

U.S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE

Page

Supplementary Sheet

License Number

Amendment No. 13

Department of the Navy
Naval Shipyard
Vallejo, California 94592

License Number 04-50354-03 is amended as follows:

The expiration date in Item 4 is changed to June 30, 1975.

Whenever the words "Atomic Energy Commission" or "Commission" appear in this license, except where the context of their use refers to a fact or event prior to January 19, 1975, they mean the Nuclear Regulatory Commission created by Public Law 93-438 and Executive Order No. 11634.

For The U.S. Nuclear Regulatory Commission
For the U.S. Atomic Energy Commission

Original Signed By
NATHAN BASSIN

by

Directorate of Licensing
Washington, D. C. 20545

Date MAR 19 1975

FORM AEC-374 (7-66)

This Copy is For Your File

BYPRODUCT MATERIAL LICENSE Amendment No. 11

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, 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 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.

<p>Licensee</p> <p>1. Department of the Navy Mare Island Naval Shipyard</p> <p>2. Vallejo, California 94592</p>	<p>In accordance with application dated January 16, 1970,</p> <p>3. License number 04-00364-05 is amended in its entirety to read as follows:</p> <p>4. Expiration date March 31, 1975</p> <p>5. Reference No.</p>
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6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Cesium 137	A. Oak Ridge National Laboratory Sealed Source	A. 1 source of 128 curies
B. Cesium 137	B. Oak Ridge National Laboratory Sealed Source	B. 1 source of 128 curies
C. Cobalt 60	C. Oak Ridge National Laboratory Sealed Source	C. 1 source of 12 curies
D. Strontium 90	D. U. S. Radium Corporation Model LAB-277 Sealed Source	D. 1 source of 3 microcuries

9. Authorized use
- A. For use in Model AN/UDM-1A Radiac Calibrator for calibration of instruments.
 - B. For use in Model AN/UDM-1A Radiac Calibrator in a Model AN/MDM-1 Mobile Radiac Repair Facility for calibration of instruments.
 - C. For use in Model AN/UDM-1 Radiac Calibrator for calibration of instruments.
 - D. Check source in Victoreen Model A 716-A sensing element in an area monitoring system.

ENCLOSURE (2)

Supplementary Sheet

License Number 04-00364-0
Amendment No. 11

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.
11. Byproduct material designated in Items 6.B. and 7.B. may be used throughout the States of California, Nevada, and Utah.
12. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."
13. Byproduct material shall be used by, or under the supervision of, individuals certified as qualified by the Radiological Protection Officer.
14. Sealed sources containing byproduct material shall not be opened.
15. A(1) Each sealed source containing byproduct 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. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) 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 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 Commission.

BYPRODUCT MATERIAL LIC

Supplementary Sheet

License Number 04-00364-05

CONDITIONS

Amendment No. 11

15. continued

C. If the test 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 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region V, Division of Compliance, USAEC, 2111 Bancroft Way, Berkeley, California, 94704.

D. Tests for leakage and/or contamination shall be performed by the licensee in accordance with procedures in application dated January 16, 1970.

16. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated January 16, 1970.

For the U. S. Atomic Energy Commission

Nathan Bassin
by Isotopes Branch

Date MAR 5 1970Division of Materials Licensing
Washington, D. C. 20545

This Copy Is For Your File

BYPRODUCT MATERIAL LICEN

Amendment No. 11

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, 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 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.

<p style="text-align: center;">Licensee</p> <p>1. Department of the Navy Mare Island Naval Shipyard</p> <p>2. Vallejo, California 94592</p>	<p>In accordance with application dated January 16, 1970,</p> <p>3. License number 04-00364-05 is amended in its entirety to read as follows:</p> <p>4. Expiration date March 31, 1975</p> <p>5. Reference No.</p>
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6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioac- tivity which licensee may possess at any one time
A. Cesium 137	A. Oak Ridge National Laboratory Sealed Source	A. 1 source of 128 curies
B. Cesium 137	B. Oak Ridge National Laboratory Sealed Source	B. 1 source of 128 curies
C. Cobalt 60	C. Oak Ridge National Laboratory Sealed Source	C. 1 source of 12 curies
D. Strontium 90	D. U. S. Radium Corporation Model LAB-277 Sealed Source	D. 1 source of 3 microcuries

<p>9. Authorized use</p> <p>A. For use in Model AN/UDM-1A Radiac Calibrator for calibration of instruments.</p> <p>B. For use in Model AN/UDM-1A Radiac Calibrator in a Model AN/MDM-1 Mobile Radiac Repair Facility for calibration of instruments.</p> <p>C. For use in Model AN/UDM-1 Radiac Calibrator for calibration of instruments.</p> <p>D. Check source in Victoreen Model A 716-A sensing element in an area monitoring system.</p>
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U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 04-00364-05
Amendment No. 11

CONDITIONS

10. Byproduct material may only be used at the licensee's address stated in Item 2 above.
11. Byproduct material designated in Items 6.B. and 7.B. may be used throughout the States of California, Nevada, and Utah.
12. The licensee shall comply with the provisions of Title 10, Chapter 1, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation."
13. Byproduct material shall be used by, or under the supervision of, individuals certified as qualified by the Radiological Protection Officer.
14. Sealed sources containing byproduct material shall not be opened.
15. A(1) Each sealed source containing byproduct 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. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

(2) 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 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 Commission.

Supplementary Sheet

License Number 04-00364-05

CONDITIONS

Amendment No. 11

15. continued

C. If the test 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 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region V, Division of Compliance, USAEC, 2111 Bancroft Way, Berkeley, California, 94704.

D. Tests for leakage and/or contamination shall be performed by the licensee in accordance with procedures in application dated January 16, 1970.

16. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated January 16, 1970.

For the U. S. Atomic Energy Commission

Nathan Bassin
Isotopes Branch

by

Division of Materials Licensing
Washington, D. C. 20545

Date 5 MAR 5 1970

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 04-00364

Amendment No. 10

This Copy Is For Your Files

Department of the Navy
San Francisco Bay Naval
Shipyard
Vallejo, California 94592

In accordance with application dated April 15, 1968, License
Number 04-00364-05 is amended as follows:

The expiration date in Item 4 is changed to June 30, 1973.

Condition 17. is amended to read:

17. Except as specifically provided otherwise by this license,
the licensee shall possess and use byproduct material described
in Items 6, 7, and 8 of this license in accordance with
statements, representations, and procedures contained in
application dated April 5, 1966, and application dated
April 15, 1968, as amended May 28, 1968.

20 June 1968

Commander, Naval Electronics Systems Command

FROM: NAVELEX 0516
 TO: CDR. NAVSHIPYD., SFRAN. BAY

1. FORWARDED FOR YOUR RECORDS

M. G. Williams
 M. G. WILLIAMS, Branch Head

SIGNATURE

By direction

cy to:
H 950 via H 300
M 356 JUN 17 1968 M 300
Date H 733

For the U. S. Atomic Energy Commission
Nathan Barson
by Isotopes Branch
Division of Materials Licensing
Washington, D. C. 20345

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Amendment No. 09

C-374

10 CFR 30

This Copy is For Your Files

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Parts 30, 32, 33, 34, and 35, 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 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.

Licensee	In accordance with application dated April 5, 1966, 3. License number 04-00364-05 is amended in its entirety to read as follows: 4. Expiration date <p style="text-align: right;">May 31, 1968</p> 5. Reference No.
1. Name Department of the Navy San Francisco Bay Naval Shipyard 2. Address Vallejo, California 94592	

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Cesium 137	A. Oak Ridge National Laboratory Sealed Source	A. 1 source of 128 curies
B. Cesium 137	B. Oak Ridge National Laboratory Sealed Source	B. 1 source of 128 curies
C. Cesium 137	C. Oak Ridge National Laboratory Sealed Source	C. 1 source of 128 curies
D. Cobalt 60	D. Oak Ridge National Laboratory Sealed Source	D. 1 source of 12 curies
E. Strontium 90	E. U. S. Radium Corporation Model LAB-277 Sealed Source	E. 1 source of 3 microcuries

9. Authorized use
- A. For use in Model AN/UDM-1A Radiac Calibrator for calibration of instruments.
 - B. For use in Model AN/UDM-1A Radiac Calibrator for calibration of instruments.
 - C. For use in Model AN/UDM-1A Radiac Calibrator in a Model AN/FDM-1 Mobile Radiac Repair Facility for calibration of instruments.
 - D. For use in Model AN/UDM-1 Radiac Calibrator for calibration of instruments.
 - E. Check source in Victoreen Model A 716-A sensing element in an area monitoring system.

(See Page 2)

Continued from Page 1

Amendment No. 09

CONDITIONS

10. Byproduct material designated in Items 6.A. and 7.A. shall be used at the Hunters Point Division, San Francisco Bay Naval Shipyard.
11. Byproduct material designated in Items 6.B., 7.B., 6.D., 7.D., 6.E., and 7.E. shall be used at the Mare Island Division, San Francisco Bay Naval Shipyard.
12. Byproduct material designated in Items 6.C. and 7.C. may be used throughout the State of California, Nevada, and Utah, and shall be stored at the Mare Island Division, San Francisco Bay Naval Shipyard, when not in use at temporary job sites.
13. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards for Protection Against Radiation."
14. Byproduct material shall be used by, or under the supervision of, individuals certified as qualified by the Radiological Safety Officer.
15. Sealed sources containing byproduct material shall not be opened.
16. A. Each sealed source containing byproduct 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. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.
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 Commission.

(Continued on Page 3)

CONDITIONS

16. C. If the test 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 5 days of the test with the Director, Division of Materials Licensing, U. S. Atomic Energy Commission, Washington, D. C., 20545, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall also be sent to the Director, Region V, Division of Compliance, USAEC, 2111 Bancroft Way, Berkeley, California, 94794.
- D. Tests for leakage and/or contamination shall be performed by Health Physics Branch personnel in accordance with procedures in Health Physics Branch Procedure V.E.4. dated August 27, 1962, or by other persons specifically authorized by the Commission or an Agreement State to perform such services.
17. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7, and 8 of this license in accordance with statements, representations, and procedures contained in application dated April 5, 1966.

Date JUN 7 1966

For the U. S. Atomic Energy Commission

Nathan Bassin
by Isotopes Branch

Division of Materials Licensing
Washington, D. C. 20545

D O 990 732 27
S. f. h. l.

Fonecon between Messrs. Book, AEC, Berkeley, and Mr. Rosati, 1-12-70.

Mr. Book called in response to Mr. Rosati's request for guidance in providing some kind of coverage during the hiatus between 1 February and receipt from AEC, Washington, of authorized licenses for the separate shipyards. Mr. Book said that as far as inspection was concerned, there would be no problem. He pointed out that the present licenses name both sites and specify the deputy commanders at each site as well as the overall commanding officer. Mr. Rosati added that Mr. Psathas had been named in the last amendment as the responsible radiological health officer at Hunters Point, and that he would continue in that capacity and as RPO after 1 February.

Mr. Book agreed that the change in the licenses was administrative only, not involving procedures or even a change in personnel. He suggested that if an incident did occur during the hiatus, the resulting report should specify the shipyard to which any answer should be directed, i.e., the shipyard where the incident occurred.

Mr. Book concluded with the statement that he would call Mr. Bassin to tell him that from an inspection standpoint, there would be no problem, and to also emphasize that the change was purely an administrative one.

Mr. Rosati also referred to the next-to-the-last paragraph in the application which states that administrative changes and redesignations are made to procedures on a continuing basis as they occur.

G. J. ROSATI

ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 4-364-5
(J62)

AMENDMENT NO. 3

Department of the Navy
Marine Island Naval Shipyard
Electronics Shop, Radiac Repair
Facility
Code 967, Building 866
Vallejo, California

In accordance with letter dated May 19, 1961 signed by V. F. Saitta, License No. 4-364-5 is hereby amended as follows:

Condition 16 is amended to read:

16. Except as otherwise specifically provided for in the license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in his applications dated May 12, 1960 and February 13, 1961, as amended by letter dated May 10, 1961 from L. V. Bousinger, and in related documents as follows:

- A. Electronics Shop Instruction 5100.1 dated May 11, 1960.
- B. Letter dated September 27, 1960 signed by Capt. W. S. MacLeod.

For the U. S. Atomic Energy Commission

Date June 5, 1961

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Encl 2 to BUSHIPS
Ser 362-327

U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Supplementary Sheet

License Number 4-364-5
(J62)

AMENDMENT NO. 2

Department of the Navy
Mare Island Naval Shipyard
Electronics Shop, Radiac Repair
Facility
Code 967, Building 866
Vallejo, California

In accordance with application dated February 13, 1961 License No. 4-364-5 is hereby amended as follows:

Items 6.C., 7.C., 8.C. and 9.C. are deleted.

For the U. S. Atomic Energy Commission

by Chief, Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

Date April 27, 1961

Encl 2 to BUSHIPS
Ser 362-276

**U. S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE**

COLLECTED COPY

Serial No. 1

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, licensing of byproduct material and release of 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 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.

In accordance with Application dated May 12, 1960

Licensee		In accordance with Application dated May 12, 1960	
1. Name	Department of the Navy Naval Air Station Electronics Shop, BuAer Support Facility Cove 967, Palmdale, CA 93551	3. License number	4-364-3 is awarded in its entirety to read as follows:
2. Address	Electronics Shop, BuAer Support Facility Cove 967, Palmdale, CA 93551	4. Expiration date	October 31, 1963
5. Reference No.		5. Reference No.	
6. Byproduct material (element and mass number)	A. Cesium-137 (See page 2)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time A. 1 curie of 137 cesium
9. Authorized use	A. To be used in Model AN/UR-1A Radio Calibrator Set for calibration of high range radiation detection instruments. (See page 2)		

CONDITIONS

- Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.
- This license shall comply with the provisions of Title 10, Code of Federal Regulations, Chapter 1, Part 30, "Standards for Protection Against Radiation".
- Byproduct materials shall be used by, or under the direct personal supervision of, Glen W. Belliff, Kenneth J. D. Luck or William H. Meyer.
- Byproduct material or sealed sources shall be encapsulated prior to possession by the licensee.
- Byproduct material or sealed sources shall not be created or removed from the Model AN/UR-1A or AN/UR-1 calibration sets unless specifically authorized by the Commission.

(Continued)

U.S. ATOMIC ENERGY COMMISSION
BYPRODUCT MATERIAL LICENSE

Continued from first page

Supplementary Sheet
Corrected Copy

License Number 4-364-5
Agreement No. 1 (J2)

<p>6. Byproduct material (element and isotope marker)</p> <p>A. Cobalt-60</p> <p>C. Cobalt-60</p>	<p>7. Chemical and/or physical form</p> <p>B. GM-15 Sealed Source Drug. No. 2333</p> <p>C. GM-15 Sealed Source Drug. No. 2333</p>	<p>8. Maximum amount of radioactivity which licenses any package at any one time</p> <p>B. 1 source of 12 curies</p> <p>C. 1 source of 12 curies</p>
<p>9. Authorized use</p> <p>B. To be used in Model MR/ED-1 Calibrator Set for calibrating low range gamma or neutron detection instruments.</p> <p>C. Storage and transfer to AEC authorized recipient.</p>		

CONDITIONS

10. Sealed sources shall be tested for leakage and/or contamination in accordance with the following:
- A. Leak test shall be performed by the individual name stated in Condition 12 of this license in accordance with procedures specified in "Measurement of Radioactive Contamination by Wipe Testing" dated May 23, 1960.
 - B. Each sealed source containing byproduct material with a half-life greater than thirty (30) days and in any form other than gas, shall be tested for leakage and/or contamination as follows:
 - (1) An appropriate test for leakage and/or contamination shall be performed on the sealed source surface, or on the accessible surfaces of the device in which such a sealed source is permanently or temporarily mounted. The test shall be performed upon receipt of a source from another person making the transfer that the sealed source had been tested within thirty (30) days prior to transfer and found free of any removable radioactive material.
 - (2) Following completion of the test prescribed in B(1), each sealed source, shall be tested for leakage and/or contamination at intervals not to exceed six (6) months.
 - C. The test performed pursuant to B shall be sufficiently sensitive to detect 0.05 microcuries of removable beta and/or gamma emitting radioactive material. Records of leak test results shall be maintained by the licensee.
 - D. If the test performed pursuant to B(1) or B(2) reveals removable radioactive material, the licensee shall take immediate action to prevent spread of

(Continued)

U. S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE

Supplementary Sheet
Corrected Copy

License Number 4-364-5
(J82)

Attachment No. 1

Continued from second page

CONDITIONS

15 continued

contamination and, within thirty (30) days after completion of the test shall notify the Isotopes Branch, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C.

F. Repair of sources shall be performed by the manufacturers of the sources or by persons specifically licensed by the Commission to perform such repairs.

16. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in Items 6, 7 and 8 of this license in accordance with statements, representations, and procedures contained in his application dated May 12, 1960, and in related documents and amendments as follows:

A. Electronics Shop Instruction 5100.1 dated May 11, 1960.

U. Letter dated September 27, 1960 signed by Capt. W. E. MacLeod.

17. Written administrative instructions referenced in Condition 16.A. and 16.B. covering radiological protection, control, and security of byproduct material shall be followed and a copy of instructions shall be supplied to each individual using or having responsibility for use of such material. Any change in the administrative instructions shall have the prior approval of the Isotopes Branch, Division of Licensing and Regulation.

18. Calibrated and operable survey instrumentation shall be maintained at the calibration sites. A physical radiation survey shall be made (1) to determine compliance with sections 20.102 and 20.203 of Title 10, CFR, Part 20, "Standards for Protection Against Radiation" and (2) immediately after each calibration operation is completed to determine that the sources are in their storage condition. The survey instrumentation shall have a range of a few milliroentgens per hour to at least one (1) roentgen per hour.

19. The licensee shall exercise appropriate administrative control to assure that no person will use or personally supervise the use of byproduct material until each person has

A. Received instructions in, and demonstrated a thorough understanding of, the regulations of 10-CFR, Part 20, the licensee's operating and emergency procedures; and the provisions of this license.

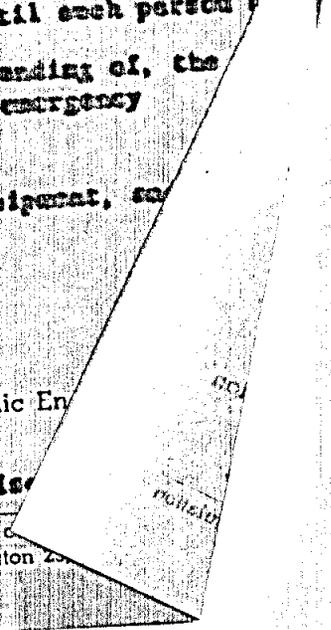
B. Demonstrated competency in the use of byproduct material, equipment, and survey instruments which will be used.

Date October 20, 1960

For the U. S. Atomic Energy Commission

Chief, Isotopes Branch

by _____
Division of Licensing and Regulation
Washington 25, D. C.





DEPARTMENT OF THE NAVY

MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA 94592

IN REPLY REFER TO:

134.02

5100

Ser 41

FEB 28 1975

From: Commander, Mare Island Naval Shipyard
To: Director, Division of Materials and Fuel Cycling Facility Licensing
U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

Subj: Extension of USNRC Licenses Nos. 04-00364-05 and 04-00364-06;
request for

Ref: (a) Title 10, Code of Federal Regulations, Part 30
(b) NAVSHIPS ltr 0731:MDA:das, 5100, Ser 351-073 of 20 July 1973
(c) ~~Forcon of 13 Feb 1975 between Mr. M. Johnson, MINS,~~
Code 134.02, and Mr. G. W. Zimmer, NAVFAC, Code 042

1. Reference (a) requires that unless license renewal applications are received by the NRC not less than 30 days prior to the license expiration date, the license will expire on that date unless a new license has been issued. Reference (b) requires that this activity forward all license applications to the Naval Facilities and Engineering Command (Code 042) via the Naval Sea Systems Command (Code 07) for review and transmittal to the NRC.

2. Applications for renewal of the subject licenses were submitted via the Naval Sea Systems Command on 6 February 1975. However, to forestall a possible interruption in licensed operations, it is requested that the subject licenses be extended 90 days past their current expiration date in order to meet the requirements of references (a) and (b).

3. This action has the concurrence of the Naval Facilities and Engineering Command, Code 042 by reference (c).

J. H. WEBBER

Copy to:
NAVFAC (Code 042)
NAVSEA (Code 07)

Ser 5/8
 DATE 12/19/74

FIRST NUMBER
 Ser 578

FROM

Commander, Naval Facilities Engineering Command
 200 Stovall Street, Alexandria, VA 22332

SUBJECT

Byproduct Material License No. 04-00364-05 Amendment No. 12

REFERENCE

NAVSHIPYD, MARE ltr 105.5-769-74 9900/2 dtd 23 Sept 1974w/FIRST ENDORSEMENT NAVSEA
 ltr 0731/RDP 9900 Ser 672/073 dtd Nov 1, 1974

TO: Commanding Officer
 Mare Island Naval Shipyard
 Vallejo, CA 94592
 ATTN: Code 105.5

ENCLOSURE

(1) Amendment No. 12

This form may be used in a window envelope.

