

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated June 3, 1996
1. Department of Commerce NOAA/PMEL	3. License Number 46-23463-01 is amended in its entirety to read as follows:
2. 7600 Sand Point Way N.E. Seattle, Washington 98115-0070	4. Expiration Date May 31, 2005
	5. Docket or Reference No. 030-22218

6. Byproduct, Source, and/or
Special Nuclear Material7. Chemical and/or Physical
Form8. Maximum Amount that Licensee
May Possess at Any One Time
Under This License

A. Nickel-63

A. Foils or plated
sources registered
either with NRC
under 10 CFR 32.210
or with an Agreement
State and
incorporated in a
compatible gas
chromatograph as
specified in Item 9
of this license

A. See Condition 9.A.

9. Authorized use

A. and B. To be used for sample analysis in compatible gas chromatography devices that have been registered either with NRC under 10 CFR 32.210 or with an Agreement State and have been distributed in accordance with an NRC or Agreement State specific license authorizing distribution to persons specifically authorized by an NRC or Agreement State license to receive, possess, and use the devices.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at 7600 Sand Point Way, N.E., Seattle, Washington, and on board NOAA or UNOLS research vessels at temporary job sites of the licensee at sea.

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number 46-23463-02

Docket or Reference Number 030-22218

Amendment No. 9

11. A. Licensed material shall be used by, or under the supervision of, James F. Gendron, John Bullister, Tim Bates, James Johnson, David Wisegarver, Fred Menzia, Bing-Sun Lee, or Lijun Hun.
- B. The Radiation Safety Officer for this license is James F. Gendron.
12. Detector cells containing licensed material shall not be opened or the foil sources removed from the detector cell by the licensee.
13. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.
- B. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- C. Sealed sources need not be leak tested if:
 - (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.
- D. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(b)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, ATTN: Director, Division

**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number 46-23463-02

Docket or Reference Number 030-22218

Amendment No. 9

of Nuclear Materials Safety. The report shall specify the source involved, the test results, and corrective action taken.

E. The licensee is authorized to collect leak test samples for analysis by Pacific Health Physics, Inc. Alternatively, tests for leakage and/or contamination may be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.

14. Maintenance, repair, cleaning, replacement, and disposal of foils contained in detector cells shall be performed only by the device manufacturer or other persons specifically authorized by the Commission or an Agreement State to perform such services.
15. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license.
16. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."
17. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the minimum limit specified in 10 CFR 30.35(d) for establishing decommissioning financial assurance.
18. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.
 - A. Letter dated June 3, 1996
 - B. Two letters dated December 4, 1996
 - C. Letter dated January 3, 1997

