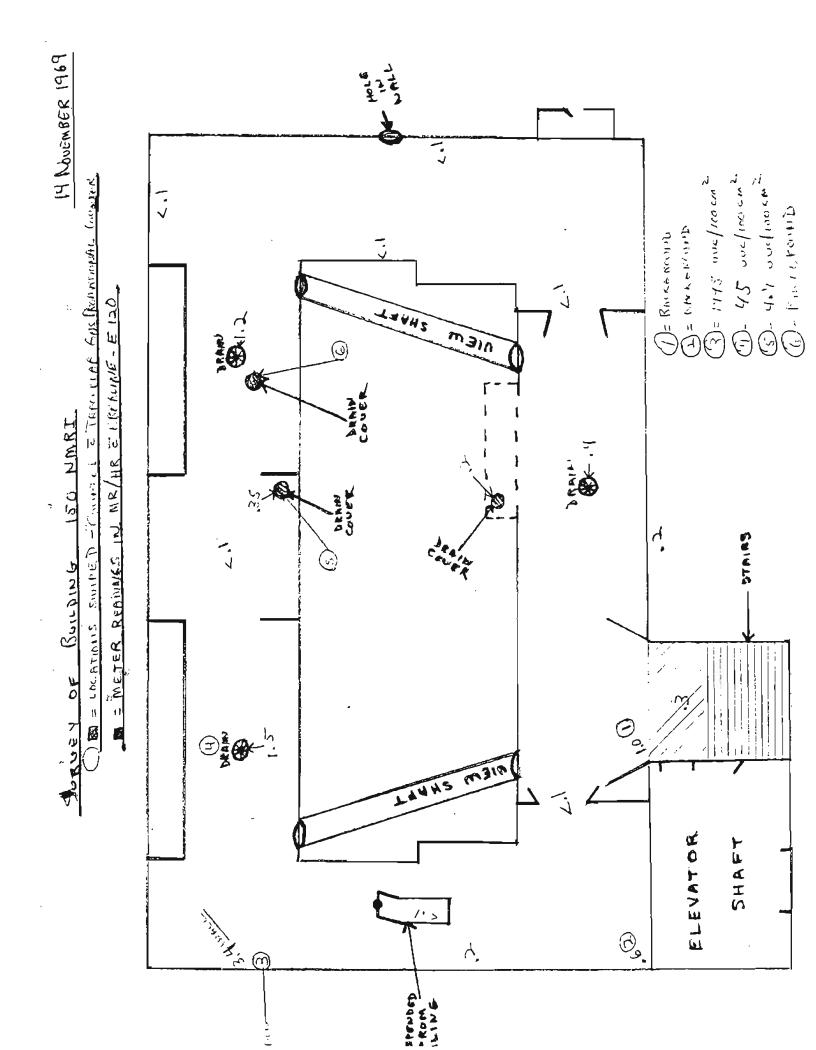
ENCL : (1) Radiation Survey Map of Building 150

1. On 14 November 1969 a survey of Building 150 was conducted to determine the feasibility for future use. Enclosure (1) shows areas of contamination determined by monitoring instruments and swipes. The Eberline Survey Instrument El20 was used for survey and all swipes were counted on a Tracer Lab gas flow proportional counter.

2. The results of the survey indicate that loose contamination of 60Co still exists and background is above specification for a non-radiation area.

3. If the building is decontaminated to the extent that all areas are less than .6 mr/hr it could be utilized as a non-radiation_area. Also if loose contamination was reduced to less than 100 uuci/100cm² the building could be utilized as a controlled area.

D. L. ODOR

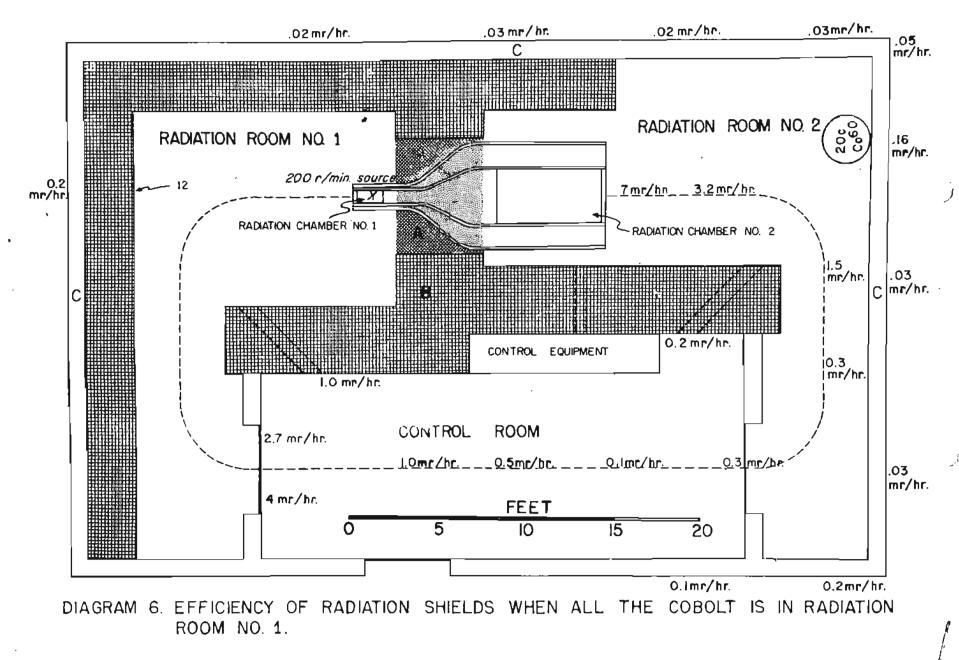


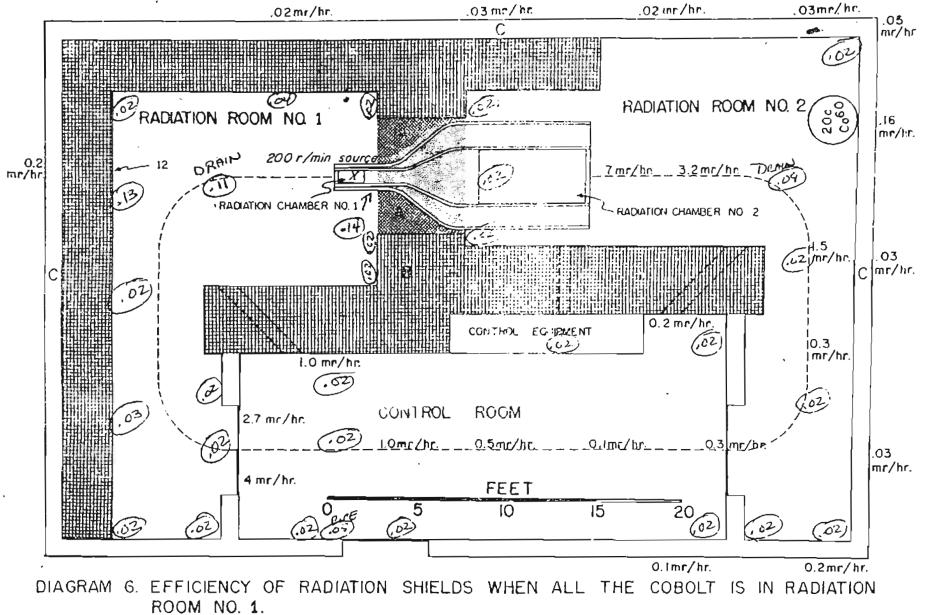
L'engle =
$$172.5' = 207c'' = 5257.8 cm$$

Diameter = 6" Rochur = 3" = $7.62 cm$ $R^2 = 58.06 cm^2$

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6470 09A 15 Mar 99

FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

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1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1b. is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories were performed during March 1999 for all of the above listed machines.

S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

.*

6470 09A 10 Dec 98

FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO letter of 07 Dec 98 (2) AFRRI RSO memorandum of 09 Dec 98

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68; S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

 The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1b. is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories and swipe surveys were performed during December 1998 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiology Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe number 1 through 8 for Cesium-137 were well below the minimum NRC contamination-detection level of 5 nanocuries [nCi] or 5,000 picocuries [pCi]. The required leak tests revealed no residual radioactive contamination.

4. In enclosure (2), the efficiency of the gamma counter is listed at 57.3%. The analysis results revealed an activity of less than 50 pCi. For the contamination action limit of 2,200 dpm, contamination swipe results would reveal an activity of 1 nCi or 1,000 pCi.

S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 25 Aug 98

FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is functional; however, the unit's mechanism for rotating samples is not functional.

3. One of NMRI's gamma irradiators, the J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, formerly located at a temporary location at NNMC Building 55, Room R-14, was transferred to the custody of Shepherd & Associates of San Fernando, California on the NNMC campus on 3 August 1998. Documentation of this transfer of custody are retained in the NMRI Radiation Safety NRMP files.

4. A physical inventory was performed during August 1998 for all of the above listed machines.

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S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 1 Jul 98

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FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO letter of 22 Jun 98 (2) AFRRI RSO memorandum of 25 Jun 98

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68; S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in a temporary location at NNMC Building 55, Room R-14.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting disassembly/disposal by Sheppard & Associates, Inc. of California. The irradiator identified as item 1c. is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories and swipe surveys were performed during June 1998 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiology Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe number 1 through 12 for Cesium-137 were well below the minimum NRC contamination-detection level of 5 nanocuries [nCi] or 5,000 picocuries [pCi]. The required leak tests revealed no residual radioactive contamination.

4. In enclosure (2), the efficiency of the gamma counter is listed at 64.3%. The analysis results revealed an activity of 1.46 pCi. For the contamination action limit of 2,200 dpm, contamination swipe results would reveal an activity of 1 nCi or 1,000 pCi.

S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 26 Mar 98

FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in a temporary location at NNMC Building 55, Room R-14.

c. Gammator 3, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting disassembly/disposal by Sheppard & Associates, Inc. of California. The irradiator identified as item 1c. is functional; however, the unit's mechanism for rotating samples is not functional.

S. L. GATTER LCDR, MSC, USN Radiation Safety Officer

6470 09A 13 Jan 98

FOR THE RECORD

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From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

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Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO letter of 22 Dec 97 (2) AFRRI RSO memorandum of 13 Jan 98

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in a temporary location at NNMC Building 55, Room R-14.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting inspection/repair by Sheppard Industries, Inc. of California. The irradiator identified as item 1c. is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories and swipe surveys were performed during December 1997 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiology Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe number 1 through 12 for Cesium-137 were well below the minimum NRC contamination-detection level of 5 nanocuries [nCi] or 5,000 picocuries [pCi]. The required leak tests revealed no residual radioactive contamination.

4. In enclosure (2), the efficiency of the gamma counter is listed at 64.2%. The analysis results revealed an activity of 12.8 pCi. For the contamination action limit of 2,200 dpm, contamination swipe results would reveal an activity of 1 nCi or 1,000 pCi.

J. GAITER

S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 25 Aug 97

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FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003~ 85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Room R-14 of Building 55 at NNMC.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting inspection/repair by the vendor. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional.

S. L. GAITER LCDR, MSC, USN

6470 09A 14 Jul 97

FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

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Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO letter of 03 Jul 97 (2) AFRRI RSO memorandum of 11 Jul 97

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68; S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in a temporary location at NNMC Building 55, Room R-14.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting inspection/repair by vendor. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories and swipe surveys were performed during June 1997 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiology Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe number 1 through 12 for Cesium-137 were well below the minimum NRC contamination-detection level of 5 nanocuries (5,000 picocuries). The required leak tests revealed no residual radioactive contamination.

S. L. GĂITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 19 Mar 97

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FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Room R-14 of Building 55 at NNMC.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting inspection/repair by the vendor. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional.

D. Jate S. L. GAITER

LCDR, MSC, USN

30 Jan 97

MEMORANDUM

From: Assistant Radiation Safety Officer To: Radiation Safety Officer

Subj: Radioanalysis of Gamma Irradiator Swipes

Ref: (a) AFRRI Bethesda, MD Memo dtd 16 Dec 96

Encl: (1) Swipe Sample List With Attached Results

1. Reference (a) lists results of 13 leak test swipes for the Gamma Irradiators. All were below the limit of 0.005 microcuries for Cesium-137.

 In accordance with our standard practice, two more sets of leak test swipes for the same locations were performed (Enclosure 1). The results for these swipe test were also below the limit.

3. These swipe tests were performed on a TM Analytic 1193 GammaTrac Gamma Counter, calibrated 1/10/97, located in room 225, Bldg. 17, NMRI.

6470 09A 18 Dec 96

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FOR THE RECORD

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From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO letter of 10 Dec 96 (2) AFRRI RSO memorandum of 16 Dec 96

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in a temporary location at NNMC Building 55, Room R-14.

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. The Cesium-137 irradiator identified as item 1 (a) is functioning. The irradiator identified as item 1 (b) is not operational and is awaiting inspection/repair by vendor. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional.

3. Physical inventories and swipe surveys were performed 9 December 1996 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiology Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe number 1 through 13 for Cesium-137 were well below the minimum NRC contamination-detection level of 5 nanocuries (5,000 picocuries). The required leak tests revealed no residual radioactive contamination.

4. Additional swipes were obtained for the gamma counters to be examined independently of the AFRRI analyses.

S.J. Jat

S. L. GAITER LCDR, MSC, USN Radiation Safety Officer

6470 09A 5 Sep 96

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FOR THE RECORD

From: NMRI Radiation Safety Officer Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Room 47 of Building 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, Located in Room 111 of the Rockville Annex.

2. Cesium-137 irradiators identified as items 1 (a) and (b) are both functioning. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional.