VIA

Endorsement on

<input type="checkbox"/> FORWARDED	<input type="checkbox"/> RETURNED	<input type="checkbox"/> FOLLOW-UP	<input type="checkbox"/> REQUEST	<input type="checkbox"/> ADVISE	<input type="checkbox"/> SUBMIT
<input checked="" type="checkbox"/> MESSAGE	<input checked="" type="checkbox"/> MESSAGE	<input checked="" type="checkbox"/> MESSAGE			
FOR APPROPRIATE ACTION	SUBJECT DOCUMENT(S) WAS/WERE FORWARDED TO YOUR OFFICE AS A MATTER UNDER YOUR JURISDICTION.	CERTIFY ENCLOSURE AS TO RECEIPT AND ACCEPTANCE OF MATERIAL AND FORWARD TO			
FOR INFORMATION OR CERTIFICATION AND/OR FILE.	SUBJECT DOCUMENTS WAS/WERE APPROVED AND FORWARDED TO YOU.	COPIES OF SUBJECT CHANGE ORDER AMENDMENT OR MODIFICATION			
<input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED	COPY(IES) OF THIS CORRESPONDENCE WITH YOUR REPLY.	CHANGE NOTICE TO THE SUPPLIER			
APPROVAL <input type="checkbox"/> IS <input type="checkbox"/> IS NOT RECOMMENDED	ENCLOSURE(S) IS/ARE FORWARDED AS REQUESTED BY REFERENCE	COPIES OF APPLICABLE PLANS AND/OR SPECIFICATIONS.			
CONCURRING IN RECOMMENDATIONS MADE IN THE BASIC CORRESPONDENCE.	ENCLOSURE(S) IS/ARE RETURNED FOR CORRECTION AS INDICATED.	FOR PLAN ACTION AS INDICATED			
COMMENTS AND/OR RECOMMENDATIONS.	CORRECTED ENCLOSURE(S) AS REQUESTED	CLASSIFICATIONS OF DEFECTS FOR SUBJECT ITEMS			
MAILING LIST ACTION	SUBJECT PERSON'S ATTENTION SHOULD BE INVITED TO THIS MATTER	CONFIRMATION THAT INSPECTION OR SOURCE INSPECTION IS NOT REQUIRED			
FOR ASSIGNMENT OF BUREAU FILE NUMBER(S)	SUBJECT PERSON(S) REPORTED TO THIS COMMAND	INSPECTION UNDER THE SUBJECT SUBCONTRACT IS NOT REQUIRED			
ON A LOAN BASIS RETURN BY	SUBJECT PERSON(S) COMPLETED HIS/THEIR DUTY AND WAS/WERE DETACHED FROM THIS COMMAND	COPIES OF SUBJECT PURCHASE DOCUMENT, IF SOURCE INSPECTION OR PROGRESSING IS REQUIRED			
SIGN ORIGINAL RECEIPT AND RETURN TO THIS OFFICE.	NAME AND LOCATION OF SUPPLIER OF SUBJECT ITEMS.	STATUS OF MATERIAL ON SUBJECT PURCHASE DOCUMENT			
SUBJECT FILES, WHICH ARE LOCATED IN BOX NO. SHIPMENT NO.	SUBCONTRACT NUMBER FOR SUBJECT ITEM	CLEARANCE AS INDICATED IN BASIC CORRESPONDENCE VERIFIED. NO REPLY UNLESS NEGATIVE.			
REPLY TO THE ABOVE REFERENCE(S) BY	SUBJECT PURCHASE DOCUMENT HAS BEEN REQUESTED AND WILL BE FORWARDED WHEN RECEIVED.	VERIFICATION OF NEED-TO-KNOW FOR VISIT PERSONNEL CLEARANCES VERIFIED.			
COPY(IES) OF REFERENCE DESCRIBED ABOVE WAS/WERE NOT RECEIVED.	ENDORSEMENT OF SUBJECT SUBCONTRACT IS BEING DELAYED PENDING RECEIPT OF BASIC PURCHASE DOCUMENT.				
SUBJECT DOCUMENT(S) WAS/WERE FORWARDED TO	APPROPRIATION SYMBOL SUBHEAD AND CHARGEABLE ACTIVITY				
SUBJECT DOCUMENT(S) IS/ARE WAS/WERE RETURNED FOR	WHETHER SUBJECT ITEMS ARE TO BE COMMERCIALY SHIPPED OR AT GOVERNMENT EXPENSE				
	A CERTIFICATE IN LIEU OF SUBJECT BILL OF LADING WHICH HAS BEEN LOST.	SEE REMARKS ON THE REVERSE SIDE.			

COPY TO

NAVSEASYSKOM Code 0731

SIGNATURE

R. E. CARLTON
 By direction

0422B / WJM
0422 / KC.

0422B/WJM
5100.00/8
Ser 532

12 NOV 1974

U.S. Atomic Energy Commission
Directorate of Licensing
Materials Branch
Washington, D.C. 20545

Gentlemen:

We endorse the attached request to amend Byproduct Material License Nos. 04-00364-02, -05, -06 issued to Mare Island Naval Shipyard. The request is made to name Mr. Malvin Johnson as the Radiation Protection Officer.

Sincerely,

D. E. CARLTON
By direction

By Direction

Attachment: NAVSHIPYD, MARE ltr 105.5-769-74 9900/2 dtd 23 Sept 1974 w/FIRST ENDORSEMENT NAVSEA ltr 0731/RDP 9900 Ser 672/073 dtd Nov 1, 1974

Copy to:
NAVSHIPYD Mare (Code 105.5)
NAVSEASYSOM (Code 0731)

Blind copies to:

042

04RF

0422

0422B

Prepared by: W.J. Morris: 0422B

Typed by: lam: 11/11/74



DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362

IN REPLY REFER TO
0731/RDP
9900
Ser 672/073
NOV 1 · 1974

FIRST ENDORSEMENT on NAVSHIPYD MARE ltr 105.5-769-74 9900/2 of 23 Sep 1974

From: Commander, Naval Sea Systems Command
To: Director, Division of Materials Licensing
U.S. Atomic Energy Commission, Washington, DC 20545
Via: Commander, Naval Facilities Engineering Command (Code 042)
Subj: Radiological Protection Officer; report of change in assignment
Ref: (d) NAVSEA First Endorsement on NAVSHIPYD MARE ltr 105.5-769-74
9900/2 of 23 Sep 1974 Ser 612/073 of 17 Oct 1974

1. Forwarded for coordinating action with approval recommended.
2. Original correspondence forwarded by reference (d) has been lost. Reference (d) is cancelled and the attached copy of the basic correspondence is certified as a true copy of the original.


R.E. BROWN
By Direction

Copy to:
NAVSHIPYD MARE (Code 105.5)(with copy of basic correspondence)



DEPARTMENT OF THE NAVY

MARE ISLAND NAVAL SHIPYARD
VALLEJO, CALIFORNIA 94592

105-5-769-74
9900/2
23 September 1974

From: Commander, Mare Island Naval Shipyard
To: Director, Division of Materials Licensing
US Atomic Energy Commission
Washington, D. C. 20545

Via: (2) Naval Facilities Engineering Command (Code 042)
(1) Naval Sea Systems Command (Code 07)

Subj: Radiological Protection Officer; report of change in assignment

Ref: (a) AEC Byproduct Material License No. 04-00364-02
(b) " " " " " 04-00364-05
(c) " " " " " 04-00364-06

Encl: (1) Training and Experience Qualifications of
Shipyard Radiological Protection Officer

Mr. Malvin Johnson has been assigned the duties of Radiological Protection Officer for this Shipyard vice Mr. Chapman Burk as of this date. Communications relating to references (a), (b), or (c), or to Shipyard responsibilities under Title 10 of the Code of Federal Regulations should be directed to his attention. Mr. Johnson's training and experience qualifications are forwarded herewith as enclosure (1).

J. F. Smith
J. F. SMITH
By direction

TRAINING AND EXPERIENCE QUALIFICATIONS OF
MARE ISLAND NAVAL SHIPYARD RADIOLOGICAL PROTECTION OFFICER

September 1974

NAME: Malvin (NMN) Johnson

TRAINING:

Prairie View A & M College, Texas, B.S., Math, 1956
Shipyards course for Radiation Monitor, 1959
University of California, Extension Division
Course in Nuclear Radiation and Detection, 1960
Course in Radiation Biology, 1961
Course in Introduction to Atomic Structure, 1961-62
Shipyards course in Instructor Training, 1965
Navy course in Nuclear Accident Team Training, 1964
Shipyards course in Radiological Protection Officer
Responsibilities, 1974

EXPERIENCE:

Health Physics Inspector (Radiation Monitor), GS-5, 1959
(Detailed to Health Physicist, GS-7 position, August 1961 to
November 1961)
Health Physicist, GS-7, 1962
Supervisory Health Physicist, GS-9, 1963
Supervisory Health Physicist, GS-11, 1964
Supervisory Health Physicist, GS-12, February 1974

Health Physicist duties have included all phases of health physics applications on the Shipyards including developing and writing procedures, evaluating ionizing radiation environment of Shipyards, evaluating internal and external occupational exposures of Shipyards personnel, surveillance of contamination and exposure control, control of source material and maintenance of source records. Since February 1974, Mr. Johnson has been working in the office of the Radiological Protection Officer to gain experience.

ENCLOSURE (1)

PRODUCTION DEPARTMENT
ELECTRONICS SHOP
RADIAC REPAIR FACILITY

AEC LICENSE No. 04-00364-05

ENCLOSURE 2

SAN FRANCISCO BAY NAVAL SHIPYARD
YARD ROUTE SLIP

CODE 108	NAME G. J. ROSATI	EXTENSION 2458/3932	DATE 11 March 1970
--------------------	-----------------------------	-------------------------------	------------------------------

TO CODE	INITIALED		REMARKS
	BY	DATE	
300			Information Copy of Amendment No. 11 to license
354			" No. 04-00364-05.
967(Radiac)			File
			For retention and replacement of former
			license.
			<i>Cy also to 542A (see ob file)</i>
			<i>732</i>

SAN FRANCISCO BAY NAVAL SHIPYARD

VALLEJO, CALIFORNIA 94582

1108

IN REPLY REFER TO:

9900.010
108

JAN 19 1970

Jan 16 1970

From: Commander, San Francisco Bay Naval Shipyard
To: Director, Division of Materials Licensing
Isotopes Branch
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subj: AEC Byproduct Material License Nos. 04-00364-05 and 04-00364-06;
Application for amendment to and replacement of

Ref: (a) Code of Federal Regulations, Title 10, AEC, Parts 30 and 34

- Encl: (1) Form AEC-313, Application for Byproduct Material License and Attachments (Calibration) for Hunters Point Naval Shipyard
→ (2) Form AEC-313, Application for Byproduct Material License and Attachments (Calibration) for Mare Island Naval Shipyard
(3) Form AEC-313R, Application for Byproduct Material License-- Use of Sealed Sources in Radiography and Attachments for Hunters Point Naval Shipyard
(4) Form AEC-313R, Application for Byproduct Material License-- Use of Sealed Sources in Radiography and Attachments for Mare Island Naval Shipyard

1. In accordance with reference (a) applications for amendment and replacement of subject licenses effective 1 February 1970 are forwarded as enclosures (1), (2), (3), and (4).
2. The amendments for Mare Island and replacements for Hunters Point are required due to a reorganization wherein these two sites comprising San Francisco Bay Naval Shipyard have been redesignated to become Hunters Point Naval Shipyard and Mare Island Naval Shipyard on 1 February 1970.
3. Complete applications are being submitted to assure future clarity; however, these applications reflect no substantive change from the subject licenses with respect to facilities, operating personnel, and procedures at the respective sites, except for:
 - a. the inclusion of procedures for the unattended exposure of a sealed source during calibration of high range Gosimeters at Mare Island, (Paragraph J. 1 and 2, K.1.a., and L.12. and 13. of Attachment C to enclosure (2))
 - b. the addition of Section XV, Recovery Procedures, to Attachment B of enclosure (3),
 - c. the addition of Tech Ops Model 650 Source Changer for IR-192 radiographic sources under item 5 of enclosures (3) and (4).

9900/9-10
108

4. Administrative changes in designation viz. organization codes, telephone and building numbers as well as named successors in operating positions are made directly to operating procedures on a continuing basis as they occur.

5. The Shipyard Ionizing Radiation Control Committee has reviewed this application and recommends approval.

Copy to: (w/encl)

S/N. Frankenberg

Code H133B (2) w/encl (3)
M133B (2) w/encl (4)
E967 w/encl (1)
M967 w/encl (2)
→ H108 w/encl (2) & (4)
H730(H108) w/encl (1) & (3)

H130 (w/o encl)
M130 "
E300 "
M300 "
M720 "
E700 "

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS. - Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the licensee is subject to Title 10, Code of Federal Regulations, Part 20.

<p>1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc. Include ZIP Code.)</p> <p>Department of the Navy San Francisco Bay Naval Shipyard Vallejo, California 94592</p>	<p>(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED (If different from 1 (a). Include ZIP Code.)</p> <p>Mare Island Naval Shipyard Vallejo, California 94592</p>
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<p>2. DEPARTMENT TO USE BYPRODUCT MATERIAL</p> <p>Production Department Mare Island Naval Shipyard</p>	<p>3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)</p> <p>Amendment of #04-00364-05</p>
--	---

<p>4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)</p> <p>Byproduct materials shall be used by, or under the direct personal supervision of, those individuals who have been certified as qualified by the Radiological Protection Officer.</p>	<p>5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)</p> <p>G. J. Rosati, Radiological Protection Officer</p>
---	--

<p>6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each)</p> <p>A. Cesium 137</p> <p>B. Cobalt 60 <i>shipped</i></p> <p>C. Strontium 90</p>	<p>(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)</p> <p>A. ORNL sealed source <i>1 source shipped</i> Drwg. No. 2339A</p> <p>A. 2 sources of approximately 128,000 mCi each</p> <p>B. ORNL sealed source Drwg. No. 2333</p> <p>B. 1 source of 12,000 mCi</p> <p>C. U.S. Radium Corporation Model LAB-277 Sealed Source.</p> <p>C. 1 source of 3 microcuries</p>
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7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

A. Byproduct materials A and B are to be stored and used in Model AN/UDM-1A and AN/UDM-1 calibrator sets respectively for calibrating ionizing radiation detection instruments and devices.

One of the sources under A above is to be used in a Mobile Radiac Repair Facility Model AN/MDM-1 for calibrating radiac equipment at temporary locations for various activities throughout the Twelfth Naval District. The facility consists of a source-containing Model AN/UDM-1A calibrator set mounted in a trailer which is towed by a truck van. This facility will be moved on highways between the various temporary field locations in the States of California, Nevada and Utah as needed.

C. Check source in Victoreen Model A 716-A sensing element in area monitoring system.
(Continued on reverse side)

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

B. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)		FORMAL COURSE (Circle answer)	
			Yes	No	Yes	No
a. Principles and practices of radiation protection	See Attachment A					
b. Radioactivity measurement standardization and monitoring techniques and instruments						
c. Mathematics and calculations basic to the use and measurement of radioactivity						
d. Biological effects of radiation						

9. EXPERIENCE WITH RADIATION. (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
See Attachment A				

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
AN/PDR-18 P		Gamma	0-500 R/hr	Thick Aluminum case	Monitoring and Surveying
AN/PDR-27		Beta-Gamma	0-500 mR/hr	3.5-4.0	"
AN/PDR-43		"	0-500 R/hr	3-4	"
AN/PDR-27 EXT		"	0-1000 mr/hr	3.5-4.0	"
Eberline E-500 B	1	"	0-2 R/hr	30	"

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE. Methods and standards, described in manuals and NAVELEX Instructions for calibration of instruments, are applied to calibrate the instruments not less frequently than every six months.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.)
 Film badges and self-reading dosimeters are used. Dosimeter readings are recorded daily. Film badges are routinely issued and related records processed monthly by the Industrial Dispensary. If a suspected excessive exposure or other nonroutine incident occurs in the future, the following procedure will be followed:

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No
 See Attachment B

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source.
 See Attachment C

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. None anticipated. If waste disposal is required, an AEC or Agreement State contractor will be engaged.

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date _____ Applicant named in item 1 _____
 By: _____
 Title of certifying official _____

WARNING.— 18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

Enclosure (2)

NAVE ISLAND NAVAL SHIPYARD

USERS OF RADAC BEAMER MACHINES
CALIBRATION COURSES

A. INITIAL TRAINING

1. Classroom instruction in

a. Radiation Detection Instrumentation

- (1) Operation of instruments
- (2) Calibration and operation check
- (3) Limitations on use
- (4) Types required
- (5) Proper use of
- (6) Value to radiation safety
- (7) Interpretation of readings
- (8) Survey techniques
- (9) Use of film badges and pocket dosimeters

b. Fundamentals of radiation protection

- (1) Characteristics of radiation
- (2) Units of dose and radioactivity
- (3) Hazards of excessive exposure
- (4) Levels from licensed material
- (5) Methods of controlling dose (time, distance, shielding)

c. Instruction on calibration devices and storage equipment

- (1) Steps to be followed during operation of the calibration devices
- (2) Construction features of calibration devices
- (3) Possible malfunctions of calibration devices and how detected and corrected.
- (4) Radiation levels to be expected from calibration devices and storage containers when sources are exposed and secured and limits on radiation levels
- (5) Locking and securing of calibration devices and storage equipment
- (6) Storage precautions
- (7) Emergency action and notifications

d. Instructions on control of sources

- (1) Procedure for returning source to manufacturer
- (2) Inventory
- (3) Utilization logs

Enclosure (2)

APPENDIX "A"
RADIATION SAFETY

ATT A
Tng
Exo

1. Instruction in the use of:
 - (1) Dosimeters
 - (2) Detectors
 - (3) Monitoring instruments
 - (4) Security
 - (5) Warning lights, signs, alarms
2. Instruction in IRRAD and ICRAD
3. Instruction in the JED license
4. Instruction in the Operating and Emergency Procedures
5. On the Job Training (6 months duration)
 - a. Finding and use of calibration devices
 - b. Handling and use of calibration with alarm system
 - c. Handling and use of dosimeters and survey instruments

B. PERIODIC TRAINING

1. Brief refresher instructions on fundamentals of radiation protection, given **biennially**.
2. Instructions on any changes in the calibration program (at effective date of change), viz.
 - a. Applicable amendments to AEC regulations
 - b. Amendments to the license

NOTE: It will be determined by personal observation and/or written examination that the users thoroughly understand the changes in 2 above, and are competent to use newly added instruments and equipment.

C. PROCEDURE FOR DETERMINING QUALIFICATION OF PERSONNEL

1. Supervisory qualified user's observation of trainee's actual handling and use of equipment
 - a. The handling procedures and techniques which are required of the trainee are:
 - (1) Operation of Model AU/MB-1A, ~~MB-1A~~
 - (2) Radiation survey and posting
 - (3) Interpretation of readings
 - (4) Operation of the calibration room alarm system
 - b. Establish the trainee's ability to apply radiation safety competence in using the equipment by:

- (1) His demonstrated understanding of AEC regulations, the AEC license, and the Operating and Emergency Procedures
- (2) His demonstrated understanding of the principles of radiation control
- (3) His demonstrated judgment under simulated emergency situations

D. PROGRAMS FOR CERTIFICATION OF QUALIFIED PERSONNEL

1. Nomination of eligible trainees by the supervisory qualified user to the Radiological Protection Officer for certification examination
2. Completion of the Radiation Safety Certification Examination with a score of 75% or more
3. Attendance at the examination review critique.

ANNEX A

Number Wrong _____

ANNEX B

Number Wrong _____

TOTAL WRONG _____

Date _____

Name _____

Badge No. _____

Grade _____

CERTIFICATION EXAMINATION
RADIAC REPAIR FACILITY PERSONNEL

JANUARY 1970

NOTE: This examination, or one similar in type, scope and difficulty, periodically revised to reflect conditions of the current license and to avoid repetition, will be used.

ATTACHMENT A

Enclosure (2)

CERTIFICATION EXAMINATION
NUCLEAR ENERGY FACILITY PERSONNEL

ANNEX A - FCIA REGULATIONS

1. Areas where a radiation safety sign is required are those areas being used or stored, or signs marking a boundary between areas with:
 - a. red danger signs with appropriate legend.
 - b. three-bladed symbol in red and white color combination with appropriate legend.
 - c. three-bladed symbol in magenta (or purple) and yellow color combination with appropriate legend.
 - d. none of the above.
2. A licensee must immediately notify the AEC Division of Compliance in his area by telephone and telegram of any incident wherein a byproduct material source causes an individual to receive a whole-body exposure of:
 - a. 25 rems or more.
 - b. 5 rems or more.
 - c. 3 rems.
 - d. $1\frac{1}{2}$ rems.
3. A sign bearing the conventional radiation caution colors and symbol, and the words "Caution - High Radiation Area" describes an area where radiation levels are such that in any one hour a major portion of the body could receive a dose in excess of:
 - a. 2000 mrem.
 - b. 5 mrem.
 - c. 100 mrem.
 - d. 50 mrem.
4. A former employee may receive, under provisions of 10 CFR 20, a report of his exposure by:
 - a. filing a claim for it.
 - b. requesting it from the licensee.
 - c. taking no particular action.
 - d. none of the above.
5. What is the maximum whole-body dose that may be received by an individual who has not completed a Form AEC-4?
 - a. $1\frac{1}{2}$ rems per calendar quarter.
 - b. 3 rems per quarter.
 - c. the calculated permissible lifetime dose.
 - d. all of the above.

6. An employee involved in an exposure to radiation which is reportable to the AEC must also be

- a. ordered to show cause why he should not be reprimanded.
- b. notified by the licensee in writing of the nature and extent of exposure.
- c. given a period of hospitalization or observation.
- d. immediately removed from any further work in order to prevent further exposure.

7. The licensee must file with the AEC a report containing

- a. the extent of exposure of persons to radiation or radioactive material.
- b. levels of radiation and concentrations of radioactive material involved.
- c. cause of the exposure and corrective measures taken.
- d. all of the above.

8. Licensed material may be disposed of by

- a. disposal into a sewage system provided the material is readily soluble and the concentration when diluted is less than 1 millicurie.
- b. incineration in underground disposal sites.
- c. dispersion into the Bay or any natural stream emptying into it.
- d. transfer to an authorized recipient.

9. All individuals working in a restricted area shall

- a. be informed of the occurrence of radioactive material or radiation in the area.
- b. be instructed in safety problems, precautions and AEC regulations.
- c. be advised of radiation exposure reports upon their request.
- d. all of the above.

10. An exposure of $1\frac{1}{4}$ rems per calendar quarter will not be permitted to an individual if his age is under

- a. 18 years.
- b. 19 years.
- c. 21 years.
- d. 25 years.

11. The official record of an individual's dose is derived by

- a. calculating his potential exposure.
- b. estimating how much time he spent in a Radiation Area.
- c. reading his film badge.
- d. interpreting a radac reading.

13. Which of the following is not a unit of radiation?
a. R
b. mR
c. mrem
d. MR

14. Which of the following is not a unit of radiation?
a. R
b. mR
c. mrem
d. MR

- a. R
- b. mR
- c. mrem
- d. MR

14. The radiation dose is the
- a. quantity of ionizing radiation absorbed by the body or any portion of the body.
 - b. the amount of ionizing radiation which cannot be exceeded.
 - c. the amount of radiation given off by a radioactive source.
 - d. the amount of dose required to cause blood changes.

15. A film badge is a device designed to be worn by an individual for the purpose of
- a. measuring the dose received.
 - b. preventing exposure.
 - c. permitting admission to radiation areas.
 - d. none of the above.

16. Which of the following illustrates the best means of protection from internal radiation exposure?
- a. Time, distance, shielding.
 - b. Confinement of the source, respirators, and protective clothing.
 - c. Adequate ventilation, filtering of air.
 - d. Lead, concrete, and steel.

17. Pocket dosimeters
- a. detect contamination.
 - b. protect the wearer from harmful effects of radiation.
 - c. are issued to personnel who work in an area where the radiation level may result in exposures greater than the MLD or is variable.
 - d. provide a monthly cumulative radiation measurement.

18. If the radiation level is 10 mR/hr at 10 feet from the source, the radiation level at 20 feet will be
- a. 20 mR/hr.
 - b. 5 mR/hr.
 - c. 5 mR/hr.
 - d. 100 mR/hr.

19. Unsealed sources transported on the shipyard shall be

- a. loaded or unloaded by hand only and not by crane or hoist
- b. loaded or unloaded by crane or hoist only and not by hand
- c. loaded or unloaded by crane or hoist only and not by hand
- d. loaded or unloaded by crane or hoist only and not by hand

d

20. Unsealed sources shall be checked

- a. each month
- b. each week
- c. each quarter
- d. at the end of each shift

21. A request for authority to get a new sealed source will be

- a. approved by the Health Physics Branch.
- b. forwarded to Code 100 for the Ionizing Radiation Control Committee to review.
- c. sent directly to the Supply Department.
- d. all of the above.

22. If a shield of $1/8$ " lead will cut the radiation to half its original value, $1/4$ " lead shield will

- a. cut it to $1/16$ of its original value.
- b. have no further effect.
- c. cut it to practically nothing.
- d. cut it to $1/4$ of its original value.