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date JAN - 6 1997

By

Robert A. Prange

Materials Branch
Region IV, WCFO
Walnut Creek, California 94596

(FOR LFMS USE)
INFORMATION FROM LTS

```

: PROGRAM CODE: 03123
: STATUS CODE: 0
: FEE CATEGORY: EX 3M
: EXP. DATE: 20050531
: FEE COMMENTS:
: DECOM FIN ASSUR REQD: N

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A. REGION

2. FEE ATTACHED
AMOUNT: _____
CHECK NO.: _____

- ### 3. COMMENTS

SIGNED _____
DATE _____

- B. LICENSE FEE MANAGEMENT BRANCH (CHECK WHEN MILESTONE 03 IS ENTERED / /)

1. FEE CATEGORY AND AMOUNT: _____

2. CORRECT FEE PAID. APPLICATION MAY BE PROCESSED FOR:
AMENDMENT _____
RENEWAL _____
LICENSE _____

3. OTHER _____

SIGNED _____
DATE _____



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV

Walnut Creek Field Office
1450 Maria Lane
Walnut Creek, California 94596-5368

JAN - 6 1997

Department of Commerce
NOAA/PMEL
ATTN: James Gendron
Radiation Safety Officer
7600 Sand Point Way N.E.
Seattle, Washington 98115-0070

SUBJECT: LICENSE AMENDMENT

Please find enclosed License No. 46-23463-01. You should review this license carefully and be sure that you understand all conditions.

If you have any questions, you may contact the reviewer who signed your license at (510) 975-0250.

You should note that License Condition 17. has been added to your license relative to the maximum amount of material you may possess under the license. This licensing action was necessary to preclude you from exceeding possession limits of materials requiring that decommissioning financial assurance be provided. Should you determine that you require possession of material in excess of 10 CFR 30.35(d) amounts, please notify us regarding an amendment to your license.

NRC expects licensees to conduct their programs with meticulous attention to detail and a high standard of compliance. Because of the serious consequences to employees and the public which can result from failure to comply with NRC requirements, you must conduct your program involving radioactive materials in accordance with the conditions of your NRC license, representations made in your license application, and NRC regulations. In particular, note that you must:

1. Operate in accordance with NRC regulations 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," 10 CFR Part 20, "Standards for Protection Against Radiation," and other applicable regulations.
2. Possess radioactive material only in the quantity and form indicated in your license.
3. Use radioactive material only for the purpose(s) indicated in your license.
4. Notify NRC in writing of any change in mailing address (no fee required if the location of radioactive material remains the same).
5. Request and obtain written NRC consent before transferring your license or any right thereunder, either voluntarily or involuntarily, directly or indirectly, through transfer of control of your license to any person or entity. A transfer of control of

your license includes not only a total change of ownership, but also a change in the controlling interest in your company whether it is a corporation, partnership, or other entity. In addition, appropriate license amendments must be requested and obtained for any other planned changes in your facility or program that are contrary to your license or contrary to representations made in your license application, as well as supplemental correspondence thereto, which are incorporated into your license. A license fee may be charged for the amendments if you are not in a fee-exempt category.

6. Maintain in a single document decommissioning records that have been certified for completeness and accuracy listing all the following items applicable to the license:
 - Onsite areas designated or formerly designated as restricted areas as defined in 10 CFR 20.3(a)(14) or 20.1003.
 - Onsite areas, other than restricted areas, where radioactive materials in quantities greater than amounts listed in Appendix C to 10 CFR 20.1001-20.2401 have been used, possessed, or stored.
 - Onsite areas, other than restricted areas, where spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site have occurred that required reporting pursuant to 10 CFR 30.50(b)(1) or (b)(4), including areas where subsequent cleanup procedures have removed the contamination.
 - Specific locations and radionuclide contents of previous and current burial areas within the site, excluding radioactive material with half-lives of 10 days or less, depleted uranium used only for shielding or as penetrators in unused munitions, or sealed sources authorized for use at temporary job sites.
 - Location and description of all contaminated equipment involved in licensed operations that is to remain onsite after license termination.
7. Submit a complete renewal application with proper fee, or termination request at least 30 days before the expiration date on your license. You will receive a reminder notice approximately 90 days before the expiration date. Possession of radioactive material after your license expires is a violation of NRC regulations.
8. Request termination of your license if you plan to permanently discontinue activities involving radioactive material.

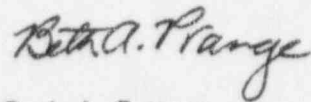
Department of Commerce
Seattle, Washington

-3-

You will be periodically inspected by NRC. Failure to conduct your program in accordance with NRC regulations, license conditions, and representations made in your license application and supplemental correspondence with NRC will result in enforcement action against you. This could include issuance of a notice of violation; imposition of a civil penalty; or an order suspending, modifying, or revoking your license as specified in the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), 60 FR 34381, June 30, 1995.

Thank you for your cooperation.

Sincerely,

A handwritten signature in cursive script that reads "Beth A. Prange".

Beth A. Prange
Sr. Health Physicist (Licensing)
Materials Branch

Docket: 030-22218
License: 46-23463-01
Control: 572371

Enclosures: As stated

Department of Commerce
Seattle, Washington

-4-

bcc:

Docket File
WCFO Inspection File
LFDCB, T-9 E10
State of WA (License Only)

DOCUMENT NAME: G:\beth\572371

To receive copy of document, indicate in box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

RIV:MB	N	C:MB						
BPrange <i>BqP</i>		Fwenslawski						
01/6/97		01/ /97		01/ /97		01/ /97		01/ /97

OFFICIAL RECORD COPY

U.S. DEPARTMENT OF COMMERCE

NATIONAL OCEANIC &
ATMOSPHERIC ADMINISTRATIONENVIRONMENTAL RESEARCH
LABORATORIES

COVER SHEET FOR MULTIPAGE FACSIMILE TRANSMISSION

DATE Jan 3, 1997 NUMBER OF PAGES INCLUDING COVER SHEET 4

FROM: <u>James Gendron</u>	TO: <u>Ms Beth Prange</u> <u>St Health Physicist</u>
ROUTING CODE: R/E/PM	ROUTING CODE:
COM'L PHONE NUMBER: (206) 526- <u>6213</u>	COM'L PHONE NUMBER:
FAX PHONE NUMBER: (206) 526-6054	FAX PHONE NUMBER: <u>510-975-0381</u>
VERIFICATION NUMBER: (206) 526-6778	VERIFICATION NUMBER:

MESSAGE

Enclosed is the information you requested.
Please contact me if you need additional
information -

James Gendron

572371



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way N.E.
Seattle, WA 98115

January 3, 1997

R/E/PM

Beth Prange,
Sr. Health Physicist
U.S. Nuclear Regulatory Commission
Region IV
1450 Maria Lane
Walnut Creek, California 94596-5368

Dear Ms. Prange:

This is in response to the questions you asked in our recent phone conversation.

Item 1) In the letter I sent to you dated December 4, 1996 the reports of wipe surveys of two rooms (1024 & 1029) were included. The wipe samples from both surveys were counted by Pacific Health Physics. Enclosed is the report from them which identifies the instrument as a Packard LSC and the calibration standard as a "C-14 LSC standard". This is the same instrument that was used in the close out report from April 1996. As indicated earlier, all counting results were below the detection limit of the instrument.

