

20 APR 1988

Docket Nos. 030-05980  
030-05982

License Nos. 37-00030-02 ✓  
37-00030-08

USR Industries, Inc.  
ATTN: Mr. Ralph T. McElvenny  
Chairman and Chief Executive Officer  
2203 Timerloch Place  
The Woodlands, Texas 77380

Gentlemen:

Subject: Ownership and organizational changes at United States Radium Corporation, its Successors, and Safety Light Corporation (SLC), Inspection No. 86-001, and how they relate to decontamination responsibilities at the Bloomsburg, PA site.

On January 21, 1981, the Nuclear Regulatory Commission (NRC) received notification that the NRC licensee known as United States Radium Corporation had changed its name to Safety Light Corporation (SLC). There was no indication that the change involved any ownership or organizational changes. The NRC more recently was informed that the entity previously known as United States Radium Corporation is now doing business as USR Industries, Inc..

During an inspection on March 8, 1983, at the SLC facilities in Bloomsburg, Pennsylvania the NRC learned that SLC had been sold to three employees of the successor corporation that continued to conduct business as SLC. In a letter from the new company dated November 11, 1983, NRC Region I was informed that USR Industries, Inc. had completed the sale of SLC on May 24, 1982. The NRC did not receive prior notice of the transfer of rights under the referenced licenses and did not grant prior written approval of the resulting transfer of the licenses as required by 10 CFR 30.34(b). Prior to approving such a transfer, among the issues NRC would review would be the issue of whether, as a result of the transfer, SLC had reduced financial resources available to decontaminate the site.

Based upon the above, it appears that the licenses were transferred in violation of Section 184 of the Atomic Energy Act of 1954, as amended, 42 U.S. 2231 ("The Act") without the appropriate notification and approval required by 10 CFR 30.34(b). As a result of the above, you are hereby directed, pursuant to Section 182a. of the Act to provide answers, in writing, signed under oath or affirmation by a responsible officer of USR Industries Inc., to the questions set forth in Appendix B to this letter, to enable the Commission to determine whether the licenses should be modified, suspended or revoked. In addition, each of the companies listed in Appendix A may also respond to the questions in Appendix B either jointly or separately to the extent that they maintain an interest in the site at Bloomsburg, Pennsylvania.

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IR SAFETY LIGHT - 0001.0.0  
04/14/88

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REG1 LIC30  
37-00030-02 DCD

RETURN ORIGINAL TO  
REGION I

1E-07

20 APR 1988

USR Industries, Inc.

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Further, a safety inspection was conducted at the Bloomsburg facilities on June 19-20 and November 12, 1986. The results of this inspection and subsequent related correspondence relative to the Bloomsburg site are documented in Combined Inspection Report Nos. 030-5980/86-001 and 030-05982/86-001, a copy of which is enclosed with this letter. During the course of the inspection, two other apparent violations of NRC requirements were identified. Enforcement action relative to these findings, in addition to the apparent violation of 10 CFR 30.34(b) described above, is still under consideration and will be decided, in part, on the basis of your response to Appendix B to this letter.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosures will be placed in the Public Document Room. A response to this letter is required within thirty calendar days from the date of this letter.

Sincerely,

Original Signed By  
WILLIAM T. RUSSELL

William T. Russell  
Regional Administrator

Enclosures:

1. Appendix A
2. Appendix B
3. NRC Region I Combined Inspection Report Nos. 030-05980/86-001 and 030-05982/86-001

cc w/encls:

Public Document Room (PDR)  
Nuclear Safety Information Center (NSIC)  
Commonwealth of Pennsylvania  
~~Mr. John MacHutchin, RSO~~  
USR Lighting, Inc.  
USR Chemicals, Inc.  
USR Metals, Inc.  
U.S. Natural Resources, Inc.  
Metreal, Inc.

20 APR 1988

USR Industries, Inc.

3

bcc w/encls:  
Region I Docket Room (w/concurrences)  
Management Assistant, DRMA (w/o encls)  
R. Cunningham, NMSS  
J. Allan, RI  
J. Gutierrez, RI  
J. Piccone, RI  
T. Thompson, RI  
J. Joyner, RI  
J. Lieberman, OE  
J. Goldberg, OGC  
D. Holody, RI

RI:DRSS  
Piccone/ca

04/14/88

RI:DRSS  
Congel

04/14/88

RI:DRSS  
Glenn

04/14/88

By phone  
4/13/88  
NMSS  
Cunningham  
fm P. Vacca

04/ /88

RI:XC  
Gutierrez

04/15/88

RI:RA  
Allan

04/15/88

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RI:DRSS  
Joyner

04/14/88

RI:RA  
Russell

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IR SAFETY LIGHT - 0003.0.0  
04/14/88

OGC  
Goldberg

04/ /88

By phone  
4/14/88  
fm J. Goldberg

APPENDIX A

1. USR Industries, Inc.
2. USR Metals, Inc.
3. USR Lighting, Inc.
4. USR Chemicals, Inc.
5. U.S. Natural Resources, Inc.
6. Safety Light Corporation
7. Metreal, Inc.