23. Information on the AEC approved label affixed to the source container to be shipped out shall be in accordance with the recommendations of

- a. one of the individuals named on the license.
- b. Health Physics Branch.
- c. Supply Department.
- d. Radiological Protection Officer

24. A gamma radiation level of 1.6 r/hr is produced at 3 feet from a 1-curie cobalt-60 capsule. A man remains 6 feet from a 10-curie cobalt-60 source for 2 hours. His approximate radiation dose is:

- a. 0.4 rem.
- b. 4 rem.
- c. 0.8 rem.
- d. 8 rem.

25. Which of the following radioactive materials has been known to produce the most severe effects?

- a. alpha emitters
- b. beta emitters
- c. gamma emitters
- d. neutron emitters

26. Which of the following is not a method of measuring the activity of a radioactive source?

- a. counting rate
- b. measuring the quantity of material (in grams per centimeter)
- c. radiation intensity (in terms of its ionization)
- d. None of the above.

27. An incoming sealed calibration source will not be accepted for use until

- a. the container has been monitored and released by the **Radiological Protection Officer**
- b. the container has been monitored and released by Health Physics personnel.
- c. the Supply Officer certifies safe condition of the source.
- d. all of the above.

28. An acute exposure is one that

- a. is received by the whole body only.
- b. does extensive damage to the whole body only.
- c. is received within a short space of time.
- d. is repeated at regular intervals continuously over a long period of time.

29. The LD 50 (median lethal dose where half of those exposed die) for ionizing radiation exposure of human beings is an acute, whole body exposure of

- a. about 800 mrem.
- b. unknown.
- c. about 500 rem.
- d. 5,000 rem.

30. Radioactive material from unsealed sources can enter the body by

- a. inhalation.
- b. ingestion (swallowing).
- c. through breaks in the skin or even absorption through the skin.
- d. all of the above.

31. The unit of activity is the curie.
- a. amount of substance
 - b. amount of energy
 - c. number of disintegrations per second
 - d. mass of the atom
32. A chronic exposure to ionizing radiation is one that
- a. is repeated at short, regular intervals continuously over long periods of time.
 - b. is received by the whole body.
 - c. does extensive damage that is observable.
 - d. occurs within a short space of time.
33. The half-life of a radioisotope is
- a. 10 years.
 - b. the time required for half an atom to decay.
 - c. the number of atoms disintegrating per minute.
 - d. the time required for one-half of the atoms of the radioisotope to decay.
34. A one-hour exposure of an individual to gamma radiation intensity of 20 r/hr would cause
- a. mild radiation sickness to occur.
 - b. deaths to half exposed.
 - c. no detectable effects.
 - d. obvious blood count changes.
35. Ion pairs consist of
- a. charged protons and neutrons.
 - b. a negative electron and a positive electron.
 - c. a negative electron and a positive atom.
 - d. none of the above.
36. The GM/PDR-27 radia can detect
- a. any kind of radiation.
 - b. beta and gamma radiation.
 - c. alpha radiation.
 - d. gamma radiation only.

39. About one half of the radioactivity in a nuclear reactor is due to
- alpha rays in gamma rays.
 - gamma rays in X-rays.
 - beta rays with fast-moving particles, for example, neutrons, in a nuclear reactor.
 - all of the above.
40. Atoms of the same chemical element which have different numbers of neutrons in the nucleus and therefore different atomic weights are called
- protons.
 - neutrons.
 - electrons.
 - isotopes.
41. External exposure to ionizing radiation is harmful to humans because
- it makes them radioactive.
 - it is contagious.
 - it ionizes the air around them, making breathing difficult.
 - it damages cells inside the body.
42. Persons convicted of wilful violations of license provisions
- may be punished only by fine.
 - may be punished only by imprisonment.
 - may be punished by fine and/or imprisonment.
 - may not be punished.
43. With regard to byproduct material licenses, the AEC may
- inspect the material, premises and related facilities and records.
 - require appropriate tests of the material, facilities and radiation detection equipment.
 - revoke, suspend, or modify the license.
 - withhold or recall the byproduct material for violations of the license.
 - All of the above.
44. Records concerning licensed byproduct materials must be kept to show
- effectiveness compared with previous sources.
 - changes in weight and shape.
 - receipt, transfer and disposal.
 - none of the above.

45. The product of a nuclear reaction is called a byproduct material.
46. "Sealed source" means any byproduct material that is encased in a capsule designed to:
- a. survey the amount of radiation present.
 - b. activate stock in materials.
 - c. prevent leakage or escape of the byproduct material.
 - d. All of the above.
47. Licenses for use of a sealed source of byproduct material, as defined in 10 CFR 50, are issued by the:
- a. Navy Department.
 - b. Radiological Protection Officer
 - c. Shipyard Commander
 - d. Atomic Energy Commission.
48. What amount of contamination found from an AEC-licensed source makes it necessary that the Health Physicist be notified so that he can prepare a report to the Radiological Protection Officer, giving all pertinent data and recommendations?
- a. 5 microcuries.
 - b. .005 microcuries.
 - c. .05 microcuries.
 - d. .5 microcuries.
49. Leak testing of licensed sources in the Radio Repair Facility is done by Health Physics personnel:
- a. Upon request of the Radiological Protection Officer
 - b. Same date as received.
 - c. Every six months.
 - d. At each inventory.

51. Sealed calibration sources will be leak tested by:
- a. Radiological Protection Officer.
 - b. the supervisor.
 - c. Health Physics Branch personnel.
 - d. any Radio Repair Facility personnel.
52. Sealed calibration sources will be leak tested by:
- a. Radiological Protection Officer
 - b. the supervisor.
 - c. Health Physics Branch personnel.
 - d. any Radio Repair Facility personnel.
53. Each sealed source containing byproduct material other than Hydrogen-3, with half-life greater than 30 days and in any other form than gas shall be tested at intervals not to exceed
- a. 1 month.
 - b. 1 week
 - c. 3 months.
 - d. 6 months.
54. Records of regular test results shall be kept in units of
- a. microcuries.
 - b. millicuries.
 - c. curies.
 - d. Need not be kept.
55. A calibration source arriving at the Radio Repair Facility must
- a. bear a release from the tracking carrier.
 - b. have a leak test certification from the manufacturer or Health Physics Branch before use.
 - c. bear a release from the Supply Officer.
 - d. be signed for by the foreman.
56. The license under which ionizing radiation sources are used in the Radio Repair Facility specifies that these sources are to be used only for
- a. simulated radiation fields for disaster training.
 - b. training of Nondestructive Test Branch Radiographers.
 - c. the calibration of instruments to detect and measure ionizing radiation.
 - d. the calibration of instruments and equipment to produce ionizing radiation.

It is the policy of the Department of Health, Education and Welfare to encourage the development of a strong and effective health care system. This system should be based on the highest quality of care and the most efficient use of resources.

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- (2) a. Notify the area radiological health officer of the source.
- (4) b. Notify the state health officer and the Area Radiological Health Supervisor present at the location and status of the source.
- (1) c. Immediately secure the source.
- (3) d. Leave the door to the Calibration Room unlocked.

59. Changes or alterations of the radio repair facility Emergency and Operating Procedures and specified practices

- a. may be made with the consultation of Code 732 because the procedure is a condition of the AEC license.
- b. may be made after consultation with Code 732
- (c) may be made with prior consultation of Code 108 and receipt of an appropriate license amendment.
- d. None of the above applies.

60. Indicate the proper sequence of events necessary to obtain certification as a calibration source operator.

- (7) a. Supervisor's nomination of the individual as a competent operator of sources and related equipment, to the Radiological Protection Officer for certification as to radiation safety competence.
- (2) b. Individual has completed training program for users of Radiac Repair Facility radioactive sources.
- (1) c. Individual has 6 months' experience on-the-job training with a certified calibration operator.
- (4) d. Individual has completed the radiation safety competence certification examination with a grade of at least 75% and attended a review critique.

Radiological Protection

61. **Who is responsible for the Radiological Protection of the reactor?**
- a. the Chief Engineer.
 - b. the Chief Operator.
 - c. the Chief Radiological Protection Officer.
 - d. the Chief Health Physicist.
62. **Responsibility for the protection of the community from the possible adverse effects of radioactive material is vested in**
- a. the Nuclear Commission.
 - b. the certified person **Radiological Protection** Officer and being qualified operators of radiating sources.
 - c. the Health Physicist.
 - d. the Industrial Radiological Safety Officer.
63. **New personnel assigned to work in the Reactor Repair Facility**
- a. are required to read and understand the license and Emergency and Operating Procedures prior to entering the Radiation Area.
 - b. must be given instructions concerning the hazards of working with ionizing radiation.
 - c. must be assigned to work with a certified operator for on-the-job training.
 - d. All of the above apply.
64. **Each operating employee is responsible for**
- a. being aware of the hazards involved in handling radioactive sources and safeguarding such sources to prevent unnecessary exposure.
 - b. understanding and following all conditions of the AEC license.
 - c. properly operating the equipment and related handling tools and instruments.
 - d. All of the above.
65. **In addition to having access to the current license, each certified calibration operator must be familiar with and have a copy of**
- a. 10 CFR Part 20.
 - b. 10 CFR Part 30.
 - c. Emergency and Operating Procedures for Reactor Repair Facility.
 - d. All of the above.
66. **Dosimeters shall be**
- a. fully charged at least weekly and doses shall be recorded daily.
 - b. charged when it is out of range and readings recorded weekly.
 - c. charged daily and the readings recorded daily.
 - d. read only by the Health Physics Branch.

67. Radiation survey instrumentation shall have a range of at least:

- a. 5 mR/hr to 5 r/hr.
- b. 1 r/hr to 10 r/hr.
- c. 1 mR/hr to 500 r/hr.
- d. 1 mR/hr to 100 r/hr.

68. Each radiation survey instrument shall be:

- a. calibrated.
- b. checked.
- c. verified.
- d. both determined by Health Physics.

69. To be sure that a source is returned to its normal storage position during calibration operations, you should

- a. crank the source all the way in.
- b. a physical radiation survey shall be made before and after each calibration exposure.
- c. connect the warning lights and audible alarm.
- d. ask your supervisor.

70. The Radiac Repair Facility Emergency and Operating Procedures

- a. must be followed by all persons in order to avoid health hazards resulting from improper handling, use, storage, transportation, security or disposal of the sources.
- b. apply to all operations and associated work performed by Radiac Facility personnel.
- c. deal with the safe operation of sealed sources of ionizing radiation and the equipment containing them.
- d. apply to all of the above.

71. Each exposure device or storage container shall be kept locked except when operated by or under the direct surveillance of

- a. the Radiological Protection Officer
- b. any Radiac Repair Facility Personnel.
- c. a certified calibration operator.
- d. the facility supervisor.

72. All areas marked with warning lights, rope barricades and approved AEC warning signs,

- a. visitors or unqualified persons shall be permitted to enter if they will only remain for very short times.
- b. any Shipyard employee may enter if accompanied by a radiac mechanic who will make sure a hazard does not exist.
- c. visitors are permitted to enter if they have a shop pass.
- d. a certified operator shall maintain direct surveillance to prevent unauthorized entry.

73. The best way to avoid overexposure to ionizing radiation is to
- wear a film badge.
 - watch the lights and signals of the control unit.
 - visit the control console of the control unit as far as it will go.
 - monitor with an AN/ECR-27 or Buships 2001 badge.
74. In manipulating the AN/ECR-1A and/or AN/ECR-1 set
- only one operator is required and he must take a position behind the barrier.
 - two operators are required; both must take their positions behind the barrier.
 - two operators are required, but only one must take a position behind the barrier.
 - the only operator of the set may or may not take a position behind the barrier.
75. The person directly responsible to the licensee for compliance with 10 CFR, Parts 20 and 30, and the conditions of the license is
- the Health Physicist.
 - the Radiological Protection Officer
 - the Shipyard Commander
 - the calibration operator.
76. Whenever warning lights go out or an alarm sounds during an operation,
- return the source to the stowed position immediately.
 - leave the source exactly as it is and ask another operator to verify the abnormal behavior.
 - do not touch the source until you can locate another meter.
 - immediately evacuate the calibration room and notify your supervisor.
77. When a source has decayed to the point where it must be renewed, the exposure device will be returned for replacement of source to
- Health Physics Branch.
 - Buships.
 - the manufacturer, vendor, or other AEC-licensed receipt designated by Buships
 - Radiological Protection Officer
78. Ionization means
- conversion of gamma rays into a pair of subatomic particles - an electron and a positron.
 - disintegration of radioactive nuclei.
 - knocking an electron out of its orbit around the nucleus of an atom, leaving the atom with a positive charge.
 - emission of fast particles or rays by nuclei.

79. The purpose of the radiation safety program is to protect the health of

- a. the operator of the source.
- b. the general public.
- c. the environment.
- d. all of the above.

80. In the event of a radiation emergency, the operator should

- 5 a. immediately report the emergency to the supervisor.
- 4 b. immediately evacuate the area.
- 2 c. quickly reposition the source to the safe storage position.
- (1) d. Secure the source immediately and evacuate the immediate area.
- (3) e. Stay in the general area until directed by health physics when spillage of radioactive material has occurred in order to avoid the spread of contamination.
- (6) f. Operators set a watch to prevent entry of personnel until relieved by proper authority.

81. When using an AM/REP-27, set on the 0-5 mr/hr scale to check the radiation level at marked spot behind the source container, if the reading shows more than 1 mr/hr then

- a. the source is in the safe storage position.
- (b) There is a defect in the positioning mechanism.
- c. the source is not locking and the operation appears normal.
- d. the source is fully exposed.

82. Which of the following occurrences need not be immediately reported to the supervisor by an operating employee?

- a. Damage to a radiation shield, source container, or protective equipment.
- (c) "Drift" of pocket dosimeter.
- c. Exceeding radiation exposure limit or dosimeter reading.
- d. Possible introduction of radioactive material through a break in the skin.
- e. Spill or leak of radioactive material.

83. Certification as a calibration operator is issued by

- a. the Shipyard Commander.
- b. the Medical Officer.
- c. The Health Physicist.
- (d) the Radiological Protection Officer

84. A label or sign, durable and clearly visible, bearing the radiation symbol and the words "Caution (or Danger) Radioactive Material," is required for

- a. rooms in which sources are used.
- b. all containers of radioactive sources.
- c. rooms in which sources are stored.
- (d) all of the above.

85. In response to which indicator

- a. a source is dropped.
- b. a source is leaking.
- c. a source fails to return to its normal storage position.
- d. any of the above.

APPENDIX B - Mobile Radio Van Operators

85. Removal of proper personnel was required to or caused by an uninjured operator to cause a accident or accident that might cause concern regarding radiation hazards in a particular area.
- (4) a. As soon as possible notify the nearest law enforcement and military agencies of conditions and report to Shipyard authorities (forms posted in van).
 - (2) b. Bander the area carefully to determine the hazard perimeter, if any.
 - (5) c. Reduce the extent of radiation area, if any, and give assistance in controlling the situation until relieved or instructed by competent authority.
 - (1) d. Render all possible assistance in clearing injured personnel from any actual or potential hazard that may have resulted.
 - (3) e. Put up radiation warning signs to keep unauthorized or unsuspecting personnel from the potentially hazardous area.
87. Prior to transporting the Mobile Radio Repair Van, a pre-departure check out need not include
- a. inspection of source positioning lever to make certain it is in the attenuated position.
 - (b) monitoring the under chassis of the truck for loose contamination.
 - c. monitoring of storage plug for surface radiation leakage and ascertaining it is secured by locking bolt and padlock.
 - d. locked trailer doors and inspection of radiation warning signs on trailer housing and source container.
88. If an emergency occurs at a temporary field calibration site, which of the following actions is incorrect?
- (b) Notify the local command only when you think it necessary.
 - b. Barricade the area.
 - c. Immediately report to the Shipyard authorities via radio communication or collect telephone.
 - d. Notify the nearest military activity having a qualified radiological safety capability, if instructed to do so.
89. Which of the following should always be present within the Mobile Radio Van?
- a. Detachables, warning signs and keys.
 - b. Operable, calibrated calibration instruments (AR/FRM-27 and AR/FRM-18).
 - c. A copy of the Operating and Emergency Procedures and AMS Byproduct Control Manual.
 - (d) All of the above.

90. When a spill occurs involving radioactive materials, the driver should:
- secure "radioactive" signs to protect public, and keep the traffic moving past.
 - remove the radioactive material from the area to prevent exposure to others.
 - clear the area and do what you can to control the incident; then notify proper authorities.
 - keep quiet about the radioactive materials.
91. Prior to transporting the Mobile Radio Repair Facility to temporary field locations, monitor for radiation leakage at the surface of the storage plug. The readings should not exceed:
- 50 mR/hr.
 - 50 mR/hr.
 - 25 mR/hr.
 - 55 mR/hr.
92. In case of fire in the vicinity of the source which threatens to involve or damage it:
- secure the source and remove the trailer.
 - if the trailer and source cannot be moved, secure the source and withdraw to a safe distance setting a watch, and if possible, post the area.
 - seek out and inform the scene commander or fire fighting supervisor of the location and status of the source and hazards involved to personnel.
 - all of the above.
93. In selecting a suitable site for the Mobile Van at temporary field locations,
- operators shall be thoroughly familiar with the radiation pattern produced by the AN/URM-1A cesium source.
 - the site will usually be pre-selected and designated.
 - the site must be such that complete control and continuous visual observation may be maintained against possible intrusion.
 - all of the above.
94. Which of the following is not necessary when making stops with the AN/URM-1()?
- Leave the truck unattended for minimum periods of time.
 - Notify the manager of overnight lodgings of the location of the truck and request immediate notification of incidents involving the truck.
 - Keep the red beacon above the truck cab in operation at all times.
 - Select a parking site as remote as practicable from the traffic.

95. After a suitable warning has been received for the Mobile Radio Repair Van, the operator shall not:
- a. Post a watch where necessary to keep all personnel at a safe distance.
 - b. Permit the radiation pattern to extend beyond the site.
 - c. Monitor the roped-off area to insure that the Radiation Area is properly defined as soon as the source is first exposed.
 - d. Insure that the radiation pattern is clear of personnel and roped off or otherwise barricaded and that appropriate warning signs and lights are installed.
 - e. Secure the source, remove and store all barricades, lights, and warning signs upon completion of exposure at temporary field locations.
96. In the event of any incident, vehicular collision or other accident which might cause concern regarding radiation hazards in a public place, the uninjured operator shall not:
- a. Monitor the area carefully to determine the hazard perimeter, if any.
 - b. Put up radiation warning signs to keep unauthorized or unsuspecting personnel from the potentially hazardous area.
 - c. Leave the scene of the accident immediately and return to Mare Island.
 - d. As soon as possible, notify the nearest law enforcement and military agencies of conditions and report to the Shipyard authorities, whose names are posted in the van, by radio communication or collect telephone call.
 - e. Render all possible assistance in clearing injured personnel from any actual or potential hazardous area, and reduce extent of radiation area.

The Calibration Room is located on the fifth floor of Bldg. 265, with the main beam of the AN/URR-1A and the AN/URM 1 directed through the exterior North wall of the building and into unoccupied space. The radiation levels at the nearest buildings and ground surfaces in the direction of the main beam have been found to be less than 0.1 mr/hr. The location of the calibration ranges, warning lights, signs, monitoring survey data and other control measures are shown in the attached plan. Safety devices for securing calibrator controls for the AN/URR-1A and AN/URM 1, are shown in attached sketches #1 and #2, respectively.

ATTACHMENT B

ENCLOSURE ()

