

License No. 46-06377-04  
Docket No. 030-08203

**FAX COVER**

Date: 8-2-06

From: **Ann Byar, M.S., C.I.H.**  
**Safety and Environmental Compliance Officer**  
**Northwest Fisheries Science Center**  
**2725 Montlake Blvd. E.**  
**Seattle, WA. 98112**

Tele.: (206) 860-3316 office  
(206) 499-6618 cell

Fax: (206) 860-5614

To: Bob Evans

Tele.: (817) 860-8234

Fax: (817) 860-3188

Number of pages including cover: 5      Re: License # 46-06377-04

**Notes:**

① Documentation for last Pb 210 Shipment.

② I will not be able to certify the isotope  
use table (i.e. <sup>for</sup> Pb 210 use) until after  
Dr. William Reichert returns from vacation  
(August 29, 2006 or thereafter).

**INFUSE**

VOLUME (cu ft)	TOTAL # OF PACKAGES	SOURCE MATERIAL (yrs)	SPECIAL NUCLEAR MATERIAL (grams)			
			U-233	U-235	PLUTONIUM	TOTAL
67.5	9	0.025				0.025
ACTIVITY						
ACTIVITY TOTALS:						
<input type="checkbox"/> Curies <input checked="" type="checkbox"/> Millicuries		TRITIUM	C-14	Te-99	I-129	ALL ISOTOPES
0.00	77	5.6	2.0			14.8
(10CFR60.3)						

(b) THIS IS TO CERTIFY THAT THE HEREIN NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELED, AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION AND ARE IN COMPLIANCE WITH ALL REQUIREMENTS APPLICABLE AT THE DESIGNATED DISPOSAL SITE, AND THAT THE MATERIALS ARE CLASSIFIED AND DESCRIBED IN ACCORDANCE WITH THE REQUIREMENTS OF 10CFR, PART 61 AND PART 202.311 OR EQUIVALENT STATE REGULATIONS:

**AUTHORIZED SIGNATURE**

CUSTOMER COPY

TABLE

DATE \_\_\_\_\_



## SAMPLE NOTICE FOR URANYL NITRATE AND/OR THORIUM NITRATE

## NOTICE AND CERTIFICATION

On December 20, 1995 (date), a shipment of wastes that formerly exhibited one of the characteristics of a hazardous waste was made from the "Originating Facility" identified below to the US Ecology commercial low-level radioactive waste disposal facility in Richland, Washington. At the time of shipment the wastes no longer exhibited a characteristic of a hazardous waste.

D.O.C., NOAA, NMFS

(Originating Facility)

USDOC, NOAA, NMFS, FWFSC, Environmental Conservation Division, 2725 Montlake Blvd. E,

(Address) Seattle, WA 98112-2097

WA8143690016

(EPA Identification Number)

The characteristic waste as initially generated had the EPA Hazardous Waste Number D001 and belonged in the ignitability, nonwastewater treatability group

*I certify under penalty of law that the waste has been treated in accordance with the requirements of 40 CFR 268.42. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment.*

*John T. Howard for D.O.C.*  
(Authorized Signature)

356 gm of uranyl acetate and 28 gm of uranyl nitrate cast into cement for disposal and pickup by broker, Thomas Gray & Associates.

*Prepped 12/16/95 by  
Pacific Health Physics.*

*Picked up 12/20/95 by  
Thomas Gray & Associates*

# *NOAA/NMFS Radioactive Waste Shipment Barrel Wipe Samples*

PAGE: 1

ID: PHP, INC.

16 DEC 1995 11:02

USER: 3

COMMENT:

PRESET TIME : 1.00

DATA CALC : CPM H# : YES SAMPLE REPEATS: 1 PRINTER : STD

COUNT BLANK : NO ID# : NO REPLICATES : 1 RS232 : OFF

TWO PHASE : NO ADC : NO CYCLE REPEATS : 1 DISK : OFF

SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0 RAM 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