Item 2) Regarding the temporary waste storage area that was utilized for one week in March 1996, located in a fenced area to the east of hangar 33. The storage area is always locked and the RSO is the only one who has access to it. The only wastes stored in this facility were approximately 5 sealed drums that were being held before removal by a licensed radioactive waste disposal company. The RSO was told verbally by the consultant who packaged the wastes that the wipes taken at the waste storage area when the wastes were removed in March of 1996 showed no removable contamination. The RSO resurveyed this waste holding area on December 24, 1996. Enclosed is a map showing the location of wipes taken during this resurvey. The wipes were submitted to Pacific Health Physics and they were counted in the same instrument which was referenced above in item 1. All of the counting results were below the detection limit of the instrument.

Item 3) The acronym "UNOLS" stands for the University National Oceanographic Laboratory Systems. This is an oversight organization that coordinates the use of the fleet of university oceanographic research vessels in the U.S.

Sincerely,

James Gendron
Oceanographer
Ocean Environment Research Division

Enclosures



572371

Pacific Health Physics, Inc. **LSC Sample Analysis Report**

Facility: Dept. of Commerce, NOAA - PMEL Division Report Date: 29-Jul-96

Sample: 25 individually packaged samples numbered 96-9-0 through 96-9-25

Sample Analysis:

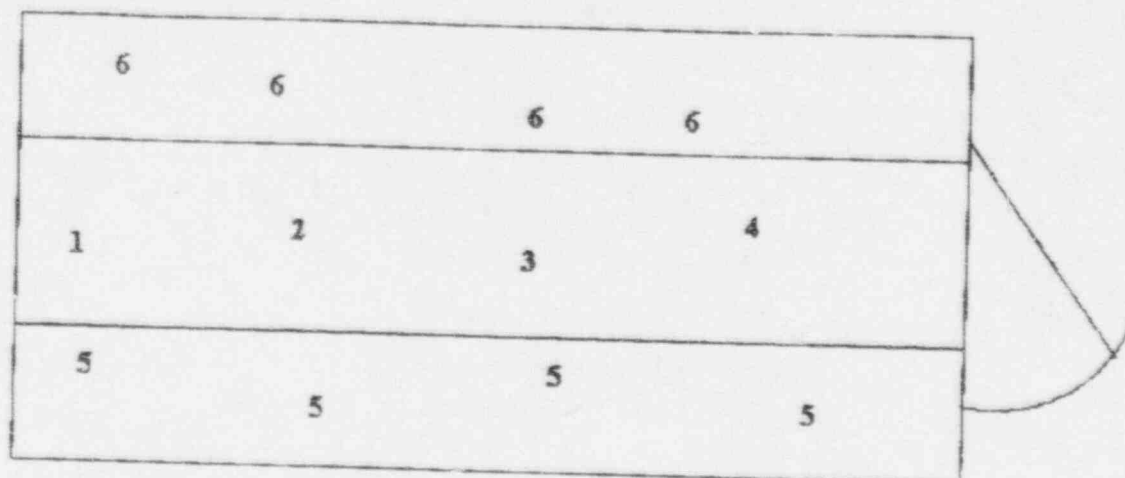
Counting Instrumentation:	Packard LSC	Standard Bkg. CPM: 4
		Standard CPM: 36396
Calibration Standard:	C-14 LSC standard	
Current Activity:	0.018 uCi	
	39,960 DPM	Eff: 0.911
Efficiency = $(3 \times \text{SQRT. BKG.}) / \text{Eff.}$		
MDC =	6.59 DPM	
MDA =	2.96736E-06 uCi	

Wipe Test Date	Control Number	Net DPM	Test Result
25-Jul-96	96-9-0	3	<MDA
25-Jul-96	96-9-1	3	<MDA
25-Jul-96	96-9-2	-2	<MDA
25-Jul-96	96-9-3	3	<MDA
25-Jul-96	96-9-4	2	<MDA
25-Jul-96	96-9-5	1	<MDA
25-Jul-96	96-9-6	9	<MDA
25-Jul-96	96-9-7	3	<MDA
25-Jul-96	96-9-8	0	<MDA
25-Jul-96	96-9-9	-1	<MDA
25-Jul-96	96-9-10	4	<MDA
25-Jul-96	96-9-11	3	<MDA
25-Jul-96	96-9-12	19	<MDA
25-Jul-96	96-9-13	2	<MDA
25-Jul-96	96-9-14	11	<MDA
25-Jul-96	96-9-15	2	<MDA
25-Jul-96	96-9-16	11	<MDA
25-Jul-96	96-9-17	-1	<MDA
25-Jul-96	96-9-18	3	<MDA
25-Jul-96	96-9-19	5	<MDA
25-Jul-96	96-9-20	0	<MDA
25-Jul-96	96-9-21	2	<MDA
25-Jul-96	96-9-22	1	<MDA
25-Jul-96	96-9-23	2	<MDA
25-Jul-96	96-9-25	1	<MDA
25-Jul-96	96-9-24	3	<MDA
25-Jul-96	96-9-25	1	<MDA

RSO Signature: _____

James Gendron

Wipe survey of temporary waste storage area near Hangar 33
December 24, 1996



96-17-0	blank	96-17-5	benchtop
96-17-1	floor	96-17-6	benchtop
96-17-2	floor		
96-17-3	floor		
96-17-4	floor		

All wipe results <0.0001 uCi/wipe

572371

00/00/00 12/20/96

TELEPHONE OR VERBAL CONVERSATION
RECORD

(MS-15)

TIME 3:20
00:00 am/pm[] INCOMING CALL ☒ OUTGOING CALL [] VISIT

PERSON CALLING:

OFFICE/ADDRESS:

PHONE NUMBER:

PERSON CALLED:

OFFICE/ADDRESS:

PHONE NUMBER:

James Gandon

Commerce, Seattle

(206) 526-6213

CONVERSATION

SUBJECT -

Control No. 572371

SUMMARY -

1. Reviewed Amendment 8 materials:

A. Iron -59 last used 7 yrs. ago, has decayed ($47.5 \text{ da} + \frac{1}{2}$)

B. Cu-64 last used 6 yrs. ago, has decayed.

C. Zn-65 - Transferred matts on 7/31/95

D. Cr-51 } Never procured

E. Hg-203 }

F. Mn-54 } Transferred 7/31/95

G. H-3 }

H. C-14 }

I. Ca-45 last used 10 yrs. ago, has decayed ($t_{\frac{1}{2}} = 165 \text{ da.}$)

J. S-35 Never procured

K. Ni-63 Transferred 7/31/95

L. Am-241 Transferred 7/31/95 - This was the source associated with the leak tests, which were provided.

M. To be retained.

REFERRED TO:

[] ADVISE ME ON ACTION
TAKEN

ACTION REQUESTED:

INITIALS:

DATE:

ACTION TAKEN:

INITIALS:

DATE:

00/00/00-12/20/96

TELEPHONE OR VERBAL CONVERSATION
RECORD

TIME

00:00 am/pm

☐ INCOMING CALL ☐ OUTGOING CALL ☐ VISIT

PERSON CALLING:

OFFICE/ADDRESS:

PHONE NUMBER:

PERSON CALLED:

OFFICE/ADDRESS:

PHONE NUMBER:

Gendron

CONVERSATION

SUBJECT -

SUMMARY -

Mr. Gendron stated that there was also a waste shipment with small amounts of these materials which was picked up by a broker, processed, and sent for burial. This shipment occurred shortly after the transfer of ~~the~~ the materials transfer to the U. of Wa.

2) The storage area shown on the map which was included with the letter of 6/3/96 was used only for about one week. Drums which were prepared for shipment were temporarily stored there. A survey was performed afterwards. Wipes were analyzed by their consultant. Mr. Gendron will forward the report.

3) Please identify the "UNOL" acronym. o.k.

4) Sources are always stored within sea-land containers which are lifted on or off ships, as needed. Bldg. 8, where the

REFERRED TO:

☐ ADVISE ME ON ACTION
TAKEN

ACTION REQUESTED:

INITIALS:

DATE:

ACTION TAKEN:

INITIALS:

DATE:

00/00/00

TELEPHONE OR VERBAL CONVERSATION
RECORD

TIME

00:00 am/pm

☐ INCOMING CALL ☐ OUTGOING CALL ☐ VISIT

PERSON CALLING:

OFFICE/ADDRESS:

PHONE NUMBER:

PERSON CALLED:

OFFICE/ADDRESS:

PHONE NUMBER:

CONVERSATION

SUBJECT -

SUMMARY -

containers are stored when not at sea, is at the 7600 Sand Point Way address. Temporary job sites on land are not needed, but at sea, they are.

- 5.) The survey results of Rooms 1024 + 1029 were done by the consultant, and analyzed on the counting equipment, which has already been identified. Mr. Gendron will so state.
- 6.) The R/E/PM after the licensee name is an internal mail code. It is not necessary to list it on the license.

- B. Prange.

REFERRED TO:

☐ ADVISE ME ON ACTION
TAKEN

ACTION REQUESTED:

INITIALS:

DATE:

ACTION TAKEN:

INITIALS:

DATE:

U. S. NUCLEAR REGULATORY COMMISSION
REGION V

DATE

00/00/00 7/23/96

TELEPHONE OR VERBAL CONVERSATION
RECORD

TIME

00:00 am/pm

☒ INCOMING CALL ☐ OUTGOING CALL ☐ VISIT

PERSON CALLING:

Jim Gendron

OFFICE/ADDRESS:

NOAA/Seattle

PHONE NUMBER:

(206) 526-6213

PERSON CALLED:

OFFICE/ADDRESS:

PHONE NUMBER:

CONVERSATION

SUBJECT -

Amendment - Control No. 572371

SUMMARY -

- 1) The Americium and other counting standards were transferred to the U. of Wa. about a year ago. He has documentation which he will forward.
 - 2) The HEPA filter was surveyed. There is a consultant report. The filter was clean, so it wasn't replaced.
 - 3) Room 1029 isn't being used, but they did have a leaking Ni-63 source there. Gendron will conduct a survey + send it in to release the room from the license.
 - 4) He is currently in the process of conducting a semi-annual inventory of the g.c.'s. Rooms are locked. There is a user list. A contractor does leak test analysis. They do not conduct maintenance or repair operations. They do need temporary job sites for ships at sea.
- Gendron will prepare a response to the questions + a resubmit for the g.c. application. - B. Prange

REFERRED TO:

☐ ADVISE ME ON ACTION
TAKEN

ACTION REQUESTED:

INITIALS:

DATE:

ACTION TAKEN:

INITIALS:

DATE:

TELECOPIER TRANSMITTAL

7/18/96

TIME

4:10pm

45-15

WARNING: Most facsimile machines produce copies on thermal paper. The image produced is highly unstable and will deteriorate significantly in a few years. Reproduce copies onto plain paper prior to filing as a record.

TO

NAME

James Candion

TELEPHONE

(206) 526-6213

NAME AND LOCATION OF COMPANY (If other than NRC)

Commerce, Seattle

TELECOPY NUMBER

(206) 526-6054

VERIFICATION NUMBER

FROM

NAME

Beth Prange

FAX: (510) 975-0381

TELEPHONE

(510) 975-0250

MAIL STOP

RIV; WCFO

TELECOPY DATA

NUMBER OF PAGES

THIS PAGE + 1 PAGES = 2 TOTAL

PRIORITY

IMMEDIATE

OTHER
(Specify)

SPECIAL INSTRUCTIONS

With respect to your letter dated 6/3/96, I need some additional information:

1) When was the Am-241 sealed source disposed? I need transfer records and a contact name and phone number to confirm receipt. The last leak test record would also be needed.

2) Transfer records are needed for the other counting standards (more →)

PROBLEMS

If any problems occur or if you do not receive all the pages, call:

TELEPHONE

DISPOSITION OF ORIGINAL