## APPENDIX B

Information needed relative to License Nos. 37-00030-02 and 37-00030-08:

1. Describe all relationships and transactions between USR Industries, Inc., United States Radium Corporation, and their successors and subsidiaries affecting the Bloomsburg, Pennsylvania site.
2. Describe the relationship of USR Industries, Inc. and its subsidiaries to United States Radium Corporation prior to November 24, 1980.
3. Identify all successors to United States Radium Corporation.
4. Provide a decommissioning plan for the site which will permit the release of the site for unrestricted use. This decommissioning plan should provide for a final radiological survey that will include all areas where licensed material has been used, stored or buried. The decontamination of the site may be gradual, extending over a period of ten years, but should be scheduled to begin within twelve months. Please include a proposed schedule for completion of the decontamination along with the decommissioning plan.
5. Provide an estimate of the cost of the decommissioning, including the cost of the disposition of the radioactive waste generated during the decommissioning effort.
6. Propose a method to ensure that sufficient funds will be available to implement the decommissioning plan. Include a discussion of any change in financial resources available as a result of the change in ownership. Specifically, you should submit a decommissioning funding plan or a certification of financial assurance for decommissioning in an amount to cover the estimated costs.

U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 030-05982/86-01  
030-05980/86-01

Docket Nos. 030-05982  
030-05980

License Nos. 37-00030-08  
37-00030-02

Priority 1  
3

Category B  
E

Licensee: Safety Light Corporation  
4150-A Old Berwick Road  
Bloomsburg, Pennsylvania 17815

Facility Name: Safety Light Corporation

Inspection At: Bloomsburg, Pennsylvania

Inspection Conducted: June 19-20, 1986 and November 12, 1986

Inspectors: Thomas K. Thompson  
Thomas K. Thompson, Health Physicist

3/22/88  
date

for John E. Glenn  
Josephine M. Piccone  
Senior Health Physicist

3/22/88  
date

for John E. Glenn  
Frank Costello, Senior Health Physicist

3/22/88  
date

Approved by: John E. Glenn  
John E. Glenn, Chief  
Nuclear Materials Safety Section B

3/22/88  
date

Inspection Summary: Inspection conducted June 19-20, 1986 and November 12, 1986 (Combined Report Nos. 030-05980/86-01, 030-05982/86-01)

Areas Inspected: Routine unannounced inspection (June 19-20, 1986), including review of scope of current operations, contamination control, training, bio-assay, stack releases, restricted area air concentrations, liquid waste disposal, environmental sampling, package surveys, solid waste disposal, material inventory, and quality assurance; and announced inspection (November 12, 1986) including review of the organization, environmental sampling, site contamination and decontamination activities.

Results: Three apparent violations were identified: (1) Failure to obtain NRC review and approval prior to the sale of Safety Light Corporation on May 24, 1982 by USR Industries, Inc. (Paragraph 3); (2) Failure to meet the intent of Condition 13. of License No. 37-00030-02 to provide a report of the decontamination status and schedule of work for each 12 month period commencing July 1, 1979 (Paragraph 4); (3) Failure to complete the decontamination of specified sites (Paragraph 4).

## DETAILS

### 1. Persons Contacted

- \*Mr. J. Miller, President
- \*Mr. J. MacHutchin, Radiation Safety Officer
- \*Mr. C. Berlin, Lead Radiation Safety Technician

\*Denotes those present at the exit interviews.

### 2. Scope of Licensed Activities

Safety Light Corporation is authorized to possess and use any form of hydrogen-3 for the purposes of research and development, manufacturing, distribution and any byproduct material as sealed sources for use as reference standards (License No. 37-00030-08)

The Corporation is also authorized to possess any byproduct material as contaminated equipment and facilities for the decontamination, cleanup, and disposal of such material (License No. 37-00030-02).

### 3. Organization

The licensee changed the name of the Corporation from U.S. Radium Corporation to Safety Light Corporation effective November 24, 1980. The licensee notified NRC licensing staff by letter dated January 21, 1981 that this name change should be incorporated into all the existing licenses.

On May 24, 1982, Safety Light Corporation, a wholly-owned subsidiary of USR Industries, Inc., was sold to a group of executive officers of Safety Light Corporation. A copy of the current Safety Light Corporation organization chart was provided to the NRC in a letter dated December 3, 1986. (Attachment 1). 10 CFR Section 30.34(b) requires that no license issued pursuant to the regulations in Parts 30 through 35 be transferred, assigned or in any manner disposed of through transfer of control of any license to any person, unless the Commission has reviewed the transaction and given its consent in writing.

The failure of USR Industries, Inc./Safety Light Corporation to apprise the NRC of the sale of Safety Light Corporation, and to obtain prior approval of this transaction, with the resulting transfer of the license, constitutes an apparent violation of 10 CFR 30.34(b).

### 4. Review of Decontamination Operations

The inspectors toured the grounds of the facilities with licensee representatives and requested a site plan which would indicate property ownership, onsite companies and location of each, and locations and levels of



all contamination and radiation found by the licensee's surveys. This information was provided in a letter dated February 6, 1987. (Attachment 2).

Condition 14 of License No. 37-00030-02 requires that licensed material be possessed and used in accordance with statements, representations and procedures contained in application dated April 25, 1969, letter dated July 23, 1969, application dated June 7, 1977, letter dated October 23, 1978 and application dated November 6, 1978.

In a letter dated October 23, 1978, the licensee submitted a plant survey to identify the contamination status of the entire plant site and provided a decontamination plan of scheduled decontamination activities through June, 1979 as part of their June 7, 1977 renewal application. In the October 23, 1978 letter, the licensee provided a 9 month decontamination program that included: excavating contaminated soil between the lagoons; decontaminating the cement trough and storm sewer, the former shipping room and the old garage; removing contaminated soil by the tritium building and the contaminated wall in the carpenter shop. The site contamination survey provided in letter dated February 6, 1987 indicates that these areas have not been decontaminated.