SAM NO	POS	TIME MIN	H#	3H		14C		32P		LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR	CPM	%ERROR		
1	**1	1.00	94.3	8.00	70.71	7.00	75.59	4.00	100.00	4.81	1.42
2	**2	1.00	83.2	27.00	38.49	11.00	60.30	10.00	63.25	1.23	2.90
3	**3	1.00	81.9	12.00	57.74	5.00	89.44	6.00	81.65	1.98	4.39
4	**4	1.00	75.6	12.00	57.74	27.00	38.49	10.00	63.25	1.39	5.90
5	**5	1.00	78.7	13.00	55.47	24.00	40.82	30.00	36.51	0.63	7.41
6	**6	1.00	91.7	22.00	42.64	30.00	36.51	7.00	75.59	1.51	8.91
7	**7	1.00	72.0	14.00	53.45	6.00	81.65	4.00	100.00	2.11	10.42
8	**8	1.00	76.9	17.00	48.51	5.00	89.44	5.00	89.44	3.93	11.92
9	**9	1.00	67.3	12.00	57.74	21.00	43.64	10.00	63.25	1.02	13.44
MISSING SAMPLE											
11	**11	1.00	3.6	19.00	45.88	3.00	115.47	4.00	100.00	0.33	15.05
12	**12	1.00	2.6	62137.00	0.80	578.00	8.32	3.00	115.47	0.00	16.60 STD 3
13	**13	1.00	3.0	8410.00	2.18	36504.00	1.05	222.00	13.42	0.00	18.12 STD 4

*oh ms*

**From:** Ann Byar <ann.byar@noaa.gov>  
**To:** <rje@nrc.gov>, <bas2@nrc.gov>, php425 <php425@comcast.net>, William L Reichert <William.L.Reichert@noaa.gov>  
**Date:** 07/26/2006 6:49:44 AM  
**Subject:** Mukilteo Decommissioning Document- Clarifications

Bob and Beth,

I had an opportunity to speak with our health physics consultant, Mike Simmons on July 21, 2006, regarding your questions pertaining to our decommissioning document for the Mukilteo Research Station. As a result, I have the following information for you:

The third channel (CPM3) measures 0 to 2000 KeV. What isotopes are being looked for are /all isotopes/ including H3 and C14- essentially looking for the presence of /anything/ in that 0 th 2000 KeV range of energy. You will note that Mike Simmons explains that, as you suspected, counts are /gross/ counts, in other words, /not/ corrected for background. The 4th column, "AVG H #" is a measure of quench. H3 and C14 standards and the background sample at the very end of the liquid scintillation counter printout are unquenched, and the readings in the "AVG H #" column are 0.0, 1.0, and -1.0 respectively.

Regarding the history of Pb210 at Northwest Fisheries Science Center: although the last use was 1978, the last manifested Pb210 waste (1 milliCurie) was disposed of on 12/18/95. Please let me know if you would like me to send you a copy of this manifest.

Attached are revised sections of the decommissioning document and a spreadsheet for scanning survey results. These revisions should help to answer your questions.

Please let me know if you need additional information in order to complete your review. I am traveling this week, and will be available by cell phone at (206) 499-6618 and will be checking E-mail at least daily.

-Ann

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Ann A. Byar, M.S., C.I.H.  
Safety and Environmental Compliance Officer  
Northwest Fisheries Science Center  
(206) 499-6618

Supplement to Section A of the NOAA Mukilteo Decommissioning Report.

**Scanning Survey Results:**

Scanning surveys were performed as indicated in paragraph 6.B. of Section A of the report. The portable survey meter was coupled to a GM pancake detector which was passed over 100 % of the work surfaces within each grid location at a distance of about 1 cm, and at a speed of about 1 detector width per second. The portable survey meter was a ratemeter rather than a scaler, therefore, individual total counts were not displayed or recorded unless areas higher than background CPMs were encountered. There were no such areas according to the survey team.

The staffs that performed the surveys were interviewed concerning the scanning survey findings. They verified that for all areas surveyed, the background count-rate of 35 CPM was not exceeded.

**Other Survey Results:**

Similar results were obtained during the dose-rate survey and the wipe sample survey with the exception of sample 121 from Room 107. The wipe sample from this grid was 77 Gross CPM. The Net CPM from this grid location was 9 CPM, and was deemed within the release criteria used at the time of the survey. A concern by NRC reviewers was the sample may have represented Pb-210 contamination. However, Pb-210 was never used in this room according to interviews with scientists who supervised the use of the radioactive material at Mukilteo.

Decommissioning survey methods and techniques used by Pacific Health Physics staff were learned while attending Oak Ridge Associated University's "Decommissioning Surveyor Training Course" during October 2001, and at an additional seminar taught by Eric Ablequist of ORAU at the VAMC Little Rock, AR, September 2002 .