After telecopy has been sent, process the original as requested below. (If none are checked, the original will be discarded.)

RETURN TO SENDER

CALL AND SENDER WILL PICK UP

DISCARD

PROCESSED BY (INITIALS)

VERIFIED BY (INITIALS)

confirmed receipt
w/ Carolyn at (206) 526-6778

3) Was the HEPA filter surveyed? Replaced?

4) If Room 1029 has not been used (^{see} Ltr. dtd. 10/17/91) do you wish to delete it from the license at this time?

5) With regard to the gas chromatographs:

- where are they located?
- are the labs locked?
- who uses them?
- who analyzes leak tests?
- are temporary job sites still needed?

Note: I will mail a copy of the g.c. checklist + guide. You may want to resubmit a new application to replace everything currently in the file so that the final license condition can be amended to reference only one document. Then, the license will be much easier to use.

Please call me when you get a chance.

- Thanks,
Beth



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way N.E.
Seattle, WA 98115

December 4, 1996

R/E/PM

Beth A. Prange
Sr. Health Physicist
U.S. Nuclear Regulatory Commission
Region IV
1450 Maria Lane
Walnut Creek, California 94596-5368

Dear Ms. Prange:

This is in response to your fax dated July 18, 1996. The items listed below were requested under special instructions:

Number 1. Please see the enclosed memo dated July 25, 1995 and the enclosed quarterly wipe record.

Number 2. Please also see the enclosed memo dated July 25, 1995.

Number 3. The Hepa filter was surveyed and found to have no removable contamination. Please see the highlighted lines in the enclosed report from Pacific Health Physics dated March 29, 1996. The filter was not replaced at this time.

Number 4. Room 1029 has never been used for work with unsealed radioactive materials. Please delete it from the license. In the application for the new license this room is included as a location for use of the sealed source electron capture detectors (ECD). In our discussion the phone July 23, 1996 I mistakenly said that we might have discovered a leaking ECD in that lab. That was not the case. The leaking ECD occurred in Room 1024. I performed wipe test surveys recently of both rooms 1024 and 1029 and the results (see the enclosed reports) show no removable contamination in either of those rooms.

Number 5. Please see the enclosed sealed source inventory dated July 25, 1996 for the locations of the ECDs. The labs and vans are locked when not occupied by an authorized user of ECDs. The following personnel are currently authorized to use ECDs:

Dr. John Bullister
Dr. Tim Bates
Dr. James Johnson
David Wisegarver
Fred Menzia
Bing-Sun Lee
Lijun Han



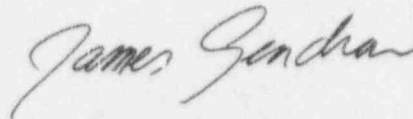
572371

The leak tests are analyzed by the following consulting service:

Pacific Health Physics, Inc.
6947 Coal Creek Parkway SE, Suite 188
Newcastle, WA 98059

Temporary job sites are still needed. The researchers that utilize the ECDs use them to characterize the global distribution of freons in the ocean. This requires that their analyses be performed on board oceanographic research vessels in very remote areas of the world.

Sincerely,

A handwritten signature in cursive script that reads "James Gendron".

James Gendron
Radiation Safety Officer

Enclosures



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way N.E.
Seattle, WA 98115

July 25, 1995

R/E/PM

MEMORANDUM FOR: The Record

FROM: James Gendron
Radiation Safety Officer

SUBJECT: Transfer Certificate of Radioactive Materials

This is a Certificate of Transfer of radioactive materials from the NOAA/ Pacific Marine Environmental Laboratory (NRC Materials License 46-23463-01) to the University of Washington (State of Washington Radioactive Material License of Broad Scope No. WN-C001-1).

The following by-product material is transferred effective July 31, 1995:

Nuclide	Current Activity	Form
✓ ¹³⁷ Cs	0.77 µCi	sealed source disc
✓ ⁶⁰ Co	0.16 µCi	sealed source disc
✓ ¹³³ Ba	1.03 µCi	sealed source disc
✓ ¹⁰⁹ Cd	0.0028 µCi	sealed source disc
✓ ⁵⁴ Mn	0.000077 µCi	sealed source rod
✓ ⁶⁰ Co	0.03 µCi	sealed source rod
✓ ²⁴¹ Am	0.015 µCi	plated source disc
✓ ¹³⁷ Cs	6.32 µCi	liquid
✓ ³ H	2.6 µCi	liquid
✓ ³ H	3.0 µCi	liquid
✓ ¹⁴ C	4.9 mCi	liquid
✓ ⁶³ Ni	2 mCi	liquid
✓ ⁶⁵ Zn	0.022 µCi	liquid

Transferred from NOAA/PMEL.

James Gendron
James Gendron
Radiation Safety Officer

7/31/95
(Date)

Transferred to University of Washington.

Brain Pankow
Brain Pankow

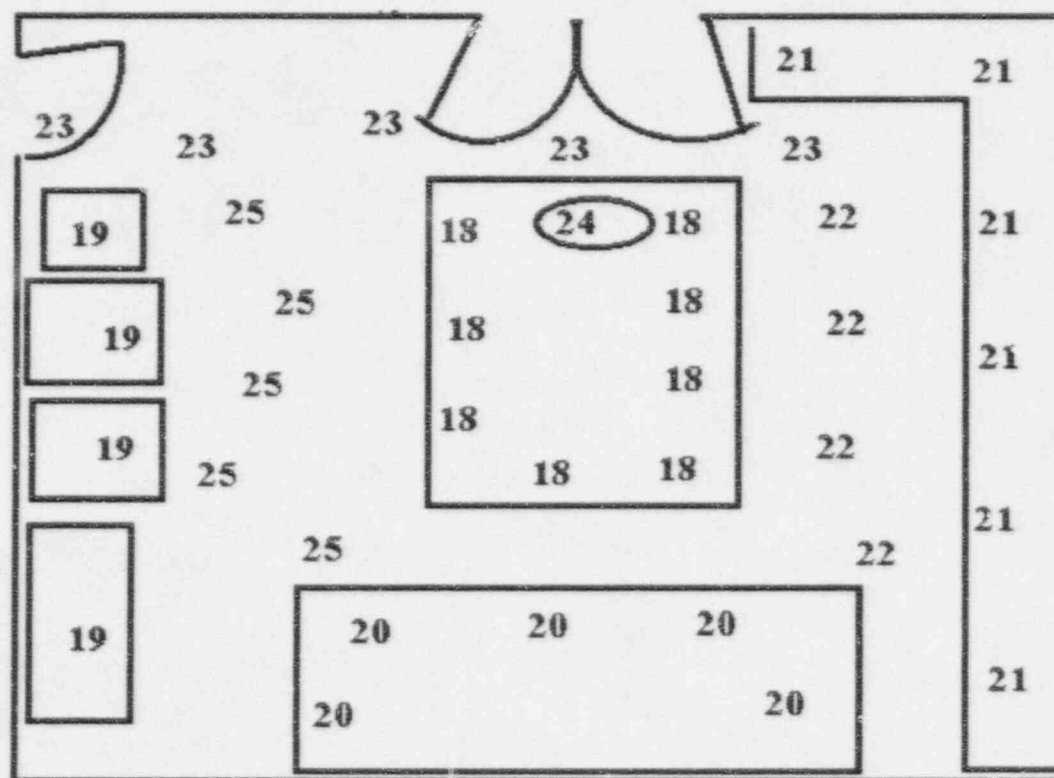
7/31/95
(Date)

phone 206-543-6328
or 206-543-0463



Am-241 sealed source quarterly wipe record.

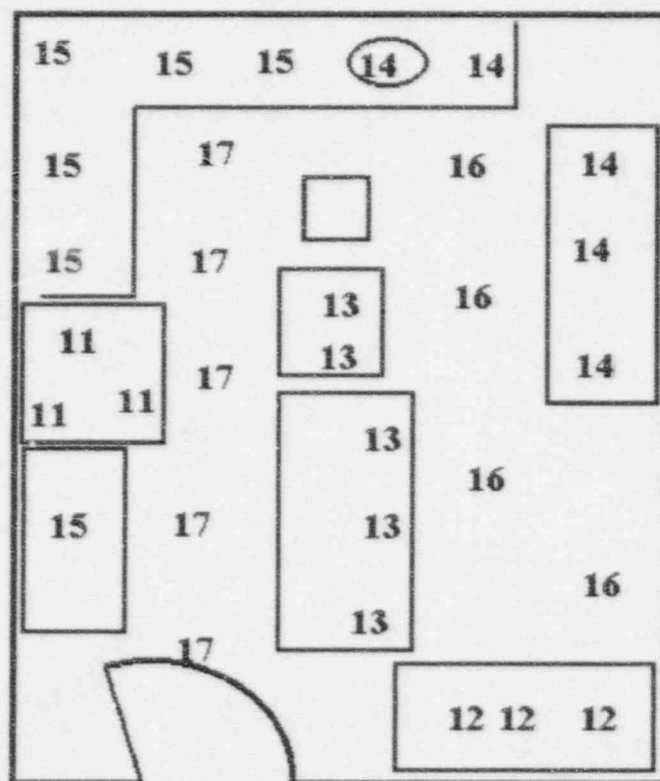
Year	Quarter	Date	result
1990	1	2/2/90	<0.00005 uCi
	2	4/4/90	<0.00005 uCi
	3	7/16/90	<0.00005 uCi
	4	10/19/90	<0.00005 uCi
1991	1	1/31/91	<0.00005 uCi
	2	4/30/91	<0.00005 uCi
	3	7/26/91	<0.00005 uCi
	4	10/30/91	<0.00005 uCi
1992	1	1/31/92	<0.00005 uCi
	2	4/24/92	<0.00005 uCi
	3	7/17/92	<0.00005 uCi
	4	12/11/92	<0.00005 uCi
1993	1	1/5/93	<0.00005 uCi
	2	4/30/93	<0.00005 uCi
	3	7/30/93	<0.00005 uCi
	4	10/29/93	<0.00005 uCi
1994	1	2/2/94	<0.00005 uCi
	2	5/31/94	<0.00005 uCi
	3	8/15/94	<0.00005 uCi
	4	10/20/94	<0.00005 uCi
1995	1	1/20/94	<0.00005 uCi
	2	4/14/95	<0.00005 uCi



Room 1029
Wipe Survey
July 25, 1996

- 96-9-18 bench
- 96-9-19 bench & refer
- 96-9-20 hood
- 96-9-21 bench
- 96-9-22 floor
- 96-9-23 floor
- 96-9-24 sink
- 96-6-25 floor

all wipes
<0.0001 uCi



Room 1024

Wipe survey July 25, 1996

- 96-9-11 hood
- 96-9-12 bench
- 96-9-13 bench/ desk
- 96-9-14 bench
- 96-9-15 bench
- 96-9-16 floor
- 96-9-17 floor

all wipes <0.0001 uCi

			Source	Inventory		25-Jul-96			
	Sealed Sources in Gas Chromatographs								
	Activity	GC Model	S/N	ECD Model	S/N	Location	Wipe ID	Date wipe test	result
Ni-63	15 mCi	spare	N/A	18713A	H1133	Room 1024	96-9-1	25-Jul-96	
Ni-63	15 mCi	HP 5730	47800A917	18724A	2235A12080	Room 1024	96-9-2	25-Jul-96	
Ni-63	15 mCi	same inst		18713A	H1426	Room 1024	96-9-3	25-Jul-96	
Ni-63	15 mCi	spare	N/A	19303	S8166	Room 1036	96-9-4	25-Jul-96	
Ni-63	15 mCi	HP 5880	2417A06062	19303	S9857	Room 1028	96-9-5	25-Jul-96	
Ni-63	10 mCi	Shimadzu		mini2	SS445	Van 464496 near bldg 8 (storage)	96-9-6	25-Jul-96	
Ni-63	10 mCi	Shimadzu		mini2	SS323	Freon Van 258610 near bldg 8	96-9-7	25-Jul-96	
Ni-63	10 mCi	Shimadzu		mini2	SS538	Room 1024	96-9-8	25-Jul-96	
Ni-63	15 mCi	HP 5890	3003A33609	61223A	F1257	Room 1024	96-9-9	25-Jul-96	
Ni-63	13 mCi	HP 5890	3140A39312	61223A	F3284	Freon Van 258610 near bldg 8	96-9-10	25-Jul-96	

572371

PACIFIC HEALTH PHYSICS, Inc.

Suite 188, 6947 Coal Creek Parkway SE, Newcastle, WA 98059-3159

(206) 228-2932 - Fax (206) 271-6698

α β γ

April 28, 1996

James Gendron
Radiator Safety Officer
NOAA/PMEL
7600 Sand Point Way NE
Seattle, WA 98115

Dear Mr. Gendron;

Enclosed please find the wipe survey results performed in support of your laboratory closeout procedure. The samples were received in good condition and were counted for one minute per sample in a three channel scintillation counter. The samples were analyzed in the following energy ranges:

Channel A = 0-18.6 kev
Channel B = 18.6-156 kev
Channel C = 156 - 2000 kev

Counting instrument sensitivity and efficiency is calculated as follows:

Isotope	CPM	Standard DPM	Efficiency
^3H	60947	91296	0.66
^{14}C	36606	45974	0.80

^3H Sensitivity

MDC = $3 \times \sqrt{\text{Bkgd}} / \text{Instrument efficiency}$

$$\frac{3\sqrt{24}}{0.66} = 22.26 \text{ dpm}$$

MDA = $22.26 \text{ dpm} / 2220000 \text{ dpm/uCi} = 0.00001 \text{ uCi}$

¹⁴C Sensitivity

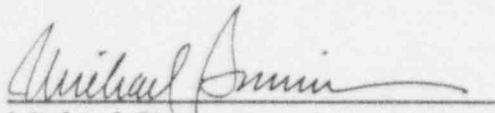
$$\text{MDC} = 3 \cdot \sqrt{\text{Bkgd}} / \text{Instrument efficiency}$$

$$\frac{3\sqrt{24}}{0.8} = 18.37 \text{ dpm}$$

$$\text{MDA} = 18.37 \text{ dpm} / 2220000 \text{ dpm/uCi} = 0.000008 \text{ uCi}$$

Findings:

All wipe survey results are beneath the instrument MDA in all channels.

A handwritten signature in cursive script, reading "Michael Simmons", written over a horizontal line.

Michael Simmons
Health Physics Consultant

ID: FHP, INC.

27 APR 1996 09:46

USER: 3

COMMENT:

PRESET TIME : 1.00

DATA CALC :	CPM	HH :	YES	SAMPLE REPEATS :	1	PRINTER :	STD