The failure to complete the decontamination of specified sites is an apparent violation of Condition 14. of License No. 37-00030-02.

The October 23, 1978 letter stated that "in June of 1979, a schedule for the next twelve months will be developed...". This requirement was formalized in Amendment 40 of License No. 37-00030-02 with Condition 13, which requires that a report of the status and schedule of work for each 12 month period commencing July 1 be submitted no later than July 1 of each year.

The failure to provide a report of the status of decontamination efforts and a schedule of work for 12 month periods beginning July 1, 1979 to the present is an apparent violation of Condition 13. of License No. 37-00030-02.

## 5. Contamination Control

The inspectors toured the foil manufacturing, tube manufacturing, liquid waste storage, and solid waste storage facilities. Contamination surveys are performed on a daily basis as required. Records indicated that magenta controlled zones were maintained below the licensee's 50,000 dpm/100cm<sup>2</sup> limit. When contamination in excess of the level is detected, the licensee decontaminates the area.

The inspectors took 50 wipes from the active processing areas. NRC independent analysis of these wipes indicates that the licensee's results were consistent with the Regional analyses, considering differences in counting geometry and equipment (Attachment 3). Two wipes on the hood in the pumping station room exceeded the licensee's 50,000 dpm/100 cm<sup>2</sup> action limit. The licensee was notified of these results.

6. Training

No new employees who work with byproduct material have been hired since the last inspection.

The inspector also reviewed the records of annual retraining.

No violation of regulatory requirements was identified.

7. Bioassay

A licensee representative stated that weekly urinalyses are performed on all individuals working with tritium. The inspector reviewed the licensee's records for 1985 and 1986, up to June 20, 1986, and determined that no urine specimen had shown more than 7.25 microcuries per liter.

No violations of regulatory requirements were identified.

8. Stack Releases

All building exhausts are combined for discharge through a single stack, 0.6m in diameter and 18m high. Continuous monitoring of this stack for particulate, aqueous and gaseous forms of tritium is performed using filters and ethylene glycol bubblers in conjunction with an oxidizer furnace. Filters and ethylene glycol solutions are changed and analyzed daily. The licensee has determined diffusion factors for the exhaust stream under predominant meteorological conditions (wind toward the southeast) and utilizes these factors to calculate the concentration released to unrestricted areas.

Operations involving possible airborne releases are performed under exhaust ventilation. Silica gel (indicating-type) columns and molecular sieve back-up columns are used for treatment of gas streams with potentially high concentrations of tritium. These are replaced when needed as determined by observation of the silica gel. The old columns are disposed of as solid waste.

The licensee's exhaust ventilation system radiation monitor alarm is received at a local police department during off hours. The police maintain a phone contact list should high radiation levels be detected.

Licensee records indicate that, during 1985, 0.8 curie of tritium was released as particulates, 120 curies as tritiated water vapor, and 1796.5 curies as gaseous tritium. During the first three quarters of 1986, 0.1 curie of tritium as particulates, 69 curies as tritiated water vapor, and 2768 curies as gaseous tritium have been released to the environment. (Attachment 1)

The concentrations of tritium from the stack monitor in particulate and gaseous forms were less than 50 percent of the maximum permissible concentrations (MPC) found in Appendix B, Table II of 10 CFR Part 20 in 1985.

The concentration of tritium from the stack monitor in the form of tritiated water averaged 6.8 times MPC in 1985. Licensee calculations of the dilution factors for stack releases indicate ground level concentrations at the site boundary are well below the MPC for release.

Two significant stack releases, resulting from accidental releases from the gas fill system, were reviewed by the inspectors. On June 18, 1986, 6.02 MPC's for 24 hours of tritium oxide and 5.82 MPC's for 24 hours of tritium gas were released.

Licensee calculations indicated that the average ground level concentration of tritium at approximately 125 meters downwind from the stack was well below the MPC for unrestricted areas. Licensee calculations indicate that approximately 16 curies of tritium oxide or 3500 curies of tritium gas would have to be released to exceed the MPC for unrestricted areas.

The second incident occurred on August 29, 1986 and resulted in the release of 815 curies of tritium gas, the largest gaseous release which had occurred to that date. The licensee's investigation of the incident and calculations are contained in the licensee's memos dated August 30, 1986, and September 4, 1986 (2 memos) and are included in Attachment 1 of this report.

Calculations made by the inspectors confirm the licensee's analysis for tritiated water vapor and tritium gas released in effluents.

The licensee samples airborne soluble tritium at three locations along the property boundary. The three samples are located along the east property line based on the prevailing westerly winds.

Licensee records show that airborne concentrations at these points are less than one percent of the applicable MPC (Attachment 5).

No violations of NRC requirements were identified.

#### 9. Restricted Area Air Concentrations

The inspectors noted that air monitors were in operation which would alarm when the restricted area MPC is exceeded. Employees told the inspectors that they would immediately leave the area should an alarm sound.

On June 19, 1986, the scrubber system alarm setting was 1000 uCi/m<sup>3</sup>, the fill hood system alarm setting was 100 uCi/m<sup>3</sup>, and the general air alarm in the room was reading 4-5 uCi/m<sup>3</sup> with the alarm set at 10 uCi/m<sup>3</sup>.

No violations of NRC requirements were identified.

10. Liquid Waste Disposal

The inspectors sampled one of the liquid waste tanks (2310 gallons) awaiting discharge to the Susquehanna River. NRC's independent analysis was in agreement with the licensee's (Attachment 6).