LCDR, MSC, USN

6470 09A 7 Jun 96

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FOR THE RECORD

Subj: SEMI-ANNUAL SEALED SOURCE LEAK TEST AND QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI RSO memorandum of 4 Jun 96 (2) AFRRI RSO memorandum of 7 Jun 96

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Rm. 1 of Bldg. 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Rm 47 of Bldg. 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, Located in Rm 111 of the Rockville Annex.

2. Cesium-137 irradiators identified as items 1 (a) and (b) are both functioning. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functional and will be repaired.

3. Physical inventories and swipe surveys were performed on May 20, 22, and 30, 1996 for all of the above listed machines. Enclosure (1) requested assistance for evaluation of the swipes from the Armed Forces Radiobiological Research Institute. Enclosure (2) provides the results of the AFRRI evaluations. The results for swipe numbers 1 through 14, except 13, were below the lower limit of detection for Cesium-137 of 3.61 picocuries, and the result for swipe 13 was an activity of 63.4 picocuries, well below the minimum NRC contamination-detection level of 5 nanocuries (5,000 picocuries). The required leak tests revealed no significant radioactive contamination.

S. L. GAITER LCDR MSC USN Radiation Safety Officer

6470 09A/0 21 Mar 96

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FOR THE RECORD

Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NAVMEDRSCHINST INST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Rm. 1 of Bldg. 17. This unit is functional.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in RM. 47 of Bldg. 1 (Tissue Bank). This unit is functional.

c. Gammator B, Model B34, S/N 1146, Located in Rm. 111 of the Rockville Annex. This irradiator has not been used since the last inventory and leak test. This unit's mechanism for rotating samples is not functioning.

S. L. GAITER

LT, MSC, USN Radiation Safety Officer

6470 09A/01 6 Dec 95

FOR THE RECORD

Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Rm. 1 of Bldg. 17. This unit is functional.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Rm 47 of Bldg. 1 (Tissue Bank). This unit is functional.

c. Gammator B, Model B34, S/N 1146, Located in Rm 111 of the Rockville Annex. This irradiator has not been used since the last inventory and leak test. The unit's mechanism for rotating samples is not functioning.

L. GAITEŔ

LT, MSC, USN Radiation Safety Officer

6470 09A 5 Jan 96

FOR THE RECORD

Subj: SEMI-ANNUAL SEALED SOURCE LEAK TEST AND QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

Encl: (1) NMRI Request for Radioanalysis (2) Results of Radiological Services

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Room 1 of Building 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Room 47 of Building 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, Located in Rm 111 of the Rockville Annex.

2. Cesium-137 irradiators identified as items 1 (a) and (b) are both functioning. The irradiator identified as item 1 (c) is functional; however, the unit's mechanism for rotating samples is not functioning and will be repaired.

3. Swipe surveys were taken on December 20, 1995 on all of the irradiators listed above and processed at the Armed Forces Radiobiological Research Institute. Enclosure (1) lists the swipe locations. Enclosure (2) provides the results of the swipe analyses. Swipe samples were counted on an LKB 1282 CompuGamma CS Universal Gamma Counter (S/N 814) with an MDA (minimum detectable activity) of 10.8 picocuries (pCi) for Cs-137 and 5.2 pCi for Co-60. No activity in excess of 5 nanocuries was detected. No surface contamination was detected.

S. L. GAITER LCDR MSC USN Radiation Safety Officer

6470 09A/01 28 Sep 95

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FOR THE RECORD

Subj: SEALED SOURCE QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1J

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact and function-ing:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Rm. 1 of Bldg. 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Rm 47 of Bldg. 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, Located in Rm 111 of the Rockville Annex. This irradiator has not been used since the last inventroy and leak test. The unit's mechanism for rotating samples is not functioning.

LT, MSC, USN Radiation Safety Officer

6470 09A/01 28 Jun 95

MEMORANDUM

Subj: QUARTERLY INVENTORY OF NMRI SEALED SOURCES

Ref: (a) NMRIINST 6470.1H

1. Per reference (a), subject inventory was conducted and the following Cesium-137 gamma irradiators were found intact and functioning:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, located in Room 1 of Building 17.

b. J. M. Best Gamma Irradiator 100, S/N 84001, NIN-81T00010. located in Room 47 of Building 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, located in Room 111 of the Rockville Annex. The street address of the Annex is NMRI, 12300 Washington Avenue, Rockville, MD 20852.

S. L. GAITER LT, MSC, USN Radiation Safety Officer

6470 09A/02 17 Apr 95

FOR THE RECORD

Subj: SEMI-ANNUAL SEALED SOURCE LEAK TEST AND QUARTERLY INVENTORY

Ref: (a) NMRIINST 6470.1H

Encl: (1) Results of Radiological Services

1. Per reference (a), subject inventory was conducted and the following Cesium-137 irradiators were found intact:

a. J. L. Sheppard Mark I, Model 68, S/N 1006, NIN-64223003-85, Located in Rm. 1 of Bldg. 17.

b. J. M. Best Gammirradiator 100, S/N 84001, NIN-81T00010, Located in Rm 47 of Bldg. 1 (Tissue Bank).

c. Gammator B, Model B34, S/N 1146, Located in Rm 111 of the Rockville Annex.

2. Cesium-137 irradiators identified as items 1 (a) and (b) are both functioning. The functional condition of the irradiator identified as item 1 (c) will be investigated.

3. Swipe surveys were taken on April 6, 1994 on all of the above listed machines and processed at the Armed Forces Radiobiological Research Institute. Swipe samples were counted on an LKB 1282 CompuGamma CS Universal Gamma Counter (S/N 814) with an MDA of 6.264 picocuries. No activity in excess of 5 nanocuries was detected.

S. L. GAITER LT MSC USN Radiation Safety Officer

D-29 NMRC Radioactive Materials Inventory Results (1995-1999)

43

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Authorized User ID Number

1. A Physical Inventory of all unsealed radioactive sources was conducted on 4 December 1998 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All radioactive material on the inventory were located in the properly secured locations. Future inventories of unsealed, sealed and radiological wastes will be conducted quarterly.

2. Enclosure (1) is a listing by [Authorized User] ID number in numerical order which correctly reflects the current inventory as of 4 December 1998.

GAITER LCDR, MSC, USN

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Authorized User ID Number

1. A Physical Inventory of all unsealed radioactive sources was conducted in June 1998 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All radioactive material on the inventory were located in the properly secured locations.

2. Enclosure (1) is a listing by [Authorized User] ID number in numerical order which correctly reflects the current inventory as of 9 June 1998.

GAITER Ľ. LCDR, MSC, USN

31 Dec 97

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Authorized User ID Number

1. A Physical Inventory of all unsealed radioactive sources was conducted in December 1997 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All radioactive material on the inventory were located in the properly secured locations.

2. Enclosure (1) is a listing by [Authorized User] ID number in numerical order which correctly reflects the current inventory as of 31 December 1997.

GAITER LCDR, MSC, USN

6470 09A 11 Jul 97

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Authorized User ID Number

1. A Physical Inventory of all unsealed radioactive sources was conducted in June 1997 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All radioactive material on the inventory were located in the properly secured locations.

2. During the December 1996 inventory of radioactive materials, one vial of S-35 was not located nor was documentation available indicating that the material had been properly disposed. The Radiation Safety Officer met with the Authorized User and several Supervised Users. A thorough search was conducted. The search involved the inspection of freezers, refrigerators, laboratory spaces, the Annex radioactive waste locker, and other likely areas. Personnel assigned to the Malaria and Enterics Programs at the NMRI Annex were questioned and aided in the search for the missing material. Efforts to locate the missing material continue from January through June 1997. The missing item was a shielded, 5-mCi container of S-35 material that was received in March 1994 and which had a decay-corrected activity of less than 1.5 microcuries as of December 1996. The decay-corrected activity as of 30 June 1997 was less that 0.5 microcuries.

3. This lost/missing quantity of S-35 will be removed from NMRI's Radioactive Material (unsealed) inventory. Usage log sheets maintained with the isotope's Receipt form indicated no evidence that the material had ever been used. The contents were most likely disposed in RAM solid waste or liquid waste sometime between June 1996 (the previous inventory) and December 1996.

4. Enclosure (1) is a listing by [Authorized User] ID number in numerical order which correctly reflects the current inventory as of June 25, 1997.

S. L. GAITER

LCDR, MSC, USN

6470 09A 10 Dec 96

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Authorized User ID Number

A Physical Inventory of all unsealed radioactive sources was conducted from 3 to 10 December 1996 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All but one item on the radioactive material inventory were located in the proper secured locations. One container of S-35 that was checked in by one of CAPT Hoffman's supervised users was not located. A thorough search was conducted. The search involved the inspec-tion of freezers, refrigerators, laboratory spaces, the Annex radioactive waste locker, and other likely areas. Personnel assigned to the Malaria and Enterics Programs at the NMRI Annex were questioned and aided in the search for the missing material. Efforts will continue to locate the shielded, 5-mCi container of S-35 material that was received in March 1994 and which had a decay-corrected activity of less than 1.5 microcuries as of December 1996. This lost/missing quantity of S-35 is well below the "reportable" [10CFR20] quantity of 100 to 1,000 microcuries. Information will be disseminated to all RAM users informing them of this incident. This incident will be discussed at the next Radiation Safety Committee meeting. Radiation Safety will increase the frequency of informal RAM inventories of unsealed radioactive materials.

2. Enclosure (1) is a listing by [Authorized User] ID number in numerical order which correctly reflects the current inventory as of December 3, 1996.

GAITER

LCDR, MSC, USN

NAVAL MEDICAL RESEARCH INSTITUTE PAGE:1 OCCUPATIONAL HEALTH AND SAFETY RADIOISOTOPE SYSTEM - NAME NAME ORDER LISTING

ID # ====	INVESTIGATOR NAME	ISOTOPE ======	AUTHORIZED AMOUNT ========	POSSESSED AMOUNT
1701	AXLEY	H3	20.000	3.650
1702	AXLEY	C14	5.000	0.325
<u>1703</u> 1101	AXLEY BOURGEOIS	<u>P33</u> H3	<u> </u>	0.006
1102	BOURGEOIS	C14	0.500	., 15.000 0.000
1102	BOURGEOIS	CR51	1.000	0.000
201	DASCH	C14	15.000	0.400
202	DASCH	НЗ	40.000	10.000
203	DASCH	I125	27.000	0.000
204	DASCH	P32	35.000	0.500
205	DASCH	P33	10.000	0.000
206	DASCH DASCH	S35 CR51	-40.000 20.000	2.000
1602	FALK	CR51	30.000	20.000
1603	FALK	I125	40.000	3.352
1604	FALK	P32	20.000	11.250
1605	FALK	S35	20.000	0.000
1612	FALK	<u>H3</u>	50.000	30.523
401	GUERRY	C14	1.000	0.000
402	GUERRY	H3 D22	5.000 18.000	1.000
403	GUERRY GUERRY	P32 S35	18.000	1.500 0.000
503	HARABIN	H3	34.000	27.250
SC	HARABIN	C14	10.000	0.050
502	HARABIN	P32	10.000	2.000
506	HARABIN	<u>S35</u>	<u>10,000</u>	0.250
601	HARLAN	C14	1.000	0.002
602	HARLAN	I125	15.000	0.000
603	HARLAN	CR51	15.000	8.000 3.250
604 605	HARLAN HARLAN	S35 H3	10.000 50.000	40.000
	HARLAN	P32	30.000	5.750
1002	HOFFMAN	H3	26.000	6.000
1003	HOFFMAN	I125	30.000	0.000
1004	HOFFMAN	S35	22.000	12.250
1005	HOFFMAN	CR51	30.000	0.000
1006	HOFFMAN	C14	11.000	1.500
1007 1801	HOFFMAN OBRIEN	<u>P32</u> I125	6.000	1.000
1201	QUESADA	C14	10.000	0.050
1203	QUESADA	I125	10.000	0.213
1204	QUESADA	H3	4,000	0.255
1301	ROLLWAGEN	H3	50.000	26.250
·1304	ROLLWAGEN	P32	2.000	0.000
1305	ROLLWAGEN	S35	12.000	0.000
1306	ROLLWAGEN	CR51	10.000	0.000
1307	ROLLWAGEN	I125	0.500	0.000

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6470 09A 23 Sep 97

ERCLOSURE(2)

MEMORANDUM

From: NMRI Radiation Safety Officer LCDR S. L. Gaiter, 295-0002

Subj: UPDATE: RADIATION AND LASER SAFETY

Encl: (1) RSO email message of 05 Aug 97 (NEHC INSPECTION)
(2) RSO memo of 22 Sep 97 (RESIGNATION OF AUTH. USERS)
(3) RSO memo of 06 Jun 97 (GAMMA IRRADIATOR UPDATE#3)
(4) RSO memo of 29 Aug 97 (IRRADIATOR REPAIR)
(5) RSO memo of 23 Sep 97 (GAMMA IRRADIATOR UPDATE#4)

1. In accordance with Navy and command instructions, a quarterly meeting of the Radiation Safety Committee (RSC) will be convened on 24 September 1997, Wednesday, at 1300, in the CO's Conference Room.

2. All Authorized Users are highly encouraged to attend. Supervised Users are welcomed to attend.

3. The last RSC meeting was held on 25 June 1997 with LCDR S. L. Gaiter as chair. The minutes were approved by the Commanding Officer.

4. <u>Review of Old Business</u>

a. Semi-annual Inventory of Radioactive Materials.