COUNT BLANK :	NO	ICH :	NO	REPLICATES :	1	RS232 :	OFF
TWO PHASE :	NO	ADC :	NO	CYCLE REPEATS :	1	DISK :	OFF
SCINTILLATOR :	LIQUID	LUMEX :	NO	LOW SAMPLE REJ :	0	RWM LIST :	OFF
LOW LEVEL :	NO	HALF LIFE CORRECTION DATE :	none				

ISOTOPE 1:	3H	%ERROR:	0.00	FACTOR:	1.000000	BKG. SUB:	0
ISOTOPE 2:	14C	%ERROR:	0.00	FACTOR:	1.000000	BKG. SUB:	0
ISOTOPE 3:	32P	%ERROR:	0.00	FACTOR:	1.000000	BKG. SUB:	0

S	AM	POS	TIME	HH	3H		14C		32P		LUMEX	ELAPSED
					CPM	%ERROR	CPM	%ERROR	CPM	%ERROR		
		NO	MIN								%	TIME
F1	1	**1	1.00	90.4	17.00	48.51	2.00	141.42	6.00	81.65	27.41	1.43
F2	2	**2	1.00	86.6	14.00	53.45	4.00	100.00	6.00	81.65	15.26	2.94
	3	**3	1.00	84.7	11.00	60.30	5.00	89.44	9.00	66.67	12.29	4.46
	4	**4	1.00	96.6	17.00	48.51	11.00	60.30	9.00	66.67	10.05	5.96
	5	**5	1.00	106.3	18.00	47.14	4.00	100.00	6.00	81.65	20.83	7.48
	6	**6	1.00	93.1	14.00	53.45	6.00	81.65	5.00	89.44	14.14	8.98
	7	**7	1.00	87.3	13.00	55.47	8.00	70.71	8.00	70.71	11.17	10.49
	8	**8	1.00	92.4	10.00	63.25	9.00	66.67	9.00	66.67	7.91	12.10
	9	**9	1.00	91.4	20.00	44.72	6.00	81.65	7.00	75.59	8.95	13.74
	10	**10	1.00	85.7	7.00	75.59	6.00	81.65	7.00	75.59	11.09	15.24
	11	**11	1.00	99.8	16.00	50.00	7.00	75.59	6.00	81.65	8.51	16.77
	12	**12	1.00	85.0	9.00	66.67	6.00	81.65	12.00	57.74	8.88	18.23
	13	**13	1.00	82.6	9.00	66.67	5.00	89.44	9.00	66.67	8.22	19.81
	14	**14	1.00	84.6	21.00	43.64	6.00	81.65	8.00	70.71	4.71	21.32
	15	**15	1.00	80.6	11.00	60.30	3.00	115.47	4.00	100.00	9.62	22.84
	16	**16	1.00	82.7	12.00	57.74	4.00	100.00	3.00	115.47	11.64	24.36
	17	**17	1.00	85.7	10.00	63.25	6.00	81.65	4.00	100.00	7.58	25.89
	18	**18	1.00	87.9	14.00	53.45	5.00	89.44	5.00	89.44	8.23	27.39
	19	**1	1.00	80.9	13.00	55.47	3.00	89.44	6.00	81.65	6.03	29.04
	20	**2	1.00	89.6	12.00	57.74	5.00	89.44	9.00	66.67	5.70	30.54
	21	**3	1.00	89.1	11.00	60.30	4.00	100.00	5.00	89.44	5.18	32.07
	22	**4	1.00	83.1	11.00	60.30	8.00	70.71	5.00	89.44	4.05	33.57
	23	**5	1.00	87.9	13.00	55.47	9.00	66.67	7.00	75.59	5.40	35.10
	24	**6	1.00	85.6	5.00	89.44	5.00	89.44	7.00	75.59	7.12	36.60
	25	**7	1.00	79.0	9.00	66.67	7.00	75.59	7.00	75.59	5.23	38.14
	26	**8	1.00	84.9	6.00	81.65	5.00	89.44	5.00	89.44	9.35	39.64
	27	**9	1.00	80.8	12.00	57.74	6.00	81.65	5.00	89.44	4.77	41.28
	28	**10	1.00	86.1	20.00	44.72	7.00	75.59	7.00	75.59	6.72	42.79
	29	**11	1.00	81.9	13.00	55.47	4.00	100.00	6.00	81.65	7.17	44.32
	30	**12	1.00	91.2	8.00	70.71	10.00	63.25	8.00	70.71	6.05	45.82
	31	**13	1.00	88.4	9.00	66.67	2.00	141.42	5.00	89.44	7.73	47.35
	32	**14	1.00	96.3	8.00	70.71	5.00	89.44	4.00	100.00	18.47	48.88
	33	**15	1.00	96.5	13.00	55.47	4.00	100.00	6.00	81.65	14.18	50.41

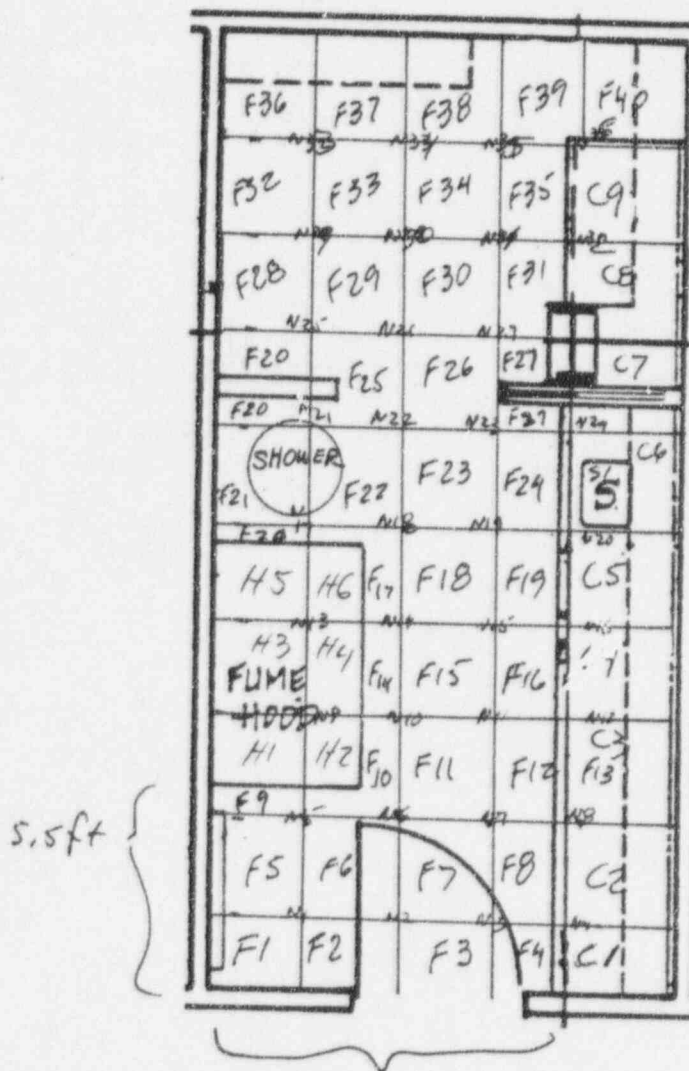
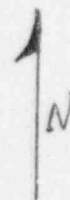
		1.00	82.5	9.00	66.67	5.00	89.44	9.00	66.67	8.22	19.81
	14	1.00	84.6	21.00	43.64	6.00	81.65	8.00	70.71	4.71	21.32
	15	1.00	80.6	11.00	60.30	3.00	115.47	4.00	100.00	9.62	22.84
	16	1.00	82.7	12.00	57.74	4.00	100.00	3.00	115.47	11.64	24.36
	17	1.00	85.7	10.00	63.25	6.00	81.65	4.00	100.00	7.58	25.89
	18	1.00	87.9	14.00	53.45	5.00	89.44	5.00	89.44	8.23	27.39
	19	1.00	80.9	13.00	55.47	5.00	89.44	6.00	81.65	6.03	29.04
	20	1.00	89.6	12.00	57.74	5.00	89.44	9.00	66.67	5.70	30.54
	21	1.00	89.1	11.00	60.30	4.00	100.00	5.00	89.44	5.18	32.07
	22	1.00	83.1	11.00	60.30	8.00	70.71	5.00	89.44	4.05	33.57
	23	1.00	87.9	13.00	55.47	9.00	66.67	7.00	75.59	5.40	35.10
	24	1.00	85.6	5.00	89.44	5.00	89.44	7.00	75.59	7.12	36.60
	25	1.00	79.0	9.00	66.67	7.00	75.59	7.00	75.59	5.23	38.14
	26	1.00	84.9	6.00	81.65	5.00	89.44	5.00	89.44	9.35	39.64
	27	1.00	80.8	12.00	57.74	6.00	81.65	5.00	89.44	4.77	41.28
	28	1.00	86.1	20.00	44.72	7.00	75.59	7.00	75.59	6.72	42.79
	29	1.00	81.9	13.00	55.47	4.00	100.00	6.00	81.65	7.17	44.32
	30	1.00	91.2	8.00	70.71	10.00	63.25	8.00	70.71	6.05	45.82
	31	1.00	88.4	9.00	66.67	2.00	141.42	5.00	89.44	7.73	47.35
	32	1.00	96.3	8.00	70.71	5.00	89.44	4.00	100.00	18.47	48.88
	33	1.00	96.5	13.00	55.47	4.00	100.00	6.00	81.65	14.18	50.41
F34	34	1.00	92.1	8.00	70.71	3.00	115.47	7.00	75.59	9.29	51.92
	35	1.00	92.3	14.00	53.45	4.00	100.00	7.00	75.59	5.66	53.46
	36	1.00	90.2	7.00	75.59	7.00	75.59	11.00	60.30	19.17	54.96
	37	1.00	99.7	12.00	57.74	7.00	75.59	5.00	89.44	17.75	56.61
	38	1.00	87.5	11.00	60.30	5.00	89.44	8.00	70.71	7.47	58.13
	39	1.00	95.5	14.00	53.45	7.00	75.59	7.00	75.59	13.30	59.66
240	40	1.00	112.5	17.00	48.51	5.00	89.44	7.00	75.59	15.60	61.16
HF1	41	1.00	125.6	15.00	51.64	5.00	89.44	5.00	89.44	9.23	62.69
HF2	42	1.00	91.0	14.00	53.45	6.00	81.65	4.00	100.00	4.11	64.18
101	43	1.00	89.8	13.00	55.47	5.00	89.44	7.00	75.59	3.78	65.72
6af1	44	1.00	93.6	16.00	50.00	7.00	75.59	10.00	63.25	1.61	67.22
H1	45	1.00	105.9	30.00	36.51	6.00	81.65	9.00	66.67	47.82	68.77
H2	46	1.00	79.8	17.00	48.51	7.00	75.59	11.00	60.30	2.75	70.27
H3	47	1.00	81.3	8.00	70.71	12.00	57.74	9.00	66.67	2.31	71.80
144	48	1.00	72.0	19.00	45.88	6.00	81.65	6.00	81.65	5.31	73.30

PAGE: 2

SAM	POS	TIME	H#	3H		14C		32P		LUMEX	ELAPSED
NO		MIN		CPM	%ERROR	CPM	%ERROR	CPM	%ERROR	%	TIME
45	49	1.00	88.6	12.00	57.74	7.00	75.59	9.00	66.67	1.71	74.83
46	50	1.00	79.2	5.00	89.44	4.00	100.00	4.00	100.00	3.95	76.33
W1	51	1.00	76.6	11.00	60.30	9.00	66.67	12.00	57.74	1.85	77.87
W2	52	1.00	116.2	17.00	48.51	8.00	70.71	6.00	81.65	3.55	79.37
W3	53	1.00	79.5	6.00	81.65	7.00	75.59	6.00	81.65	3.35	80.90
1	54	1.00	86.8	11.00	60.30	7.00	75.59	8.00	70.71	1.87	82.40
2	55	1.00	81.5	9.00	66.67	2.00	141.42	6.00	81.65	5.59	84.04
3	56	1.00	70.8	14.00	53.45	8.00	70.71	4.00	100.00	2.17	85.55
4	57	1.00	70.9	14.00	53.45	7.00	75.59	2.00	141.42	2.33	87.07
5	58	1.00	71.7	14.00	53.45	6.00	81.65	3.00	115.47	2.31	88.57
6	59	1.00	75.0	11.00	60.30	5.00	89.44	5.00	89.44	2.57	90.10
7	60	1.00	81.9	5.00	89.44	13.00	55.47	8.00	70.71	1.77	91.60
8	61	1.00	77.0	10.00	63.25	11.00	60.30	5.00	89.44	1.91	93.13
9	62	1.00	68.9	11.00	60.30	7.00	75.59	7.00	75.59	1.81	94.63
	63	1.00	81.5	13.00	55.47	9.00	66.67	4.00	100.00	2.09	96.15
MISSING SAMPLE											
Std	65	1.00	-0.3	24.00	40.82	4.00	100.00	5.00	89.44	0.17	97.80
Std	66	1.00	0.3	60947.00	0.81	681.00	7.66	8.00	70.71	0.00	99.46
Std	67	1.00	0.3	8394.00	2.18	36606.00	1.05	254.00	12.55	0.00	100.97

HF1 and HF2 are wipes taken from the HEPA filter

Room 1036 29 March 96 -
Close out + monthly
Wipe Survey -



Hf1 & Hf2 are wipes taken of the HEPA filter.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way N.E.
Seattle, WA 98115

December 4, 1996

R/E/PM

James Montgomery
Senior Radiation Health Physicist
NRC Region IV Field Office
1450 Maria Lane
Walnut Creek, California 94596-5368

RE: Application for a new NRC license.

Enclosed please find an application for a new radioactive materials license for the
National Oceanic and Atmospheric Administration, Pacific Marine Environmental Laboratory.

Sincerely,

James Gendron
Radiation Safety Officer

Enclosures



(6-93)
10 CFR 30, 32, 33
34, 35, 36, 39 and 40

APPLICATION FOR MATERIAL LICENSE

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 9 HOURS. SUBMITTAL OF THE APPLICATION IS NECESSARY TO DETERMINE THAT THE APPLICANT IS QUALIFIED AND THAT ADEQUATE PROCEDURES EXIST TO PROTECT THE PUBLIC HEALTH AND SAFETY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0120), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND,
MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA,
RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO
RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,
SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION II
101 MARIETTA STREET, NW, SUITE 2900
ATLANTA, GA 30323-0199

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN,
SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137-5927

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW
MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING,
SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S.
TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

RADIOACTIVE MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION V
1450 MARIA LANE
WALNUT CREEK, CA 94596-5368

1. THIS IS AN APPLICATION FOR (Check appropriate item)

☒

A. NEW LICENSE

☐

B. AMENDMENT TO LICENSE NUMBER _____

☐

C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip code)