No violations of NRC requirements were identified.

11. Package Surveys

The inspectors reviewed the records of surveys of incoming and outgoing packages. All packages are surveyed prior to leaving the gas-fill room and results are recorded prior to shipment. Incoming packages of tritium are taken to the liquid waste building for wipe surveying. On February 10, 1986 and March 11, 1986 the licensee received 9000 curies of tritium from a supplier with removable package contamination of 20,000 DPM/100cm<sup>2</sup>. The licensee informed the supplier and NRC.

No violations of NRC requirements were identified.

12. Solid Waste Disposal

The licensee has not made a shipment of radioactive waste to an authorized burial site since December of 1982. Presently, the licensee is storing approximately 20,000 curies of tritium waste (Attachment 7). The licensee stated that it found the cost of waste burial at a commercial site prohibitive, but are reinvestigating the burial site requirements and charges.

No violations of NRC requirements were identified.

13. Environmental Sampling

The inspectors reviewed bore hole and well water sampling results. Some variability was noted in the data with higher than normal concentrations obtained on February 19, 1986. Monitoring results indicated 113,000 picocuries/liter of tritium in bore hole #14 sample and 30,000 picocuries/liter of tritium in an offsite drinking water well. The inspectors requested historical tritium monitoring data for the Walton/Vance well (Attachment 8) and onsite bores #14 and #16 (Attachment 1). In an analysis made by the inspectors, there does not appear to be a trend between the offsite well results and either airborne tritium or bore #14, which is closest to the offsite well (Attachment 9). The inspectors obtained an offsite well water sample and a bore #1 sample for analysis. Results (Attachment 10) were consistent with the licensee's analyses.

A licensee representative stated that the monitoring procedure now required a repeat analysis be made on any well water samples equal to or exceeding 20,000 picocuries/liter of tritium (EPA standard).

No violations of NRC requirements were identified.

14. Quality Assurance

The inspector reviewed the procedures used to test gas-filled products to assure adequacy of the tritium seals. The procedure includes visual inspection and wipe tests of all individual tubes of gas. The completed units are placed in a chamber whose air is monitored for tritium to detect any leakage.

No violations of NRC requirements were identified.

15. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 at the conclusion of the inspection. The scope and findings of the inspection were summarized.

# SAFETY LIGHT CORPORATION

4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815  
717-784-4344 FAX 717-784-1402

November 25, 1986

U.S. Nuclear Regulatory Commission  
Region I  
631 Park Ave.  
King of Prussia, PA 19406

ATTN: Josephine M. Piccone, Ph.D.  
Health Physicist

Dear Dr. Piccone:

Further to discussions held here on 12 November with Mr. F. Costello and yourself, please be advised as follows:

- (1) I am enclosing herewith a summary of H(3) monitoring data for onsite bores #14 and 16 for period May, 1982 through October, 1986. Enclosed also is a copy of a drawing indicating the approximate locations of our onsite bores.

We have not, so far, been able to determine the cause of the extreme variations in the water activity levels for these particular bores. All precautions have been taken to avoid cross-contamination during sample taking and preparation for counting.

- (2) With respect to the Vance/Walton well water sample taken on 12 November, 1986, our analysis made on 14 November indicated a value of 1,800 pCi H(3) per liter of water. We would appreciate it if you would advise of the analytical results of your sample when this data becomes available.

I am not sure if you are aware of the fact that, because of the large volume of H(3) analyses we conduct routinely, we do NOT use a sample distillation step, but count the samples directly. However, we do program our LSC unit to provide simultaneous beta count rate data for energy ranges 0-19 keV (Channel 'A'), 2-19 keV (Channel 'B') and 21-2000 keV (Channel 'C') - thus if detectable levels of beta emitters having higher energies than that of H(3) are present, we can determine this fact from the Channel 'C' count rate.

- (3) Enclosed also, as requested, are copies of the following memos to our Radiation Safety Committee, relative to H(3) an emission incident which occurred on Friday, August 29, 1986:

- (a) JTM memo of Saturday, August 30, 1986.
- (b) NF memo of Thursday, September 4, 1986.
- (c) JGM memo of Thursday, September 4, 1986.

/ . . . Continued

Attachment 1

10-2-87 1-300 000  
1-300 000

## SAFETY LIGHT CORPORATION

U.S. Nuclear Regulatory Commission  
Dr. J.M. Piccone  
November 20, 1986  
Page 2

(4) As promised, I shall send you the following data as soon as we obtain it from Clean Harbors of Natick, MA:

(a) Gross alpha and gross beta concentrations for the Vance/Walton well water sample taken on 12 November 1986.

(b) Gross alpha and gross beta concentrations for the Bore 1 sample taken earlier on 18 October, 1986.

Item 4(a) above will not likely be received by us until the latter part of next month; Item 4(b) information should be in our hands within the next couple of weeks.

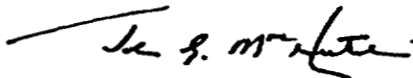
(5) With respect to the various organizations located on the Bloomsburg plant site, please be advised as follows:

(a) Enclosed is the requested copy of the Safety Light Corp. organization chart.

(b) We acknowledge your request to provide a site plan which will show (1) the various onsite companies and location of each and (2) location and levels of significant contamination or radiation found by survey. Facility drawings and identification of areas will take some time to prepare, but we hope to have this accomplished in a few months.

Please advise if you require any clarification of the above, or any additional information.