RANGE AREA DOOR LOCKING
MICRO SWITCH

RED WARNING LIGHT MICRO SWITCH

AUTOMATIC DOOR LOCKING
MICRO SWITCH

SWITCH STRIKER PLATE

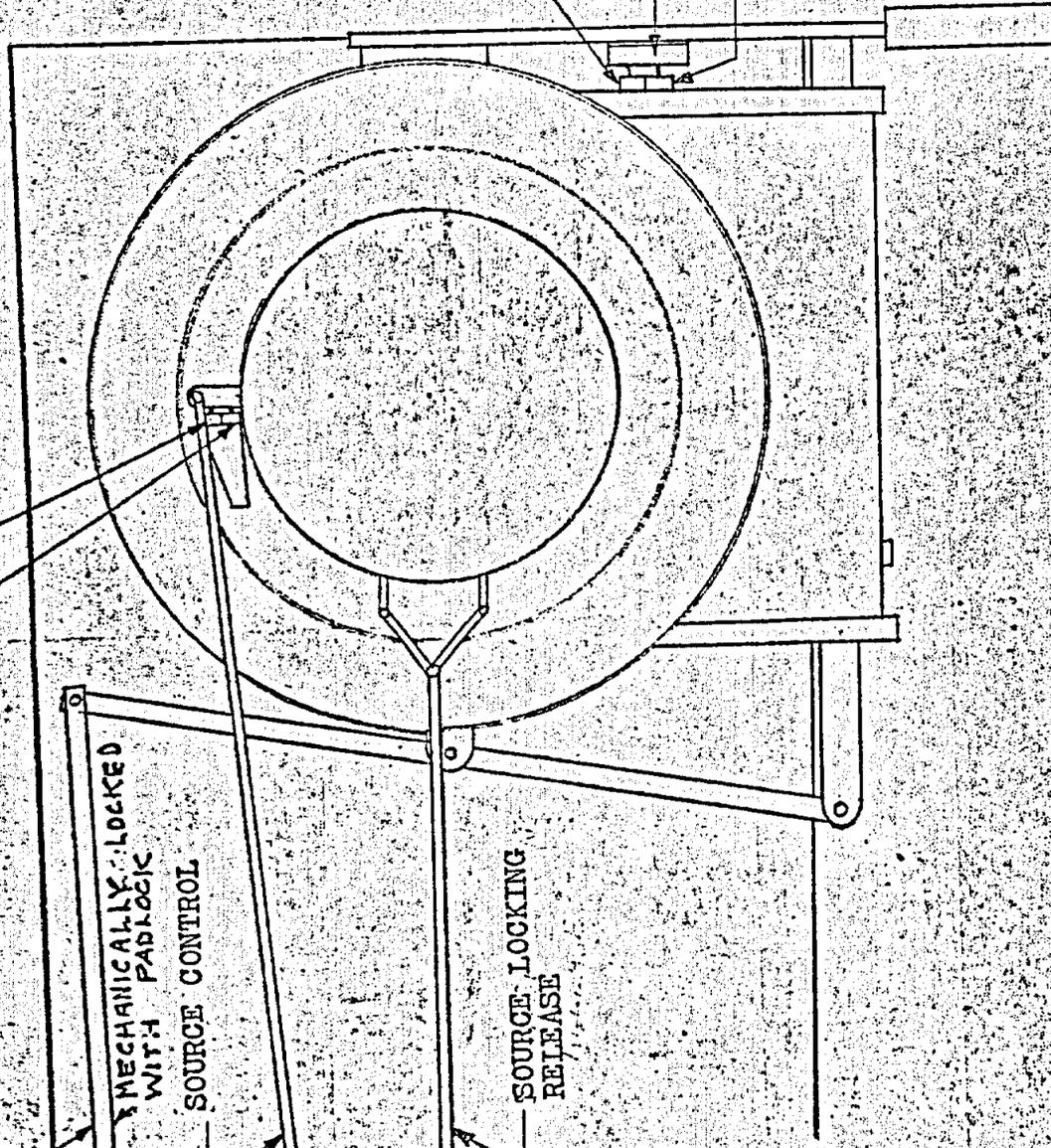
ORANGE WARNING LIGHT
MICRO SWITCH

ATTENUATOR CONTROL

MECHANICALLY LOCKED
WITH PADLOCK

SOURCE CONTROL

SOURCE LOCKING
RELEASE



AN/UDM-1A CALIBRATOR CONTROLS WITH SAFETY AND INDICATING DEVICES

Enclosure C

ATTACHMENT B

RED LIGHT ON WE
SOURCE EXPOSE

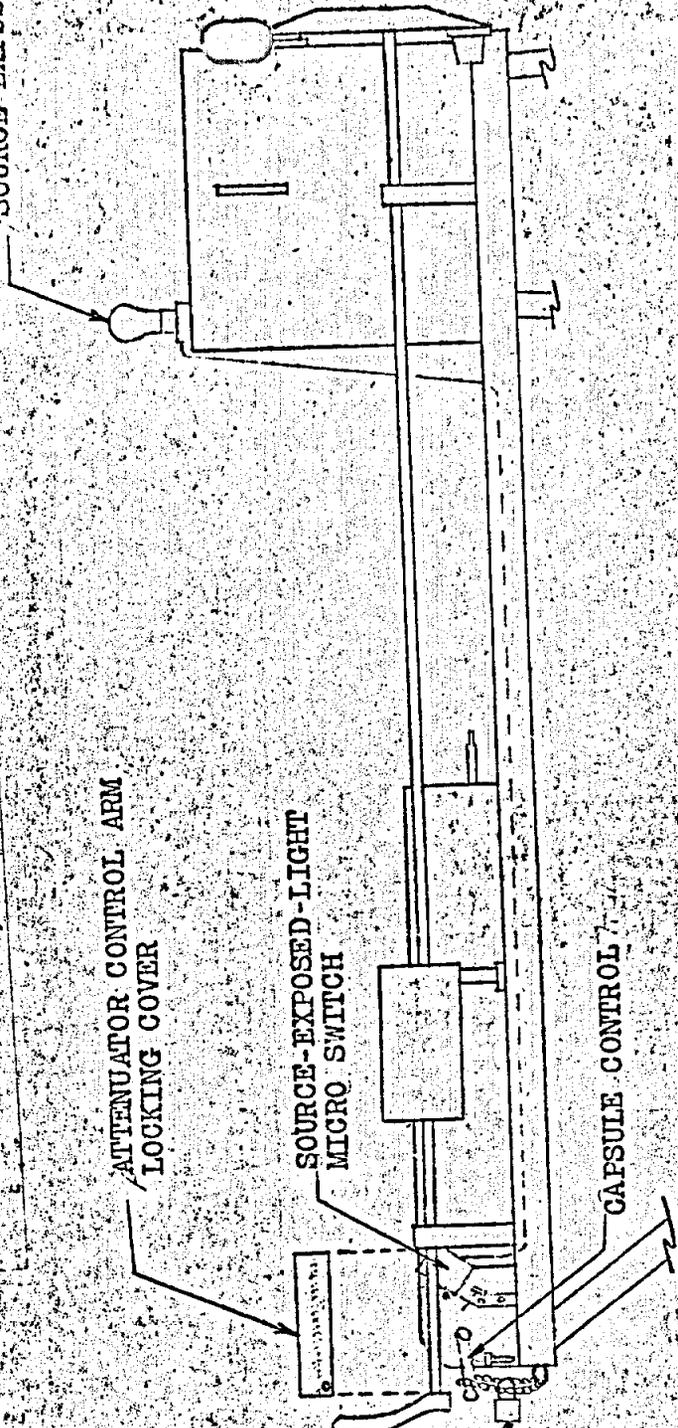
ATTENUATOR CONTROL ARM
LOCKING COVER

SOURCE-EXPOSED-LIGHT
MICRO SWITCH

CAPSULE CONTROL

ATTENUATOR
CONTROL

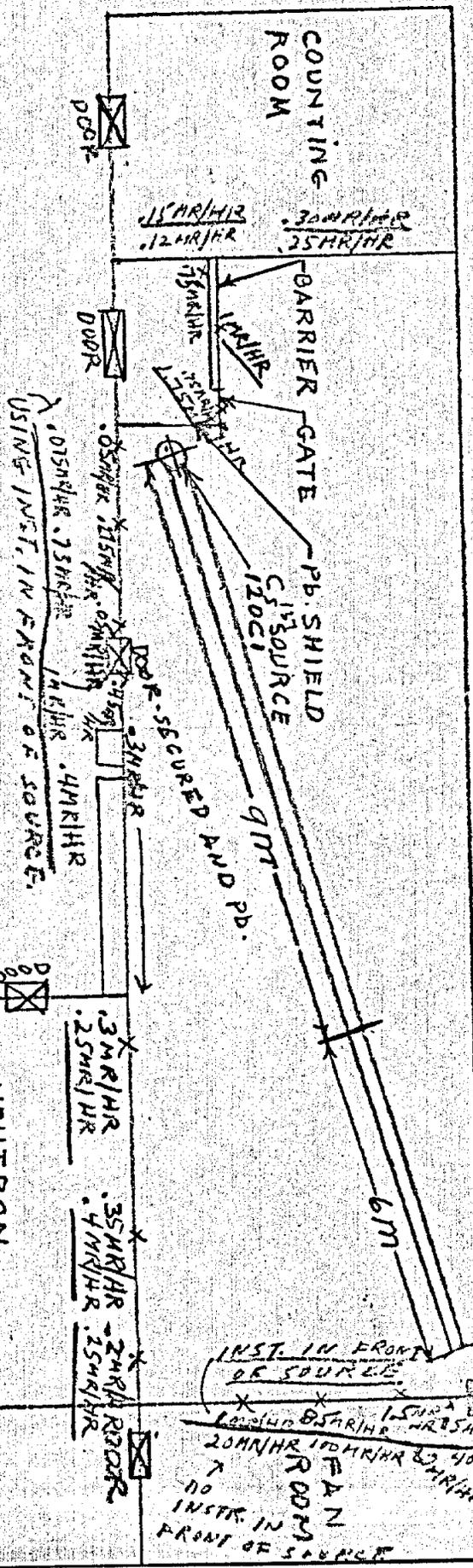
SOURCE LOCKED
IN SAFE
POSITION
WHEN NOT IN
USE



AN/UDM-1 CALIBRATOR CONTROLS WITH SAFETY AND INDICATING DEVICES

ENCLOSURE (A)

ATTACHMENT B



INSTRUMENTS USED: M-209/PDR 27F 5/N 2196
 CAL. DUE DATE: 13 MARCH 1973

A CHECK OF SYSTEMS.

1. FAN ROOM DOOR INTERLOCK ALARM.
2. GREEN LIGHT WHEN SECURED.
3. YELLOW LIGHT WHEN PLUG IS PULLED.
4. RED LIGHT WHEN SOURCE IS ROTATED TO OPERATING POSITION.
5. BUZZER FOR OPENING GATE IS ONLY OPERABLE WHEN GREEN LIGHT IS ON.
6. METER WITH PROBE MOUNTED IN FRONT OF SOURCE IS INOPERABLE WHEN SOURCE IS ACTIVATED.
7. METER - PROBE POSITIONED BEHIND SOURCE - USED FOR CHECKING SOURCE POSITION -
 - a. GREEN LIGHT - .4 MR/HR.
 - b. YELLOW LIGHT - 4.5 MR/HR.
 - c. RED LIGHT - .075 MR/HR.
8. PLUG OUT - SOURCE IN AN OPERATING POSITION.
 - a. OPERATOR SIDE OF SHIELD - 2 HR/HR AT SURFACE, 3 MR/HR - USING INSTR. IN FRONT
 - b. PENETRATION OF SHIELD FOR CONTROL RODS - .25 MR/HR, 3 MR/HR
 - c. ON PB. GLASS DOOR OF SHIELD - 2 MR/HR, 3 MR/HR
 - d. EDGE OF GLASS DOOR - 2 MR/HR, 3 MR/HR
9. INSTRUMENT IN FRONT OF SOURCE AT 400R/HR MARK.

NOTE: RED READINGS WHEN HQ CONDITION EXIST. MAXIMUM. REP. READINGS UNDER LINED FOR

EMERGENCY AND OPERATING PROCEDURES

RADIAC REPAIR FACILITY

ELECTRONICS SHOP

PRODUCTION DEPARTMENT

MARE ISLAND NAVAL SHIPYARD

VALLEJO, CALIFORNIA

JANUARY 1970

ATTACH C
enclosure (2)

RADIAC REPAIR FACILITY
EMERGENCY AND OPERATING PROCEDURES

A. Introduction.

The Radiac Repair Facility of the Electronics Shop at Mare Island has custody of and uses radioactive by-product material sources of ionizing radiation under a license issued by the Atomic Energy Commission. These sources are used for the calibration of instruments to detect and measure ionizing radiation.

B. Caution.

All personnel are cautioned that excessive exposure to ionizing radiation from these radioactive sources is extremely hazardous to the health of individuals so exposed. Excessive exposure may result from improper handling, use, storage, transportation, security or disposal of the sources.

C. Instruction.

Accordingly, all radiac repair facility personnel are directed to follow the instructions contained in this procedure, which deals with the safe operation of these sealed sources and the equipment containing them.

D. Scope.

This procedure applies to all operations and associated work performed by Radiac Repair Facility personnel.

E. Procedural Changes.

Because this procedure is a condition of the AEC license, no change or alteration of it or the practices specified in it will be made without prior consultation of the Radiological Protection Officer, Code 730, and application for and receipt of an appropriate license amendment or renewal, as specified in current Shipyard instructions.

F. Responsibilities.

1. The use of radioactive calibration sources in the Radiac Repair Facility will be under the supervision of individuals who have been certified by the Radiological Protection Officer.

2. The following persons, or their successors, with the advice of the Shipyard Radiological Protection Officer and Health Physicist, are responsible for implementation of the overall radiation protection program of the Facility:

P. F. Mil^lin
W. V. Norfleet
T. H. Perkins
A. C. Dennis

Position only?

Electrical Group Superintendent
Electronic Shop Superintendent
General Foreman, Electronics Mechanics
Foreman, Electronics Mechanics, in charge
of Radiac Repair Facility

3. Each operating employee is responsible for:

a. Being aware of the hazards involved in handling by-product radioactive material sources and safeguarding such sources in his charge, or with which he is working, to prevent unnecessary exposure to himself and other personnel.

b. Understanding and following these procedures and all conditions of the AEC license.

c. Properly operating the equipment, related handling tools and surveying instruments which will be used in his work assignments and using the sources only for purposes authorized in the AEC license and this procedure.

d. Following the posted or verbal instructions of his supervisor.

e. Prohibiting smoking, eating, drinking and chewing in the Calibration Room.

f. Immediately reporting to his supervisor any accident or unusual incident involving a source of ionizing radiation, such as, but not limited to, the following:

- (1) Exceeding radiation exposure limit or dosimeter reading,
- (2) Protective equipment damage.
- (3) Any spilling or leak of radioactive material.
- (4) Any damage to a radiation shield or source container.
- (5) Any wound or scratch resulting in a break of the skin or

any incident where radioactive material may have entered a person's body.

G. Qualification and Training of Operators

1. Each person to be considered for training or certification as a calibration operator must submit to a medical examination and be qualified for work with ionizing radiation by the Medical Officer. Persons who regularly work with ionizing radiation must also have periodic follow-up examinations.

a. In the event of an acute illness lasting a week or more, the employee must obtain medical clearance prior to returning to duty which requires association with, or operation of, radiation sources.

2. Each calibration operator will be certified qualified in radiation safety competence at the discretion of the Radiological Protection Officer, after demonstrating to the supervisor his competence in handling calibration sources and related equipment.

3. New personnel (including apprentices) (who must be over eighteen years of age) assigned to work in the Radiac Repair Facility are required to read and understand, prior to entering the Radiation Area, the AEC license and these procedures. They must be given verbal instructions concerning the hazards of working with ionizing radiation and must also be assigned to work with a certified operator for on-the-job training.

4. Calibration operators will be considered for certification after completion of the following:

- a. Six months of experience in on-the-job training.
- b. Training Program for Users of Radiac Repair Facility Calibration Sources.
- c. Nomination of the individual as a competent operator of sources and related equipment, by the supervisor, to the Radiological Protection Officer for certification as to radiation safety competence.
- d. Completion of the certification examination with a passing grade of 75% or more and attendance at the review critique.

5. Certified operators will be given periodic formal refresher training at appropriate intervals biennially, as well as short informal refresher sessions conducted by the supervisor when required.

6. Certification and re-certification will be for periods designated by the Radiological Protection Officer.

7. Each certified calibration operator must be furnished or otherwise have access to (i.e., by posting) a copy of 10 CFR 20, 10 CFR 30, this procedure, and the current license.

H. Personnel Monitoring.

1. All personnel who enter or are in the Calibration Room or restricted operating area in the field during an exposure must wear a film badge issued by the Medical Department and two self-reading pocket dosimeters. The dosimeters must have a range of zero to two hundred mr. The supervisor shall insure that the dosimeters are fully charged at least once a week.

a. Film badges will be obtained from the installed film badge board in the Facility at the beginning of the work period and returned to the board at the end of each work period. Pocket dosimeters will be kept in the holder provided at each bench when not in use.

2. Doses shall be recorded daily on an exposure/dosimeter record card or permanent log book by the employee. The records shall be maintained for inspection and reviewed by the supervisor weekly.

3. Any person whose cumulative dosimeter dose reaches 300 mr in any one week shall be removed from further exposure and his film badge delivered to the Medical Officer for evaluation. He shall not be again exposed until approved by the Medical Officer. The quarterly exposure limits established by 10 CFR 20 will be adhered to.

I. Radiation Survey Instrumentation.

1. Calibrated and operable survey instrumentation is maintained in the Calibration Room (and also in the AN/MDM-1 truck van when in transit and at field sites) to make physical radiation surveys as required by 10 CFR 20 and 10 CFR 30. Each radiation survey instrument shall be calibrated at intervals not to exceed six months, and after each replacement of batteries, other components, or otherwise serviced. A record shall be maintained of the latest date of calibration. Survey instrumentation shall have a range such that 2 mr per hour through 1 r per hour can be measured. The following instruments are currently in use:

AN/PDR-27() with AN/PDR-18() or AN/PDR-43() or AN/PDR-27
() EXT; Eberline Model E-500B - calibrated by Radiac Repair
Facility or

2. Operators shall inform their supervisors at any time when the calibration of the instrument seems in doubt. It shall be used to check radiation levels in setting up limits within which non-operating personnel may work.

3. A physical radiation survey shall be made before and after each calibration exposure to determine that all sealed sources have been returned to their normal storage position in the shielded container.

4. The supervisor shall be responsible for the determination of compliance with 10 CFR 20 regarding physical radiation surveys.

J. Security of Sources during Storage and Exposure.

1. (a) The Calibration Room shall be kept locked at all times when not attended by a certified operator. The keys shall be returned to the respective key storage locations at the end of each work shift. The key to the Calibration Room will be kept in a key locker within the Radiac Facility Area, which is locked during off hours.

(b) When a source is left in the exposed position during times other than a regular work day, such as during the calibration of high-range dosimeters, the Police and Fire Branches and the Department Watch Officer shall be notified, as well as the Radiological Protection Officer, and the Health Physics Branch. Notification will include the name of the individual to be contacted in the event of an emergency.

2. Each exposure device or storage container shall be provided with a lock designed to prevent unauthorized or accidental removal or exposure of the sealed source, and shall be kept locked at all times except during a calibration procedure or while under the direct surveillance of a certified operator. Sources will be operated only by or under the direct supervision of a certified operator.

3. Each exposure device, storage container, and room in which sources are stored or used shall bear a durable, clearly visible sign or label bearing the radiation symbol and the words "CAUTION (or DANGER) Radioactive Material", in accordance with Section 20.203 of 10 CFR 20. Labels on containers shall also state the quantity and kind of radioactive material and the date of measurement of the quantity.

4. Exposure devices measuring less than four (4) inches from the source storage position to any exterior surface of the device shall have no radiation level in excess of fifty (50) mr/hr at six (6) inches from any exterior surface of the device. Exposure devices measuring four (4) inches or more from the source storage position to any exterior surface of the device, and all storage containers, shall have no radiation level in excess of two hundred (200) mr/hr at any exterior surface, and ten (10) mr/hr at one (1) meter from any exterior surface. The radiation levels specified are with the sealed source in the "off" (i.e., shielded) position.

5. Whenever practicable, additional shielding should be employed to reduce radiation exposure of the operators or of persons in the unrestricted area.

K. Control of Access to Radiation Areas.

1. Security

a. During actual exposures in the Calibration Room (or at AN/MDM-1 field calibration sites) a certified operator shall maintain direct surveillance to protect against unauthorized entry into the Radiation Area, unless the room is locked to prevent such entry.

b. A warning sign and warning lights shall be in place at each access into the Calibration Room. The warning lights shall be energized through an interlock with the source controls to indicate exposure of a source.

(1) The door leading to the High Radiation Area in the Mechanical Equipment Room shall also be so equipped. In addition, the interlocks on doors in the Calibration Room shall be energized on exposure of the source to prevent inadvertent access to High Radiation Areas.

2. Posting.

a. Notwithstanding any provisions in Section 20.204^a(c) of 10 CFR 20, areas in which calibration is being performed shall be conspicuously posted as required by Section 20.203(b) and (c) (1) 10 CFR 20.

b. Radiation Area. "Radiation Area" means any area accessible to personnel in which there exists radiation, originating in whole or in part within licensed material sources, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days, a dose in excess of 100 millirem. Each Radiation Area, so determined, shall be conspicuously posted with approved AEC sign or signs, bearing the radiation caution symbol and the words "CAUTION-RADIATION AREA".

c. High Radiation Area. "High Radiation Area" means any area accessible to personnel, in which there exists radiation originating in whole or in part within licensed source material at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem. Each High Radiation Area, so determined, shall be conspicuously posted with approved AEC sign or signs bearing the radiation caution symbol and the words: "CAUTION-HIGH RADIATION AREA".

d. Restricted Area. "Restricted Area" means any area, access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials.

e. When the source is exposed, the calibration range is a High Radiation Area.

(1) The entire Radiac Repair Facility is a Restricted Area. When the source is exposed the Radiation Area is within the interlocked barrier and the Mechanical Equipment Room is a High Radiation Area.

f. When the source is exposed at field sites, the calibration range is roped off at the 2 mr/hr isodose and is a Radiation Area. The operating area inside the tent is a Restricted Area.

L. Range Operational Procedures.

1. Check source radiation level at marked spot behind source container, using a radiac survey instrument. The reading should be no more than 1 mr/hr.

a. When the source radiation level has been found to be less than 1 mr/hr, enter and inspect locked mechanical equipment room, making certain that personnel are not in the room. Verify operation of door alarm and lock door when leaving.

2. Assure that no one is on the range beyond the barrier or within the 2 mr/hr isodose area of a field calibration site.

3. Unlock the control handle.

4. Log the time the source is unlocked.

5. Operate source position controls (from a position behind source container) to assure smooth operation, and return source to stowed position and verify proper operation of all warning lights and interlocks.

6. Using the low range radiac survey instrument, check radiation level at marked spot behind the source container. The reading should be approximately 0.5 mr/hr. If the reading exceeds 1 mr/hr, there is a defect in the positioning mechanism. Do not proceed until the defect has been corrected. (REPAIRING OR SERVICING OF THE SEALED SOURCE BY SIOP PERSONNEL IS NOT PERMITTED).

7. With the source in the stowed position, and container plugs in place, place the instrument to be calibrated at the proper position on the range and adjust optical system.

8. Two operators work in unison from operating positions behind the source shield; one exposes the source by means of the source positioning controls, and observes the instrument meter readings while the other operator records data on the calibration sheet.

a. At a field calibration site, the operators' positions are behind the control end of the trailer.

9. After each reading, the source is returned to its stowed position and the radiation level checked with a survey meter to verify this position before anyone enters the range.

10. If the alarm sounds or the warning lights go out during the operation, the source shall be returned immediately to its stowed position and the operation secured until the trouble has been found and corrected.

11. At the end of each working shift, the lead operator will verify that the source is in the safe position, lock the control handle, and sign the log book accordingly.

12. When a source is to be left in the exposed position during off-shifts, the lead operator will enter the scheduled use in the log, assure that all personnel have left the Calibration Room, and lock the door to the room to prevent unauthorized entry. He will also place a sign on the door stating that a source is exposed, and whom to notify in the event entry is required. A similar sign shall be placed on the door to the Mechanical Equipment Room. He will assure that the notifications required by Section J.1.C. are made.

13. Upon re-entry, a certified operator will unlock the door and enter the Calibration Room while observing a radiac to assure that radiation levels are unchanged. If radiation levels are unchanged, other personnel may enter the room. If not, the operator shall immediately secure the source, and notify his supervisor.

M. Emergency Procedures.

1. An "emergency" exists whenever control of a sealed radioactive source has been lost. This includes a dropped source, a leaking source, or a source that cannot be returned to its normal storage position.

2. In the event of an emergency, all operating personnel shall:

a. Secure the source immediately.

b. Use one of the survey radiac instruments on the range and evacuate the area to the 2 mr/hr isodose line, or to a safe distance beyond, if necessary, and set a watch to prevent entry of personnel.

c. Quickly make a preliminary survey of the area to determine the location and extent of the emergency.

d. If spillage of radioactive material may have occurred, every effort will be made to avoid the spread of contamination. No one will be permitted to leave the safe area until he has been monitored by Industrial Hygiene/Health Physics personnel, provided someone else outside the affected area is present to perform the duties below in "e".

c. If either no one else is present, in the event of radioactive contamination, or such contamination is known not to exist:

(1) Notify the supervisor or one of those named on the emergency list posted at the telephone. All others on the list will be notified thereafter as soon as possible.

(2) Secure any ventilation to the room.

(3) Barricade and post accesses to the area at the 2 mr/hr isodose line or proximal safe distance beyond with the ropes, signs and stanchions provided.

(4) Maintain security of the area until relieved by a supervisor on the advice of the Radiological Protection Officer, or his representative, who will also advise on remedial action.

(5) Restore ventilation to the room when it is determined that no loose radioactive contamination has resulted.

3. In the event of fire in or adjacent ^{define} to the Radiation Area, persons in charge of the area or the radioactive material sources shall immediately:

a. Secure the source.

b. Vacate the area in accordance with the established fire bill procedures.

c. Close the doors to the calibration room and leave them unlocked.

d. Seek and inform the Fire Protection Branch Supervisor present about the location and status of the sources and the hazards involved.

e. Notify the supervisor or one of those named on the emergency list posted at the telephone. All others on the list will be notified thereafter as soon as possible.

4. Emergency procedures concerning Mobile Radiac Repair Facility sources either in transit or at field calibration site operations are included under the heading of "Special Operating and Emergency Procedures for Mobile Radiac Repair Facility AN/MDM-1" in section Q.

N. Removal and exchange of sealed sources in exposure devices.

1. When a source has decayed to a point where it must be renewed, the exposure device will be returned to the manufacturer, vendor, or other BUSHIPS designated recipient for replacement of the source.