Department of Commerce
NOAA/Pacific Marine Environmental Lab.
7600 Sand Point Way NE
SEATTLE WA 98115-0070

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

7600 Sand Point Way NE
SEATTLE WA 98115-0070
and on board NOAA and UNOL research vessels at temporary
job sites around the world

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

James Gendron

TELEPHONE NUMBER
(206) 526-6213

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time	6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.	8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.
9. FACILITIES AND EQUIPMENT.	10. RADIATION SAFETY PROGRAM.
11. WASTE MANAGEMENT.	12. LICENSEE FEES (See 10 CFR 170 and Section 170.31) FEE CATEGORY _____ AMOUNT ENCLOSED \$ _____
13. CERTIFICATION (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39 AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF. 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.	

CERTIFYING OFFICER - TYPED/PRINTED NAME AND TITLE

James Gendron, RSO

SIGNATURE

DATE

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED \$	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

Page 1.

Item 5. Licensed Material

A. Element & Mass No.	B. Chemical/Phys. form	C. Maximum amount possessed at one time
A. Nickel 63	Plated sources in detector cells (Hewlett Packard models 18713A, 18724A, or 19303 and Shimadzu ECD-Series Mini-2)	15 millicuries per foil or source, 225 millicuries total

Item 6. Purpose for which the licensed material will be used.

- A. The detectors will be used in gas chromatographic analyses for research and development studies as defined in Section 30.4(q) CFR Part 30 to support NOAA's mission of global oceanographic and atmospheric research.

Item 7. (Please see page 3.)

Item 8.

No special training in the use and handling of radioactive materials will be given to the individuals who use gas chromatographs containing electron capture detectors at PMEL. A list of authorized users for ECD's will be maintained by the Radiation Safety Officer (RSO). The following personnel are currently authorized to use Electron Capture Detectors:

Dr. John Bullister
Dr. Tim Bates
Dr. James Johnson
David Wisegarver
Fred Menzia
Bing-Sun Lee
Lijun Han

Item 9. Facilities and equipment.

The gas chromatographs will be used primary, but not exclusively, in the following rooms in building 3: 1024, 1028, 1029, 1036, 1037. They will also be located in laboratory vans which are Sea Land type shipping containers that have been outfitted as mobile laboratories. While not at sea these laboratory vans are used near building 8. While on board NOAA or UNOL oceanographic research vessels the GC's will be

either in the laboratory vans or in other laboratory spaces on the ship. In all cases the laboratories and vans will only be accessible to persons who are authorized to use the device. The laboratories and vans will be locked when an authorized person is not present.

Item 10. Radiation Safety Program

- 10.1 Personnel monitoring equipment will not be used during the routine operation of gas chromatographs.
- 10.2 Radiation detecting instruments will not be used during the routine operation of gas chromatographs.
- 10.3 A physical inventory and leak-test will be performed every six months on the ECD's by the RSO or his representative. The wipes will be submitted to a qualified analytical service for analysis by liquid scintillation counting. If there is any indication of significant removable radioactivity the sealed source will be resurveyed. Currently the consulting service that PMEL uses is the following:

Pacific Health Physics, Inc.
Suite 188
6947 Coal Creek Parkway SE
Newcastle, WA 98059

License number: WN-L0167-1

10.4 Maintenance and repair

All maintenance and repair will be performed by the manufacturer of the device.

Item 11. Waste Disposal

Disposal of any of the sealed sources will be by transfer to the original manufacturer or by transfer to a licensed radioactive waste disposal company.

Item 12. License fees

No fee is necessary.

Item 7. Individual responsible for radiation safety program

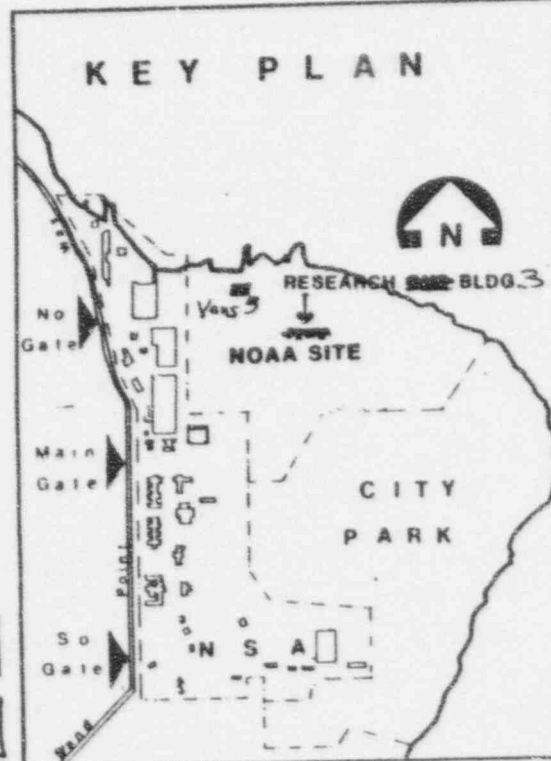
James F Gendron, a chemist at NOAA, PMEL will be the radiation safety officer (RSO). The following describe Mr Gendron's experience and training in radiation safety.

Type of Training/Experience	Where Trained	Duration	On the Job	Formal Course
A. Principles and Practices of Radiation Protection	LFE Environmental Analysis Labs, Richmond, CA (LFE EAL)	6 mos.	X	
	Teledyne Isotopes Palo Alto, CA. (TI)	2 yrs.	X	
	San Jose State Univ., San Jose, CA. (SJSU)	1 yr.		X
B. Radioactivity Measurements Standardization & Monitoring, Techniques & Instruments	LFE TI SJSU	6 mos. 2 yrs. 1 yr.	X X	X
C. Math & Calculations Basic to the Use & Measurement of Radioactivity	LFE TI SJSU	6 mos. 2 yrs. 1 yr.	X X	X
D. Biological Effects of Radiation	LFE TI SJSU	6 mos. 2 yrs. 1 yr.	X X	X

Experience

Location	Position	Nature of Experience	Nuclides
NOAA/PMEL 16 years	RSO, Oceanographer	Implement and maintain radiation safety program	Ni-63
LFE EAL 4 years total 6 months radchem	Chemist	Separation and decontamination for radiochemical analysis	Mixed fission products (mCi quantities)
TI 2 years	RSO, Chemist	In house radiation safety & radiochemical analyses and routine and emergency Health Physics Services for NASA Ames Research Center, Mt. View, CA.	H-3, C-14, P-32, Sr-90, Pb-210, Pu-238 (mCi quantities)
SJSU 1 year	Student	Chemistry Dept.	Na-22, P-32, Mn-54, Co-60, I-131, Cs-137, U-238 (µCi quantities)

572371



REGISTERED
ARCHITECT
JOHN GRAHAM
STATE OF WASHINGTON

NO		REVISION		DATE	
John Graham Company Architects Planners Engineers 1118 Third Avenue, Seattle, Washington 98101					
APPROVED					
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE SEATTLE WASHINGTON					
NOAA WESTERN REGIONAL CENTER					
BUILDING	NAME	SANDPOINT FACILITY			
	ADDRESS	7600 SANDPOINT WY N.E. SEATTLE, WASHINGTON			
	NUMBER				
PROJECT	DESCRIPTION	RESEARCH ONE BLDG. 3 INTERIORS			
	NUMBER	NASO-82-76281			
	DATE	TEAM	END BY	EJM	DATE
DRAWING	TITLE	FIRST FLR PART PLAN PLBG			
	TYPE	MECHANICAL			
	NUMBER	MR		15	
		TYPE	SERIES	SEQUENCE	
AS		CONTRACT NUMBER	02	81815 - 03	
CONSTRUCTION		05	1		

27/82



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV

Walnut Creek Field Office
1450 Maria Lane
Walnut Creek, California 94596-5368

JUN 26 1996

License No. 46-23463-01
Docket No. 030-22218
Control No. 572371

U.S. Department of Commerce
National Oceanic and Atmospheric Admin.
ATTN: James Gendron
Radiation Safety Officer
PMEL/ R/ E/ PM
7600 Sand Point Way, N.E.
Seattle, Washington 98115

SUBJECT: ACKNOWLEDGMENT OF REQUEST FOR LICENSING ACTION

REFERENCE: Application dated June 3, 1996

We have completed the administrative review and initial processing of your application.

Amendment actions are normally processed within 90 days, unless the technical review identifies:

- Major technical deficiencies
- Decommissioning/ decontamination activities are required before an application can be completed
- Confirmatory closeout surveys after decontamination/ decommissioning activities are required before a license can be terminated or a facility removed from the license
- Policy issues are identified that require input and coordination with other NRC Regional offices, Agreement State offices, or NRC's Office of Nuclear Materials and Safeguards

Any correspondence about this application should reference the Control number listed above.

Sincerely,

Beth A. Prange

Beth A. Prange
Sr. Health Physicist (Licensing)
Materials Branch

bcc:
Docket File

To receive a copy of this document, indicate in the box "C" - Copy without attachment/ enclosure "E" -
Copy with attachment/ enclosure "N" - No Copy

OFFICE	RIV:AO:NMLB	N		N				
NAME	B. Prange	<i>BAP</i>						
DATE	6/26/96		1	1	96			



Amendment
030-22218
RECEIVED
RIV WSPD
95 JUN -6 AM 11:16
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
ENVIRONMENTAL RESEARCH LABORATORIES
Pacific Marine Environmental Laboratory
NOAA Building Number 3
7600 Sand Point Way N.E.