Yours very truly,  
SAFETY LIGHT CORPORATION



John G. MacHutchin  
Radiation Safety Officer

cc J.T. Miller

# SAFETY LIGHT CORPORATION

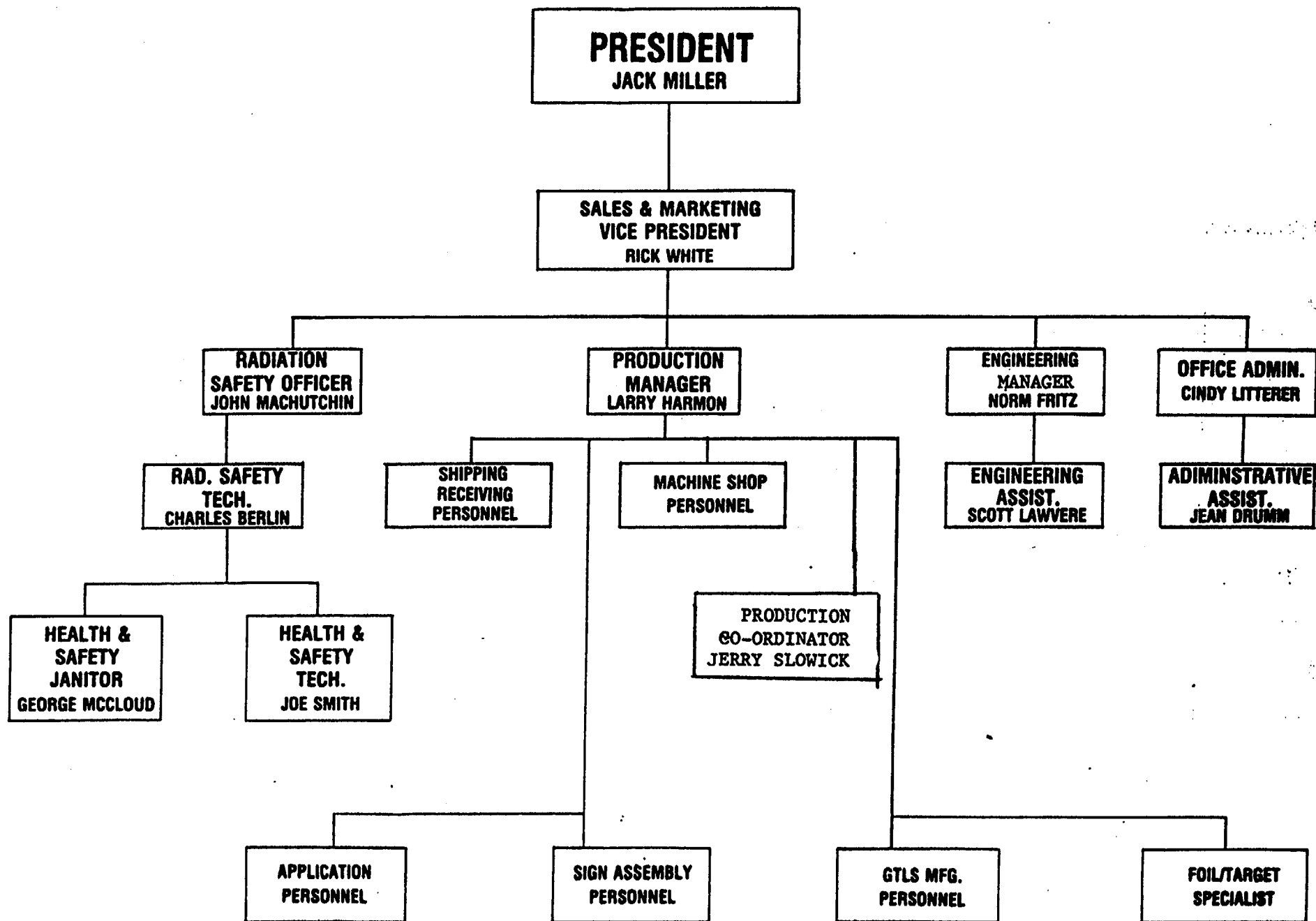
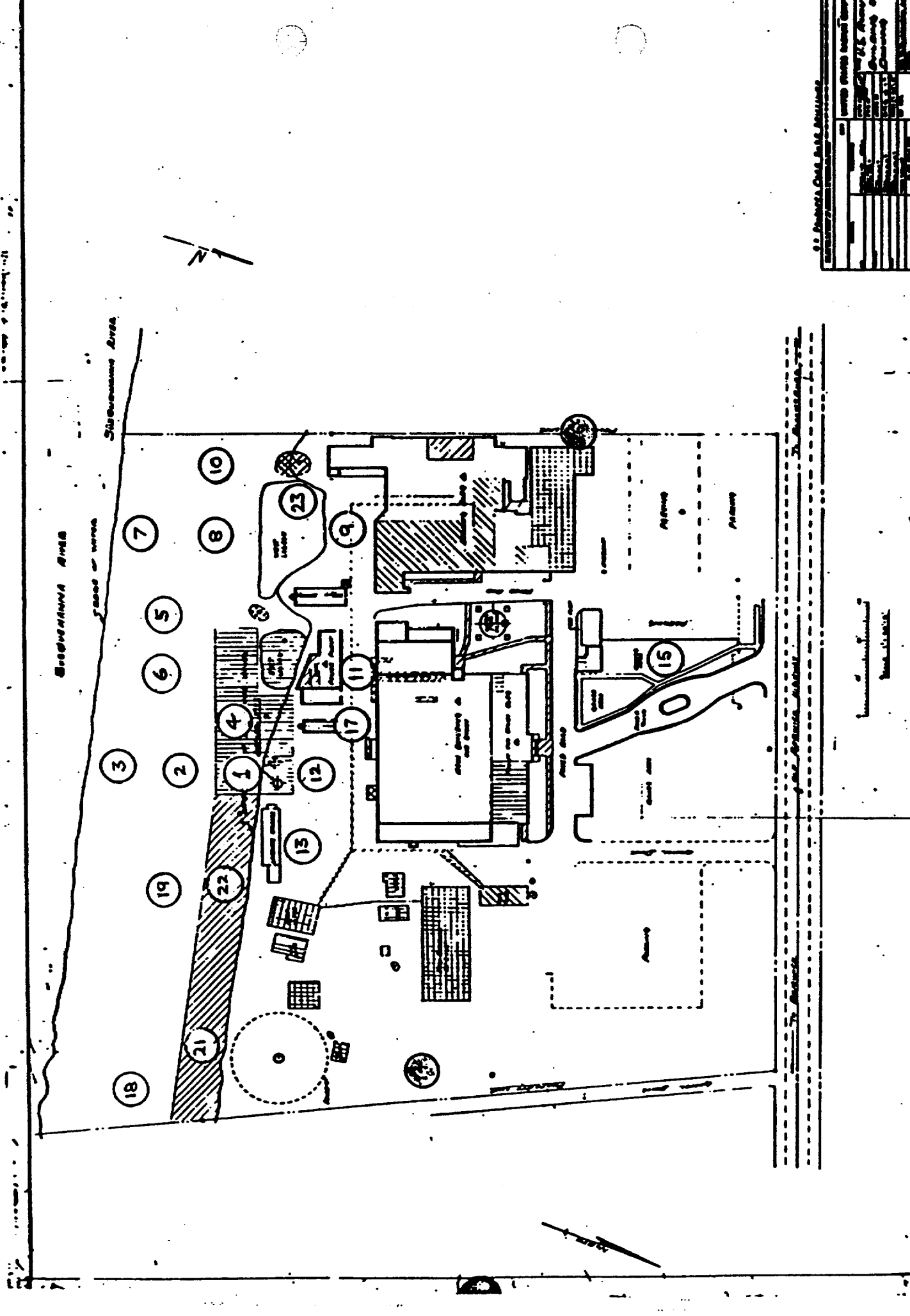