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Facility: NOAA/Mukilteo  
Decommissioning Survey

## SECTION C

### **SURVEY AND ANALYTICAL PROCEDURES**

#### **SURVEY PROCEDURES**

##### Surface Scans

Scanning surveys were performed with 100 % coverage of areas within the survey locations by passing the detector slowly over the surface at a speed of 1 detector width per second. The distance between the detector and the surface was maintained at a minimum - nominally about 1 centimeter. A thin window halogen quenched GM pancake detector coupled to a portable survey meter with an audible indicator was used to scan the laboratory portable storage module, floors, cabinets, shelves, walls, backsplashes, sinks, and sink drains of the surveyed areas. Identification of elevated levels was based on increases in the audible signal from the survey instrument. For survey locations with elevated (>two times background) fixed radioactivity, one minute direct measurements were completed. The initial survey map was adjusted, as needed, to identify any locations with elevated fixed radioactivity.

##### Removable Activity Measurements

Removable activity levels were determined using pre-numbered thin soft absorbant paper squares, approximately 2 x 2 cm in size. Moderate pressure was applied to the smear with two or three fingers during surface wipe sampling. Wipe sampling occurred as a repeated "S" pattern over the entire grid area. The smears were then placed in individual counting vials with 7 ml of counting solution and identified with the numbered location or other pertinent information. One smear sample for removable contamination was obtained from each measurement location.

##### Dose Equivalent Rate Measurements

Radiation dose equivalent rate measurements were made using a energy compensated thin wall GM detector coupled to a portable survey meter with an audible indicator. Exposure rate measurements for each survey location were taken at a distance of 1 meter from and/or above work surfaces to provide a good estimate of potential external radiation exposure.

##### Miscellaneous Samples

Micellaneous sampling was made in the sink drains, drainboards, and fume hood ventilation ducts as noted in the maps in section B. Moderate pressure was applied to the swab on the interior surfaces of drainpipes and ventilation ducts. The swab samples were placed in individually labeled plastic containers with the location and other pertinent information recorded, then analyzed in the three channel scintillation counting system. Please note sample location number 221 was a representative background sample taken from the building lobby.

#### **ANALYTICAL PROCEDURES**

##### Removable Activity

##### **Gross Beta Counting by Liquid Scintillation**

Smear samples were counted in a three channel liquid scintillation counter to quantitate sample beta/gamma activity. A quench curve using ten  $^{14}\text{C}$  standards of varying quench factors was applied to any samples that exhibited counts per minute in amounts that were greater than the representative background samples.



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### CORRECTED PAGE

### LIQUID SCINTILLATION COUNTER DETECTION LIMITS

The analytical data presented in the tables of this report represent the 99 % confidence level for that data. These data were calculated based on gross sample count levels and the associated background count levels. When the net sample count was less than  $2.71 + 4.66$  multiplied by the statistical deviation of the background count [ $2.71 + 4.66 \times (\text{background CPM})^{1/2} / \text{total instrument efficiency}$ ], the sample concentration was reported as less than the detection limit of the detection system. Because of variations in background levels and measurement efficiencies, the detection limits may differ from sample to sample and instrument to instrument.

Table 1

Beckman LS-5801, SN7013898 Counting Instrument Sensitivity,			
	CPM1	CPM2	CPM3
Bkg	11	28	36
H-3	51692	52764	52770
C-14	7664	44261	44690
H-3 eff=	0.62		
C-14, S-35 eff=	0.952		
I-125		0.50	
C-14, S-35,			H-3
MDC=	29 dpm		MDC= 29 dpm
MDA=	1.3E-05 uCi		MDA= 1.3 0E-05 uCi
I-125	55 dpm		
	2.47E-5 uCi		

### CALIBRATION AND QUALITY ASSURANCE

Field survey equipment is calibrated on an annual frequency. The liquid scintillation counter was calibrated on November 3, 2004. Survey instrument calibration documents are appended to this section.

Calibration of field and laboratory instrumentation is based on standards and sources traceable to the National Institute of Standards and Traceability.

PHP quality control procedures include:

- Daily or each time used instrument background and constancy check-source/NIST source measurements to confirm that equipment operation is within acceptable limits,
- Documents review to ensure agreement between survey findings and report data,
- Training and certification of individuals supervising or performing the survey procedures.