2. Operators shall not remove or exchange sealed sources in the AN/UDM-1A and/or AN/UDM-1 calibration devices from their present containers.

O. Leak Testing of Sources.

1. Licensed sources in the Radiac Repair Facility are leak tested by Health Physics personnel at least every six months in accordance with the approved procedure. Records of these tests are kept in the files of the Health Physics Branch, Radiological Protection Officer, and Radiac Section.

P. Records and Reports.

1. The following records shall be maintained in the Radiac Repair Facility:

- a. Quarterly physical inventory and location of all licensed sources
- b. Daily source utilization record.
- c. Receipts, transfers and disposal documents concerning licensed sources,
- d. Results of area surveys and monitoring.
- e. Calibration history of survey instruments.
- f. List of currently certified operators.
- g. Type and date of training performed under Section G.
- h. Current license application(s) and license(s) issued, and related amendments.
- i. Film badge exposure results.
- j. Pocket dosimeter readings.
- k. Pertinent AEC, BUSHIPS and Shipyard directives and procedures.
- l. Unusual incidents involving radioactive materials or handling devices.

2. All records pertaining to personnel protection shall be made available to the Radiological Protection Officer, Code 730, and/or Medical Department personnel, upon request.

Q. Special Emergency Procedures Pertaining to Mobil Radiac Repair Facility AN/MDM-1.

1. Pre-departure Check-out. Prior to transporting the Mobile Radiac Repair Facility to temporary field locations, the operators shall:

a. Inspect the storage plug of the source to make certain that it is secured by the locking bolt and padlock.

b. Inspect source positioning lever to make certain that it is in the attenuated position.

c. Monitor for radiation leakage at the surface of the storage plug; readings should not exceed 35 mr/hr.

d. Lock the trailer doors and inspect radiation warning signs on the trailer housing and source container to make certain that they are not obscured or defaced in any way.

e. Inspect the trailer hitch assembly and safety chains to assure proper security.

f. Insure that barricades, warning signs and operable, calibrated detection instruments, a copy of this operating and emergency procedure, license, keys, etc., are in the van.

g. Operate the truck on public highways in accordance with all applicable Federal regulations and State Laws.

2. Stops In-transit. In making stops in-transit between temporary field or storage locations, usually for food or overnight lodging, the operator shall:

a. Select a parking area as remote from traffic and other potential hazards and activity as practicable.

b. Leave the truck unattended only for minimum periods during stops for meals.

c. Notify the manager of overnight lodgings, or his representatives, of the location of the truck, its safety integrity, and request immediate notification of any involvement of the truck or trailer in any incidents, accident, or imminent danger.

3. Emergencies. In the event of any incident, vehicular collision or other accident that might cause any concern regarding radiation hazards in a public place, the uninjured operator shall:

a. Render all possible assistance in clearing injured personnel from any actual or potential hazard area that may have resulted.

b. Monitor the area carefully to determine the hazard perimeter, if any.

c. Put up radiation warning signs to keep unauthorized or unsuspecting personnel from the potentially hazardous area.

d. As soon as possible, notify the nearest law enforcement and military agencies of conditions and report to Shipyard authorities, whose names are posted in the van, by radio communication or preferably collect telephone call.

e. Reduce the extent of the radiation hazard area, if any, and give all possible assistance in controlling the situation until relieved, or otherwise instructed by competent authority in charge at the scene.

(1) If an Emergency Occurs at a Temporary Field Calibration Site: Barricade the area and immediately report to Shipyard authorities whose names are posted in the truck via radio communications or preferably collect telephone. If necessary you will be instructed to notify the nearest military activity having a qualified radiological safety capability. A list of such activities is posted in the truck. Notify local command.

(2) In case of Fire in the Vicinity of the Source, which threatens to involve or damage it:

(a) Secure the source and remove the trailer.

(b) If the trailer and source cannot be moved, secure the source and withdraw to a safe distance setting a watch and, if possible, posting the area. Seek out and inform the scene commander or fire fighting supervisor of the location and status of the source and the hazards involved to personnel.

4. Selection of a Suitable Site at Temporary Field Locations.

a. Radiation patterns. All operators shall be thoroughly familiar with the radiation pattern produced by the AN/UDM-1A, 120 Curie Cesium source. A graph is posted on the front panel of the trailer showing the 2 and 5 mr/hr isodose contours when the source is exposed and the background levels surrounding the trailer when the source is secured.

b. The calibration site at each temporary location will usually be pre-selected and designated. If not, it must be selected with extreme care to insure that:

(1) The radiation pattern may be completely contained within the site.

(2) The site must be such that complete control and continuous visual observation may be maintained against possible intrusion by all unauthorized personnel including children and small domestic animals.

(3) Where the temporary field site has not been pre-selected and designated, some possible sites to be considered are:

(a) National Guard or Reserve Armories.

(b) Fenced athletic fields that are not in use.

(c) Inactive air fields.

(d) Positions overlooking normally inaccessible areas, such as tidal flats or into the base of cliffs.

5. After a suitable site has been reached, the operator shall:

a. Insure that the radiation pattern is clear of personnel and ~~roped off or otherwise barricaded~~ and appropriate warning signs and lights are installed.

b. Post-a watch where necessary to keep all personnel at a safe distance.

c. Monitor the roped off area to confirm that the computed Radiation Area is correct as soon as the source is first exposed.

6. Upon completion of exposures at temporary field locations, the operator shall:

a. Assure that the source is properly secured and control mechanisms locked.

b. Remove and store all monitoring equipment, barricades, lights, and warning signs.

c. Perform all actions indicated on the pre-departure check-off list to properly prepare for moving the AN/UDM-1A calibrator.

d. Complete and sign the pre-departure check-off list prior to leaving the site.

V.E.4.
9 January 1970

NAVE ISLAND NAVAL SHIPYARD
INDUSTRIAL DISPENSARY
INDUSTRIAL HYGIENE DIVISION
HEALTH PHYSICS BRANCH PROCEDURE V.E.4.

V. Contamination Control

E. Source Control

4. Leak test of Radiax calibration sources

a. General

The Radiax Facility, Shop 67, calibration sources must be leak tested at least once every six months. The Assistant Health Physicist in charge of the Radiation Exposure Control Section is responsible for scheduling and supervising such leak tests. Persons performing the leak test must be permanent employees of the Health Physics Branch, and must be approved by the Radiological Protection Officer. Records of all leak tests shall be kept with the record of the corresponding source in the Source Control file. This procedure is part of the Radiax AEC license application and therefore changes must be cleared via appropriate channels.

b. Procedure

(1) Assure that the source is in the safe position by observing the controls and indicating lights, and by monitoring with a survey meter.

(2) Wrap pressure-sensitive adhesive tape around a half-inch rod with the adhesive side out so that four inches at one end is covered.

(3) Remove the plug from the port, and wipe inside the port by pressing the adhesive tape on all available surfaces. Replace the plug.

(4) Remove the tape from the rod by rolling it up with the adhesive side in, and place it in a half-inch test tube.

(5) Count the wipe in the gamma well-crystal scintillator. Calculate the results as microcuries, and record.

(6) If the results are over 0.005 microcuries, or significantly greater than the previous test, report it to the Health Physicist.

c. Records and Reports

(1) Records. The results of each leak test, including date, operator, and activity found, shall be entered on the appropriate Isotope Sheet, and filed with the record of that source in the Source Control file.

V.E.4.
9 January 1970

(2) Reports:

(a) If contamination over 0.005 microcuries or other evidence of leaking is found, the Health Physicist will prepare a report to the Radiological Protection Officer via the Head, Industrial Hygiene Division, giving all pertinent data, and his recommendations.

(b) All leak test results will be reported to the Radiological Protection Officer on Form 732-1 in accordance with Health Physics Branch Procedure V.E.6.

Approved:

Chapman Bush
Head, Health Physics Branch



DEPARTMENT OF THE NAVY
NAVAL ELECTRONIC SYSTEMS COMMAND
WASHINGTON, D.C. 20360

IN REPLY REFER TO

9900
Ser 133 - 0516
JUN 5 1968

JUN 17 08 35 '68

FIRST ENDORSEMENT ON HAVSHIPED EFRAN RAY LETTER 9900 730 OF 23 MAY 1968

From: Commander, Naval Electronic Systems Command
To: Chief, Isotopes Branch
Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545

Subj: AEC Byproduct Material License No. 06-02164-03

1. Basic letter with enclosures contains supplemental information for the application for renewal of subject license.
2. The material covered in the enclosures has been reviewed and is to replace Attachments "A" and "B" previously submitted with the completed AEC-113 Form dated 15 April 1968.

Copy to:
EPRM (Code 74)
HAVSHIPED EFRAN RAY

H. G. WILLIAMS
By direction

135651

9900

700
730

SAN FRANCISCO BAY NAVAL SHIPYARD

VALLEJO, CALIFORNIA 94502

IN REPLY REFER TO:

9900

→ 730

From: Commander, San Francisco Bay Naval Shipyard
To: Commander, Naval Electronic Systems Command

MAY 28 1968

Subj: AEC Byproduct Material License No. 04-00364-05

Ref: (a) COMNAVLEX Ltr 9900 Ser 110 - 0516 of May 10, 1968
(b) COMNAVSHIPYD SFRANBAY Ltr 9900/730 of May 2, 1968
(c) COMNAVSHIPYD SFRANBAY Ltr 9900/730 of April 15, 1968

Encl: (1) Attachment "A" (Training and Experience)
(2) Attachment "B" (Radiation Protection Program)

1. In response to reference (a), enclosures (1) and (2) are forwarded in connection with application for renewal of AEC Byproduct Material License 04-00364-05.
2. These enclosures replace information submitted in reference (b) as well as the attachments to the enclosure of reference (c).
3. The Ionizing Radiation Control Committee has reviewed and recommended approval of the enclosures.

J. H. MC OULKIN

Copy to:
BUMED (Code 74)
AEC (Attn: Mr. Bassin)

Code 700
H300
H950
H300
H354
H733

*Let me read
to Mr. M. Rosati
by Mr. M. Rosati
and Mr. M. Rosati
5/21
approved it.*

PINK
→

Originator: G. J. Rosati
Steno: R. Utterback.

ATTACHMENT "A"

TRAINING AND EXPERIENCE

The following change is made to the Training and Experience statement in Attachment "A" to the application dated 5 April 1966:

✓ Page 2, Paragraph B.1.:

Remove "approximately annually" and substitute "biennially."

ATTACHMENT "B"

RADIATION PROTECTION PROGRAM

The following changes are made to the Emergency and Operating Procedures in Attachment "C" to the application dated 5 April 1966: .

- ✓ a. Page 3, Paragraph G.5.:
Remove "approximately annually," and substitute "biennially."
- ✓ b. Page 4, Paragraph I.1.:
Add "or AN/FDR-43" after AN/FDR-18.

ENCLOSURE (2)

SAN FRANCISCO BAY NAVAL SHIPYARD

VALLEJO, CALIFORNIA 94592

IN REPLY REFER TO:

9900

730

MAY 2 1968

From: Commander, San Francisco Bay Naval Shipyard
To: Director, Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545
Via: Commander, Naval Electronics System Command (Code 0516)
Washington, D. C. 20360
Subj: AEC Byproduct Material License No. 04-00364-05; amendment of request for
renewal of
Ref: (a) Ltr 9900, Code 730 of 15 Apr 68
Encl: (1) Revised Attachment A to reference (a)

1. It is requested that enclosure (1) be substituted for the Attachment A originally submitted with reference (a).
2. The purpose of this change is to assure that refresher training for users of the byproduct material authorized under the subject license will be provided at intervals sufficiently frequent to assure maintenance of the necessary level of competence.
3. The Shipyard Ionizing Radiation Control Committee has reviewed and approved this change.

J. H. MC OULKIN

Copy to: (w/encl)
EUMED (Code 74)
NAVELEXSYSCOM (Code 0516)

Code 700
H300
H950 (w/encl)
H300
H354 (w/encl)
H733 (w/encl)

PTK

Originator: C. Burk
Stenc: R. Utterback

ATTACHMENT A

TRAINING AND EXPERIENCE

The following change is made to the training and experience statement in Attachment A to the application dated 5 April 1966:

Page 2, Paragraph B.1.:

Remove "approximately annually," and substitute "after each renewal or significant amendment of the license or of AEC Regulations, and as directed by higher authority."

ENCLOSURE (1)



SAN FRANCISCO BAY NAVAL SHIPYARD
SAN FRANCISCO, CALIFORNIA 94135

10 330
1700
A 1730
21K

IN REPLY REFER TO:
H950;KAE:lrt
21 March 1968

MEMORANDUM

From: Group Superintendent, Electrical Group
To: Radiological Protection Officer, Code 732
Via: Production Officer, Code H300

Subj: AEC License No. 04-00364-05; renewal of

1. AEC License No. 04-00364-05, which authorizes the use of the Radiac Calibrator, AN/UDM-1A, serial number 24, at Hunter's Point, is scheduled to expire on the 31st of May 1968. The Calibrator contains 128 curies of Cesium 137. It is requested that the license be renewed. No changes to the license are requested.

R. A. Raggio
R. A. RAGGIO

Copy to:
H967
2397B3(H930)
732

H385-107

FIRST ENDORSEMENT on Code H950 Memo of 21 March 1968

5 APR 1968

From: Production Officer, Hunters Point
To: Radiological Protection Officer, Code 730

Subj: AEC License Renewal

1. Forwarded recommending approval.

H. C. Page

H. C. PAGE

681121

21 March 1968

From: A. C. Dennis, Foreman Electronics Mechanic, Shop M67
To: Industrial Radiological Protection Officer, Code 108
Via: (1) Mr. E. H. Williams, General Foreman, Shop M67
(2) Shop Superintendent, M967 (WAS)
(3) Group Superintendent, M354

Subj: A.E.C. License No. 04-00364-05

Ref: (a) BUSHIPSINST 5100.11A

1. It is requested that subject license be renewed in compliance with ref (a) and with the following changes in Attachment C, Emergency and Operating Procedures.

(a) Page 3, paragraph 5:
Remove "approximately annually".
Substitute "after each renewal or significant amendment of the license".

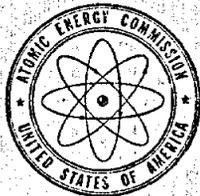
(b) Page 4, paragraph 1:
Add "or AN/PDR-43" after "AN/PDR-27 with AN/PDR-18"

A.C. Dennis

To: Code 108 - Believe above request is in acc/w ref a and should be processed promptly.

Thacker

P. L. Kerasian



UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545

DML:IB:37

IN REPLY REFER TO: This notice of your license expiration is sent for your convenience and it should be interpreted that similar notices will be sent in the future. The responsibility for the license remains with the licensee.

Department of the Navy
San Francisco Bay Naval Shipyard
Vallejo, California 94592

April 1, 1968
LICENSE NUMBER
04-00364-05
EXPIRATION DATE
May 31, 1968

RICHARD E. CANNINGHAM
SUBJECT: NOTICE OF LICENSE EXPIRATION

Notice is given that the above Byproduct Material (Radioisotopes) License expires on the date indicated.

If you desire to continue your radioisotope program, an application for renewal of the license should be filed with this office. It is to your advantage to file such an application at least thirty (30) days before the expiration date of your existing license. Your program will then be covered by your existing license until we can issue you a new license, (Title 10, Code of Federal Regulations, Part 30, Section 30.37 (b).) If applications received less than 30 days prior to the expiration date of your license cannot be processed before your existing license expires, this could result in your possessing radioisotopes without a valid license which is a violation of Federal Regulations.

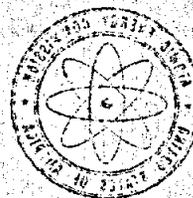
If you do not wish to renew your license, please complete the enclosed Form HQ-277, "Certificate - Disposition of Radioisotopes," and return it to this office.

In submitting a renewal application, all items in Form AEC-313 must be completed. Information contained in previous applications, statements, or reports filed with the Commission with respect to the information specified in Items 8 through 15, Form AEC-313, may be incorporated by reference, provided that such references are clear and specific. References should not be made to the license. The document which contains the information should be given instead.

If you have obtained an amendment which has extended the expiration date of the above license, or if a new license has been issued which superseded the above license, please disregard this notice.

UNITED STATES
ATOMIC ENERGY COMMISSION

WASHINGTON, D.C. 20545



DML:IB:37

This notice of your license expiration is sent for your convenience and it should not be interpreted that similar notices will be sent in the future. The responsibility for license renewal remains with the licensee.

April 1, 1968

LICENSE NUMBER

04-00364-02

EXPIRATION DATE

MAY 31, 1968

Department of the Navy
San Francisco Bay Naval
Shipyard
Vallejo, California

Sincerely yours,
Richard E. Cunningham

Richard E. Cunningham

Chief, Isotopes Branch

Division of Materials

Licensing

Notice is given that the above Byproduct Material (Radioisotopes) License expires on the date indicated.

Enclosures:

1. Form AEC-313

2. HQ-277

CC:

Department of the Navy

Commander

Naval Electronic Systems Command

Washington, D. C. 20360

Attn:

Mr. George N. Mahaffey

Code: 05163

If you do not wish to renew your license, please complete the enclosed Form HQ-277, "Certificate - Disposition of Radioisotopes", and return it to this office.

In submitting a renewal application, all items in Form AEC-313 must be completed. Information contained in previous applications, statements or reports filed with the Commission with respect to the information specified in Items 8 through 15, Form AEC-313, may be incorporated by reference, provided that such references are clear and specific. References should not be made to the license. The document which contains the information should be given instead.

If you have obtained an amendment which has extended the expiration date of the above license, or if a new license has been issued which superseded the above license, please disregard this notice.

SAN FRANCISCO BAY NAVAL SHIPYARD

VALLEJO, CALIFORNIA 94592

IN REPLY REFER TO:

9900

30

APR 15 1968

From: Commander, San Francisco Bay Naval Shipyard
To: Director, Division of Materials Licensing
U. S. Atomic Energy Commission
Washington, D. C. 20545
Via: Commander, Naval Electronics System Command (Code 0516)
Subj: AEC Byproduct Material License No. 04-00364-05; Request for renewal of
Ref: (a) HANRED P-5055, Radiation Health Protection Manual
Encl: (1) Form AEC-313, Application for Byproduct Material License, with
two attachments (original and three copies)

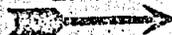
1. It is requested that the subject license be renewed. Enclosure (1) is forwarded in accordance with reference (a).
2. The Shipyard Ionizing Radiation Control Committee has reviewed this application and recommends approval.

J. H. MC QUINN

Copy to: (w/encl)
HANRED (Code 74)
NAVELEXSYSCOM (Code 0516)

Code 700
H300
H350 (w/encl)
H300
H354 (w/encl)
H733 (w/encl)

PERK



ORIGINATOR: C. Park
Typist: R. Utterback

UNITED STATES ATOMIC ENERGY COMMISSION
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the licensee is subject to Title 10, Code of Federal Regulations, Part 20.

<p>1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital person, etc. Include ZIP Code.)</p> <p>Commander San Francisco Bay Naval Shipyard Vallejo, California 94592</p>	<p>(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1(a). Include ZIP Code.)</p> <p>Hunters Point San Francisco, California 94135 and Mare Island Vallejo, California 94592</p>
<p>2. DEPARTMENT TO USE BYPRODUCT MATERIAL</p> <p>Production Departments Hunters Point and Mare Island</p>	<p>3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)</p> <p>Renewal of #04-00364-05</p>
<p>4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)</p> <p>Byproduct materials shall be used by, or under the direct personal supervision of, those individuals who have been certified as qualified by the Radiological Protection Officer.</p>	<p>5. RADIATION PROTECTION OFFICER. (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)</p> <p>G. J. Rosati, Radiological Protection Officer (See COMNAVSHIPYDMARE ltr to AEC 10330 (108-640) dtd 5-10-61 for resume of training and experience.)</p>
<p>6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.)</p> <p>A. Cesium 137</p> <p>B. Cobalt 60</p> <p>C. Strontium 90</p>	<p>(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)</p> <p>A. ORNL sealed source Drwg. No. 2339A A. 3 sources of approximately 128,000 mCi each</p> <p>B. ORNL sealed source Drwg. No. 2333 B. 1 source of 12,000 mCi</p> <p>C. U.S. Radium Corporation Model LAB-277 Sealed Source C. 1 source of 3 microcuries</p>
<p>7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)</p> <p>A. Byproduct materials A and B are to be stored and used in Model AN/UDM-1A and AN/UDM-1 calibrator sets respectively for calibrating ionizing radiation detection instruments and devices.</p> <p>One of the sources under A above is to be used in a Mobile Radiac Repair Facility Model AN/MDM-1 for calibrating radiac equipment at temporary locations for various activities throughout the Twelfth Naval District. The facility consists of a source-containing Model AN/UDM-1A calibrator set mounted in a trailer which is towed by a truck van. This facility will be moved on highways between the various temporary field locations in the States of California, Nevada and Utah as needed.</p> <p>C. Check source in Victoreen Model A T16-A sensing element in area monitoring system.</p>	

TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

B. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)		FORMAL COURSE (Circle answer)	
			Yes	No	Yes	No
a. Principles and practices of radiation protection	See Attachment A		Yes	No	Yes	No
b. Radioactivity measurement standardization and monitoring techniques and instruments			Yes	No	Yes	No
c. Mathematics and calculations basic to the use and measurement of radioactivity			Yes	No	Yes	No
d. Biological effects of radiation			Yes	No	Yes	No

9. EXPERIENCE WITH RADIATION. (Actual use of radioisotopes or equivalent experience.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See Attachment A		

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
AN/FDR-18	1	Gamma	0-500 R/hr	Thick Alumi-num case	Monitoring and Surveying
AN/FDR-27		Beta-Gamma	0-500 mR/hr	3.5-4.0	"
AN/FDR-43		"	0-500 R/hr	3-4	"
Eberline E-500B		"	0-2 R/hr	30	"

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE. Methods and standards, described in manuals and NAVELEX Instructions for calibration of instruments, are applied to calibrate the instruments not less frequently than every six months.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.) Film badges and self-reading dosimeters are used. Dosimeter readings are recorded daily. Film badges are routinely issued and related records processed monthly by the Medical Department. If a suspected excessive exposure or other nonroutine incident occurs in the interim, special processing is done.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No See Application dated 5 April 1966

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. See Attachment B

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. None anticipated. If waste disposal is required, an AEC or Agreement State contractor will be engaged.

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PART 30, AND THAT ALL INFORMATION CONTAINED HEREIN, INCLUDING ANY SUPPLEMENTS ATTACHED HERETO, IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF.

Date _____ Applicant named in item 1 _____
 By: _____
 Title of certifying official _____

WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

ATTACHMENT "A"
TRAINING AND EXPERIENCE

The following change is made to the training and experience statement in Attachment "A" to the application dated 5 April 1966:

Page 2, Paragraph B.1:

Remove "approximately annually," and substitute "after each renewal or significant amendment of the license or of AEC Regulations."

ATTACHMENT "B"
RADIATION PROTECTION PROGRAM

The following changes are made to the Emergency and Operating Procedures in Attachment "C" to the application dated 5 April 1966:

a. Page 3, Paragraph G.5:

Remove "approximately annually," and substitute "after each renewal or significant amendment of the license or of AEC Regulations."

b. Page 4, Paragraph I.1:

Add "or AN/PDR-43" after AN/PDR-18.