FIGURE 4.1





U.S. AIR FORCE ONE B-100 AIRCRAFT

NO.	NAME	GRADE	BRANCH	DATE	REMARKS
1	...	...	...	...	...
2	...	...	...	...	...
3	...	...	...	...	...
4	...	...	...	...	...
5	...	...	...	...	...
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21	...	...	...	...	...
22	...	...	...	...	...
23	...	...	...	...	...

SLC H<sup>3</sup> ENVIRONMENTAL MONITORING DATA  
FOR  
ONSITE BORES NOS. 14 & 16.  
(ACC. H<sup>3</sup>/L OF H<sub>2</sub>O)

MONTH	1982		1983		1984		1985		1986	
	#14	#16	#14	#16	#14	#16	#14	#16	#14	#16
JAN.	N/S	N/S	2,500	= MDA	24,510	4,800	9,200	3,800	23,600	23,200
FEB.	"	"	8,600	5,800	23,700	2,000	4,600	= MDA	113,000	21,000
MAR.	"	"	N/S	N/S	26,300	7,900	4,600	14,800	2,300	1,000
APRIL	"	"	19,600	26,300	26,800	4,600	7,600	3,600	26,500	11,400
MAY	18,000	4,000	= MDA	= MDA	20,700	3,900	9,700	2,800	18,700	5,200
JUNE	48,000	5,000	18,200	= MDA	18,900	17,800	11,900	8,200	8,400	8,400
JULY	45,010	= MDA	42,000	26,000	13,000	3,300	12,400	1,700	6,400	5,100
AUG.	11,000	7,800	6,100	2,100	18,700	8,400	4,700	3,700	7,100	5 MDA
SEPT.	62,000	16,000	6,200	3,400	14,000	9,000	7,700	4,500	10,900	12,600
OCT.	5,900	2,800	5,200	2,000	7,600	= MDA	6,600	4,800	12,500	8,400
NOV.	3,600	2,200	8,500	3,200	44,500	17,900	26,200	21,000		
DEC.	5,100	= MDA	25,100	16,800	6,300	4,300	9,700			

11/14/86  
 STS  
 Jc

REMARK: CB

SL 607

8/30/86

TO: RADIATION SAFETY COMMITTEE MEMBERS  
(JTM, LH, NF, SL & JGM)

RE: UNUSUAL INCIDENT 8/29/86 A.M. - PRELIMINARY REPORT

WE HAVE THIS A.M. DETERMINED, FROM PRELIMINARY ASSAYS OF OUR  
STACK MONITOR IMPINGER SOLUTIONS, THAT THE FOLLOWING RELEASES  
WERE MADE TO THE ENVIRONMENT DURING THE DEMO 0710 HRS.  
8/29/86 - 0610 HRS. 8/30/86 :

	$\text{Ci H}^3$	$\text{AVG CONC}^* (\mu\text{Ci H}^3/\text{ML AIR})$	$\times \text{MPC}^*$
$3\text{H}_{\text{SUB}}$ :	1,021.3	$434.0 \times 10^{-5}$	108.5
$3\text{H}_g$ :	0.6	$24.3 \times 10^{-7}$	12.1

\* AT POINT OF RELEASE (i.e., STACK).