In June 1997, the Radiation Safety Office conducted an inventory of all radioactive material (RAM) source vials. All materials were accounted for except the vial of S-35 that was discovered missing during the December 1996 semi-annual inventory. It was determined that since the material was received at NMRI during 1994 and since the half-life of S-35 is about 87.4 days and since the decay-corrected activity of the materials as of March 1997 was less than 2 micro-curies, the lost material was not reportable to NEHC nor the NRC. Exhaustive searches did not result in finding the missing RAM. Although efforts to find the RAM will continue, the material has been removed from the inventory of active radioisotope vials. During the July 1997 NEHC inspection of NMRIS RAM permit, Mr. Tveten, the principal inspector, concurred that NMRI's actions had been appropriate.

b. 1997 NEHC Inspection of NMRI's Radiation Safety Program.

Enclosure (1) summarizes the results of the 28-30 July 1997 inspection of NMRI's Radiation Safety Program by two inspectors from the Naval Environmental Health Center, Norfolk, Virginia.

In summary, NMRI's Radiation Safety Program was rated as outstanding with all program elements in place and fully

6470 09A 3 Jun 96

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Account Number

1. A Physical Inventory of all unsealed radioactive sources was conducted from 28 May to 3 June 1996 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. Sources found to be unaccounted for were properly disposed and records found to be in error were corrected.

2. Enclosure (1) is a listing by account number in numerical order which correctly reflects the current inventory as of June 3, 1996.

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S. L. GAITER LCDR, MSC, USN

6470 09A/01 05 Jan 96

MEMORANDUM

Subj: SEMI-ANNUAL INVENTORY OF NMRI UNSEALED SOURCES

Ref: (a) NMRIINST 6470.1H

Encl: (1) Radioisotope Inventory by Account Number

1. A Physical Inventory of all unsealed radioactive sources was conducted from 5 December to 15 December by the Radiation Safety Office and reconciled against the Radioactive Inventory records maintained in the Radiation Safety Office. All radioactive materials were properly accounted for and records found to be in error were corrected.

2. Enclosure (1) is a listing by account number in numerical order which correctly reflects the current inventory as of January 5, 1996.

S. L. GAITER LT, MSC, USN Radiation Safety Officer

6470 09A/01 28 Jun 95

MEMORANDUM

Subj: SEMI-ANNUAL INVENTORY OF NMRJ UNSEALED SOURCES

Ref: (a) NMRJINST 6470.1H

Encl: (1) Radioisotope Inventory by Account Number

1. A Physical Inventory of all unsealed radioactive sources was conducted from 6 June to 28 June 1995 by the Radiation safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. All radioactive materials were properly accounted for and records found to be in error were corrected.

2. Enclosure (1) is a listing by account number in numerical order which correctly reflects the current inventory as of July 18, 1995.

S. L. GAITER LT, MSC, USN Radiation Safety Officer

6470 09A/02 10 Mar 95

MEMORANDUM

From: Radiation Safety Officer To: For the Record

Subj: SEMI-ANNUAL PHYSICAL INVENTORY OF UNSEALED SOURCES

Encl: (1) Radioisotope Inventory by Account Number

1. A Physical Inventory of all unsealed radioactive sources was conducted from 13 Feb - 01 Mar 95 by the Radiation Safety Office and reconciled against the Radioisotope Inventory records maintained in the Radiation Safety Office. Sources found to be unaccounted for were properly disposed and records found to be in error were corrected.

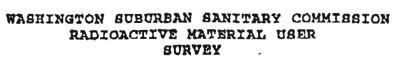
2. Enclosure (1) is a listing by account number in numerical order which correctly reflects the current inventory as of March 10, 1995.

B. K. HOLLAND LT MSC USNR

Copy to: XO

D-30

Annual Reports of Discharges into the Sanitary Sewer (1989 - 1998)



I. GENERAL INFORMATION

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Industry Name: Naval Medical Research Institute, Rockville Annex Street Address: 12300 Washington Ave. City: _____ Rockville ____ State: MD__ Zip Code: 20852____ Industry Contact: LTJG Bruce K. Holland, MSC USNR Title: Safety Officer Phone Number: 295-0001 II. INDUSTRY CLASSIFICATION Please check all appropriate classification(s). Hospital Health Treatment ____ University/College X Research/Medical ____ Private Laboratory Federal Installation Materials Testing Sales Other III. DISPOSAL INFORMATION Please circle Y (Yes) or N (No) to the following questions: () a. Have you discharged radioactive N

- materials to WSSC's sanitary sewer within the past two years?
- b. Do you currently discharge radicactive (Y) N materials to WSSC's sanitary sewer?

If your response to questions a and b is no, do not continue with survey. Please mail survey in the enclosed self-addressed envelope. If your response was yes to questions a or b, continue with survey.

c. Do you utilize a hauler for purposes of (Y) N disposing of radioactive waste?

If yes, list name(s) of haulers utilized: DOD Contractor



IV. LICENSE INFORMATION

Please complete the table below and submit a copy of each current license and amendments.

RADIOACTIVE MATERIAL LICENSE NUMBER(S)	EXPIRATION DATE(S)
1. 19-64223.41NP	3/Mar 92
2.	
3.	
4.	
5.	i .
6.	

V. RADIOISCTOPE USE AND DISPOSAL

In the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released in the indicated years (specify units used; millicuries or microcuries).

ISOTOPE (S) Released	IBOTOPE USE OR APPLICATION	FREQUENCY OF RELEASE		TAL ACTIVITY 1990
1. P32	Medical Research	Semi-Annual	.335mC1	14.6mCi
2. C14	Medical Research	Semi-Appual :	.030mCi	0.0mC1
3. \$35	Medical Research	Semi-Appual	.628mC1	0.0mC1
4.				
5.	· · · · · · · · · · · · · · · · · · ·			
6.				
7.				
8.				

VI. CERTIFICATION

The information contained in this survey is complete and accurate to the best of my knowledge.

359

Name of Official:	John J. Ryan, Phd.
Title:	Radiation Safety Officer
Signature:	2h Q. Q. 2n Date: 5/23/91
Return this su	rvey with a copy of your radioactive

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materials license or certificate within 30 days in the enclosed self-addressed envelope.

FOR WESC USE ONLY	• • • • • • • • • • • • • • • • • • •
Industry identification number_	
Input date	
Initials	

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WASHINGTON SUBURBAN SANITARY COMMISSION RADIOACTIVE MATERIAL USER SURVEY

I. GENERAL INFORMATION

ľ

Industry Name: Naval Medical Research Institute Street Address: National Naval Medical Center City: _____ Bethesda ____ State: MD Zip Code: 20889-5055 Industry Contact: LTJG Bruce K. Holland, MSC USNR Title: Safety Officer Phone Number: 295-0001 INDUSTRY CLASSIFICATION Please check all appropriate classification(s). Health Treatment Hospital ____ University/College x Research/Medical ____ Private Laboratory Federal Installation

- II.
 - Materials Testing Sales . Other

III. DISPOSAL INFORMATION

Please circle Y (Yes) or N (No) to the following questions:

- (Y) a. Have you discharged radioactive N materials to WSSC's sanitary sewer within the past two years?
- (\mathbf{Y}) N **b**. Do you currently discharge radioactive materials to WSSC's sanitary sewer?

If your response to questions a and b is no, do not continue with survey. Please mail survey in the enclosed self-addressed envelope. If your response was yes to questions a or b, continue with survey.

 (\mathbf{Y}) N c. Do you utilize a hauler for purposes of disposing of radioactive waste?

If yes, list name(s) of haulers utilized: DOD Contract



IV. LICENSE INFORMATION

Please complete the table below and submit a copy of each current license and amendments.

RADIOACTIVE MATERIAL LICENSE NUMBER(S)	EXPIRATION DATE(8)
1. 19-64223-41 NP	31Mar92
2.	
3.	
4.	
5.	i
6.	

V. RADIOISOTOPE USE AND DISPOSAL

In the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released in the indicated years (specify units used; millicuries or microcuries).

isotope(s) Released	ISOTOPE USE OR APPLICATION	FREQUENCY OF RELEASE	TO RELEASED 1989	FAL ACTIVITY 1990
1. H3	Medical Regearch	Bi-weekly	50.0mCi	50.0mCi
2. C14	Medical Research	Monthly .	2.0mC1	2.9mC1
3.Ca45	Medical Research	Semi-Annual	2. <u>lmCí</u>	0.OmCi
4 - Cr51	Medical Research	Quarterly	.7mCi	0.010mC1
5. 1125	Medical Research	Monthly	.7mCi	0.080mCi
6. P32	Medical Research	Semi-Annual	.0 <u>32mC1</u>	0.0mCi
7. \$35	Medical Research	Semi-Annual	.170mCi	3mC1
8.				

CERTIFICATION VI.

ι.

The information contained in this survey is complete and accurate to the best of my knowledge.

Name of Official:	John J. Ryan, Phd.	
Title:	Radiation Safety Officer	
Signature:	h Q Rya Date:	5/23/91
Return this s materials license enclosed self-addr	urvey with a copy of your ra or certificate within 30 day essed envelope.	adioactive ys in the

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Industr	ry identification number	
	Input data	
	Initials	
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WASHINGTON SUBURBAN DANITARY COMMIGNION RADIOACTIVE MATERIAL USER SURVEY

I. GENERAL INFORNATION

Industr	y Name:	Naval	Medical	Research	Inst	itute, Rock	ville Annex
Streat	Addross:	12300	Washingt	on Ave.			
city:	Rockville			State:	MD	2ip Code:_	20852

Industry Contract: LT Bruce K. Holland, MSC, USNR

Title: Radiation Safety Officer Phone Number: (301) 295-0001

II. INDUSTRY CLASSIFICATION

Please check all appropriate classification(s) for the industry described above.

____ Hosith Treatment ____ Hospital

X Research/Medical ____ University/College

____ Federal Installation ____ Private Laboratory

____ Sales ____ Materials yesting

____ Other_____

III. DISPOSAL INFORMATION

Please circle Y (Yes) or N (NO) to the following questions:

٤.	Have you discharged radiosctive materials to WSSC's sanitary sever within the past two years?	Ŷ	И
ь.	No you currently discharge radioactive mamerials to WESC's semitary sever?	\bigcirc	

If your response in questions a and b is no, do not continue with survey. Please sign and sait survey in the enclosed swif addressed envelope, if your response was you to questions a on b, continue with survey.

c. Do you utilize a hauler for purposes of dispering of radioactive waste?

If yes, lis	st name(s) of haulers
utili2=0:	DOD Contractor

23/19/93

IV. LICENRE INFORMATION

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Please complete the table below and submit a copy of each current licence and amendments.

RADIOACTIVE MATERIAL LICENSE NUMBER(S)	EXPIRATION DATE(S)
1. 19-64223-41NP	31 March 1997
2.	·
3.	
4	
5	
6.	·

V. FADIOISOTOPE HSE AND DISPOSAL

On the table below, please list all radioactive materials which are us have been, directly or indirectly, discharged to the samitary sewer. Also, briefly describe below each isotope's use or application and the general frequency of discharge to the sonitary sever (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released in the indicated years (specify units used: milliouries or microcuries).

ISOTOPE(S) Releaged	TROTOPE USE OR APPLICATION	FREQUENCY OF RELEASE	TOTI RELEASED 2 1991	
<u>H-3</u>	Medical Research	Annually	67.500 mCi	0.380 mCi
2. S-35	Medical Research	Annually	6.225 mCi	3.000 mCi
í 4.				
3.	· ·			
<u>s.</u>				
7.				
0.				



VI. CERTIFICATION

E CERCIFY UNDER PERALTY OF FERJURY AND LAW THAT THIS DOCUMENT AND ALL ALTACHMENTS WERE PREPARED-UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUMBITTED. BASED ON MY INQUIRY OF THE PERSON OR FERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND SELLEF, TRUE, ACCURATE, AND COMPLETE, I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBLITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

·· _ · · · _

Name of Official: LT Bruce K. Holland, MSC, USNR
Title: Radiation Safety Officer
Signature: Date: Date: Date: Og APR 93

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed celf-addressed envelops.

> FOR WEEG USE GNLY Industry identification number______ Input date

Reviewers initials



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WREHINGTON SUBUREAN EANITARY COMMISSION RADIOACTIVE MATERIAL USER

SURVEY .

1. GENERAL INFORNATION

.

Industry Name: Naval Medical Research Institute

Streat Address: 8901 Wisconsin Ave., Bldg. 17

City: ______ Bethesda ______ State: MD Zip Code: 20889-5055

Industry Contact: LT Bruce K. Holland, MSC, USNR

Title: Radiation Safety Officer Phone Number: (301) 295-0001

II. INDUSTRY CLASSIFICATION

Please check all appropriate classification(s) for the industry described above.