ATTACHMENT "A"
TRAINING AND EXPERIENCE

SUPPLEMENT 1
Training Program

SUPPLEMENT 2
Certification Examination

SAN FRANCISCO BAY NAVAL SHIPYARD
TRAINING PROGRAM
For
USERS OF RADIAC REPAIR FACILITY
CALIBRATION SOURCES

A. INTERNAL TRAINING

1. Classroom instruction in

a. Radiation Detection Instrumentation

- (1) Operation of instruments
- (2) Calibration and operation check
- (3) Limitations on use
- (4) Types required
- (5) Proper use of
- (6) Value to radiation safety
- (7) Interpretation of readings
- (8) Survey techniques
- (9) Use of film badges and pocket dosimeters

b. Fundamentals of radiation protection

- (1) Characteristics of radiation
- (2) Units of dose and radioactivity
- (3) Hazards of excessive exposure
- (4) Levels from licensed material
- (5) Methods of controlling dose (time, distance, shielding)

c. Instruction on calibration devices and storage equipment

- (1) Steps to be followed during operation of the calibration devices
- (2) Construction features of calibration devices
- (3) Possible malfunctions of calibration devices and how detected and corrected.
- (4) Radiation levels to be expected from calibration devices and storage containers when sources are exposed and secured and limits on radiation levels
- (5) Locking and securing of calibration devices and storage equipment
- (6) Storage precautions
- (7) Emergency action and notifications

d. Instructions on control of sources

- (1) Procedure for returning source to manufacturer
- (2) Inventory
- (3) Utilization logs

- e. Restricted and Radiation Areas
 - (1) Control of access to
 - (2) Posting
 - (3) Limits at perimeters
 - (4) Security of
 - (5) Warning lights, signs, alarms
 - f. Instruction in MXFR20 and LOGFR30
 - g. Instruction in the AEC license
 - h. Instruction in the Operating and Emergency Procedures
2. On the Job Training (6 months duration)
- a. Handling and use of calibration devices
 - b. Handling and use of calibration room alarm system
 - c. Handling and use of dosimeters and survey instruments

B. PERIODIC TRAINING

- 1. Basic refresher instructions on fundamentals of radiation protection, given ~~approximately annually~~ *biennially (Amend. #10 6/17/68)*
- 2. Instructions on any changes in the calibration program (at effective date of change), viz.
 - a. Applicable amendments to AEC regulations
 - b. Amendments to the license

NOTE: It will be determined by personal observation and/or written examination that the users thoroughly understand the changes in 2 above, and are competent to use newly added instruments and equipment.

C. PROCEDURE FOR DETERMINING QUALIFICATION OF PERSONNEL

- 1. Supervisory qualified user's observation of trainee's actual handling and use of equipment
 - a. The handling procedures and techniques which are required of the trainee are:
 - (1) Operation of Model AM/UM-1A and/or AM/UM-1
 - (2) Radiation surveys and posting
 - (3) Interpretation of readings
 - (4) Operation of the calibration room alarm system
 - b. Establish the trainee's ability to apply radiation safety competence in using the equipment by:

- (1) His demonstrated understanding of AEC regulations, the AEC license, and the Operating and Emergency Procedures
- (2) His demonstrated understanding of the principles of radiation control
- (3) His demonstrated judgment under simulated emergency situations

D. PROCEDURE FOR CERTIFICATION OF QUALIFIED PERSONNEL

1. Recommendation of eligible trainees by the supervisory qualified user to the Radiological ~~Safety~~ Officer for certification examination
Protection
2. Completion of the Radiation Safety Certification Examination with a score of 75% or more
3. Attendance at the examination review critique.

ATTACHMENT "B"
FACILITIES AND EQUIPMENT

SUPPLEMENT 1
Hunters Point

SUPPLEMENT 2
Mare Island

SUPPLEMENT 1

AN/UHM-1A Calibration Room. The calibrator is completely contained in a detached room (or house) of permanent construction, built on a corner of the roof of the fifth floor, of Building 253. Only two walls of the room are accessible to persons on the outside of the room. The only access into the room are doors in each of these two walls. The direction of the radiation beam is away from these two walls, out through a window and into unoccupied space 85 feet above the ground, so that no person on the outside of the room can foreseeably get into the radiation beam. The Calibration Room is above the tops of adjoining or nearby structures. Radiation surveys have been made on the tops of these structures, on the ground nearby, on ships moored at nearby berths, and on the fifth floor of Building 253 below the Calibration Room. These adjoining places have been found free of radiation from the AN/UHM-1A source while calibration operations have been taking place. See attached Sketch #1.

The doors to the AN/UHM-1A calibration room are kept locked at all times when not in use. They are unlocked only when authorized persons are actually entering or leaving the room. The keys for the room are kept in a locked cabinet in Building 351A at all times during which no work is being done in the Calibration Room. The room is posted on the outside at all times with radiation caution signs. Red warning lights are located on the exterior of the enclosure near each access. These caution lights are connected with the calibrator controls so as to be automatically lighted when the source is in the unattended position. This and other safety devices for securing the calibrator controls are shown in attached Sketch #2.

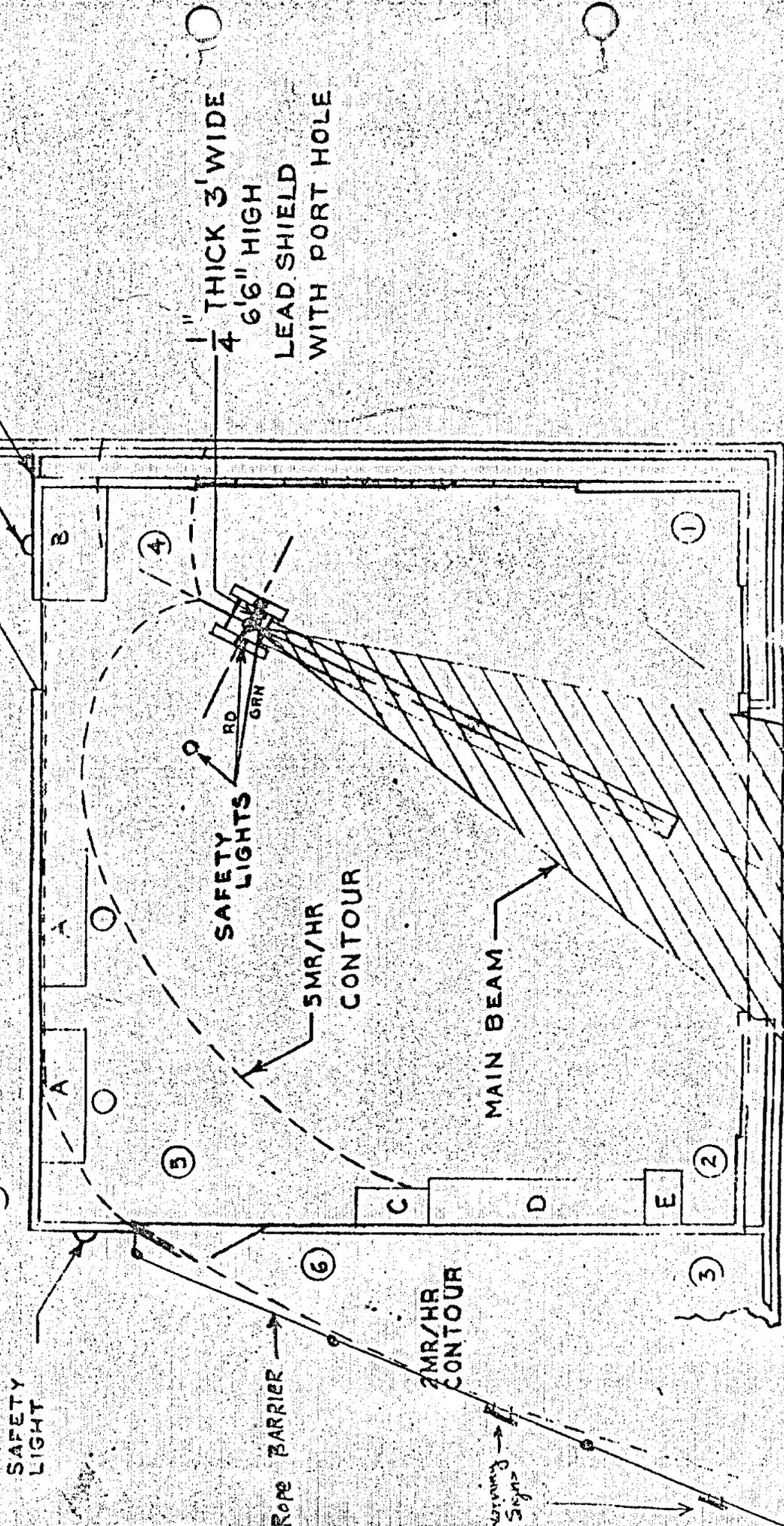
ATTACHMENT B
SUPPLEMENT 1

CALIBRATION ROOM

BLDG 253, 6TH FLOOR
AN/UDM-1A

SKETCH #1
SUPPLEMENT #1

SAFETY LIGHT
BARRIER



1" THICK 3' WIDE
6' 6" HIGH
LEAD SHIELD
WITH PORT HOLE

SAFETY LIGHTS

5MR/HR
CONTOUR

MAIN BEAM

2MR/HR
CONTOUR

SAFETY LIGHT

ROPE BARRIER

SAFETY LIGHTS

- A WK TABLE + STOOL
- B DESK
- C MATERIAL CABINET
- D EQUIPT. STORAGE
- E SAFE

SCALE: 1/8" = 9"

PT.	R.	H.
1	12.5	
2	53.6	
3	30	
4	10	
5	25	
6	1.25	
7	1.5	
8	0.5	

SHEET
12
2 OF 2

SKETCH #2
SUPPL. #1

(SOURCE)
ATTENUATED POSITION & RED WARNING LIGHT OFF

SOURCE LOCK-RELEASE
FOR ATTENUATED POSITION.

MECHANICAL SOURCE
CONTROL, PLUG IN & OUT.

PLUG IN.

RED WARNING LIGHT
MICRO SWITCH
FOR PLUG OUT.

SAFETY LOCK WHEN
SOURCE IS SECURED.

NOTE:
WHEN ALL RED WARNING LIGHT
SWITCHES ARE IN OFF POSITION
GREEN SAFETY LIGHT IS ON.

SOURCE LOCK-RELEASE
FOR UNATTENUATED
POSITION.

(SOURCE)
UNATTENUATED POSITION
& RED WARNING LIGHT ON.

1-4-66
SHOP 67 SFBWS. HP

HOESON-JENKINS
ELECTRONIC MECH.

AN/UDM-1A CALIBRATOR CONTROLS WITH SAFETY

XERO COPY

XERO COPY

XERO COPY

SUPPLEMENT 2

The Calibration Room is located on the fifth floor of Bldg. 865, with the main beam of the AM/UM-1A and the AM/UM 1 directed through the exterior North wall of the building and into unoccupied space. The radiation levels at the nearest buildings and ground surfaces in the direction of the main beam have been found to be less than 0.1 mr/hr. The location of the calibration ranges, warning lights, signs, monitoring survey data and other control measures are shown in the attached plan. Safety devices for securing calibrator controls for the AM/UM-1A and AM/UM 1, are shown in attached sketches #1 and #2, respectively.

Sketch #1
Suppl. #2

RANGE AREA DOOR LOCKING
MICRO SWITCH

RED WARNING LIGHT MICRO SWITCH

AUTOMATIC DOOR LOCKING
MICRO SWITCH

SWITCH STRIKER PLATE

ORANGE WARNING LIGHT
MICRO SWITCH

ATTENUATOR CONTROL

MECHANICALLY LOCKED
WITH PADLOCK

SOURCE CONTROL

SOURCE LOCKING
RELEASE

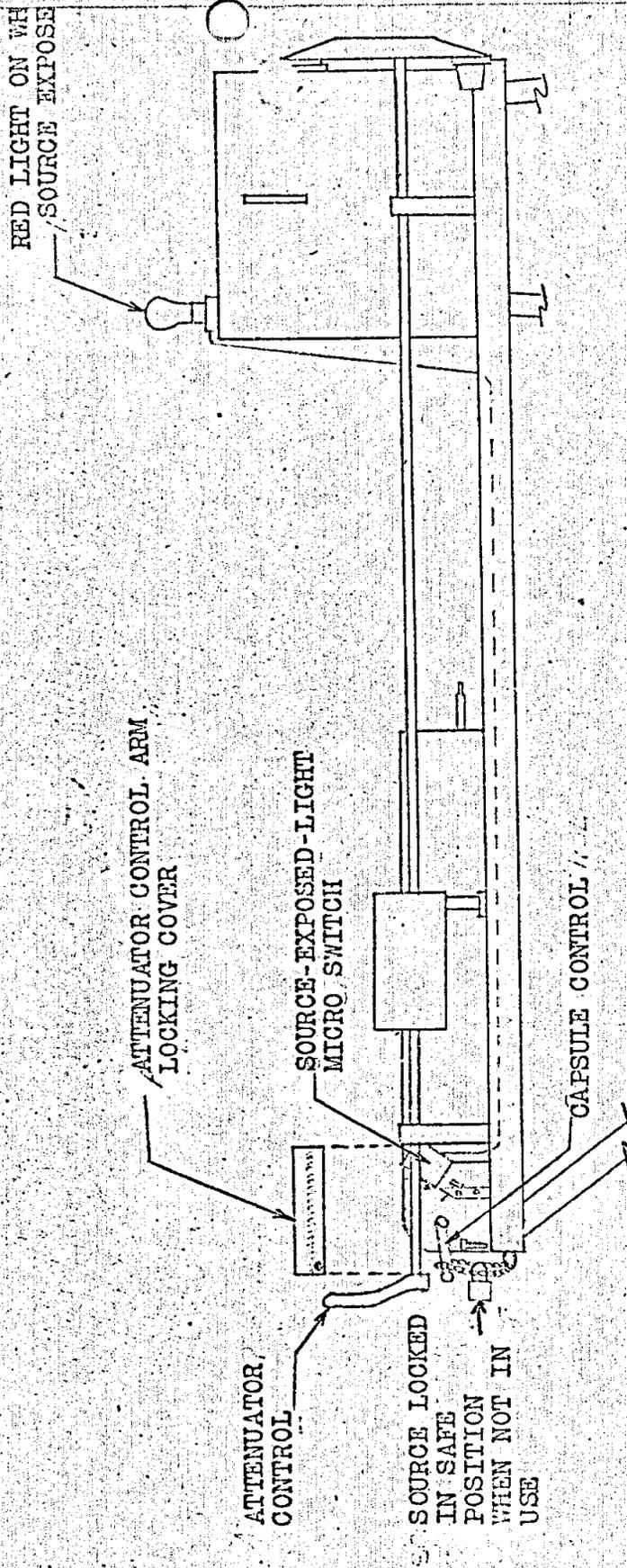
AN/UDM-1A CALIBRATOR CONTROLS WITH SAFETY AND INDICATING DEVICES

XERO COPY

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Sketch # 2
Suppl. # 2



AN/UDM-1 CALIBRATOR CONTROLS WITH SAFETY AND INDICATING DEVICES

XERO COPY

XERO COPY

XERO COPY

5X2-5pp 2

ATTACHMENT "C"
CONTROL PROCEDURES

SUPPLEMENT 1
Operating and Emergency Procedures

SUPPLEMENT 2
Leak Test Procedure

EMERGENCY AND OPERATING PROCEDURES

RADIAC REPAIR FACILITY

ELECTRONICS SHOP

PRODUCTION DEPARTMENTS

HUNTERS POINT AND MARE ISLAND

SAN FRANCISCO BAY NAVAL SHIPYARD

VALLEJO, CALIFORNIA

March 1966

ATTACHMENT C
SUPPLEMENT 1

RADIAC REPAIR FACILITY
EMERGENCY AND OPERATING PROCEDURES

A. Introduction

The Radiac Repair Facility of the Electronics Shop at both Hunters Point and Mare Island has custody of and uses radioactive byproduct material sources of ionizing radiation under a license issued by the Atomic Energy Commission. These sources are used for the calibration of instruments to detect and measure ionizing radiation.

B. Caution

All personnel are cautioned that excessive exposure to ionizing radiation from these radioactive sources is extremely hazardous to the health of individuals so exposed. Excessive exposure may result from improper handling, use, storage, transportation, security or disposal of the sources.

C. Instruction

Accordingly, all radiac repair facility personnel are directed to follow the instructions contained in this procedure, which deals with the safe operation of these sealed sources and the equipment containing them.

D. Scope

This procedure applies to all operations and associated work performed by Radiac Repair Facility personnel.

E. Procedural Changes

Because this procedure is a condition of the AEC license, no change or alteration of it or the practices specified in it will be made without prior consultation of the Radiological ^{Protection} Officer, Code ~~317~~¹⁰⁸, and application for and receipt of an appropriate license amendment or renewal, as specified in current Shipyard instructions.

F. Responsibilities

1. The use of radioactive calibration sources in the Radiac Repair Facility will be under the supervision of individuals who have been certified by the Radiological Safety Officer.

2. The following persons, or their successors, with the advice of the Shipyard Radiological ^{Protection} Officer and Health Physicist, are responsible for implementation of the overall radiation protection program of the Facility:

a. At Mare Island

F. F. Mikasian

~~F. F. Mikasian~~

A. G. Dennis

Master Mechanic, Electrical-Electronics Group
Head of Electronics Shop
Chargehand Electronics Mechanic
Chargehand Electronics Mechanic, in charge
of Radiac Repair Facility

T.M. Robnett
includ.

17354-308-66 10/10/66

b. At Hunters Point

G. L. Constock
Earl Tsuchi
W. H. Williams

Master Mechanic, Electronics Shop
Quartermen Electronics Mechanic
Leadingman Electronics Mechanic, in charge
of Radiac Repair Facility

3. Each operating employee is responsible for:

a. Being aware of the hazards involved in handling byproduct radioactive material sources and safeguarding such sources in his charge, or with which he is working, to prevent unnecessary exposure to himself and other personnel.

b. Understanding and following these procedures and all conditions of the AEC license.

c. Properly operating the equipment, related handling tools and survey instruments which will be used in his work assignments and using the sources only for purposes authorized in the AEC license and this procedure.

d. Following the posted or verbal instructions of his supervisor.

e. Prohibiting smoking, eating, drinking and chewing in the Calibration Room.

f. Immediately reporting to his supervisor any accident or unusual incident involving a source of ionizing radiation, such as, but not limited to the following:

- (1) Exceeding radiation exposure limit or dosimeter reading.
- (2) Protective equipment damaged.
- (3) Any spilling or leak of radioactive material.
- (4) Any damage to a radiation shield or source container.
- (5) Any wound or scratch resulting in a break of the skin or any incident where radioactive material may have entered a person's body.

G. Qualification and Training of Operators

1. Each person to be considered for training or certification as a calibration operator must submit to a medical examination and be qualified for work with ionizing radiation by the Medical Officer. Persons who regularly work with ionizing radiation must also have periodic follow-up examinations.

a. In the event of an acute illness lasting a week or more, the employee must obtain medical clearance prior to returning to duty which requires association with or operation of radiation sources.

2. Each calibration operator will be certified qualified in radiation safety competence at the discretion of the Radiological ~~Section~~ Officer, after demonstrating to the supervisor his competence in handling calibration sources and related equipment.

3. New personnel (including apprentices who must be over 18 years of age) who are assigned to work in the Radiac Repair Facility are required to

read and understand, prior to entering the Radiation Area, the AEC license and these procedures. They must be given verbal instructions concerning the hazards of working with ionizing radiation and must also be assigned to work with a certified operator for on-the-job training.

4. Calibration operators will be considered for certification after completion of the following:

- a. Six months of experience in on-the-job training.
- b. Training Program for Users of Radio Repair Facility Calibration Sources.
- c. Examination of the individual as a competent operator of sources and related equipment, by the supervisor, to the Radiological ~~Officer~~ ^{Protection} Officer for certification as to radiation safety competence.
- d. Completion of the certification examination with a passing grade of 75% or more and attendance at the review critique.

5. Certified operators will be given periodic formal refresher training at appropriate intervals, ~~biennially (Amend #10 6/12/65)~~ as well as short informal refresher sessions conducted by the supervisor when required.

6. Certification and re-certification will be for periods designated by the Radiological ~~Officer~~ ^{Protection} Officer.

7. Each certified calibration operator must be furnished or otherwise have access to (viz. by posting) a copy of 10 CFR 20, 10 CFR 30, this procedure, and the current license.

II. Personnel Monitoring

1. All personnel who enter or are in the Calibration Room or restricted operating area in the field during an exposure must wear a film badge issued by the Medical Department and two self-reading pocket dosimeters. The dosimeters must have a range of zero to 200 mr. The supervisor shall insure that the dosimeters are fully charged at least once a week.

a. At Hunters Point, film badges and pocket dosimeters will be picked up at Bldg. 31A at the beginning of the work period and returned to this location at the end of each work period.

b. At Mare Island, film badges will be obtained from the installed film badge board in the Facility at the beginning of the work period and returned to the board at the end of each work period. Pocket dosimeters will be kept in the holder provided at each bench when not in use.

2. Expos shall be recorded daily on an exposure/dosimeter record card or permanent log book by the employee. The records shall be maintained for inspection and reviewed by the supervisor weekly.

3. Any person whose cumulative dosimeter dose reaches 200 mr in any one week shall be removed from further exposure and his film badge delivered to the Medical Department for evaluation. He shall not be again exposed until approved by the Medical Department. The quarterly exposure limits established by 10 CFR 20 will be adhered to.

I. Radiation Survey Instrumentation

1. Calibrated and operable survey instrumentation is maintained in the Calibration Room (and also in the AN/SEM-1 truck van when in transit and at field sites) to make physical radiation surveys as required by 10 CFR 20 and 10 CFR 30. Each radiation survey instrument shall be calibrated at intervals not to exceed six months and after each replacement of batteries, other components or otherwise serviced. A record will be maintained of the latest date of calibration. Survey instrumentation shall have a range such that 2 mr per hour through 1 r per hour can be measured. The following instruments are currently in use:

or AN/PDR 43 (Award #10 6/17/68)

AN/PDR-27 with AN/PDR-10A - calibrated by Radiac Repair Facility
Eberline Mod. H-500B - calibrated by Radiac Repair Facility

2. Operators shall inform their supervisor at any time when the calibration of the instrument seems in doubt. It shall be used to check radiation levels in setting up limits within which non-operating personnel may work.

3. A physical radiation survey shall be made before and after each calibration exposure to determine that all sealed sources have been returned to their normal storage position in the shielded container.

4. The supervisor shall be responsible for the determination of compliance with 10 CFR 20 regarding physical radiation surveys.

J. Security of Sources during Storage and Exposure.

1. The Calibration Room will be kept locked at all times when not in use or otherwise attended by a certified operator.

a. At Hunters Point the key to this Calibration Room will be kept in a locked cabinet in Bldg. 351A when work is not being done. The keys will be picked up and returned to this cabinet at the beginning and end, respectively, of each work period.

2. Each exposure device or storage container shall be provided with a lock designed to prevent unauthorized or accidental removal or exposure of the sealed source, and shall be kept locked at all times except when under the direct surveillance of a certified operator. Sources will be operated only by or under the direct supervision of one of the certified operators.