A REVIEW OF OUR STACK MONITOR CHARTS INDICATES THE  
FOLLOWING :

- (1) DURING PERIOD 0732 - 1010 HRS, IT WAS NECESSARY  
TO OPERATE THE STACK MONITOR ON THE 1V-3V  
RANGES - IT WOULD APPEAR THAT THE MAJOR  
PORTION OF THE RELEASE OCCURRED DURING THIS  
PERIOD.
- (2) DURING PERIOD 1010 - 1305 HRS., THE  $\text{H}^3$  EMISSION  
LEVELS TAPERED DOWN FROM 52% FULL SCALE ON  
300 MV RANGE TO 11% FULL SCALE ON 30 MV RANGE  
- INDICATING THAT RELATIVELY LOW LEVELS OF  
 $\text{H}^3$  WERE RELEASED DURING THIS PERIOD.
- (3) AT APPROXIMATELY 1310 HRS., AFTER THE SYSTEM  
FOREPUMP WAS AIR-BALLASTED, THE  $\text{H}^3$  EMISSION  
LEVEL WAS INCREASED FOR A SHORT PERIOD TO  
ABOUT 32% ON THE 1V RANGE.
- (4) STARTING AT APPROX. 1400 HOURS, THE MONITOR WAS  
OPERATED OVERNITE ON THE 100 MV RANGE - THE

(2)

CHART INDICATES THAT THE EMISSION LEVEL DECREASED STEADILY OVERNIGHT & HAD REACHED NORMAL BACKGROUND AT 0616 HRS 8/30/86.

WE INTEND TO RE-CHECK THE ACTIVITY LEVELS IN THE  $^3\text{H}_{\text{SUB}}$  IMPINGER SOLUTIONS ON 9/2/86 A.M. & SHALL ADVISE OF OUR FINDINGS THEREAFTER.

IN ORDER THAT THIS INCIDENT CAN BE INVESTIGATED PROMPTLY, IT IS REQUESTED THAT A BRIEF REPORT BE SUBMITTED FOR COMMITTEE REVIEW AS QUICKLY AS POSSIBLE. THIS REPORT SHOULD INDICATE :

- (1) CAUSE(S) OF THE PROBLEM, ONCE DETERMINED.
- AND (2) STEPS TAKEN (OR TO BE TAKEN) TO PREVENT A RECURRENCE.

THIS IS THE LARGEST  $^3\text{H}_{\text{SUB}}$  RELEASE WHICH HAS OCCURRED TO DATE AT SLC. HOWEVER, OUR PRELIMINARY CALCULATIONS INDICATE THAT THE INCIDENT IS NOT REPORTABLE TO USNRC. IT IS IMPORTANT, HOWEVER, THAT WE HAVE ON RECORD DETAILS OF OUR INVESTIGATION & FINDINGS & ACTION TAKEN TO PREVENT A RECURRENCE.

—JGm  
R.S.O.

P.S. A COPY OF OUR E/A ( $^3\text{H}_{\text{SUB}} + ^3\text{H}_s$ ) CHART RECORDING IS ATTACHED FOR YOUR INFO.

YLM: C. ✓

9/4/86

TO: RADIATION SAFETY COMMITTEE MEMBERS  
(JTM, LH, NF, SL & JGM)

RE: COMMITTEE MEETING 9/2/86 P.M.

THE COMMITTEE MET ON 9/2/86 TO DISCUSS THE INCIDENT WHICH OCCURRED ON 8/29/86 A.M.

NF & SL REVIEWED THE EVENTS WHICH OCCURRED, AND OUTLINED SEVERAL POSSIBLE CAUSES, ONE OR MORE OF WHICH COULD HAVE RESULTED IN THE LOSS OF  $^3\text{H}$ SUB WHICH OCCURRED. BASED ON THE INFORMATION AVAILABLE AT THIS POINT, IT WAS CONCLUDED THAT THE CAUSE(S) OF THE RELEASE COULD NOT BE POSITIVELY DEFINED. IT WAS AGREED THAT NF & LH WOULD AGAIN INTERVIEW THE OPERATOR (MH) TO DETERMINE IF ANY ADDITIONAL INFORMATION COULD BE OBTAINED. FOLLOWING THIS, NF WAS REQUESTED TO ISSUE A WRITTEN REPORT, SUMMARIZING THE SITUATION TO DATE, AND INCLUDING RECOMMENDATIONS RELATIVE TO WHAT ACTIONS SHOULD BE TAKEN TO PREVENT A RECURRENCE. COPIES OF THIS REPORT WERE ISSUED TO COMMITTEE MEMBERS ON 9/4/86.