Hoalt	Treatment	Hospital	

X Research/Medical ____ University/College

___ Federal Installation ___ Frivate Laboratory

~~~ 29)AR

\_\_\_\_ Other\_\_\_\_\_

#### III. DISPOSAL INFORMATION

Please circle Y (Yes) or N (No) to the following questions:

\_\_\_ Materials Testing

H

R

|                                                               | N |
|---------------------------------------------------------------|---|
| materials to WSSC's senitary sever within the past two years? |   |
|                                                               |   |

b. No you currently discharge radioactive materials to WESC's senitary sever?

If your response in questions a and b is no, do not continue with survey. Please sign and mail survey in the enclosed swift-addressed envelope. If your response was you to questions a or b, continue with survey.

c. Do you utilize a nauler for purposes of disposing of radioactive waste?

If yes, list name(s) of haulers utilized: DOD Contractor

:3/15/23

201 295 5779 NAVENUIRHLTHCEN → 301 295 5779

NMRI -- Bldg. 17

#### IV. LICENSE INFORMATION

Flease complete the table below and submit a copy of each current license and amendments.

Ę.

| RADIOACTIVE MATERIAL LICENSE<br>NUMBER (5) | EXPIRATION DATE(S) |
|--------------------------------------------|--------------------|
| 1. 19-64223-41-NP                          | 31 March 1997      |
| 2.                                         | :                  |
| 3.                                         |                    |
| 4                                          |                    |
| ç                                          |                    |
| 5.                                         |                    |

#### V. FADIOISOTOFE HSE AND DIGPOSAL

on the table below, please list all radioactive materials which are of have been, directly or indirectly, discharged to the sanitary sever. Also, briefly describe below each isotope's use or application and the general frequency of discharge to the sanitary sever (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released in the indicated years (specify units used: milliouries or microcuries).

| ISOTOPE(S)<br>Releaged | TROTOPE USE OR<br>APPLICATION | FREQUENCY<br>OF RELEASE               | TOT<br>RELEASED<br>1991 |            |
|------------------------|-------------------------------|---------------------------------------|-------------------------|------------|
| н-3                    | Medical Research              | Monthly                               | 38.876 mCi              | 32.988 mCi |
| <u>2</u> . S-35        | Medical Research              | Annually                              | 0.030 mCi               | 1.000 mCi  |
| 3. C-14                | Medical Research              | Annually                              | 0.003 mCi               | None       |
| <u>4</u> . I-125       | Medical Research              | Semi-Annual                           | 182.81 mC1              | None       |
| 5. Ca-45               | Medical Research              | Annually                              | None                    | 0.250 mC1  |
| <u>s</u> .             |                               |                                       |                         |            |
| 7.                     |                               | · · · · · · · · · · · · · · · · · · · |                         |            |
| e                      |                               |                                       |                         |            |

#### VI. CERCIFICATION

CERCIFY UNDER PENALTY OF FERJURY AND LAW THAT THIS DOCUMENT AND ALL AUTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH & EXSTEM DESIGNED TO ASSURE THAT QUALIFIED FERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUMBLIFED FERMULAL PROPERTS WATLEN AND MUNDARL WAT INFORMATION SUMBLIFED. BASED ON MY INQUIRY OF THE PERSON OR FERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUEMITTED IS, TO THE BEST OF MY KNOWLEDGE AND SELIEF, TRUE, ACCURATE, AND COMPLETE, I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMLITING FALSE INFORMATION, INCLUDING THE POSSIB . LITY OF FINE AND IMPRISONMENT YOR KNOWING VIULATIONS.

\_ · · \_

Name of Official: LT Bruce K. Holland, MSC, USNR Radiation Safety Officer 7110: Uate: 09 APR 93 ຽະມູກສະໜ

Recorn this survey with a copy of your redicactive enterials license or certification within 30 days in the enclosed celf-addressed envelope.

FOR WEEC USE ONLY

Industry identification number

Input dala \_\_\_\_\_

Reviewers initials

| 3ENT BY: ONO N45 |               | 6:41 ; OP                               | NAV N\$57 | <b>6</b> 04 444 . | 2 /3 \$ 3672 |
|------------------|---------------|-----------------------------------------|-----------|-------------------|--------------|
|                  |               | SUBURBAN SAN<br>IOACTIVE MATE<br>SURVEY |           | IBBION            | 1            |
| I. GENERA        | L INFORMATION |                                         | •         |                   |              |

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2

|      | Indu               | ustry Name: Naval Medical Research Institute, Roch                                                    | cville  | Annex |
|------|--------------------|-------------------------------------------------------------------------------------------------------|---------|-------|
|      | Stre               | eet Address: 12300 Washington Ave.                                                                    |         | _     |
|      | City               | y: Rockville State: MD Zip Code:                                                                      | 20852   | 2     |
|      | Indu               | Austry Contact: LT Bruce K. Holland, MSC, USNR                                                        |         | _     |
|      | Т3 <del>г</del> .1 | Radiation Safety Officerphone Number: (301) 24                                                        | 95-0001 | L     |
| II.  | THE                | DUBTRY CLASSIFICATION                                                                                 |         |       |
|      | Plea<br>indu       | ease check all appropriate classification(s) 1<br>dustry described above.                             | for th  | 9     |
|      |                    | _ Health Treatment Hospital                                                                           |         |       |
|      | XX                 | Research/Modical University/Coll                                                                      | lege    |       |
|      |                    | _ Federal Installation Private Laborat                                                                | ory     |       |
|      | <b></b>            | _ Sales Materials Tests                                                                               | lng     |       |
|      |                    | Other                                                                                                 |         |       |
| III. | DIS                | SPOBAL INFORMATION                                                                                    |         |       |
|      | <b>Plo</b>         | AABA circle Y (Yes) or N (No) to the following que                                                    | estions | 5:    |
|      | â,                 | Have you discharged radioactive<br>materials to WBSC's sanitary sewer<br>within the past year (1993)? | r Y     | 1     |
|      | b.                 | Do you currently discharge radioactive<br>materials to WSSC's sanitary sewer?                         | Y Y     | Ň     |
|      | c.                 | Do you utilize a hauler for purposes of<br>disposing of radioactive wasto?                            | Ŷ I     | N     |
|      |                    | If yee, list name(s) of haulers<br>utilized: DOD Contractor                                           |         | _     |
|      |                    | IF YOUR RESPONSE TO QUESTIONS A AND B IS NO.                                                          |         |       |
|      |                    | THEN GO TO SECTION VI. IF YOUR RESPONSE WAS YES                                                       |         |       |
|      |                    | TO QUESTIONS A OR B, THEN CONTINUE WITH SURVEY.                                                       |         |       |
|      |                    | q                                                                                                     | 9/23/94 |       |

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#### IV. LICENSE INFORMATION

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Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL LICENSE<br>NUMBER (5) | EXPIRATION DATE(S) |   |
|--------------------------------------------|--------------------|---|
| 1. 19-64223-41NP                           | 31 March 1997      |   |
| 2.                                         |                    | _ |
| 3.                                         |                    |   |
| 4.                                         |                    |   |
| 5.                                         |                    |   |
| 6.                                         |                    |   |

#### V. RADIOISOTOPE USE AND DISPOSAL

On the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below, each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weakly, monthly, or yearly). Finally, summarize the total activity released for 1993 (specify units used: milliouries or microcuries).

| isotope (8)<br>Released | ISOTOPE DEE OR<br>APPLICATION | FEEQUENCY<br>OF RELEASE | RELEAS | TOTAL<br>ED ACTIVITY<br>1993 |
|-------------------------|-------------------------------|-------------------------|--------|------------------------------|
| 1. H-3                  | Medical Research              | Quarterly               | 7.9    | 93 mCi                       |
| <b>2.</b> P-32          | Medical Research              | Monthly                 | 12.0   | 45 mCi                       |
| 3. S-35                 | Medical Research              | Annually                | 0.0    | 07 mCi                       |
| <b>4</b> . I-125        | Medical Research              | Annually                | 0.0    | 01 mCí                       |
| 5.                      |                               |                         |        |                              |
| 6.                      |                               |                         |        |                              |
| 7.                      |                               |                         |        |                              |
| <u>8</u> ,              |                               |                         |        |                              |

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#### VI. CERTIFICATION

10/14/24

I CERTIFY UNDER PENALTY OF PERJURY AND LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELLEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

| Name of Official: | LT. Bruce K. Holland, MSC, USNR |
|-------------------|---------------------------------|
| Title:            | Radiation Safety Officer        |
| Bignature:        | Date: 18 Oct 94                 |
|                   |                                 |

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed self-addressed envelope. If you do not discharge radioactive material to WBSC, then only return survey and not license or certificate.

#### POR WEEC USE ONLY

Industry identification number

Input date

Reviewers initials



I.

II.

III.

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| ?  | WASHINGTON SUBURBAN SANITARY COMMI<br>RADIOACTIVE MATERIAL USER<br>SURVEY                                | 8810 <b>n</b> |
|----|----------------------------------------------------------------------------------------------------------|---------------|
|    | GENERAL INFORMATION                                                                                      |               |
|    | Industry Name: Naval Medical Research Institute                                                          |               |
|    | Street Address: 8901 Wisconsin Ave., Bldg. 17                                                            |               |
|    | City; Bethesda State: MD Zip Cod                                                                         | 20889-5607    |
|    | Industry Contact:LT. Bruce K. Holland, MSC, USNR                                                         |               |
|    | Title, Radiation Safety Officer Phone Number: (301)                                                      | 295-0001      |
|    | INDUSTRY CLASSIFICATION                                                                                  |               |
|    | Please check all appropriate classification(s) industry described above.                                 | for the       |
|    | Health Treatment Hospital                                                                                |               |
|    | XX Research/Medical University/Co                                                                        | llege         |
|    | Federal Installation Private Labor                                                                       | atory         |
|    | Sales Materials Tes                                                                                      | ting          |
|    | Other                                                                                                    | 1             |
| τ. | DISPOBAL INFORMATION                                                                                     |               |
|    | Please circle Y (Yes) or N (No) to the following g                                                       | vestions:     |
|    | a. Have you discharged radioactive<br>materials to WBSC's sanitary sewer<br>within the past year (1993)? | Y N           |
|    | b. Do you currently discharge radioactive<br>materials to WSSC's sanitary sewer?                         | Y N           |
|    | c. Do you utilize a hauler for purposes of disposing of radioactive waste?                               | Y N           |
|    | If yee, list name(s) of haulers<br>utilized: DOD Contractor                                              |               |
|    | IF YOUR RESPONSE TO QUESTIONS A AND B IS NO.                                                             | 1             |
|    | THEN GO TO SECTION VI. IF YOUR RESPONSE WAS YES                                                          |               |
| :  | TO QUESTIONS <u>A OR</u> B, THEN CONTINUE WITH SURVEY.                                                   | D9/23/94      |