Seattle, WA 98115

June 3, 1996

R/E/PM

Mr. James Montgomery
Senior Radiation Health Physicist
NRC Region IV Field Office
1450 Maria Lane
Walnut Creek, California 94596-5368

RE: Amendment Request for NRC license No. 46-2346-01.

Dear Mr. Montgomery:

National Oceanic and Atmospheric Administration, Pacific Marine Environmental Laboratory requests an amendment to Radioactive Materials License No. 46-2346-01 to remove Room 1036 in building 3 as an area of use for unsealed radioactive materials. The room is to be used as a non-radioactive materials use laboratory. All records in support of the closeout of this lab will be maintained in accordance with Condition 18 of the license. The final surveys for removable activity will not exceed the limit of 1000 dpm/100 cm² contained in Table 1 of NRC publication "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material." The only item to be retained in Section 6 for licensed material will be M. plated sources of ⁶³Ni to be used in gas chromatographs as detector cells.

Sincerely,

James Gendron
James Gendron
Radiation Safety Officer

cc: D. Bretschneider
Associate Director, PMEL

Enclosures



572371

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Pacific Marine Environmental Laboratory

7600 Sand Point Way NE
Seattle , WA 98115

Closeout Report

NRC License # 46-23463-01

National Oceanic and Atmospheric Administration
Pacific Marine Environmental Laboratory

Description of Research Laboratory Closeout Procedure

1. Background Information:

The National Oceanic and Atmospheric Administration, Pacific Marine Environmental Laboratory (PMEL) is located in the Western Regional Center, Sand Point Facility. The site is bordered on the north by Lake Washington and to the east and south by a city park. To the west are a number of hangars and buildings which are managed by the Coast Guard. PMEL is located in building 3 which is roughly in the center of the facility. The radiochemical laboratory that is to be closed out is room 1036 in building 3. The NRC license that authorizes the use of radionuclides in this lab is number 46-23463-01.

2. Site Information

Physical Description of room 1036:

The room is a 300 square foot laboratory that is partitioned into a general section for chemical procedures and a small counting room. The room is located near the center of building 3. The walls have been painted with a washable enamel paint. The cement floor has been painted using a seamless epoxy floor covering. There are two floor drains that have never been used since the room was put into service. The ceiling is acoustic tile.

The lab is equipped with compressed air, vacuum, gas, and distilled water. There is a stainless steel sink located next to the partition to the counting room. The sink was never used to dispose of liquid radioactive wastes. There is also a small sink inside the radiochemical fume hood. It too was never used to dispose of any liquid radioactive wastes. The hood is a Vectaire model manufactured by Hamilton, Inc. At a distance of about three feet from the top of the hood, above the ceiling tile, there is a stainless steel HEPA filter housing. The housing contains a nuclear grade HEPA filter (#00700305nuggf) manufactured by Flanders Filters, Inc. The hood exhaust ducting is a 12 inch diameter fiberglass duct that travels 60 feet eastward and then passes through the second floor to the roof. There are no other hoods exhausted by this ducting.

The lab is equipped with automatic sprinklers and a fire extinguisher. There is an emergency shower that has never been used. Next to the shower is a rack for securing compressed gas cylinders. There are cabinets on the east wall. Below the cabinets is a lab bench covered with a formica top. Chemical manipulations that were carried out in this area were always done in trays, and the top of the bench and tray were covered with a plastic backed absorbent material.

History of radionuclide usage in room 1036.

The lab has been utilized on an intermittent basis for research and development studies as defined in (Section 30.4(q) CFR Part 30) to support NOAA's mission of oceanographic research. Microcurie quantities of ^{54}Mn and ^{59}Fe were used in studies of hydrothermal vent plume bacteria until 1989. Millicurie amounts of ^{45}Ca were used to investigate pteropod growth in 1985 and 1986. Productivity measurements of marine phytoplankton were conducted using millicurie amounts of ^{14}C . Both ^{65}Zn and ^{64}Cu were used in speciation studies of these metals in sea water. Millicurie levels of ^{63}Ni were diluted and used to prepare standards during the investigation of a reportable incident of a leaking sealed source (Electron Capture Detector) in January of 1990.

In addition, microcurie quantities of ^{137}Cs , and ^3H were stored in the lab but were never opened. Sealed sources for calibration of the MCA and LSC were also stored in this lab. The sealed sources for gamma calibration included nanocurie quantities of ^{137}Cs , ^{60}Co , ^{57}Co , ^{22}Na , ^{133}Ba , ^{109}Cd and ^{54}Mn . Sealed sources of nanocurie quantities of ^{14}C for the calibration of the LSC were also stored in the lab.

No work with unsealed liquid radioactive sources has been performed in the lab since the spring of 1990 when the ^{64}Cu studies were completed. No spills of liquid radioactive sources are known to have occurred in this lab. Solid and liquid wastes from the investigations listed above were stored in the lab prior to disposal.

3. Safety Records:

The Radiation Safety Officer has performed surveys monthly in this lab. The wipes were collected using 4.25 cm diameter Whatman filter papers. The bench tops, hood, sink floor, and storage areas were wiped to document that no contamination was present. There has never been a major or minor spill as defined by Table J.1 in NRC Reg. Guide 10.8 Rev. 2 in this lab. There have been occasional months during which surveys were not completed. The lab remained locked and no one entered the room during these times.

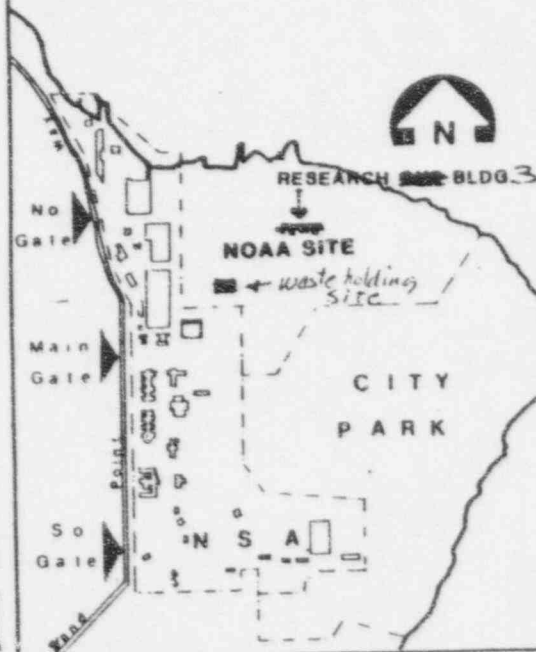
4. Scope:

There are no plans to continue to perform monthly wipe surveys in room 1036 based on the extensive survey of March 29, 1996. The room has been gridded into 2 foot by 2 foot square areas. The detailed wipe survey was performed on each 2x2 floor square, the sink, hood, ducting, HEPA filter and prefilter, and bench surfaces. The wipes were counted in a Packard three channel liquid scintillation counter. All wipe results were below the minimum detectable activity. In addition, at the intersection of each grid node (see attached floor

plan for room 1036) survey meter readings were taken at height of 1 inch and also 3 feet from the floor. No reading above background was observed. This survey was taken on April 11, 1996.

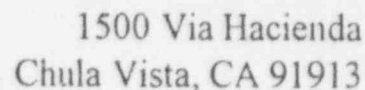
Attached are the portable survey instrument calibration report and the calculations used to determine the minimum detectable activity, and the LSC counting report. The removable activity does not exceed the limit of 1000 dpm/100cm² found in Table 1 of NRC publication, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material."

KEY PLAN



REGISTERED
ARCHITECT
JOHN GRAHAM
STATE OF WASHINGTON

NO		REVISION		DATE	
John Graham Company Architects Planners Engineers 1110 Third Avenue, Seattle, Washington 98101					
APPROVED					
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE SEATTLE WASHINGTON					
NOAA WESTERN REGIONAL CENTER					
BUILDING	NAME	SANDPOINT FACILITY			
	ADDRESS	7600 SANDPOINT WY N.E. SEATTLE, WASHINGTON			
	NUMBER				
PROJECT	DESCRIPTION	RESEARCH ONE BLDG. 3			
		INTERIORS			
	NUMBER	NASO-82-76281			
DRAWING	DRAWN BY	TEAM	CHKD BY	EJM	DATE 9/10/82
	TITLE	FIRST FLR PART PLAN PLBG			
	TYPE	MECHANICAL			
	NUMBER	MR		15	
		TYPE	SERIES	SEQUENCE	
CONSTRUCTION	CONTRACT NUMBER	GS	81615 - 03		



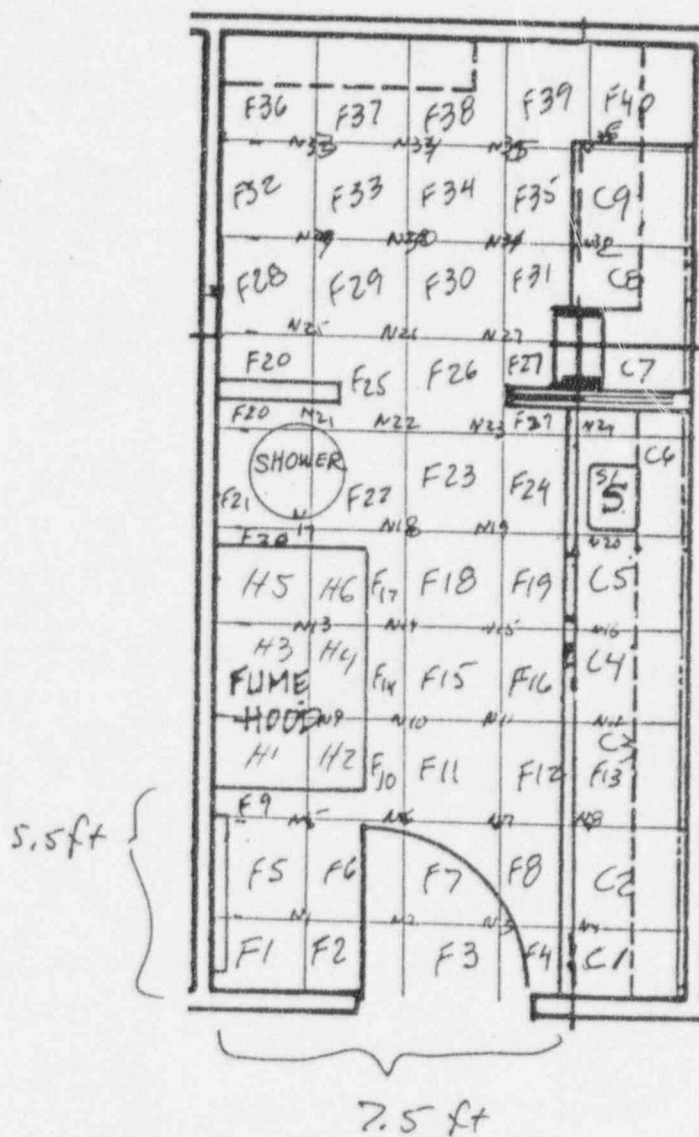
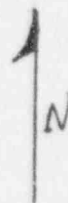
Customer NOAA/PMEL/ERL
Customer ID No. _____
Detector Type Shielded GM
Detector Serial No. NA
Adjusted HV 914