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The preceding page was corrected for the formula used to calculate MDA. The MDA formula and related calculations are explained below using the Liquid Scintillation Counter (LSC) standard data from Table 1:

The MDA formula used is 2.71 added to 4.66 times the square root (sqrt) of the background, divided by the counting system total efficiency, or

For 3H:

$$\frac{(\text{Sqrt } 11 \text{ CPM} * 4.66) + 2.71}{0.62 \text{ CPM / DPM}} = 29 \text{ DPM}$$

$$\frac{29 \text{ DPM}}{2.22\text{e}6 \text{ DPM/uCi}} = 1.3 \text{ e-5 uCi}$$

For C-14 and S-35:

$$\frac{(\text{Sqrt } 28 \text{ CPM} * 4.66) + 2.71}{0.95 \text{ CPM / DPM}} = 29 \text{ DPM (rounded up from 28.8)}$$

$$\frac{29 \text{ DPM}}{2.22\text{e}6 \text{ DPM/uCi}} = 1.3 \text{ e-5 uCi}$$

For I-125:

$$\frac{(\text{Sqrt } 28 \text{ CPM} * 4.66) + 2.71}{0.5 \text{ CPM / DPM}} = 55 \text{ DPM}$$

$$\frac{55 \text{ DPM}}{2.22\text{e}6 \text{ DPM/uCi}} = 2.4 \text{ e-5 uCi}$$

## Decommissioning Survey Data for NOAA, Mukilteo

Sample #	Scan CPM	mR/hr	Sample #	Scan CPM	mR/hr	Sample #	Scan CPM	mR/hr
1	35	0.02	31	35	0.02	61	35	0.02
2	35	0.02	32	35	0.02	62	35	0.02
3	35	0.02	33	35	0.02	63	35	0.02
4	35	0.02	34	35	0.02	64	35	0.02
5	35	0.02	35	35	0.02	65	35	0.02
6	35	0.02	36	35	0.02	66	35	0.02
7	35	0.02	37	35	0.02	67	35	0.02
8	35	0.02	38	35	0.02	68	35	0.02
9	35	0.02	39	35	0.02	69	35	0.02
10	35	0.02	40	35	0.02	70	35	0.02
11	35	0.02	41	35	0.02	71	35	0.02
12	35	0.02	42	35	0.02	72	35	0.02
13	35	0.02	43	35	0.02	73	35	0.02
14	35	0.02	44	35	0.02	74	35	0.02
15	35	0.02	45	35	0.02	75	35	0.02
16	35	0.02	46	35	0.02	76	35	0.02
17	35	0.02	47	35	0.02	77	35	0.02
18	35	0.02	48	35	0.02	78	35	0.02
19	35	0.02	49	35	0.02	79	35	0.02
20	35	0.02	50	35	0.02	80	35	0.02
21	35	0.02	51	35	0.02	81	35	0.02
22	35	0.02	52	35	0.02	82	35	0.02
23	35	0.02	53	35	0.02	83	35	0.02
24	35	0.02	54	35	0.02	84	35	0.02
25	35	0.02	55	35	0.02	85	35	0.02
26	35	0.02	56	35	0.02	86	35	0.02
27	35	0.02	57	35	0.02	87	35	0.02
28	35	0.02	58	35	0.02	88	35	0.02
29	35	0.02	59	35	0.02	89	35	0.02
30	35	0.02	60	35	0.02	90	35	0.02