|    |                                                                                                          |               |

#### IV. LICENSE INFORMATION

Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL LICENSE<br>NUMBER (S) | EXPIRATION DATE (S) |  |
|--------------------------------------------|---------------------|--|
| <b>1</b> . 19-64223-41NP                   | 31 March 1997       |  |
| 2.                                         |                     |  |
| 3.                                         |                     |  |
| 4.                                         |                     |  |
| 5.                                         |                     |  |
| 6.                                         | ·····               |  |

#### V, RADIOISOTOPE USE AND DISPOSAL

On the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below, each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weakly, monthly, or yearly). Finally, summarize the total activity released for 1993 (specify units used: millicuries or microcuries).

| IBOTOPE(8)<br>Released | ISOTOPE DEE OR<br>APPLICATION | YREQUENCY<br>OF RELEASE | TOTAL<br>RELEASED ACTIVITY<br>1993 |
|------------------------|-------------------------------|-------------------------|------------------------------------|
| <b>1</b> . H-3         | Medical Research              | Monthly                 | 86.882 mCi                         |
| <b>2.</b> C-14         | Medical Research              | Annually                | 0.001 mCi                          |
| 3. P-32                | Medical Research              | Monthly                 | 0.790 mCi                          |
| 4. s-35                | Medical Research              | Annually                | 15.000 mCi                         |
| <b>5.</b> I-125        | Medical Research              | Monthly                 | 2.492 mCi                          |
| 6.                     |                               |                         |                                    |
| 7.                     |                               |                         |                                    |
| <b>.</b>               |                               |                         |                                    |

## WASHINGTON SUBURBAN SANITARY COMMISSION RADIOACTIVE MATERIAL USER SURVEY



.

## L GENERAL INFORMATION

| Industry Name: Naval Medical Research Center (formerly Naval Medical                                                             | Research   | Institute) |
|----------------------------------------------------------------------------------------------------------------------------------|------------|------------|
| Street Address: 8901 Wisconsin Avenue                                                                                            |            |            |
| City: Bethesda State: MD Zip Code: 20889-5607                                                                                    |            |            |
| Industry ContactLCDR S. L. Gaiter, MSC, USN                                                                                      |            |            |
| Title: Radiation Safety Offightone Number: (301) / 295-3653/0002                                                                 |            |            |
| WSSC Account Number: City of Rockville:                                                                                          |            |            |
| II. INDUSTRY CLASSIFICATION         Please check all appropriate classification(s) for the industry described above.             |            |            |
| X_Rescarch/MedicalUniversity/College                                                                                             |            |            |
| X Federal Installation Private Laboratory                                                                                        |            |            |
| SalesMaterials Testing                                                                                                           |            |            |
| III. DISPOSAL INFORMATION<br>Please circle Y (Yes) or N (No) to the following questions:                                         |            |            |
| a. Have you discharged radioactive<br>materials to WSSC's sanitary sewer<br>within the past year 3 years (1996, 1997, and 1998)? |            |            |
| b. Do you currently discharge radioactive (Y) N<br>materials to WSSC's sanitary sewer?                                           |            |            |
| c. Do you utilize a hauler for purposes of<br>disposing of radioactive waste?                                                    |            |            |
| If yes, list name(s) of haulers<br>utilized Department of Defense_Low_Level Radioactive Waste Exec                               | cutive Age | ency       |
| IF YOUR RESPONSE TO QUESTIONS A AND B IS NO.                                                                                     |            |            |

THEN GO TO SECTION VL IF YOUR RESPONSE WAS YES TO QUESTIONS <u>A OR B.</u> THEN CONTINUE WITH SURVEY.

## IV. LICENSE INFORMATION

Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL<br>LICENSE NUMBER(S) | EXPIRATION DATE(S) |
|-------------------------------------------|--------------------|
| <b>1</b> . 45-23645-01NA                  |                    |
| 2.                                        |                    |
| 3.                                        |                    |
| 4.                                        |                    |
| 5.                                        |                    |
| б.                                        |                    |

## V. RADIOISOTOPE USE AND DISPOSAL

On the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below, each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released for 1996, 1997, and 1998 in **millicuries.** 

| ISOTOPE(S)<br>RELEASED | ISOTOPE USE OR<br>APPLICATION | FREQUENCY<br>OF RELEASE | TOTAL<br>RELEASED ACTIVITY<br>(millicuries) |        |         |
|------------------------|-------------------------------|-------------------------|---------------------------------------------|--------|---------|
|                        |                               |                         | 1996                                        | 1997   | 1998    |
| 1. н-з                 | Medical Research              | Monthly                 | 27.471                                      | 35.811 | 26.5091 |
| <b>2</b> C-14          | Medícal Research              | Annually                | 0                                           | 0      | 0.0013  |
| <b>3.</b> P-32         | Medícal Research              | Monthly                 | 0.223                                       | 0.082  | 1.1913  |
| <b>4.</b> S-35         | Medical Research              | Quarterly               | 0.003                                       | 0      | 0       |
| 5. Cr-51               | Medical Research              | Quarterly               | 0.02027                                     | 0.0608 | 3.3938  |
| <b>6.</b> I-125        | Medical Research              | Quarterly               | 0.082                                       | 0.004  | 0.001   |
| 7.                     | :                             |                         |                                             |        |         |
| 8. Totals              |                               |                         | 27.799                                      | 35.958 | 31.0965 |

Naval Medical Research Center, Bethesda, MD

## VI. CERTIFICATION

I CERTIFY UNDER PENALTY OF PERJURY AND LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

Name of Official: P. K. Blake, CAPT, MSC, USN

Title: Executive Secretary, Navy Radiation Safety Committee

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed self-addressed envelope. If you do not discharge radioactive material to WSSC, then only return survey and not license or certificate.

### FOR WSSC USE ONLY

Industry identification number\_\_\_\_\_

Input date \_\_\_\_\_

Reviewers Initials \_\_\_\_\_

## WASHINGTON SUBURBAN SANITARY COMMISSION RADIOACTIVE MATERIAL USER SURVEY



L GENERAL INFORMATION

| Industry Name:Naval Medical Research Center, Rockville Annex                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------|
| Street Address:                                                                                                                       |
| City: <u>Rockville</u> State: <u>MD</u> Zip Code: 20852                                                                               |
| Industry Contact: LCDR S. L. Gaiter, MSC, USN                                                                                         |
| Title: Phone Number: 295-3653/0002                                                                                                    |
| WSSC Account Number City of Rockville;                                                                                                |
| II. INDUSTRY CLASSIFICATION         Please check all appropriate classification(s) for the industry described above.                  |
| X Research/MedicalUniversity/College                                                                                                  |
| X Federal Installation Private Laboratory                                                                                             |
| SalesMaterials Testing                                                                                                                |
| III. DISPOSAL INFORMATION<br>Please circle Y (Yes) or N (No) to the following questions:                                              |
| a. Have you discharged radioactive (YN)<br>materials to WSSC's sanitary sewer<br>within the past year 3 years (1996, 1997, and 1998)? |
| b. Do you currently discharge radioactive<br>materials to WSSC's sanitary sewer?                                                      |
| c. Do you utilize a hauler for purposes of<br>disposing of radioactive waste?                                                         |
| If yes, list name(s) of haulers<br>utilized: Department of Defense_Low Level Radioactive Waste Executive Agency                       |

IF YOUR RESPONSE TO QUESTIONS <u>A AND B</u> IS NO, THEN GO TO SECTION VI. IF YOUR RESPONSE WAS YES TO QUESTIONS <u>A OR B</u>, THEN CONTINUE WITH SURVEY.

## IV. LICENSE INFORMATION

.. .

Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL<br>LICENSE NUMBER(S) | EXPIRATION DATE(S) |
|-------------------------------------------|--------------------|
| 1. 45-23645-01NA                          |                    |
| 2.                                        |                    |
| 3.                                        |                    |
| 4.                                        |                    |
| 5.                                        |                    |
| 6.                                        | -                  |

## V. RADIOISOTOPE USE AND DISPOSAL

On the table below, please list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Also, briefly describe below, each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released for 1996, 1997, and 1998 in millicuries.

| ISOTOPE(S)<br>RELEASED | ISOTOPE USE OR<br>APPLICATION | FREQUENCY<br>OF RELEASE | TOTAL<br>RELEASED ACTIVITY<br>(millicuries) |         |         |
|------------------------|-------------------------------|-------------------------|---------------------------------------------|---------|---------|
|                        |                               |                         | 1996                                        | 1997    | 1998    |
| 1. H-3                 | Medical Research              | Quarterly               | 9.930                                       | 6.485   | 8.2629  |
| 2 P-32                 | Medical Research              | Monthly                 | 3.398                                       | 2.053   | 1.1946  |
| <b>3</b> . S-35        | Medical Research              | Quarterly               | 0.00064                                     | 0.00016 | 0       |
| 4. Cr-51               | Medical Research              | Quarterly               | 6.045                                       | 14.279  | 2.8582  |
| 5. <sub>I-125</sub>    | Medical Research              |                         | 0                                           | 0       | 0       |
| б.                     |                               |                         |                                             |         |         |
| 7.                     | :                             | , ,                     |                                             |         |         |
| 8. Totals              |                               |                         | 19.374                                      | 22.817  | 12.3157 |

Naval Medical Research Center, Rockville Annex

## VI. CERTIFICATION

I CERTIFY UNDER PENALTY OF PERJURY AND LAW THAT THIS DOCUMENT AND ALL ATTACHMENTS WERE PREPARED UNDER MY DIRECTION OR SUPERVISION IN ACCORDANCE WITH A SYSTEM DESIGNED TO ASSURE THAT QUALIFIED PERSONNEL PROPERLY GATHER AND EVALUATE THE INFORMATION SUBMITTED. BASED ON MY INQUIRY OF THE PERSON OR PERSONS DIRECTLY RESPONSIBLE FOR GATHERING THE INFORMATION, THE INFORMATION SUBMITTED IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE, ACCURATE, AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT FOR KNOWING VIOLATIONS.

Name of Official: P. K. Blake, CAPT, MSC, USN

Title: Executive Secretary, Navy Radiation Safety Committee

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed self-addressed envelope. If you do not discharge radioactive material to WSSC, then only return survey and not license or certificate.

### FOR WSSC USE ONLY

Industry identification number\_\_\_\_\_

Input date\_\_\_\_\_

Reviewers Initials \_\_\_\_\_



II.

## WASHINGTON SUBURBAN SANITARY COMMISSION RADIOACTIVE MATERIAL USER SURVEY

## I. GENERAL INFORMATION

| Industry Name:                | NAVAL MEDICAL RES | EARCH INSTITUTE                |
|-------------------------------|-------------------|--------------------------------|
| Site Address:                 | ENUE              |                                |
| City:                         | BETHESDA          | State: MD Zip Code: 20889-5607 |
| WSSC Account N                | umber:            | City of Rockville:             |
| Industry Conta                | ct: LCDR SCHLEUR  | IOUS L. GAITER, MSC, USN       |
| Title:                        | ON SAFETY OFFICER | Phone Number; (301) 295-0002   |
| INDUSTRY CLAS                 | BIFICATION        |                                |