3. Each exposure device, storage container, and room in which sources are stored or used shall bear a durable, clearly visible sign or label bearing the radiation symbol and the words "Caution (or Danger) Radioactive Material" in accordance with Section 19.203 of 10 CFR 20. Labels on containers shall also state the quantity and kind of radioactive material and the date of measurement of the quantity.

4. Exposure devices measuring less than four (4) inches from the source storage position to any exterior surface of the device shall have no radiation level in excess of fifty (50) mr/hr at six (6) inches from any exterior surface of the device. Exposure devices measuring four (4) inches or more from the source storage position to any exterior surface of the device, and all storage containers, shall have no radiation level in excess of two hundred (200) mr/hr at any exterior surface, and ten (10) mr/hr at one (1) meter from any exterior surface. The radiation levels specified are with the sealed source in the off (i.e., shielded) position.

5. Whenever additional shielding should be employed to reduce radiation exposure of the operators or of persons in the unrestricted area.

K. Control of Access to Radiation Areas

1. Security

a. During actual exposures in the Calibration Room (or at AN/MCM-1 field calibration sites) a certified operator shall maintain direct surveillance to protect against unauthorized entry into the Radiation Area.

b. A warning sign and warning lights shall be in place at each access into the Calibration Room. The warning lights shall be energized through an interlock with the source controls, to indicate exposure of a source.

(1) At Mare Island the door leading to the High Radiation Area in the Mechanical Equipment Room shall also be so equipped. In addition, the interlocks on doors in the Calibration Room shall be energized on exposure of the source to prevent inadvertent access to High Radiation Areas.

2. Posting

a. Notwithstanding any provisions in Section 20.204(c) of 10 CFR 20, areas in which calibration is being performed shall be conspicuously posted as required by Section 20.203(b) and (c) (1) 10 CFR 20.

b. Radiation Area - "Radiation Area" means any area accessible to personnel, in which there exists radiation, originating in whole or in part within licensed material sources, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirem. Each Radiation Area, as determined, shall be conspicuously posted with approved AEC sign or signs bearing the radiation caution symbol and the words "CAUTION - RADIATION AREA".

c. High Radiation Area - "High Radiation Area" means any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed source material at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem. Each High Radiation Area, so determined, shall be conspicuously posted with approved AEC sign or signs bearing the radiation caution symbol and the words: "CAUTION - HIGH RADIATION AREA".

d. Restricted Area - "Restricted Area" means any area; access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials.

e. When the source is exposed, the calibration range is a High Radiation Area.

(1) At Mare Island the entire Radiac Repair Facility is a Restricted Area. When the source is exposed the Radiation Area is within the interlocked barrier and the Mechanical Equipment Room is a High Radiation Area.

(2) At Hunters Point, the Calibration Room is a Restricted Area. When the source is exposed, the Radiation Area is within the rope barrier.

7. When the source is exposed, at field sites, the Calibration Range is roped off at the 2 mr/hr isodose and is a Radiation Area. The operating area inside the tent is a Restricted Area.

L. Range Operational Procedures

1. Check source radiation level at marked spot behind source container using a radiac survey instrument. The reading should be no more than 1 mr/hr.

a. At Mare Island, when the source radiation level has been found to be less than 1 mr/hr, enter and inspect locked Mechanical Equipment Room, making certain that personnel are not in the room. Verify operation of door alarm and lock door when leaving.

2. Assure that no one is on the range beyond the barrier or within the 2 mr/hr isodose area of a field calibration site.

3. Unlock the control handle.

4. Operate source position controls (from a position behind source container) to assure smooth operation and return source to stowed position and verify proper operation of all warning lights and interlocks.

5. Using the low range radiac survey instrument, check radiation level at marked spot behind the source container. The reading should be approximately 0.5 mr/hr. If the reading exceeds 1 mr/hr, there is a defect in the positioning mechanism. Do not proceed until the defect has been corrected. (REPAIRING OR SERVICING OF THE SEALED SOURCE BY SHOP PERSONNEL IS NOT PERMITTED.)

6. With the source in the stowed position, and container plugs in place, place the instrument to be calibrated at the proper position on the range and adjust optical system.

7. Two operators work in unison from operating positions behind the source shield; one exposes the source by means of the source positioning controls, and observes the instrument meter readings while the other operator records data on the calibration sheet.

a. At a field calibration site, the operators' position is behind the control end of the trailer.

8. After each reading, the source is returned to its stowed position and the radiation level checked with a survey meter to verify this position before anyone enters the range.

9. If the alarm sounds or the warning lights go out during the operation, the source shall be returned immediately to its stowed position and the operation secured until the trouble has been found and corrected.

10. Log the time of calibration in the log book.

11. At the end of each working shift, the lead operator will verify that the source is in the safe position, lock the control handle, and sign the log book accordingly.

M. Emergency Procedures

1. An "emergency" exists whenever control of a sealed radioactive source has been lost. This includes a dropped source, a leaking source or a source that cannot be returned to its normal storage position.

2. In the event of an emergency, all operating personnel shall:

a. Secure the source immediately.

b. Use one of the survey radiac instruments on the range and evacuate the area to the 2 mR/hr isodose line or to a safe distance beyond, if necessary, and set a watch to prevent entry of personnel.

c. Quickly make a preliminary survey of the area to determine the location and extent of the emergency.

d. If spillage of radioactive material may have occurred, every effort will be made to avoid the spread of contamination. No one will be permitted to leave the safe area until he has been monitored by Industrial Hygiene/Health Physics personnel provided someone else outside the affected area is present to perform the duties below in "e".

e. If either no one else is present, in the event of radioactive contamination, or such contamination is known not to exist:

(1) Notify the supervisor or one of those named on the emergency list posted at the telephone. All others on the list will be notified thereafter as soon as possible.

(2) Secure any ventilation to the room.

(3) Barricade and post accesses to the area at the 2 mR/hr isodose line or proximal safe distance beyond with the ropes, signs and stanchions provided.

(4) Maintain security of the area until relieved by a supervisor on the advice of the Radiological Protection Officer, or his representative, who will also advise on remedial action.

(5) Restore ventilation to the room when it is determined that no loose radioactive contamination has resulted.

3. In the event of fire in or adjacent to the Radiac Shop, persons in charge of the area or the radioactive material sources shall immediately:
 - a. Secure the source.
 - b. Vacate the area in accordance with established fire drill procedures.
 - c. Close the doors to the calibration room and leave them unlocked.
 - d. Seek and inform the Fire Protection Branch Supervisor present about the location and status of the sources and the hazards involved.
 - e. Notify the supervisor or one of those named on the emergency list posted at the telephone. All others on the list will be notified thereafter as soon as possible.

4. Emergency procedures concerning Mobile Radiac Repair Facility sources either in transit or at field calibration site operations are included under the heading of "Special Operating and Emergency Procedures for Mobile Radiac Repair Facility AM/UM-1" in section Q.

H. Removal and exchange of sealed sources in exposure devices

1. When a source has decayed to the point where it must be renewed, the exposure device will be returned to the manufacturer, vendor or other BUSHIPS designated recipient for replacement of the source.

2. Operators shall not remove or exchange sealed sources in the AM/UM-1A and/or AM/UM-1 calibration devices from their present containers.

O. Leak Testing of Sources

1. Licensed sources in the Radiac Repair Facility are leak tested by Health Physics personnel at least every six months in accordance with the approved procedure. Records of these tests are kept in the files of the Health Physics Branch, Radiological Protection Officer and Radiac Section.

P. Records and Reports

1. The following records shall be maintained in the Radiac Repair Facility:

- a. Quarterly physical inventory and location of all licensed sources.
- b. Daily source utilization record.
- c. Receipt, transfers and disposal documents concerning licensed sources.
- d. Results of area surveys and monitoring.
- e. Calibration history of survey instruments.
- f. List of currently certified operators.
- g. Type and date of training performed under Section C.
- h. Current license application(s) and license(s) issued; *related amendments*

- i. Film badge exposure results.
- j. Pocket dosimeter readings.
- k. Pertinent AEC, EUCHEPC and Shipyard directives and procedures.
- l. Unusual incidents involving radioactive materials or handling devices.

8. All records pertaining to personnel protection shall be made available to the Radiological Safety Officer, Code 106, and/or Medical Department personnel, upon request.

9. Special Emergency Procedures Pertaining to Mobile Radiac Repair Facility AM/MIR-1

1. P.B-Departure Check-Out

Prior to transporting the Mobile Radiac Repair Facility to temporary field locations, the operators shall:

a. Inspect the storage plug of the source to make certain that it is secured by the locking bolt and padlock.

b. Inspect source positioning lever to make certain that it is in the attenuated position.

c. Monitor for radiation leakage at the surface of the storage plug, readings should not exceed 35 mr/hr.

d. Lock the trailer doors and inspect radiation warning signs on the trailer housing and source container to make certain that they are not obscured or defaced in any way.

e. Inspect the trailer hitch assembly and safety chains to assure proper security.

f. Insure that barricades, warning signs and operable, calibrated detection instruments, a copy of this operating and emergency procedure, license, keys, etc., are in the van.

g. Operate the truck on public highways in accordance with all applicable Federal regulations and State laws.

2. Steps In-Transit

In making stops in transit between temporary field or storage locations, usually for food or overnight lodging, the operator shall:

a. Select a parking area as remote from traffic and other potential hazards and activity as practicable.

b. Leave the truck unattended only for minimum periods during stops for meals.

c. Notify the manager of overnight lodgings, or his representative, of the location of the truck, its safety integrity and request immediate notification of any involvement of the truck or trailer in any incident, accident or imminent danger.

3. Emergencies

In the event of any incident, vehicular collision or other accident that might cause any concern regarding radiation hazards in a public place, the uninjured operator shall:

- a. Render all possible assistance in clearing injured personnel from any actual or potential hazard area that may have resulted.
- b. Monitor the area carefully to determine the hazard perimeter, if any.
- c. Put up radiation warning signs to keep unauthorized or unsuspecting personnel from the potentially hazardous area.
- d. As soon as possible, notify the nearest law enforcement and military agencies of conditions and report to Shipyard authorities, whose names are posted in the van, by radio communication or preferably collect telephone call.
- e. Reduce the extent of the radiation hazard area, if any, and give all possible assistance in controlling the situation until relieved or otherwise instructed by competent authority in charge at the scene.

(1) If an Emergency Occurs at a Temporary Field Calibration Site.

Barricade the area and immediately report to Shipyard authorities whose names are posted in the truck via radio communications or preferably collect telephone. If necessary you will be instructed to notify the nearest military activity having a qualified radiological safety capability. A list of such activities is posted in the truck. Notify local command.

(2) In Case of Fire in the Vicinity of the Source, which threatens to involve or damage it.

- (a) Secure the source and remove the trailer.
- (b) If the trailer and source cannot be moved, secure the source and withdraw to a safe distance setting a watch and, if possible, posting the area. Seek out and inform the scene commander or fire fighting supervisor of the location and status of the source and the hazards involved to personnel.

4. Selection of a Suitable Site at Temporary Field Locations

a. Radiation patterns. All operators shall be thoroughly familiar with the radiation pattern produced by the M/UM-1A, 120 curie Cesium source. A graph is posted on the front panel of the trailer showing the 2 and 5 m/hr isodose contours when the source is exposed and the background levels surrounding the trailer when the source is secured.

b. The calibration site at each temporary location will usually be pre-selected and designated. If not, it must be selected with extreme care to insure that:

(1) The radiation pattern may be completely contained within the site.

(2) The site must be such that complete control and continuous visual observation may be maintained against possible intrusion by all unauthorized personnel including children and small domestic animals.

(3) Where the temporary field site has not been pre-selected and designated, some possible sites to be considered are:

(a) National Guard or Reserve Armories

(b) Fenced athletic fields that are not in use

(c) Inactive air fields

(d) Positions overlooking normally inaccessible areas, such as tidal flats or into the base of cliffs.

5. After a suitable site has been reached the operator shall:

a. Insure that the radiation pattern is clear of personnel and roped off or otherwise barricaded and appropriate warning signs and lights are installed.

b. Post a watch where necessary to keep all personnel at a safe distance.

c. Monitor the roped off area to confirm that the computed Radiation Area is correct as soon as the source is first exposed.

6. Upon completion of exposures at temporary field locations the operator shall:

a. Assure that the source is properly secured and control mechanisms locked.

b. Remove and store all monitoring equipment, barricades, lights and warning signs.

c. Perform all actions indicated on the pre-departure check-off list to properly prepare for moving the AM/UM-1A calibrator.

d. Complete and sign the pre-departure check-off list prior to leaving the site.

HARE ISLAND NAVAL SHIPYARD
MEDICAL DEPARTMENT
INDUSTRIAL HYGIENE DIVISION
HEALTH PHYSICS BRANCH PROCEDURE V.E.4.

V. Contamination Control

E. Source Control

4. Leak test of Radiac calibration sources

a. General

The Radiac Facility, Shop 67, calibration sources must be leak tested at least once every six months. The Assistant Health Physicist in Charge of the Radiation Exposure Control Section is responsible for scheduling and supervising such leak tests. Persons performing the leak test must be permanent employees of the Health Physics Branch, and must be approved by the ~~Industrial Radiological~~ Protection Officer. Records of all leak tests shall be kept with the record of the corresponding source in the Source Control file.

b. Procedure

(1) Assure that the source is in the safe position by observing the controls and indicating lights, and by monitoring with a survey meter.

(2) Wind pressure-sensitive adhesive tape around a half-inch rod with the adhesive side out so that four inches at one end is covered.

(3) Remove the plug from the port, and wipe inside the port by pressing the adhesive tape on all available surfaces. Replace the plug.

(4) Remove the tape from the rod by rolling it up with the adhesive side in, and place it in a half-inch test tube.

(5) Count the wipe in the gamma well-crystal scintillator. Calculate the results as microcuries, and record.

(6) If the results are over 0.005 microcuries, or significantly greater than the previous test, report it to the Health Physicist.

c. Records and Reports.

(1) Records. The results of each leak test, including date, operator, and activity found, shall be entered on the appropriate

Isotope Data Sheet, and filed with the record of that source in the Source Control file.

(2) Reports. If contamination over 0.005 microcuries or other evidence of leaking is found, the Health Physicist will prepare a report to the ~~Industrial~~ Radiological ~~Protection~~ Officer via the Head, Industrial Hygiene Division, giving all pertinent data, and his recommendations.

Approved:

Chadman Burk
Health Physicist

May 1968

EXAMINATION FOR CERTIFICATION
OF
RADIAC REPAIR FACILITY PERSONNEL

NOTE: This examination or one similar in type, scope and difficulty, periodically revised to reflect conditions of the current license and to avoid repetition, will be used.

1. Read each question carefully.
2. Review its list of answers.
3. Select the statement that best answers the question.
4. Circle the letter preceding the statement you choose.

There is only one correct choice in each question

1. The surest way to avoid overexposure to radiation when approaching an AM/UDM-1 calibration set is to:

- a. Wear a film badge
- b. Watch the lights and signals of the control unit
- c. Wind the crank handle of the control unit as far as it will go
- d. Use an AM/PDR-27 radiac

2. Gamma rays are electromagnetic rays which:

- a. Attract beta particles
- b. Have high penetrating power and are similar to X-rays
- c. Have collisions with alpha particles
- d. Are similar to L-particles and have low penetrating power

3. A gamma radiation level of 1.6 r/hr is produced at 3 feet from a 1-curie Co 60 capsule. A man remains 6 feet from a 10-curie Co 60 source for 2 hours. His approximate radiation dose is:

- a. 0.4 rem
- b. 4 rem
- c. 0.6 rem
- d. 8 rem

4. If you were told by a military or civilian supervisor other than your own to omit a safety precaution or to perform a potentially unsafe act, you would:

- a. Comply and make a report to your supervisor
- b. Refer him to your supervisor
- c. Refuse to comply
- d. Comply and say nothing

5. No individual shall be caused to receive a whole-body dose in excess of:

- a. 1-1/4 rems per calendar quarter
- b. 3 rems per quarter with prior completion of Form AEC-4
- c. 5 rems per year
- d. All of the above

7. Radiation levels in unrestricted areas shall not exceed:
- 5 mrem/hr or 500 mrem in any 7 consecutive days
 - 2 mrem/hr or 100 mrem in any 7 consecutive days
 - .5 mrem/hr or 50 mrem in any 7 consecutive days
 - None of the above; no radiation levels are allowed in unrestricted areas
8. Ionization means:
- Conversion of gamma rays into a pair of particles - an electron and a positron
 - Knocking an electron out of orbit around the nucleus of an atom, leaving the atom with a positive charge
 - Disintegration of radioactive nuclei
 - The emission of fast particles or rays by nuclei
9. Records concerning licensed byproduct materials must be kept to show:
- Effectiveness compared with previous sources
 - Changes in weight and shape
 - Receipt, transfer and disposal
 - None of the above
10. All individuals working in a restricted area shall:
- Be informed of the occurrence of radioactive material or radiation in the area
 - Be instructed in safety problems, precautions and AEC regulations
 - Be advised of radiation exposure reports on their request
 - All of the above
11. Only qualified personnel are permitted to work with radioactive materials. To be qualified, a person must:
- Have a film badge issued by the Medical Department
 - Satisfy the Group Master of Shop 67 or his designate in the Radiac Repair Facility that he is aware of the hazards involved
 - Satisfy the Industrial Radiological Safety Officer that he knows the rules which must be obeyed
 - Be capable of operating the equipment properly
 - All of the above
12. The entire area occupied by the Radiac Repair Facility shall be monitored and the results permanently recorded:
- Monthly
 - Weekly
 - Quarterly
 - At the end of each shift

13. Areas where a radiological hazard exists because calibration sources are being used or stored or wipe testing is being performed shall be marked with:
- Red danger signs with appropriate legend
 - Three-bladed symbol and magenta and yellow color combination with appropriate legend
 - Three-bladed symbol and red and white color combination with appropriate legend
 - None of the above
14. Receipt, transfer, or disposal of licensed materials require notification of:
- The Supply Officer
 - The Production Officer
 - The Industrial Radiological Safety Officer
 - The Safety Office
15. The neutron instrument calibration set is the:
- AN/UDM-1
 - AN/UDM-1A
 - AN/UDM-3
 - AN/PDR-18
16. Placement of a spent source in its shipping container shall be done by:
- Supply Department personnel
 - Health Physics representative
 - One of the individuals named on the license
 - The manufacturer
17. After installation of the operating levers and verification of the position of the source, the next thing you should do is:
- Start calibration procedures
 - Connect warning lights and audible alarms and verify that they are operating
 - Place an AN/PDR-27 on the range for a calibration check
 - Place the instrument to be calibrated at the pre-selected position on the range
18. The Electronics Shop Instruction 5100.1 is:
- Provided as a guide for working procedures and is not a legal requirement
 - An administrative procedure
 - A condition of the license
 - All of the above

19. The difference between X-rays and gamma rays is:
- X-rays are not penetrating
 - The source they come from
 - Gamma rays cannot be used like X-rays
 - None of the above
20. Ionizing radiation is dangerous because it:
- Damages cells
 - May make you radioactive
 - Causes air ionization
 - May be inhaled
21. Radium and radon gas present a significant hazard because of the possibility of:
- Thermal neutron emission
 - Air ionization
 - Internal exposure
 - None of the above
22. If a shield of $1/8$ " lead will cut the radiation to half its former value, $1/4$ " will:
- Cut it to nothing
 - Cut it to $1/4$ its former value
 - Have no further effect
 - Cut it to $1/16$ its former value
23. Licensed material may be disposed of by:
- Disposal into a sewage system provided the material is readily soluble and the concentration when diluted is less than 1 millicurie
 - Incineration in underground disposal sites
 - Transfer to an authorized recipient
 - Dispersion into the Mars Island Channel
24. Licenses for use of a sealed source of byproduct material, as defined in 10CFR30, are issued by:
- The Navy Department
 - The Industrial Radiological Safety Officer
 - The Shipyard Commander
 - The Atomic Energy Commission
25. The issuing authority of byproduct material licenses may:
- Inspect the material, premises and related facilities and records
 - Require appropriate tests of the material, facilities and detection equipment
 - Revoke, suspend or modify the license
 - Withhold or recall the byproduct material for violations of the license
 - All of the above

26. Each byproduct material licensee must post or have available for employees' inspection which of the following:
- Current copy of 10CFR20
 - Current copy of the license
 - Current copy of operating procedures
 - All of the above
27. A request for procurement of a new sealed source will be:
- Approved by the Health Physics Branch
 - Forwarded to Code 108
 - Sent directly to the Supply Department
 - All of the above
28. Radiation surveys shall be made and recorded:
- When the location of the AM/UDM-1 is changed
 - When the location of the AM/UDM-1A is changed
 - When a different source is installed
 - Every six months
 - All of the above
29. When the warning lights or audible alarm are operating in any areas marked with appropriate AEC-approved signs:
- Visitors or unqualified persons shall be permitted to enter if wearing a film badge and two pocket dosimeters
 - Any Shipyard employee may enter if accompanied by a qualified person who will make sure a hazard does not exist
 - Visitors are permitted to enter if they have a shop pass
 - No one is permitted to enter the area
30. Changes in handling devices or methods require prior approval of:
- The Health Physics Branch
 - The Shipyard Commander
 - The Advisory Board
 - The Industrial Radiological Safety Officer
31. After notifying of an emergency, you should next:
- Make a survey and rope off the 2 mR/hr uncontaminated boundaries
 - Request decontamination services from the Planning Department
 - Try to determine the cause of the accident
 - Evacuate the area
32. Information on the AEC-approved label affixed to the source container to be shipped out shall be inserted by:
- One of the individuals named on the license
 - Health Physics representative
 - Supply Department
 - Industrial Radiological Safety Officer

33. Before placing the instrument to be calibrated at the pre-selected position on the range, verify that:
- The supervisor is notified of readiness to calibrate
 - All facility personnel are informed of the start of calibration operations
 - No one is in the blower room and that the door to this room is locked
 - The mirror and telescope are adjusted
34. Byproduct materials may be removed from the calibration sets:
- For repairs and leak testing
 - Only when authorized by AEC
 - When removed from one exposure device to another
 - All of the above
35. About the only way to make ordinary materials radioactive is to:
- Expose them to gamma rays
 - Expose them to X-rays
 - Bombard them with fast-moving particles in a nuclear reactor
 - All of the above
36. Usually, a sealed source emits only:
- Alpha particles
 - Beta rays
 - Neutrons
 - Gamma rays
37. The radiation dose is the:
- Quantity of ionizing radiation absorbed by the body
 - The amount of ionizing radiation which cannot be exceeded
 - The amount of radiation given off by a radioactive source
 - The amount required to cause blood changes
38. A one-hour exposure of an individual to gamma radiation intensity of 20 r/hr would cause:
- Obvious blood count changes
 - Mild radiation sickness to some
 - Deaths to half exposed
 - No detectable effects
39. The AN/PDR-27 radiscan can detect:
- Any kind of radiation
 - Alpha radiation
 - Delta radiation
 - Beta and gamma radiation