Count Rate Calibration - Ludlum Pulser (Counts per minute - cpm)

4-5-97

Next Calibration Due

Room 1036 29 March 96 -
Close out + monthly
Wipe Survey -



PACIFIC HEALTH PHYSICS, Inc.

Suite 188, 6947 Coal Creek Parkway SE, Newcastle, WA 98059-3159

(206) 228-2932 - Fax (206) 271-6698

α β γ

April 28, 1996

James Gendron
Radiation Safety Officer
NOAA/PMEL
7600 Sand Point Way NE
Seattle, WA 98115

Dear Mr. Gendron;

Enclosed please find the wipe survey results performed in support of your laboratory closeout procedure. The samples were received in good condition and were counted for one minute per sample in a three channel scintillation counter. The samples were analyzed in the following energy ranges:

Channel A = 0-18.6 kev

Channel B = 18.6-156 kev

Channel C = 156 - 2000 kev

Counting instrument sensitivity and efficiency is calculated as follows:

Isotope	CPM	Standard DPM	Efficiency
^3H	60947	91296	0.66
^{14}C	36606	45974	0.80

^3H Sensitivity

$\text{MDC} = 3 \cdot \sqrt{\text{Bkgd}} / \text{Instrument efficiency}$

$$\frac{3\sqrt{24}}{0.66} = 22.26 \text{ dpm}$$

$\text{MDA} = 22.26 \text{ dpm} / 2220000 \text{ dpm/uCi} = 0.00001 \text{ uCi}$

¹⁴C Sensitivity

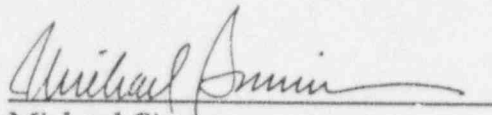
MDC = $3 \cdot \sqrt{\text{Bkgd}} / \text{Instrument efficiency}$

$$\frac{3\sqrt{24}}{0.8} = 18.37 \text{ dpm}$$

MDA = $18.37 \text{ dpm} / 2220000 \text{ dpm/uCi} = 0.000008 \text{ uCi}$

Findings:

All wipe survey results are beneath the instrument MDA in all channels.

A handwritten signature in cursive script, reading "Michael Simmons", written over a horizontal line.

Michael Simmons
Health Physics Consultant

ID:PHP, INC.

27 APR 1996 09:46

USER: 3

COMMENT:

PRESET TIME : 1.00

DATA CALC : CPM H# :YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : OFF
 TWO PHASE : NO AOC : NO CYCLE REPEATS : 1 DISK : OFF
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0 RWM LIST : OFF
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 3H %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 ISOTOPE 2: 14C %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 ISOTOPE 3: 32P %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

S/N	POS	TIME MIN	H#	3H		14C		32P		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR	CPM	%ERROR		
1	**1	1.00	90.4	17.00	48.51	2.00	141.42	6.00	81.65	27.41	1.43
2	**2	1.00	86.6	14.00	53.45	4.00	100.00	6.00	81.65	15.26	2.94
3	**3	1.00	84.7	11.00	60.30	5.00	89.44	9.00	66.67	12.29	4.46
4	**4	1.00	96.6	17.00	48.51	11.00	60.30	9.00	66.67	10.05	5.96
5	**5	1.00	106.3	18.00	47.14	4.00	100.00	6.00	81.65	20.83	7.48
6	**6	1.00	93.1	14.00	53.45	6.00	81.65	5.00	89.44	14.14	8.98
7	**7	1.00	87.3	13.00	55.47	8.00	70.71	8.00	70.71	11.17	10.49
8	**8	1.00	92.4	10.00	63.25	9.00	66.67	9.00	66.67	7.91	12.10
9	**9	1.00	91.4	20.00	44.72	6.00	81.65	7.00	75.59	8.95	13.74
10	**10	1.00	85.7	7.00	75.59	6.00	81.65	7.00	75.59	11.09	15.24
11	**11	1.00	99.8	16.00	50.00	7.00	75.59	6.00	81.65	8.51	16.77
12	**12	1.00	85.0	9.00	66.67	6.00	81.65	12.00	57.74	8.88	18.28
13	**13	1.00	82.6	9.00	66.67	5.00	89.44	9.00	66.67	8.22	19.81
14	**14	1.00	84.6	21.00	43.64	6.00	81.65	8.00	70.71	4.71	21.32
15	**15	1.00	80.6	11.00	60.30	3.00	115.47	4.00	100.00	9.62	22.84
16	**16	1.00	82.7	12.00	57.74	4.00	100.00	3.00	115.47	11.64	24.36
17	**17	1.00	85.7	10.00	63.25	6.00	81.65	4.00	100.00	7.58	25.89
18	**18	1.00	87.9	14.00	53.45	5.00	89.44	5.00	89.44	8.23	27.39
19	**1	1.00	80.9	13.00	55.47	5.00	89.44	6.00	81.65	6.03	29.04
20	**2	1.00	89.6	12.00	57.74	5.00	89.44	9.00	66.67	5.70	30.54
21	**3	1.00	89.1	11.00	60.30	4.00	100.00	5.00	89.44	5.18	32.07
22	**4	1.00	83.1	11.00	60.30	8.00	70.71	5.00	89.44	4.05	33.57
23	**5	1.00	87.9	13.00	55.47	9.00	66.67	7.00	75.59	5.40	35.10
24	**6	1.00	85.6	5.00	89.44	5.00	89.44	7.00	75.59	7.12	36.60
25	**7	1.00	79.0	9.00	66.67	7.00	75.59	7.00	75.59	5.23	38.14
26	**8	1.00	84.9	6.00	81.65	5.00	89.44	5.00	89.44	9.35	39.64
27	**9	1.00	80.8	12.00	57.74	6.00	81.65	5.00	89.44	4.77	41.28
28	**10	1.00	86.1	20.00	44.72	7.00	75.59	7.00	75.59	6.72	42.79
29	**11	1.00	81.9	13.00	55.47	4.00	100.00	6.00	81.65	7.17	44.32
30	**12	1.00	91.2	8.00	70.71	10.00	63.25	8.00	70.71	6.05	45.82
31	**13	1.00	88.4	9.00	66.67	2.00	141.42	5.00	89.44	7.73	47.35
32	**14	1.00	96.3	8.00	70.71	5.00	89.44	4.00	100.00	18.47	48.88
33	**15	1.00	96.5	13.00	55.47	4.00	100.00	6.00	81.65	14.18	50.41

13	**	-13	1.00	82.6	9.00	66.67	5.00	89.44	9.00	66.67	8.22	19.81
14	**	-14	1.00	84.6	21.00	43.64	6.00	81.65	8.00	70.71	4.71	21.32
15	**	-15	1.00	80.6	11.00	60.30	3.00	115.47	4.00	100.00	9.62	22.84
16	**	-16	1.00	82.7	12.00	57.74	4.00	100.00	3.00	115.47	11.64	24.36
17	**	-17	1.00	85.7	10.00	63.25	6.00	81.65	4.00	100.00	7.58	25.89
18	**	-18	1.00	87.9	14.00	53.45	5.00	89.44	5.00	89.44	8.23	27.39
19	**	-1	1.00	80.9	13.00	55.47	5.00	89.44	6.00	81.65	6.03	29.04
20	**	-2	1.00	89.6	12.00	57.74	5.00	89.44	9.00	66.67	5.70	30.54
21	**	-3	1.00	89.1	11.00	60.30	4.00	100.00	5.00	89.44	5.18	32.07
22	**	-4	1.00	83.1	11.00	60.30	8.00	70.71	5.00	89.44	4.05	33.57
23	**	-5	1.00	87.9	13.00	55.47	9.00	66.67	7.00	75.59	5.40	35.10
24	**	-6	1.00	85.6	5.00	89.44	5.00	89.44	7.00	75.59	7.12	36.60
25	**	-7	1.00	79.0	9.00	66.67	7.00	75.59	7.00	75.59	5.23	38.14
26	**	-8	1.00	84.9	6.00	81.65	5.00	89.44	5.00	89.44	9.35	39.64
27	**	-9	1.00	80.8	12.00	57.74	6.00	81.65	5.00	89.44	4.77	41.28
28	**	-10	1.00	86.1	20.00	44.72	7.00	75.59	7.00	75.59	6.72	42.79
29	**	-11	1.00	81.9	13.00	55.47	4.00	100.00	6.00	81.65	7.17	44.32
30	**	-12	1.00	91.2	8.00	70.71	10.00	63.25	8.00	70.71	6.05	45.82
31	**	-13	1.00	88.4	9.00	66.67	2.00	141.42	5.00	89.44	7.73	47.35
32	**	-14	1.00	96.3	8.00	70.71	5.00	89.44	4.00	100.00	18.47	48.88
33	**	-15	1.00	96.5	13.00	55.47	4.00	100.00	6.00	81.65	14.18	50.41
34	**	-16	1.00	92.1	8.00	70.71	3.00	115.47	7.00	75.59	9.29	51.92
35	**	-17	1.00	92.3	14.00	53.45	4.00	100.00	7.00	75.59	5.66	53.46
36	**	-18	1.00	90.2	7.00	75.59	7.00	75.59	11.00	60.30	19.17	54.96
37	**	-1	1.00	99.7	12.00	57.74	7.00	75.59	5.00	89.44	17.75	56.61
38	**	-2	1.00	87.5	11.00	60.30	5.00	89.44	8.00	70.71	7.47	58.13
39	**	-3	1.00	95.5	14.00	53.45	7.00	75.59	7.00	75.59	13.30	59.66
40	**	-4	1.00	112.5	17.00	48.51	5.00	89.44	7.00	75.59	15.60	61.16
F1	**	-5	1.00	125.6	15.00	51.64	5.00	89.44	5.00	89.44	9.23	62.69
F2	**	-6	1.00	91.0	14.00	53.45	6.00	81.65	4.00	100.00	4.11	64.18
01	**	-7	1.00	89.8	13.00	55.47	5.00	89.44	7.00	75.59	3.78	65.72
01	**	-8	1.00	93.6	16.00	50.00	7.00	75.59	10.00	63.25	1.61	67.22
11	**	-9	1.00	105.9	30.00	36.51	6.00	81.65	9.00	66.67	47.82	68.77
12	**	-10	1.00	79.8	17.00	48.51	7.00	75.59	11.00	60.30	2.75	70.27
H3	**	-11	1.00	81.3	8.00	70.71	12.00	57.74	9.00	66.67	2.31	71.80
144	**	-12	1.00	72.0	19.00	45.88	6.00	81.65	6.00	81.65	5.31	73.30

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SAM NO	POS	TIME MIN	HH	EH		14C		32F		LUMEX %	ELAPSED TIME	
				CPM	%ERROR	CPM	%ERROR	CPM	%ERROR			
5	49	** -13	1.00	88.6	12.00	57.74	7.00	75.59	9.00	66.67	1.71	74.83
6	50	** -14	1.00	79.2	5.00	89.44	4.00	100.00	4.00	100.00	3.95	76.33
11	51	** -15	1.00	76.6	11.00	60.30	9.00	66.67	12.00	57.74	1.85	77.87
12	52	** -16	1.00	116.2	17.00	48.51	8.00	70.71	6.00	81.65	3.55	79.37
13	53	** -17	1.00	79.5	6.00	81.65	7.00	75.59	6.00	81.65	3.35	80.90
1	54	** -18	1.00	86.8	11.00	60.30	7.00	75.59	8.00	70.71	1.87	82.40
1	55	** -1	1.00	81.5	9.00	66.67	2.00	141.42	6.00	81.65	5.59	84.04
1	56	** -2	1.00	70.8	14.00	53.45	8.00	70.71	4.00	100.00	2.17	85.55
3	57	** -3	1.00	70.9	14.00	53.45	7.00	75.59	2.00	141.42	2.33	87.07
1	58	** -4	1.00	71.7	14.00	53.45	6.00	81.65	3.00	115.47	2.31	88.57
5	59	** -5	1.00	75.0	11.00	60.30	5.00	89.44	5.00	89.44	2.57	90.10
2	60	** -6	1.00	81.9	5.00	89.44	13.00	55.47	8.00	70.71	1.77	91.60
1	61	** -7	1.00	77.0	10.00	63.25	11.00	60.30	5.00	89.44	1.91	93.13
3	62	** -8	1.00	68.9	11.00	60.30	7.00	75.59	7.00	75.59	1.81	94.63
9	63	** -9	1.00	81.5	13.00	55.47	9.00	66.67	4.00	100.00	2.09	96.15
MISSING SAMPLE												
Std	65	** -11	1.00	-0.3	24.00	40.82	4.00	100.00	5.00	89.44	0.17	97.80
Std	66	** -12	1.00	0.3	60947.00	0.81	681.00	7.66	9.00	70.71	0.00	99.46
Std	67	** -13	1.00	0.3	8394.00	2.18	36606.00	1.05	254.00	12.55	0.00	100.97