| Please check<br>industry list |                   | classification(s) for the      |
| Health Tr                     | eatmont           | Hospital                       |
| X Research/                   | Medical           | University/College             |
| Federal I                     | nstallation       | Private Laboratory             |

\_\_\_\_\_ Sales \_\_\_\_\_ Materials Testing

Ocher\_

## III. DISPOSAL INFORMATION

Please circle Y (Yes) or N (No) to the following questions:

a. Have you discharged radioactive (Y) N materials to WSSC's sanitary sewer within the past 2 years (1994-1995)?
b. Do you currently discharge radioactive materials to WSSC's sanitary sewer?
c. Do you utilize a hauler for purposes of disposing of radioactive waste?

If yes, list name(s) of haulers utilized:

DEPARTMENT OF DEFENSE, LOW LEVEL RADIOACTIVE WASTE EXECUTIVE AGENCY

IF YOUR RESPONSE TO QUESTIONS <u>A OR B</u> WAS NO. GO TO SECTION VI. IF YOUR RESPONSE TO QUESTIONS <u>A OR B</u> WAS YES, CONTINUE WITH SURVEY.

Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL LICENSE<br>NUMBER (S) | EXPIRATION DATE(S) |
|--------------------------------------------|--------------------|
| 1. 45-23645-01NA                           | INDEFINITE         |
| 2.                                         |                    |
| 3.                                         |                    |
| 4.                                         |                    |
| 5.                                         |                    |
| 6.                                         |                    |

#### V. RADIOISOTOPE USE AND DISPOSAL

On the table below, list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Briefly describe each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released for 1994 and 1995 (specify units in microcuries).

DATA FOR DISPOSAL AT NMRI, BETHESDA, MARYLAND

| ISOTOPE (8)<br>Rel <b>ea</b> sed | ISOTOPE USE OR<br>APPLICATION | FREQUENCY OF<br>RELEASE | TOTAL<br>RELEASED ACTIVITY |        |
|----------------------------------|-------------------------------|-------------------------|----------------------------|--------|
|                                  |                               |                         | 1994                       | 1995   |
| 1. H-3                           | MEDICAL RESEACRH              | MONTHLY                 | 33,585                     | 21,360 |
| <b>2.</b> C-14                   | MEDICAL RESEARCH              | ANNUALLY                | 0                          | 581    |
| 3. P-32                          | MEDICAL RESEARCH              | MONTHLY                 | 2,074                      | 1,567  |
| <b>4</b> . S-35                  | MEDICAL RESEARCH              | QUARTERLY               | 2,863                      | 1,366  |
| <b>5</b> . <sup>I-125</sup>      | MEDICAL RESEARCH              | QUARTERLY               | 3,846                      | 447    |
| 6. TOTALS                        | (IN MICROCURIES)              |                         | 42,368                     | 25,321 |
| 7.                               |                               |                         |                            |        |
| 8.                               |                               |                         |                            |        |

### VI. CERTIFICATION

I certify under penalty of perjury and law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| Name of  | Official: CDR P. K. BLAKE, MSC, USN                    |  |
|----------|--------------------------------------------------------|--|
| Title:   | EXECUTIVE SECRETARY<br>NAVY RADIATION SAFETY COMMITTEE |  |
| Signatur | Date:                                                  |  |

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed self-addressed envelope. If you do not discharge radioactive material to WSSC, return the survey only and not license or certificate information.

|          | FOR WESC USE ONLY       |
|----------|-------------------------|
| Industr  | y identification number |
| Input di | ate                     |
| Reviewe  | r's initials            |
|          |                         |
|          | ·                       |



## WASHINGTON SUBURBAN SANITARY COMMISSION RADIOACTIVE MATERIAL USER SURVEY

## 1. GENERAL INFORMATION

|      | Industry Name: NAVAL MEDICAL RESEARCH INSTITUTE, ROCKVILLE ANNEX                                                       |                                     |                         |  |  |  |  |
|------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------|--|--|--|--|
|      | Site Address:                                                                                                          | 12300 WASHINGTON                    | 12300 WASHINGTON AVENUE |  |  |  |  |
|      | City:                                                                                                                  | ROCKVILLE State: MD Zip Code: 20852 |                         |  |  |  |  |
|      | WSSC Account Nu                                                                                                        |                                     |                         |  |  |  |  |
|      | Industry Contact: LCDR SCHLEURIOUS L. GAITER, MSC, USN<br>Title: RADIATION SAFETY OFFICER Phone Number: (301) 295-0002 |                                     |                         |  |  |  |  |
|      |                                                                                                                        |                                     |                         |  |  |  |  |
| II.  | INDUSTRY CLASSIFICATION                                                                                                |                                     |                         |  |  |  |  |
|      | Please check all appropriate classification(s) for the industry listed above.                                          |                                     |                         |  |  |  |  |
|      | Health Tre                                                                                                             | atment                              | Hospital                |  |  |  |  |
|      | X Research/Medical University/College                                                                                  |                                     |                         |  |  |  |  |
|      | Federal Installation Private Laboratory                                                                                |                                     |                         |  |  |  |  |
|      | Sales                                                                                                                  |                                     | Materials Testing       |  |  |  |  |
|      | Other                                                                                                                  |                                     |                         |  |  |  |  |
| III. | DISPOSAL INFOR                                                                                                         | MATION                              |                         |  |  |  |  |

Please circle Y (Yes) or N (No) to the following questions:

- a. Have you discharged radioactive (X) N materials to WSSC's sanitary sewer within the past 2 years (1994-1995)?
- b. Do you currently discharge radioactive (Y) N materials to WSSC's sanitary sewer?
- c. Do you utilize a hauler for purposes of disposing of radioactive waste?

If yes, list name(s) of haulers utilized: DEPARTMENT OF DEFENSE, LOW LEVEL RADIOACTIVE WASTE EXECUTIVE AGENCY

N

IF YOUR RESPONSE TO QUESTIONS A OR B WAS NO, GO TO SECTION VI. IF YOUR RESPONSE TO QUESTIONS A OR B

WAS YES, CONTINUE WITH SURVEY.

Please complete the table below and submit a copy of each current license and amendments.

| RADIOACTIVE MATERIAL LICENSE<br>NUMBER (S) | EXPIRATION DATE(S) |
|--------------------------------------------|--------------------|
| 1. 45-23645-01NA                           | INDEFINITE         |
| 2.                                         |                    |
| 3.                                         |                    |
| 4.                                         |                    |
| 5.                                         |                    |
| 6.                                         |                    |

#### V. RADIOISOTOPE USE AND DISPOSAL

On the table below, list all radioactive materials which are or have been, directly or indirectly, discharged to the sanitary sewer. Briefly describe each isotope's use or application and the general frequency of discharge to the sanitary sewer (i.e. daily, weekly, monthly, or yearly). Finally, summarize the total activity released for 1994 and 1995 (specify units in microcuries).

DATA FOR DISPOSAL AT NMRI, ROCKVILLE ANNEX

| ISOTOPE (S)<br>RELEASED | ISOTOPE USE OR<br>APPLICATION | FREQUENCY OF<br>RELEASE | TOTAL<br>RELEASED ACTIVITY |        |
|-------------------------|-------------------------------|-------------------------|----------------------------|--------|
|                         |                               |                         | 1994                       | 1995   |
| 1. H-3                  | MEDICAL RESEARCH              | OUARTERLY               | 1,938                      | 6,566  |
| <b>2.</b> P-32          | MEDICAL RESEARCH              | MONTHLY                 | 3,023                      | 910    |
| <b>3</b> . S-35         | MEDICAL RESEARCH              | QUARTERLY               | 942                        | 3      |
| <b>4.</b> CR-51         | MEDICAL RESEARCH              | QUARTERLY               | 2,953                      | 2,354  |
| 5. TOTALS               | (IN MICROCURIES)              |                         | 8,856                      | .9.833 |
| 6.                      |                               |                         |                            |        |
| 7.                      |                               |                         |                            |        |
| 8.                      |                               |                         |                            |        |

#### VI. CERTIFICATION

I certify under penalty of perjury and law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

| Nama o | f  | Official: CDR P. K. BLAKE, MSC, USN                    |     |
|--------|----|--------------------------------------------------------|-----|
| Ticla: |    | EXECUTIVE SECRETARY<br>NAVY RADIATION SAFETY COMMITTEE |     |
| Signat | ur | Dat                                                    | :e: |

Return this survey with a copy of your radioactive materials license or certification within 30 days in the enclosed self-addressed envelope. If you do not discharge radioactive material to WSSC, return the survey only and not license or certificate information.

| FOR | MSSC | <b>U8K</b> | ONT.Y |
|-----|------|------------|-------|
|     | HODU |            |       |

Industry identification number\_\_\_\_\_\_

Input date \_\_\_\_\_

Reviewer's initials \_\_\_\_\_

6470 09A/01 09 Mar 94

#### MEMORANDUM

From: Radiation Safety Officer To: File

Subj: FREE RELEASE OF FACILITIES FOR RADIOACTIVE CONTAMINATION FROM SPILL OCCURRING ON 07 OCT 93 AT NMRI ANNEX

Ref: (a) Title 10 Code of Federal Regulations

- (b) Nuclear Regulatory Guide 8.23
- (c) Nuclear Regulatory Guide 10.8

Encl: (1) Room Survey Results

1. In accordance with references (a) through (c), the remaining rooms and hallways of the NMRI Annex were surveyed on March 7, 1994 by the Radiation Safety Office for radioactive contamination from P<sup>32</sup> following a decay period of five months. In all rooms and hallways the levels of fixed surface contamination were below detectable quantities and indistinguishable from background amounts. The NMRI Annex is considered completely free from contamination at this time; all spaces were released and floor coverings were removed.

٠.

| 2. | Enclosure | (1) | records survey results.      |   |
|----|-----------|-----|------------------------------|---|
|    |           |     | $\frown$                     | ) |
|    |           |     | 2 Jun                        |   |
|    |           |     | B. K. HOLLAND<br>LT MSC USNR |   |
|    |           |     | LT MSC USNR                  |   |

Copy to: CO XO CAPT Hoffman

6470 09A/02 15 Nov 93

## MEMORANDUM

| From:<br>To:<br>Via: | Radiation Safety Officer<br>Commanding Officer, Naval Medical Research Institute (19)<br>Executive Officer, Naval Medical Research Institute (20)<br>Rew 1/12/4                                                                                |  |  |  |  |  |  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| Subj:                | FREE RELEASE OF NMRI ANNEX FROM CONTAMINATION DUE TO A<br>SPILL OCCURRING ON 07 OCT 93                                                                                                                                                         |  |  |  |  |  |  |
| Ref:                 | <ul> <li>(a) Title 10 Code of Federal Regulations</li> <li>(b) Nuclear Regulatory Guide 8.23</li> <li>(c) Nuclear Regulatory Guide 10.8</li> <li>(d) NMRI NRMP 19-64223-41NP</li> </ul>                                                        |  |  |  |  |  |  |
| Encl:                | <ol> <li>List of Radiation Detection Meters</li> <li>Areas with Survey Counts Greater than 100 CPM Upon<br/>Release</li> <li>Water Samples from Mopping</li> <li>Distribution of Initial Survey Findings</li> <li>Area Survey Forms</li> </ol> |  |  |  |  |  |  |

1. On Thursday, October 7, 1993, a spill of what is estimated to be approximately 0.135 mCi or less of the radionuclide P-32 in the chemical form gamma-ATP occurred at the Naval Medical Research Institute (NMRI) Annex located at 12300 Washington Ave., Rockville, MD 20852. The spill went undiscovered for approximately less than four hours and trace amounts were tracked throughout the complex. This report represents only the results of the clean up portion of the spill and the release of the Annex for normal operations. A discussion of events surrounding the spill will be forthcoming in a later report.

2. Per reference (a) through (d), subject swipes were taken following the decontamination of the NMRI Annex. Enclosure (5) indicates areas where the swipes were collected and the results of the swipes and survey meter readings following decontamination. Enclosure (4) is a chart indicating the contamination spread and reported in counts per minute. All swipe samples were run on a Packard Liquid Scintillation Analyzer, Model 2500TR, Serial Number 403848. Action level for contamination per reference (b) is 1000 dpm/100 cm<sup>2</sup>. All swipe samples were less than 210 dpm/100 cm<sup>2</sup>: well below the action level for contamination. Swipe samples were taken only from the floor since no contamination was found at levels above the floor.