40. If at 10 feet from a source the radiation level is 10 mr/hr, the radiation level at 20 feet will be:
- 2-1/2 mr/hr
 - 20 mr/hr
 - 100 mr/hr
 - 5 mr/hr
41. The official record of an individual's dose is obtained by:
- Calculating his potential exposure
 - Estimating how much time he spent in a Radiation Area
 - Contacting the Industrial Radiological Safety Officer
 - Radiac readings
 - His film badge reading
42. Applications for byproduct material licenses are approved if the user:
- Has an authorized purpose
 - Has facilities and equipment adequate to protect health
 - Is qualified by training and experience to use the material
 - All of the above
43. Persons convicted of willful violations of license provisions:
- May be punished by fine
 - May be punished by imprisonment
 - May be punished by fine and imprisonment
 - May not be punished
44. A licensee must immediately notify the AEC by telephone or telegraph of any incident wherein an individual receives a whole-body exposure from his byproduct material source of:
- 25 rems or more
 - 5 rems or more
 - 3 rems
 - 1-1/4 rems
45. An incoming sealed calibration source will not be accepted from the Supply Department until:
- The container has been monitored and released by the Industrial Radiological Safety Officer
 - The container has been monitored and released by the Health Physicist
 - The Supply Officer certifies safe condition of the source
 - All of the above

46. Sealed calibration sources will be leak tested by:
- An "individual user" and a Health Physics Inspector
 - Any Radiac Repair Facility personnel
 - Industrial Radiological Safety Officer
 - The supervisor
47. Each person working around radioactive materials will record the average total reading of his pocket dosimeters:
- Each week
 - Whenever he receives an exposure of over 100 mrem
 - Each day
 - Not always required
48. The individual personally responsible for the safe use of the calibration sources and strict observance of regulations pertaining thereto is:
- The Shipyard Commander
 - The Industrial Radiological Safety Officer
 - The Health Physicist
 - One of the users named on the license
49. An emergency exists whenever:
- A source is dropped
 - A source is leaking
 - A source fails to return to its normal storage position
 - Any of the above occurrences
50. Radiation detection instrumentation to be used during operation of the calibration sets shall have a range of:
- 5 mr/hr to 5 r/hr
 - 1 r/hr to 10 r/hr
 - 0 mr/hr to 500 mr/hr
 - 2 mr/hr to 1 r/hr
51. In manipulating the AN/UDM-1 and AN/UDM-1A sets:
- Only one operator is required and he must take a position behind the lead protective shield
 - Of the two operators required, only one must take a position behind the lead protective shield
 - The only operator of the set may or may not take a position behind the lead protective shield
 - Two operators are required; both must take their position behind the lead protective shield

52. If you get a reading of 1 mr/hr after placing an AM/PDR-27 between the lead personnel shield and the source, you may assume that:
- Something is wrong
 - The source is in its safe storage position
 - The source is not leaking and operation appears normal
 - The source is fully exposed
53. The neutron calibration operation for fast neutron meters is carried out as specified by:
- The Industrial Radiological Safety Officer's instructions
 - The Radiation Control Branch procedure
 - The instruction manual for the calibrator
 - The shop supervisor's notes
54. Repair of sources shall be performed by:
- The individual users
 - The Health Physics Branch
 - The manufacturer
 - The Industrial Services Branch
55. The half-life of radioisotopes is:
- 10 years
 - The time required for half an atom to decay
 - The number of atoms disintegrating per minute
 - The time required for one-half of the atoms of the radioisotope to decay
56. Units of accumulated radiation dose are expressed in:
- Curie (c), millicurie (mc)
 - Roentgen (r) per hour or milliroentgen (mr) per hour
 - Roentgen equivalent man (rem), milliroentgen equivalent man (mrem)
 - RBE
57. The LD/50 (median lethal dose where half those exposed die) for ionizing radiation exposure of human beings is:
- Unknown
 - About 500 mrem
 - About 500 rem
 - 5,000 r
 - About 20 rem
58. A film badge is worn to:
- Detect dose received
 - Keep you from getting exposed
 - Get you into a radiation area
 - None of the above

59. Unsealed sources of radioactive material can enter the body by:
- Inhalation
 - Absorption through breaks in the skin
 - Ingestion or swallowing
 - All of the above
60. Isotopes could be defined as:
- An atom containing the same number of neutrons and protons
 - A molecule containing three atoms
 - Two nuclei of the same element which have different masses
 - The only elements that are radioactive and cause ionization
61. Additional requirements or conditions which may be incorporated in any license by the issuing authority:
- Are subject to review and modification by the Industrial Radiological Safety Officer
 - Are considered necessary by the issuing authority to protect health or minimize danger to life and property
 - Are not an integral part of the license and therefore need not be legally complied with
 - All of the above
62. A sign bearing the conventional radiation caution colors and symbol, and the words "Caution (or Danger) High Radiation Area" describes an area where radiation levels are such that in any one hour a major portion of the body could receive a dose in excess of:
- 2 mrem
 - 5 mrem
 - 100 mrem
 - 500 mrem
63. An employee involved in an exposure to radiation which must be reported to the AEC must also be:
- Ordered to show cause why he should not be reprimanded
 - Notified by the licensee in writing of the nature and extent of exposure
 - Given a period of hospitalization under observation
 - Carefully instructed in filling out reports of future incidents
64. Packing for shipment or unpacking of a calibration source will be:
- Under the supervision of an individual named in the license in the presence of a Health Physics representative
 - Under the supervision of the Industrial Radiological Safety Officer
 - Under the personal supervision of the Shop Master
 - Accomplished by any Radio Repair Facility employee

65. Leak testing will be performed:

- a. In accordance with Health Physics Branch wipe testing procedure
- b. By the "individual users" named in the license
- c. Not less frequently than every six months
- d. All of the above

66. Permanent, up-to-date records shall be kept of:

- a. Location and use of all sources and licenses
- b. Trained and medically qualified personnel
- c. Radiation surveys and monitoring of areas
- d. All receipts and disposals of licensed materials
- e. All of the above

67. In the event of an emergency, the first thing to do is:

- a. Notify your supervisor
- b. Evacuate the area
- c. Turn on the ventilation
- d. Monitor the area

68. A calibration source arriving at the Radio Repair Facility must:

- a. Have a leak test certification from the manufacturer
- b. Bear a release from the Health Physics Branch
- c. Bear a release from the Supply Officer
- d. Be signed for by the Foreman

69. To be sure that the source is in its storage position, you should:

- a. Use an AN/FDR-27
- b. Crank the source all the way in
- c. Connect the warning lights and audible alarm
- d. Ask your supervisor

70. Whenever warning signals or meters indicate abnormal behavior:

- a. Return the source to the safe position immediately
- b. Leave the source exactly as it is and ask another operator to verify the abnormal behavior
- c. Do not touch the source until you can locate another meter
- d. Immediately evacuate the calibration room and notify your supervisor

71. An acute exposure is one that:

- a. Is repeated at short, regular intervals continuously
- b. Is received by the whole body
- c. Does extensive damage
- d. Occurs within a short space of time

72. A chronic exposure is one that:
- Is repeated at short, regular intervals, continuously
 - Is received by the whole body
 - Does extensive damage
 - Occurs within a short space of time
73. A radiation area is set up around each source in order to:
- Prevent significant exposure of people who do not have film badges
 - Interfere with production
 - Only to comply with regulations
 - Keep people from interfering with the exposure
74. Which of the following combinations illustrates the best means of protection from external radiation:
- Controlling working time, distance from the source, and shielding
 - Lead, concrete, and steel
 - Glass, tin, aluminum
 - Air, water, and earth
 - Protective clothing, mask, gloves
75. Pocket dosimeters:
- Detect contamination
 - Protect wearers from harmful effects of radiation
 - Can detect your exposure as soon as it happens
 - Won't work upside down
76. Of the following combinations, which illustrates the best means of protection from internal radiation exposure:
- Time, distance, shielding
 - Lead, concrete steel
 - Adequate ventilation, filtering of air
 - Protective clothing, respirator and gloves
77. A former employee may receive, under provisions of 10CFR20, a report of his exposure from each licensee by:
- Requesting it from the licensee
 - Filing a claim for it
 - Taking no particular action
 - None of the above
78. The licensee is required to report to the AEC in writing, within 30 days, any exposure to radiation exceeding limits in 10CFR20 or the license. The report must describe:
- The extent of exposure of persons involved
 - Levels of radiation involved
 - Cause of the exposure and corrective measures taken
 - All of the above

EMERGENCY AND OPERATING PROCEDURES
MOBILE RADAR REPAIR FACILITY AN/MDM-1 ()
ELECTRONICS SHOP
PRODUCTION DEPARTMENT
HARE ISLAND NAVAL SHIPYARD

March 1964

Supplement 1 to Attachment C
AEC License No. 4-364-5

ENCLOSURE (1)

Supplement 1 to Attachment C for Amendment to AEC License No. A-364-5

The operating and emergency procedures pertaining to normal operation of the AN/UEM-1A in this particular set are the same as those defined in Attachment C to the original license with the following exceptions:

1. In paragraph F.1. "of work in the calibration area" in lieu of "who enter the calibration range room."
2. In paragraph G.1. "truck van while in transit" in lieu of "calibration room."
3. Paragraph I.1. is not applicable.
4. Paragraph I.2.d. is not applicable.
5. Paragraph J.2. is not applicable.
6. Paragraph J.3. should have the words "beyond the interlocked barrier" deleted.
7. Paragraph J.8. "trailer" in lieu of "interlocked barriers."
8. Paragraph K.2.h. and i are not applicable.

In addition the following procedures will apply to the operation of the AN/UEM-1 ().

A. Pre-Departure Check-Out

Prior to transporting the Mobile Radiac Repair Facility to temporary field locations, the operators shall:

1. Inspect the storage plug of the source to make certain that it is secured by the locking bolt and padlock.
2. Inspect source positioning lever to make certain that it is in the attenuated position.
3. Monitor for radiation leakage at the surface of the storage plug, readings should not exceed 35 mr/hr.
4. Lock the trailer doors and inspect radiation warning signs on the trailer housing and source container to make certain that they are not obscured or defaced in any way.

5. Inspect the trailer hitch assembly and safety chains to assure proper security.

6. Insure that barricades, warning signs and operable, calibrated detection instruments, a copy of this operating and emergency procedure, license, keys etc., are in the van.

7. Operate the truck on public highways in accordance with all applicable Federal regulations and State laws.

B. Steps In-Transit

In making stops in transit between temporary field or storage locations, usually for food or overnight lodging, the operator shall:

1. Select a parking area as remote from traffic and other potential hazards and activity as practicable.

2. Leave the truck unattended only for minimum periods during stops for meals.

3. Notify the manager of overnight lodgings, or his representative, of the location of the truck, its safety integrity and request immediate notification of any involvement of the truck or trailer in any incident, accident or imminent danger.

C. Emergencies

In the event of any incident, vehicular collision or other accident that might cause any concern regarding radiation hazards in a public place, the uninjured operator shall:

1. Render all possible assistance in clearing injured personnel from any actual or potential hazard area that may have resulted.

2. Monitor the area carefully to determine the hazard perimeter, if any.

3. Put up radiation warning signs to keep unauthorized or unsuspecting personnel from the potentially hazardous area.

4. As soon as possible, notify the nearest law enforcement and military agencies of conditions and report to Shipyard authorities, whose names are posted in the van, by radio communication or preferably collect telephone call.

5. Reduce the extent of the radiation hazard area, if any, and give all possible assistance in controlling the situation until relieved or otherwise instructed by competent authority in charge at the scene.

a. If an Emergency Occurs at a Temporary Field Calibration Site,

Ed
Barricade the area and immediately report to Shipyard authorities whose names are posted in the truck via radio communications or preferably collect telephone. If necessary you will be instructed to notify the nearest military activity having a qualified radiological safety capability. A list of such activities is posted in the truck. Notify local command.

b. In Case of Fire in the Vicinity of the Source, which threatens to involve or damage it.

(1) Secure the source and remove the trailer.

(2) If the trailer and source cannot be moved, secure the source and withdraw to a safe distance setting a watch and, if possible, posting the area. Seek out and inform the scene commander or fire fighting supervisor of the location and status of the source and the hazards involved to personnel.

D. Selection of a Suitable Site at Temporary Field Locations

1. Radiation patterns. All operators shall be thoroughly familiar with the radiation pattern produced by the AN/UDM-1A, 120 curie Cesium source. A graph is posted on the front panel of the trailer showing the 2 and 5 mr/hr isodose contours when the source is exposed and the background levels surrounding the trailer, when the source is secured.

2. The calibration site at each temporary location will usually be pre-selected and designated. If not, it must be selected with extreme care to insure that:

a. The radiation pattern may be completely contained within the site.

b. The site must be such that complete control and continuous visual observation may be maintained against possible intrusion by all unauthorized personnel including children and small domestic animals.

c. Where the temporary field site has not been pre-selected and designated, some possible sites to be considered are:

(1) National Guard or Reserve Armories

(2) Fenced athletic fields that are not in use

(3) Inactive air fields

(4) Positions overlooking normally inaccessible areas, such as tidal flats or into the base of cliffs.

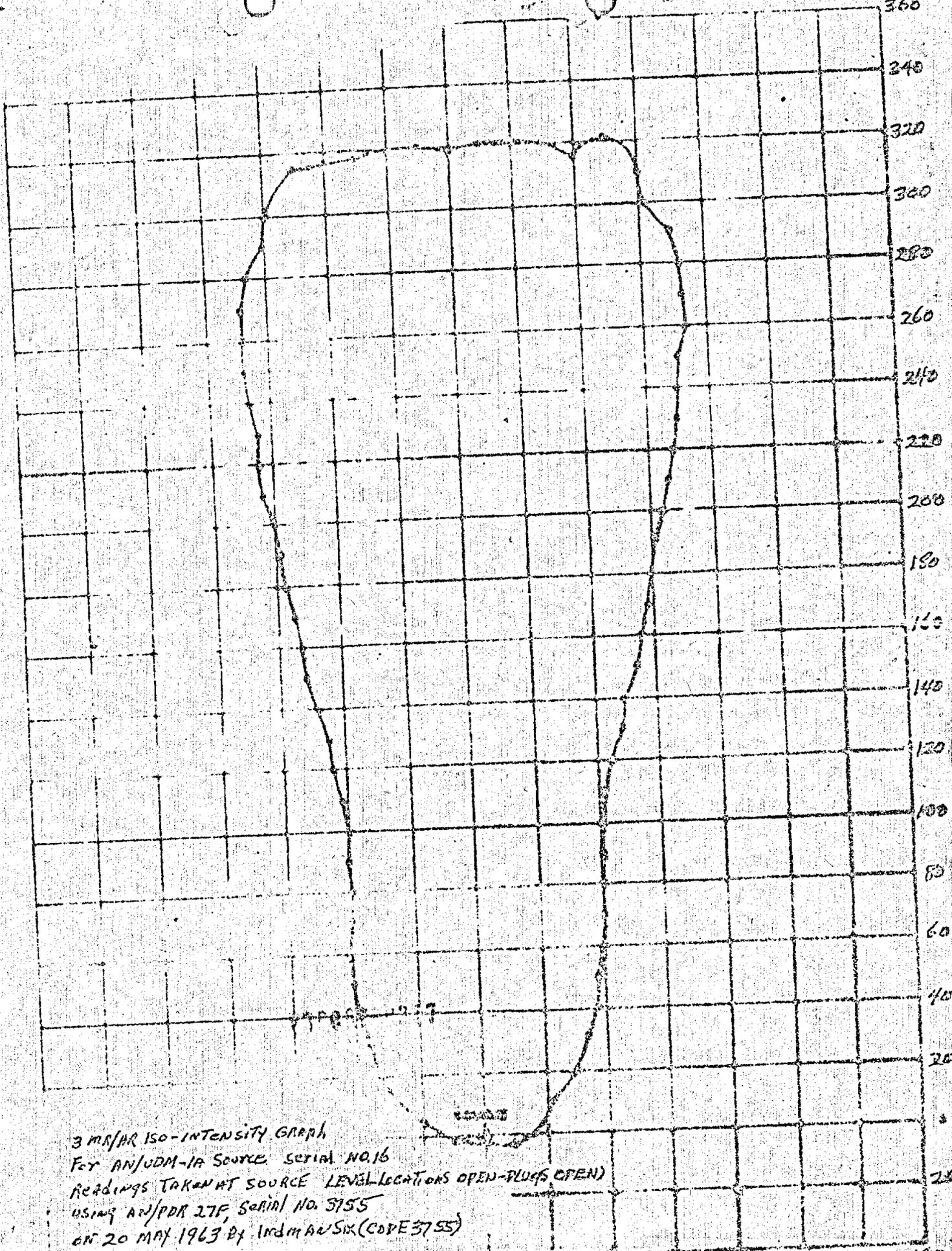
E. After a Suitable Site has been Reached the Operator shall

1. Insure that the radiation pattern is clear of personnel and roped off or otherwise barricaded and appropriate warning signs and lights are installed.

2. Post a watch where necessary to keep all personnel at a safe distance.

3. Monitor the roped off area to insure that Radiation Area is properly defined as soon as the source is first exposed.

4. Upon completion of exposures at temporary field locations and securing of the source, remove and store all barricades, lights, warning signs.



3 MR/HR ISO-INTENSITY GRAPH
 FOR AN/JDM-1A SOURCE SERIAL NO. 16
 READINGS TAKEN AT SOURCE LEVEL LOCATIONS OPEN-PLUGS OPEN)
 USING AN/PDR 27F, SERIAL NO. 3755
 ON 20 MAY 1963 BY INDMAN SIK (CODE 3755)

13. d. FACILITIES AND EQUIPMENT, MOBILE

The Mobile Radiac Repair Facility AN/MDM-1() consists of a truck van, calibration trailer and tent. The calibration trailer, which is towed by the truck to a temporary exposure location (usually a pre-selected site in a Federal activity), is positioned so that the radiation field will be directed away from the rear of the trailer. The trailer doors are unlocked and opened, the monorail for the instrument carriage is installed in the direction of the calibration beam, the tent erected alongside the truck and the exclusion area bounded by the 2 mr/hr isodose contour is barricaded and posted with radiation warning signs before the source is exposed.

The van is a commercial type 1-1/2 ton walk-in cab-over engine truck equipped with a military pintle-type trailer hitch with latched type lock. The hitch is secured to the chassis of the truck. The truck is divided into an equipment maintenance area, equipment storage area and the cab. The maintenance and repair area on the driver's side is fitted with a workbench running along the side of the truck with doors and cabinets above and below the bench for spare parts and small tools. The storage area on the opposite side of the van has storage for survey meters, an air sampler, scaler, chargers, dosimeters and a safe for the storage of small radioactive test sources.

The trailer is a modified military N-100 type and houses an AN/UDM-1A Radiac Calibration Set containing a 120-curie Cesium-137 source. The set consists of the lead-lined storage container, monorail and carriage, and optical system. The AN/UDM-1A source container is equipped with the same controls as for Source A of this license except for an automatic door locking switch. It is appropriately labeled as to contents, activity, identity and address of the custodian and is bolted to a base plate which in turn is bolted to the steel platform in the trailer so that the exposure port on the source container faces the rear of the trailer. The trailer is fitted with a lunette-type bracket assembly manufactured in accordance with U. S. Army Ordnance Corps drawing number 732-8305, and with safety chains for connection to the truck van. The trailer is permanently marked on all exterior sides with radiation-warning signs meeting AEC and ICC Regulations.

The controls to the calibration set are operated from the front of the trailer (rear of the source shield). Red, amber and green warning lights alert the operator as to the source position. The 2 mr/hr iso-intensity area for the exposed source is anticipated to be similar to that in the attached chart. This will be verified after receipt of the source but before using the equipment to calibrate instruments. Graphs of the 2 mr and 5 mr/hr isodose contours, when the source is exposed, as well as the background levels when the source is secured inside the trailer, will be posted on the front panel of the trailer and inside the truck. The latter levels are expected to be less than 10 mr/hr at all outside surfaces.

When not in transit between temporary field locations, the trailer will be stored with all doors locked at Station #6, a long-term storage area enclosed by 7' cyclone fence whose gate is locked when unattended. This area is located in a relatively remote site at the southern end of Mare Island Naval Shipyard.

Byproduct material specified in Items 6.C., 7.C., and 8.C. may be used at temporary job sites in the States of California, Nevada, and Utah.

ISLAND NAVAL SHIPYARD

(c) Radiation levels **TRAINING PROGRAM** on calibration devices and storage containers which persons are exposed and secured and limited on radiation level for

(d) Training of **USERS OF RADIAC REPAIR FACILITY** and storage equipment

(e) Training program **CALIBRATION SOURCES**

A. INITIAL TRAINING and notifications

1. Classroom instruction in radiation detection instrumentation

a. Operation of instruments care to manufacturer

b. Calibration and operation check

c. Limitations on use

d. Types required at this Area

e. Proper use of use

f. Value to radiation safety

g. Interpretation of readings

h. Survey techniques

i. Use of film badges and pocket dosimeters

2. Fundamentals of radiation protection

a. Characteristics of radiation

b. Units of dose and radioactivity agency Procedures and

c. Hazards of excessive exposure

PROTECTED TRAINING

d. Levels from licensed material

1. Annual refresher instructions on fundamentals of radiation protection

e. Methods of controlling dose (time, distance, shielding)

2. Instructions on any changes in the calibration program (as effective)

3. Instruction on calibration devices and storage equipment

a. Steps to be followed during operation of the calibration devices

b. Construction features of calibration devices: radiation survey instruments and calibration devices

c. Possible malfunctions of calibration devices and how detected

d. Provisions to the Operating and Emergency Procedures

and corrected.

e. Assessments to the license

NOTE: It will be determined by personal observation and/or written examination that the users thoroughly understand the changes in this by a, d, and e above, and are competent to use new, added instruments and equipment.

10330
(108-640)
May 10 1961

COPY 6/16/61 M1 (3)

AIRMAIL
SPEEDLETTER

From: Commander, Mare Island Naval Shipyard
To: Director, U. S. Atomic Energy Commission
Isotopes Branch, Division of Licensing and Regulation,
Washington 25, D. C.
Via: Chief, Bureau of Ships (Code 362B)

Subj: Radiological Safety Officer; designation of

Ref: (a) COMNAVSHIPYDMARE ltr 10330 (108-37765) of 13 Feb 1961

Mr. Guido J. Rosati has been designated Industrial Radiological Safety Officer in place of Mr. H. G. Isbell, who has retired from government service. It is therefore requested that the following information be substituted for Item 5 of enclosure (1) to reference (a) which requested consolidation of the AEC licenses held by Mare Island:

Guido J. Rosati, GS-13 (768400) - Industrial Radiological Safety Officer. University of California, D. S., College of Chemistry 1941. Post-graduate study (Industrial Hygiene) DeLamar Inst. Public Health Columbia University, 1942. Radiological Safety (6 weeks) Damage Control School, Naval Training Station, Treasure Island, California (1943). Post-graduate study (Radiological Health) New York University Post Graduate Medical School (1956). Nineteen years professional experience in Industrial Hygiene. Ten years of this experience as Industrial Hygienist Mare Island, followed during the last four years as Head of the Industrial Hygiene Division, Medical Department. Duties include technical and administrative direction of health physics functions for the shipyard.

L. V. HONSINGER

Copy to:
BUMED (Code 74)
AEC Operations Office
2111 Bancroft Way
Berkeley, California

Code 108