## Decommissioning Survey Data for NOAA, Mukilteo

Sample #	Scan CPM	mR/hr	Sample #	Scan CPM	mR/hr	Sample #	Scan CPM	mR/hr
91	35	0.02	121	35	0.02	151	35	0.02
92	35	0.02	122	35	0.02	152	35	0.02
93	35	0.02	123	35	0.02	153	35	0.02
94	35	0.02	124	35	0.02	154	35	0.02
95	35	0.02	125	35	0.02	155	35	0.02
96	35	0.02	126	35	0.02	156	35	0.02
97	35	0.02	127	35	0.02	157	35	0.02
98	35	0.02	128	35	0.02	158	35	0.02
99	35	0.02	129	35	0.02	159	35	0.02
100	35	0.02	130	35	0.02	160	35	0.02
101	35	0.02	131	35	0.02	161	35	0.02
102	35	0.02	132	35	0.02	162	35	0.02
103	35	0.02	133	35	0.02	163	35	0.02
104	35	0.02	134	35	0.02	164	35	0.02
105	35	0.02	135	35	0.02	165	35	0.02
106	35	0.02	136	35	0.02	166	35	0.02
107	35	0.02	137	35	0.02	167	35	0.02
108	35	0.02	138	35	0.02	168	35	0.02
109	35	0.02	139	35	0.02	169	35	0.02
110	35	0.02	140	35	0.02	170	35	0.02
111	35	0.02	141	35	0.02	171	35	0.02
112	35	0.02	142	35	0.02	172	35	0.02
113	35	0.02	143	35	0.02	173	35	0.02
114	35	0.02	144	35	0.02	174	35	0.02
115	35	0.02	145	35	0.02	175	35	0.02
116	35	0.02	146	35	0.02	176	35	0.02
117	35	0.02	147	35	0.02	177	35	0.02
118	35	0.02	148	35	0.02	178	35	0.02
119	35	0.02	149	35	0.02	179	35	0.02
120	35	0.02	150	35	0.02	180	35	0.02

## Decommissioning Survey Data for NOAA, Mukilteo

Sample #	Scan CPM	mR/hr	Sample #	Scan CPM	mR/hr
181	35	0.02	211	35	0.02
182	35	0.02	212	35	0.02
183	35	0.02	213	35	0.02
184	35	0.02	214	35	0.02
185	35	0.02	215	35	0.02
186	35	0.02	216	35	0.02
187	35	0.02	217	35	0.02
188	35	0.02	218	35	0.02
189	35	0.02	219	35	0.02
190	35	0.02	220	35	0.02
191	35	0.02	221	35	0.02 Representative Background
192	35	0.02			
193	35	0.02			
194	35	0.02			
195	35	0.02			
196	35	0.02			
197	35	0.02			
198	35	0.02			
199	35	0.02			
200	35	0.02			
201	35	0.02			
202	35	0.02			
203	35	0.02			
204	35	0.02			
205	35	0.02			
206	35	0.02			
207	35	0.02			
208	35	0.02			
209	35	0.02			
210	35	0.02			

**Mail Envelope Properties** (44C756BE.085 : 20 : 57477)

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**From:** Ann Byar <[ann.byar@noaa.gov](mailto:ann.byar@noaa.gov)>  
**Created By:** [ann.byar@noaa.gov](mailto:ann.byar@noaa.gov)

**Recipients**

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BAS2 (Beth Alferink)

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William.L.Reichert (William L Reichert)

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php425 (php425)

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MESSAGE	1677	07/26/2006 6:48:29 AM
TEXT.htm	2103	
Section A supplement jul 06.doc		24576
Mukilteo Sec_c Nov 04.doc	53760	
Mukilteo survey data Nov 04.xls		23040
Mime.822	145105	

**Options**

**Expiration Date:** None  
**Priority:** Standard  
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**Return Notification:** None

**Concealed Subject:** No  
**Security:** Standard

**Junk Mail Handling Evaluation Results**

Message is eligible for Junk Mail handling

<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		Date: 7/20/2006
<b>TELEPHONE CONVERSATION RECORDS</b>		
Mail Control 470863 or Report No(s):	License No.: 46-06377-04	Docket No. 030-08203
Name of Licensee: Commerce, Department of - NOAA  Contact: Ann Byar Telephone Number: 206-860-3316  Subject: NOAA-Mukilteo, Dtd. 7/20/06, Control No. 470863 <small>(Note: this will be used as the document title in ADAMS)</small>		
<p>Summary: Robert Evans and Beth Alferink contacted Ann Byar, the RSO, via telephone at 2:00PM on 7/20/06 regarding the licensee's final status survey report submittal dated November 21, 2005. During this conversation, we discussed some of the potential report issues related to processing the license amendment request. These issues were documented by the RSO for followup and possible submittal of an addendum to the final status survey report.</p> <p>We requested that the licensee define the units in the report for the swipe sampling, include information related to the scan surveys and further justify the conclusions drawn on page A-4 of the report. We also discussed NRC's need to process this under 10CFR20 dose based criterion and that it appears that lead-210 is the limiting radionuclide. We also requested additional discussion of the swipe sampling results and scan results to include lead-210, as appropriate.</p>		
Beth S. Alferink	<i>/RA/</i>	7/20/06
Robert J. Evans	<i>/RA/</i>	7/20/06