3. The first floor of the Rockville Annex was released by the NMRI Radiation Safety Officer (RSO) for normal use on October 15, 1993. The corridor accessing the office spaces, library, bathrooms, lunch room and room 219 on the second floor were released by the NMRI RSO on October 14, 1993. All remaining rooms on the second floor, and the corridor accessing them with the exception of rooms 222, 221, 220 and 218 were released by the NMRI RSO on October 15, 1993. Lastly, rooms 222, 221, 220 and 218 were released by the NMRI RSO on October 19, 1993.

4. Enclosure (1) lists the radiation detection meters that were used to conduct surveys of the NMRI Annex. Background survey readings were less than 30 cpm. Contamination was considered to be activity with counts greater than 100 cpm above background. All points of contamination were reduced to less than 100 cpm above background (in most all cases the readings were indistinguishable from background) with the exception of the areas listed in enclosure (2).

5. Enclosure (3) lists the results of water samples taken from the mop water of each room. All water samples showed no true signs of contamination as expected. Before mopping, all points of contamination were identified and cleaned with paper towels and "Spray Nine" to levels below 100 cpm using meters listed in enclosure (1).

6. Air samples were taken from two sites where contamination was expected to be at its highest on October 8, 1993. The determined air concentrations for P-32 were well below the DAC (Derived Air Concentration) limit listed in reference (a) of 4 x  $10^{-7}$  uCi/ml.

7. Four spots with counts greater than 100 cpm were discovered outside the complex on the loading dock stairs outside of room 213 and were cleaned and released.

8. Carpeted spaces which were contaminated and had to be covered will remain covered until March 7, 1993 at which time the contamination will be surveyed to determine it indistinguishable from background.

B. K. HOLLAND LT MSC USNR

Copy to: NEHC/ Code 31 BUMED

| Mfg.              | Mode 1         | Serial # | Probe<br>Model | Probe<br>Serial # | Cal. Date | Status |
|-------------------|----------------|----------|----------------|-------------------|-----------|--------|
| Ember-<br>line    | RM-3C-4        | 158      | DT-304/<br>PRD | G-013             | 05/27/93  | NMRI   |
| Ludlum            | 1 <u>4</u> C   | 86160    | 44-9           | 038532            | 08/24/93  | AFRRI  |
| Ludlum            | 14C            | 58758    | 44-9           | 082281            | 08/24/93  | AFRRI  |
| Ludlum            | 14C            | 51391    | 44-9           | 048286            | 08/24/93  | AFRRI  |
| Ludlum            | 14C            | 58765    | 44-9           | 038543            | 08/24/93  | AFRRI  |
| Ludlum            | 14C            | 51398    | HP-260         | none              | 08/19/93  | AFRRI  |
| Wm. B.<br>Johnson | IM 247<br>B/PD | A287     | DT-304/<br>PDR | F-092             | 05/13/93  | NNMC   |
| Ember-<br>line    | E-140N         | C-224    | DT-304/<br>PDR | G-023             | 07/12/93  | NNMC   |
|                   |                |          |                |                   |           |        |

# List of Radiation Detection Meters

.

Air Samplers:

· · · · ·

| Mfg.                 | Mode1   | Serial # | Cal. Date | Status |
|----------------------|---------|----------|-----------|--------|
| Staplex              | TFIA 3  | . 17155N | 04/19/93  | AFRRI  |
| HQ-<br>Environmental | CF-971T | 4189     | 04/19/93  | AFRRI  |

•

Enclosure (1)

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## Areas with Survey Counts Greater than 100 cpm upon release

Room 220 - Levels of contamination were reduced to less than 1000 cpm. Three coats of polyurethane sealant were applied to the floor to prevent loose surface contamination.

Room 218 - Duct tape was used to cover one spot recorded at approximately 500 cpm. All other room counts were less than 100 cpm or essentially background.

Room 213, 213A and 213B - Levels of contamination were reduced to below 500 cpm. Two coats of paint were applied to the floors to prevent loose surface contamination.

Rooms 202 through 210 and adjoining corridor and rooms 102 through 104 - No attempts were made to decontaminate these spaces due to the areas being carpeted. Points of contamination were identified, covered with plastic or a chucks pad, and carpeting was laid over covered mark to prevent spread of contamination. The isotope will be allowed to decay for 5 months (10 half-lives) before floor coverings are removed.

Reception office and corridor adjoining rooms 102 through 109 - No attempts were made to decontaminate these spaces due to the areas being carpeted. All counts were less than 1000 cpm with exception of one spot of 25,000 cpm. Because of the high volume of traffic, the points of contamination were identified and covered with a chucks pad; Herculite was laid over the floor and carpeting was laid over the herculite to prevent spread of contamination. Most contaminated spots were reduced to less than 100 cpm after covering. The isotope will be allowed to decay for 5 months before floor covérings are removed.

Stairwell A - No attempt was made to decontaminate this space since it is carpeted. A thick plastic was secured to each individual step covering identified points of contamination. The isotope will be allowed to decay for 5 months before the plastic covering is removed.

Enclosure (2)

## WATER SAMPLES FROM MOPPING

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| Sample | Room         | Bucket<br>Vol. (1) | Sample<br>Vol. (ml) | dpm | Actívity<br>(nCi) | Comments                            |
|--------|--------------|--------------------|---------------------|-----|-------------------|-------------------------------------|
| 1      | 127          | 4                  | 1.0                 | 43  | 77                |                                     |
| 2      | 115          | 4                  | 1.0                 | 48  | 86                | 1st mopping                         |
| 3      | 128          | 4                  | 1.0                 | 75  | 135               |                                     |
| 4      | 110          | 4                  | 1.0                 | 45  | 81                |                                     |
| 5      | 111          | 4                  | 1.0                 | 43  | 77                |                                     |
| 6      | 115          | 4                  | 1.0                 | 0   | 0                 | 2nd mopping                         |
| 7      | 114          | 4                  | 1.0                 | 38  | 68                |                                     |
| 8      | 116          | 4                  | 1.0                 | 49  | 88                |                                     |
| 9      | 112          | 4                  | 1.0                 | 0   | 0                 | also rm. 113 and<br>hallway for 114 |
| 10     | 118          | 4                  | 1.0                 | 77  | 139               | 1st mopping                         |
| 11     | 117          | 4                  | 1.0                 | 0   | 0                 |                                     |
| 12     | 125          | 4                  | 1.0                 | 0   | 0                 |                                     |
| 13     | 123          | 4                  | 1.0                 | 59  | 106               |                                     |
| 14     | 126          | 4                  | 1.0_                | 60  | 108               |                                     |
| 15     | load<br>dock | 4                  | 1.0                 | 40  | 72                | and janitorial<br>room, 1st floor   |
| 16     | 118          | 4                  | 1.0                 | 28  | 50                | 2nd mopping                         |
| 17     | Hall         | 4                  | 1.0                 | 20  | _36               | 1st_floor                           |
| 18     | 223          | 4                  | 1.0                 | 12  | _22               |                                     |
| 19     | 224          | 4                  | 1.0_                | 67  | 121               |                                     |
| 20     | stair        | 4.                 | 1.0                 | 90  | 162               | Stairwell B                         |
| 21     | 213A         | 4                  | 1.0                 | 87  | 157               |                                     |
| 22     | 212          | 4                  | 1.0                 | 169 | 305               | <u>-</u>                            |

Enclosure (3)

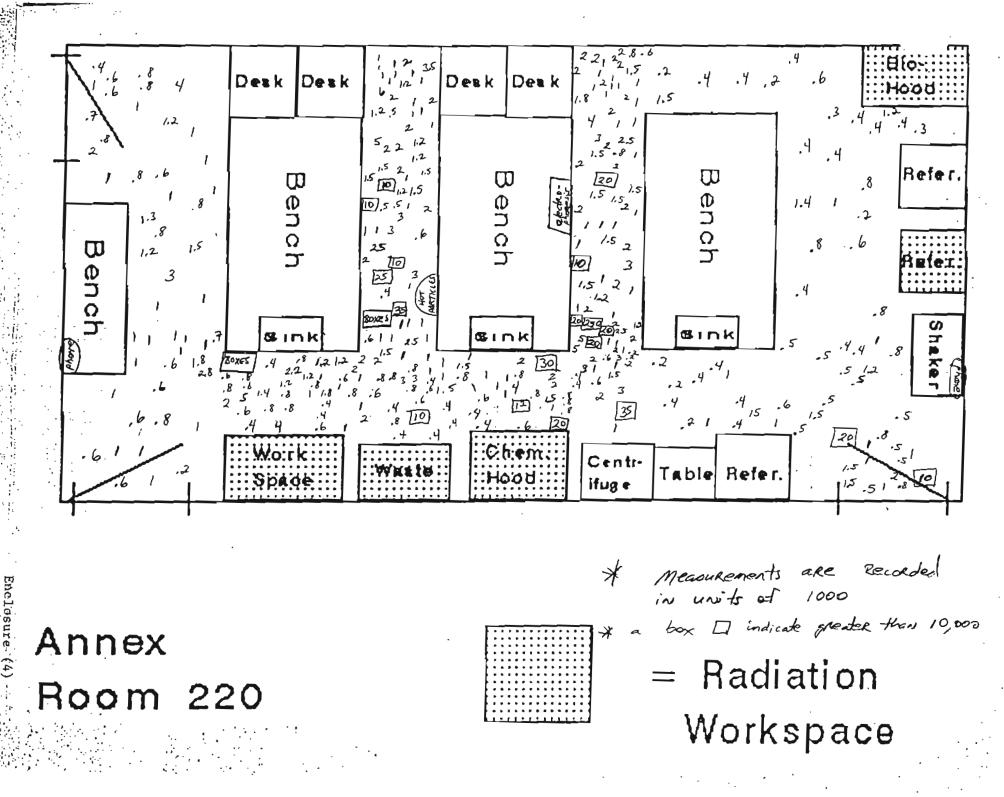
| Sample | Room | Bucket<br>Vol. (1) | Sample<br>Vol. (ml) | dpm | Activity<br>(nCi) | Comments        |
|--------|------|--------------------|---------------------|-----|-------------------|-----------------|
| 23     | 219A | 4                  | 1.0                 | 25  | 45                |                 |
| 24     | Hall | 4                  | 1.0                 | 96  | 173               | from 209 to 211 |
| 25     | 213  | 4                  | 1.0                 | 94  | 169               | 1st mopping     |
| 26     | 213B | 4                  | 1.0                 | 93  | 168               |                 |
| 27     | 219B | 4                  | 1.0                 | 96  | 173               |                 |
| 28     | 216  | 4                  | 1.0                 | 71  | 128               |                 |
| 29     | 215  | 4                  | 1.0                 | 57  | 103               | and rm. 215A    |
| 30     | 222  | 4                  | 1.0                 | 92  | 166               |                 |
| 31     | 214  | 4                  | 1.0                 | 94  | 169               |                 |
| 32     | 221  | 4                  | 1.0                 | 97  | 175               |                 |
| 33     | 217  | 4                  | 1.0                 | 95  | 171               | 1st mopping     |
| 34     | 218  | 4                  | 1.0                 | 98  | 177               | 1st mopping     |
| 35     | 217  | 4                  | 1.0                 | 133 | 240               | 2nd mopping     |
| 36     | 218  | 4                  | 1.0                 | 92  | 166               | 2nd mopping     |
| 37     | 213  | 4                  | 1.0                 | 3   | 5                 | 2nd mopping     |
| 38     | 201  | 4                  | 1.0                 | 107 | 193               |                 |
| 39     | 219  | 4                  | 1.0                 | 168 | 303               |                 |
| 40     | 220  | 7                  | 1.0                 | 132 | 416               |                 |

Total Activity Detected/Disposed: <u>5030 nCi</u>

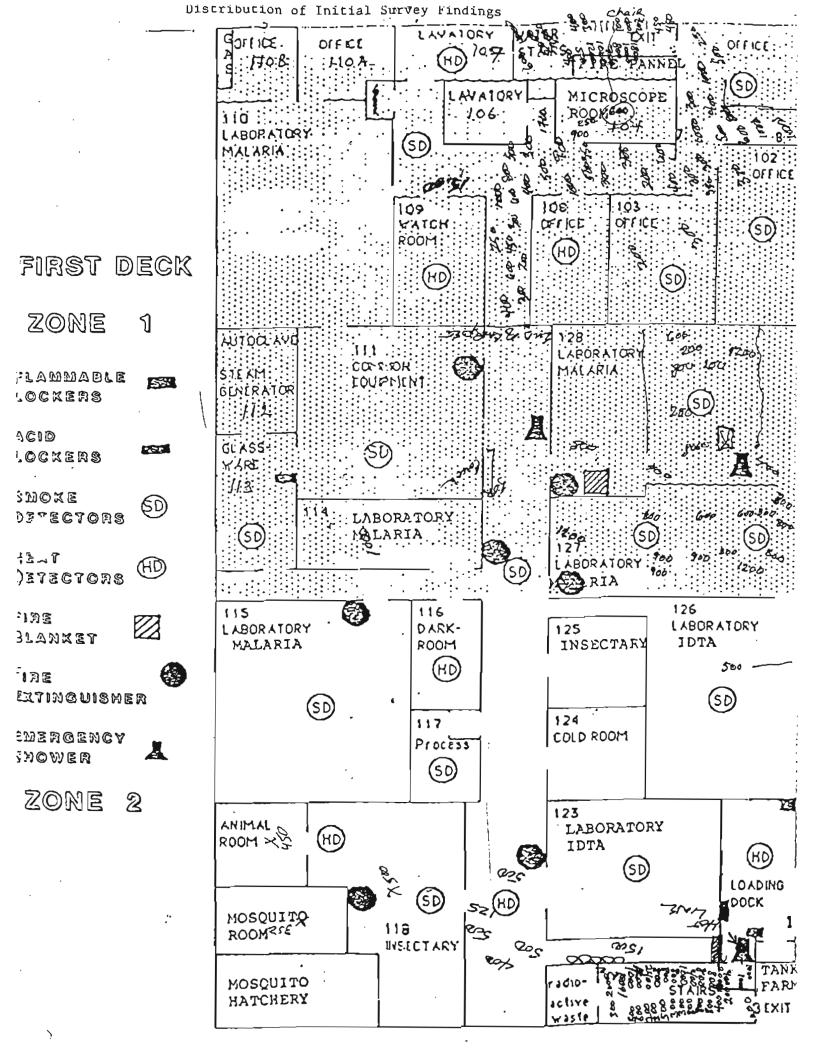
,

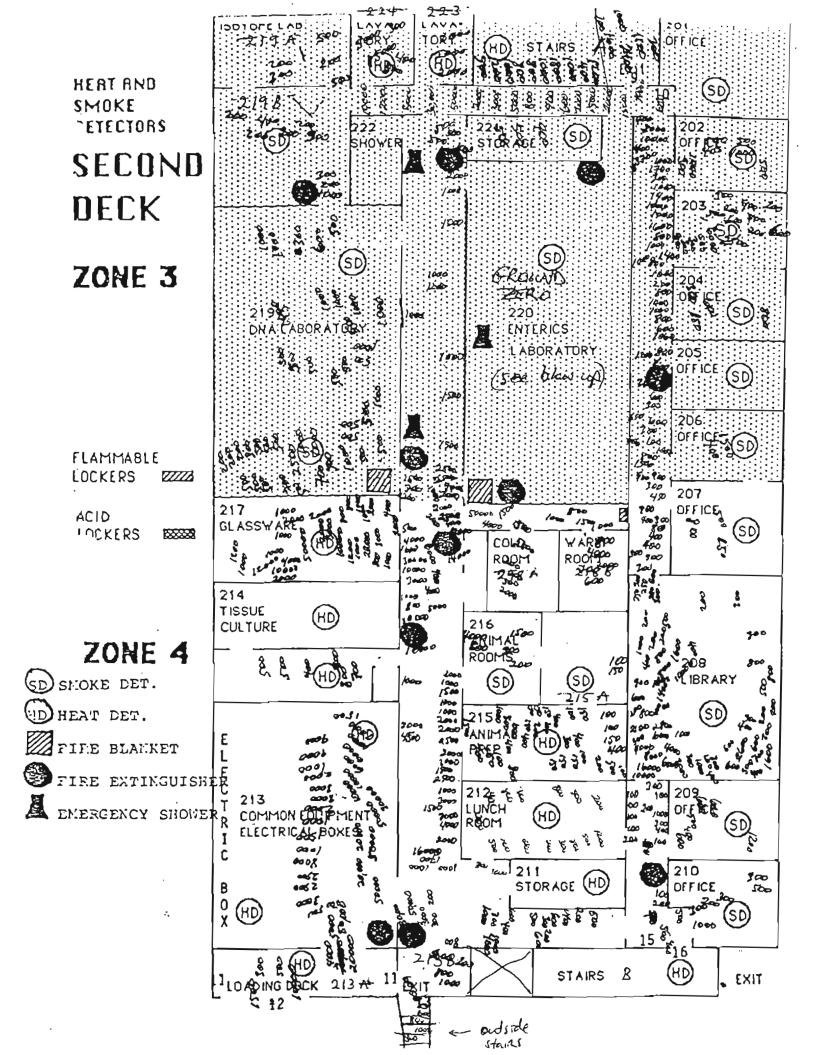
Note: all dpm readings are above background

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Distribution 0 £ Initial Survey Findings





D-32 Leakage of Xenon-127 gas in the hood in building 53, room 112



#### DEPARTMENT OF THE NAVY NAVAL MEDICAL RESEARCH INSTITUTE NAVAL MEDICAL COMMAND, NATIONAL CAPITAL REGION

#### BETHESDA. MD 20814-5055

IN REPLY REFER TO

6470 HM5 29 October 1985

From: CDR Ronald Fine, Hyperbaric Medicine Program Center
To: Radiation Safety Division, Naval Medical Command, National Capital Region, Bethesda, Maryland 20814-5000

Subj: LEAKAGE OF XENON-127 GAS IN THE HOOD IN ROOM 112, BLDG. 53

Ref: (a) NMRIINST 6470.1G (b) NMCNCR INST 6470.1A

1. Per references (a) and (b), the following information is furnished for your review and consideration:

a. Type of isotope: Xenon-127

b. Activity of isotope: Estimated between 28 mCi and 100 mCi over 9 weeks depending on the actual time of loss.

c. Personnel involved: LCDR D. Mayers, MC, USN HM2 W. Villanueva, USN

d. Reasons for leakage:

(1) Leaky connection between RGD 700 container and gas-tight syringe used to draw gas doses from container (proven).

(2) Possible non-closure of RGD 700 container value after a gas sample was withdrawn from the container (suspected).

(3) Description of incident. The laboratory in Room 112, Building 53, NMRI has recently obtained a radiation dose calibrator to determine the actual doses of radioactive Xenon gas utilized during experiments. On 16 August 1985, a vial of Xenon-127 gas was obtained from Oak Ridge. This vial was presumed to contain 208 mCi of gas based on information obtained from Oak Ridge. The gas was transferred without incident into an RGD 700 container which had previously held a vaccuum for periods up to a week on leak testing. Over the next nine weeks, the gas was withdrawn into a sample syringe for equipment calibration and then returned into the container; no samples were used in actual experiments. No evidence of leakage was noted on the Xenon-133 monitor which was continuously sampling the air in the hood of Room 112 during this time. The monitor was periodically checked and found to be very sensitive to minute quantities of Xenon-127 or Xenon-133. On 25 October 1985, the amount of Xenon-127 gas in the RGD container was estimated to be 56 mCi. Two samples of gas were assayed from the container and had an average activity of 3.55 mCi/5cc in the radiation dose calibrator. Back calculation reveals that there was 28 mCi of gas in the container at that time. Assuming that there was 200 mCi of gas in the container on 16 August 1985, this implies a

loss between 100 mCi (if lost on 16 August) and 28 mCi (if lost on 25 October) of gas from the container. Assuming a worst case of a gradual 100 mCi loss over 9.4 weeks, this would amount to approximately 1% MPC for a restricted area and 12% MPC for unrestricted areas. Further testing revealed a slight leak at the syringe/container junction during gas transfer. This leak is too small to account for the amount of gas lost so an episode in which the RGD 700 container was left with the valves cracked open is presumed to explain the amount of gas lost.

e. Contamination levels: The Xenon-133 meter which sampled air from the hood was functioning well and never showed Xenon levels greater than 0.2 MPC during instrument calibration. Between manipulations, the gas level in the hood was consistently less than 0.1 MPC (essentially zero) on the meter. No decontamination is required for Xenon gas.

f. Corrective actions:

(1) A new gas-tight connection will be developed for transfer of Xenon gas from the RGD 700 container to the gas-tight syringe during each experiment.

(2) Two persons will be present during each transfer of gas from the RGD 700 container. One user will transfer the gas, the second user will check technique and verify the cannister valve positions at the end of each gas transfer procedure.

Respectfully submitted,

R. FINE

D-33 Protocol and Reference Information for NMRC Use of Uranyl Acetate/Nitrate

47

(from Garvey et al, J. Histotechnol. 8:15-17, 1985, modified by Dr. Miriam Anver, and Cathi George, NCI-FCRDC, Frederick, MD)

Fixation: 10% Buffered neutral formalin Process: Paraffin, frozen, or celloidin

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1%Uranyl Nitrate-Uranyl nitrate, 1.0gm, Distilled Water, 100.0ml
1% Silver Nitrate, Silver nitrate crystals, 1.0 gm, Distilled water, 100.0 ml
2.5% Gum Mastic, Gum mastic, 2.5 gm, Absolute Alcohol, 100.0 ml
0.04% Silver Nitrate, Silver nitrate crystals 0.04 gm, Distilled water 100.0 ml
2% Hydroquinone, Hydroquinone crystals 1.0 gm, Distilled water 50.0 ml
Reducing Solution (Prepared just before use), 2.5% Gum Mastic 20.0 ml, 2% Hydoquinone 50.0 ml

Combine the gum mastic solution and the hydroquinone solution. Add the alcohol and mix well. Filter through Whatmann #4 filter paper. Immediately before placing slides in solution, add 5 ml of 0.04% silver nitrate.

Staining Procedure

1. Decerate slides in xylene, 2 changes, 2 minutes each. Place in absolute alcohol, 2 changes, 2 minutes each; 95% alcohol, 2 changes, 2 minutes each; then rinse in distilled water.

2. Place in 1% uranyl nitrate, preheated to 60oC, for 15 minutes.

3. Rinse thoroughly in distilled water.

4. Place in 1% silver nitrate for 2 hours at 60oC.

5. Rinse in 2 changes of distilled water.

6. Dehydrate in 2 changes of 95% and 2 changes of 100% alcohol.

7. Place in 2.5% gum mastic for 5 minutes.

8. Allow sections to air dry for 1 minute or until white all over.

9. Rinse in 2 changes of distilled water.

10. Place sections in reducing solution that has been preheated to 430C (no more than 10 minutes).

Check development on microscope after 10 minutes, then every 5 minutes until developed. Approximately 15-25 minutes.

11. Rinse in distilled water to stop reduction.

12. Dehydrate slides in 95% alcohol and absolute alcohol 3 changes each. Clear in xylene, 3 changes.

13. Mount coverglass with appropriate medium (refractive index 1.48-1.56).

Results

# Use of Zinc Formalin as a Sensitizer in Silver Stains for Spirochetes

Lorelei S. Margeson and Clifford M. Chappman Pathology Services Inc., <<u>info@pathsrv.com></u>

### Abstract

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Uranyl nitrate has been utilized as a sensitizer in silver stains formulated to detect spirochetes since the inception of these methods, even though many other aspects of these techniques have been changed over time. We have substituted <u>zinc formalin</u> for uranyl nitrate in both the Warthin-Starry and modified Steiner techniques. The resulting spirochete staining is as good or better than when uranyl nitrate is used. (The J Histotechnol 19: ,1996)

### Key words

spirochetes, Steiner, uranyl nitrate, Warthin-Starry, zinc formalin

### Introduction

Spirochetes belong to an important group of organisms, some of which are pathogenic. Examples include Treponema pallidum, the causative agent of syphilis, and Borrelia burgdorferi, which causes Lyme disease. It has been over 70 years since Gilbert Steiner first described a method for demonstrating spirochetes in single sections of formalin fixed, paraffin embedded tissue (1). Although the Levaditi and Warthin-Starry methods for demonstrating spirochetes were published earlier, these procedures used en bloc staining and unreliable coverslip sandwich methods, respectively, and both resulted in inconsistent staining of spirochetes (2,3). For these reasons, Steiner himself modified his method several times to obtain precise, clean, reproducible results (4-6).

Many histology laboratories use some version of the Steiner stain to demonstrate spirochetes. Since the advent of the microwave oven, many "modified" Steiner stains have been described (7). The majority of these modifications involve varying either the times in the microwave and/or the concentrations of some of the reagents (8). Alternatively, some laboratories use the original Warthin-Starry technique, or a modification thereof, for detection of spirochetes (9).

In all of these methods, however modified, one of the reagents used has remained unchanged; uranyl nitrate is still used as a sensitizer. Uranyl nitrate is a very hazardous radioactive chemical. In our continuing effort to eliminate hazardous chemicals from the histology laboratory, we report on the use of zinc formalin as a substitute for uranyl nitrate in both the modified Steiner and Warthin-Starry techniques.

### Materials and Methods

#### WARTHIN-STARRY STAIN

#### FIXATION:

10% neutral buffered formalin with sections cut at 4-6 microns. Avoid chromate fixatives.

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### TECHNICAL CONSIDERATIONS:

- 1. Use chemically clean glassware.
- 2. All glassware must be heated to 60C.

#### SOLUTIONS:

- 1. Acidulated water: add 1% citric acid to 1,000.0 ml triple distilled water(DW) until pH is 4.0
- 2. 10% zinc formalin: (20% zinc sulfate in 3.7% formalin; Rowley Biochemical, MA).
- 3. 1% silver nitrate: add 1.0 gm silver nitrate to 100.0 ml acidulated water.
- 4. 5% gelatin: add 5.0 gm gelatin, purified grade, Fisher Type A-275 Bloom to 100.0 ml acidulated water, heat to 56 C.
- 5. 2% silver nitrate: add 2.0 gm silver nitrate to 100.0 ml acidulated water.
- 6. 0.15% hydroquinone: dissolve 0.15 gm hydroquinone crystals 100.0 ml acidulated water, heat to 56 C.

#### Developer solution

Mix just before use, not in advance. Combine in the following order.

2% silver nitrate solution 15.0 ml

5% gelatin solution 37.5 ml

0.15% hydroquinone solution 20.0 ml

#### PROCEDURE:

- 1. Deparaffinize and hydrate sections down to acidulated water. Let stand for two changes at 5 min each to bring sections to pH 4.0.
- 2. Place slides in heated 10% zinc formalin for 15 min in a 60 C water bath.
- 3. Rinse with acidulated distilled water.
- 4. Put slides into heated 1% silver nitrate for 2 hours in a 43 C water bath.
- 5. Prepare the developer solution after the 2 hours are up. Take the slides out of the 1% sliver solution individually and place on pipets or a staining rack.
- 6. Flood with developer, using a glass or plastic transfer pipet. Allow sections to develop for 5-15 min. at 60C.
- 7. Rinse with hot DW (56 C), 6-7 changes. Check positive control under the microscope. Spirochetes should be black with a clear background.
- 8. Dehydrate with 2 changes of 95% ethanol and 3 changes of 100% ethanol, clear with 3 changes of xylene and coverslip with Permount.

#### RESULTS:

| spirochetes | black   |
|-------------|---------|
| background  | . clear |

#### MODIFIED STEINER

#### FIXATION:

10% neutral buffered formalin yields the best results with sections cut at 4-6 microns.

#### TECHNICAL CONSIDERATIONS:

- 1. Use acid cleaned glassware rinsed well with distilled water.
- 2. Use fresh silver and hydroquinone solutions.
- 3. Do not preheat the reducing solution. Add the slides after filtering at room temperature, then place the Coplin jar in the 45 C waterbath.

### SOLUTIONS:

- 1. 10% zinc formalin.
- 2. 1% Silver nitrate: add 0.5 gm silver nitrate to 50.0 ml DW.
- 3.
- 0 2.5% Gum mastic: dilute the 10% gum mastic, 1 part to 3 parts of 100% alcohol.
- o 10% Gum mastic: add 10.0 gm gum mastic to 100.0 ml of 100% alcohol.
- This takes several days to go into solution. Refrigerate at 4 C. May be reused, but keep separate from fresh.
- 4. 0.04% Silver nitrate: add 0.02 gm silver nitrate to 50.0 ml DW.
- 5. 2% Hydroquinone: add 0.5 gm hydroquinone to 25.0 ml DW.
- 6. Reducing solution
  - 2.5% Gum mastic 10.0 ml
  - o 2.0% Hydroquinone 25.0 ml
  - 100% Ethanol 5.0 ml
  - Make just before use, filter and then add 2.5 ml of 0.04% silver nitrate (do not filter this silver).

### PROCEDURE:

- 1. Deparaffinize and rehydrate tissues to distilled water.
- 2. Sensitize sections in 10% zinc formalin at 60 C in a waterbath for 15 min (cover jar loosely). Preheat this solution.
- 3. Rinse in DW, 3 times for 2 min each.
- 4. Place in 1% silver nitrate in a plastic coplin jar. Place in microwave (800 watts);start and run for 80 sec. Remove from microwave and allow to stand in hot silver solution for 20 min (cover jar loosely).
- 5. Rinse in DW, 3 times for 2 min each.
- 6. Dehydrate in 2 changes of 95% ethanol followed by 2 changes of 100% ethanol.
- 7. Treat with 2.5% gum mastic for 5 min.
- 8. Allow to airdry for 1 min.
- 9. Rinse in DW (two changes). Slides may stand in distilled water while reducing solution is being made, or longer if necessary.
- Reducing solution at 45 C in waterbath for 5-30 min or until sections have developed satisfactorily, with the spirochetes at desired intensity and the background light yellow. Avoid an intensely stained background by checking microscopically. DO NOT PREHEAT THIS SOLUTION.
- 11. Rinse in DW to stop reaction.
- 12. Dehydrate through graded alcohols, clear in xylene (not xylene substitute) and mount with Permount (Fisher Scientific, Medford, MA).

### RESULTS: (See Figure 1d)

Spirochetes, Donovan bodies (granuloma inguinale), general bacteria, legionnaires' disease (Legionella pneumophilia) bacteria - dark brown or black

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Background - bright yellow to light brown.

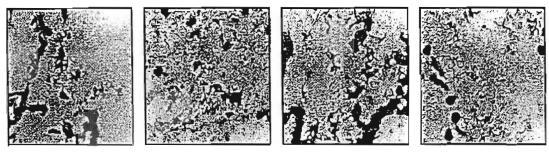


Figure 1a:

Figure 1b:

Figure 1c:

Figure 1d:

Warthin-Starry stain with (a) uranyl nitrate and (b) zinc formalin as sensitizer. Modified Steiner stain with (c) uranyl nitrate and (d) zinc formalin as a sensitizer. Spirochetes appear as dark black spiral shaped organisms. Original maginfication x2500.

## Results

Titration experiments showed the optimal dilution of zinc formalin, as a substitute for uranyl nitrate, to be full strength. This result was the same for both the Warthin-Starry and the modified Steiner.

The conditions of treatment using zinc formalin were the same in each method. In both the Warthin-Starry and modified Steiner methods, zinc nitrate treatment was 15 minutes at 60 C. The remainder of both methods was the same as we usually perform in our laboratory.

The resulting stain quality using zinc formalin was as good or better than using uranyl nitrate (Figure 1). Spirochetes stained black in both the Warthin-Starry and modified Steiner, with a light brown background. In fact, use of zinc formalin in the modified Steiner actually resulted in a lighter, gold background which was easier to view than the uranyl nitrate treated slides.

Additionally, the development time for the modified Steiner was much shorter for slides treated with zinc formalin, as opposed to uranyl nitrate. Instead of waiting for a 20-30 minute development time, the use of zinc formalin resulted in a development time of approximately 5-10 minutes.

### Discussion

Uranyl nitrate has been used in both the modified Steiner and Warthin-Starry stains since it was first used by Jahnel (10,11). Steiner himself was well aware of its importance and recommended the use of a fresh preparation of uranyl nitrate in his modification of 1950 (6). Throughout the years, histologists have followed these procedures using uranyl nitrate because, when it is eliminated, spirochetes stain very faintly, or not at all (12).

Uranyl nitrate is a hazardous chemical. It is a strong oxidizer that may cause ignition if combined with a reducing agent, or may explode when shocked or if exposed to heat, friction or flame. Solutions of uranyl nitrate in ether can explode upon exposure to sunlight. Additionally, uranyl nitrate is radioactive and must be handled with extreme caution since it can cause both kidney and liver damage. Waste solutions of uranyl nitrate must be disposed of as hazardous radioactive waste which can be very expensive (13).

Dieterle explained that the use of uranium salts was to prevent the impregnation of nerve fibers, collagen and elastic tissue by the subsequent silver step, which could result in a preferential silver impregnation of any spirochetes present (11). It is now known that spirochetes, like bacteria, possess a cell wall external to the cell membrane. This cell wall consists of a rigid structural network made of a peptidoglycan composed of alternating N-acetylglucosamine and N-acetyl muramic acid residues (14). Based upon the chemistry of these residues, the cell wall of spirochetes and bacteria should have a net negative charge.

Pretreatment of tissue sections with uranyl nitrate or zinc formalin may result in binding of these chemicals to this negatively charged spirochete cell wall, where they facilitate subsequent silver impregnation. This facilitation may be due to an effect of direct binding to the cell wall, or may be in the form of a mordanting action. The final result is that the spirochetes exhibit more black silver metallic staining than the surrounding tissue, just as Dieterle explained.

It is true that these silver impregnation methods are not specific for spirochetes; other bacteria and tissue elements (i.e. melanin) are also stained. These methods simply allow the visualization of the spirochetes. Attempts have been made to use antisera in immunoperoxidase methods to demonstrate spirochetes in tissue sections. Some have been successful, however antigens common to both pathogenic and nonpathogenic or saprophytic treponemes have been identified (15). Unless these particular antibodies are removed from the anti-sera being used, the result is the same as the silver methods; the spirochetes can be visualized, but not specifically identified. In addition, it is known that T. pallidum is morphologically and serologically identical to T. perenue and T. carateum, the spirochetes that cause yaws and pinta, respectively. Thus, immunohistochemical methods are unable to differentiate these organisms at this time.

The current silver impregnation methods for visualizing spirochetes described herein using zinc formalin allow for accurate, reproducible, clear staining of spirochetes in tissue sections. The resulting staining of spirochetes is as good, or better than using uranyl nitrate. Additional advantages of using zinc formalin include decreased development time, decreased background staining, and substitution of a less hazardous chemical for uranyl nitrate.

### Acknowledgments

We thank Ms. Myrtha Constant for her excellent technical expertise. This work was supported by private funding from Pathology Services, Inc.

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Back to Home page

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