JGM ADVISED THE COMMITTEE THAT RE-CHECKS ON THE  $\text{H}^3$  ACTIVITY FOUND IN THE  $^3\text{H}$ SUB STOCK SAMPLING IMPINGERS WERE CONDUCTED ON 9/2/86 A.M. DUPLICATE 1 ML. SAMPLES OF THE IMPINGER SOLUTION WERE DILUTED (9/1 BY VOL.) WITH INACTIVE EG, MIXED THOROUGHLY. TRIPLICATE 0.2 ML. ALIQUOTS WERE PIPETTED FROM EACH OF THE TWO DILUTED "STOCK" SOLUTIONS, 0.8 ML. DIST $^2$  H $_2$ O ADDED TO EACH, FOLLOWED BY ADDITION OF 10 ML SCINTILLANT E' SCINTILLATOR TO EACH OF THE 6 SAMPLES. FROM THE LSC DATA OBTAINED IT WAS APPARENT THAT EXCELLENT AGREEMENT WAS OBTAINED BETWEEN THE 6 ASSAY SAMPLES. BASED ON THE RE-CHECK DATA, THE CALCULATED AMOUNT OF  $^3\text{H}$ SUB RELEASED TO THE ENVIRONMENT WAS 815 Ci (AS COMPARED TO THE 1021 Ci REPORTED IN JGM NEWS 8/30/86). HOWEVER

THE HIGHER 1021 Ci VALUE WAS USED IN ESTIMATING THE HIGHEST AVERAGE DOWNWIND CONCENTRATION OF  $^3\text{H}_2\text{SO}_4$  (SEE COPY OF CALCULATIONS ATTACHED)

BASED ON FINAL REVIEW BY COMMITTEE MEMBERS OF ALL INFORMATION ON HAND, IT WAS AGREED THAT:

- (1) THE RECOMMENDED STEPS TO PREVENT A RECURRENCE (PER PAGE 3 OF NF'S 9/4/86 REPORT) BE TAKEN IMMEDIATELY.
- (2) THE INCIDENT IS NOT REPORTABLE TO USNRC; HOWEVER, ALL RECORDS OF THE INCIDENT AND ITS INVESTIGATION ARE TO BE KEPT ON FILE FOR FUTURE EXAMINATION, AS REQUIRED.

  
R.S.O.

# 8/29/86 <sup>3</sup>H<sub>2</sub>O Emission Incident

9/2/86

ASSUMED: ① TOTAL <sup>3</sup>H<sub>2</sub>O EMISSION (0710 8/29/86 - 0610 8/30/86) = 1021 Ci (ALTMORE REPORTS MADE TODAY INDICATED THAT THE EMISSION WAS 815 Ci <sup>3</sup>H<sub>2</sub>O).

② AVERAGE WINDSPEED (u) = 1-2 m/SEC (USED 1 m/SEC IN CALCULATIONS)

③ AVE. ATMOS. STABILITY CONDITION = "C" (CLEAR & SUNNY)

④ For Class "C":

(1) MAX <sup>3</sup>H<sub>2</sub>O CONC. OCCURS @ ~175 m. DOWNWIND FROM STACK

(2) AVE WIND DIRECTION DURING DAY (0700 - 1530 Hrs 8/29/86) = NNW → SSE

(3)  $\sigma_y = 21.0m$ ;  $\sigma_z = 12.5m$ .

(4) 0-8 HOUR RELEASE PERIOD.

## CALCULATION:

USING REG. GUIDE 3.35 INFO (0-8 HR):

$$Q = \frac{1021 \text{ Ci}}{8 \text{ HR} \times 3600 \text{ SEC}} = 3.5 \times 10^{-2} \text{ Ci}^3 \text{ H}_{2}\text{O} / \text{SEC}.$$

$$\chi = Q \left[ \frac{e^{-\frac{u^2}{2\sigma_y^2}}}{\pi(\mu)\sigma_y\sigma_z} \right] = 3.5 \times 10^{-2} \left[ \frac{e^{-\frac{(0.3)^2}{2(21.0)^2}}}{\pi(1)(21.0)(12.5)} \right]$$

$$= 3.5 \times 10^{-2} \left[ \frac{e^{-1.072}}{824.3} \right]$$

$$= 3.5 \times 10^{-2} \left[ \frac{0.3}{824.3} \right]$$

$$= 3.5 \times 10^{-2} (3.6 \times 10^{-4})$$

$$= 12.6 \times 10^{-6} \mu\text{Ci}^3 \text{ H}_{2}\text{O} / \mu\text{L}$$

$$\text{i.e. } \chi = 1.3 \times 10^{-5} \mu\text{Ci}^3 \text{ H}_{2}\text{O} / \text{ML AIR}$$

$$= \frac{1.3 \times 10^{-5}}{4 \times 10^{-5}}$$

$$= \sim 0.33 \times \text{MPC}$$

→ IF RELEASED OVER 24 HRS,  $\chi$  WOULD BE DECREASED TO  $\sim 4.3 \times 10^{-6} \mu\text{Ci}^3 \text{ H}_{2}\text{O} / \mu\text{L}$

JP  
R.P.O.

9-4-86

TO: RADIATION SAFETY COMMITTEE  
JTM, LH, JGM, SL

SUBJECT: TRITIUM GAS LOSS - 8-29-86

NOTE: REFERENCE ATTACHED SKETCH

ON FRIDAY, 8-29-86, MARTHA HIPPENSTIEL APPLIED HEAT TO PYRO #1 TO GENERATE SUFFICIENT  $^3\text{H}$  GAS PRESSURE IN THE METAL BELLWS TO FILL TUBES. IN LESS THAN 5 MINUTES SHE NOTICED THAT THERMOCOUPLES #1 & #2 WERE UPSCALE. MARTHA THEN SHUT OFF HEAT TO THE PYRO AND QUICKLY CLOSED ALL SYSTEM VALVES EXCEPT #4 (TO ALLOW SOME ROOM FOR EXPANSION). WITHIN 2 TO 3 MINUTES THE SCRUBBER MONITOR WENT OFF SCALE, SIGNIFYING THAT  $^3\text{H}$  GAS, IN SOME AMOUNT HAD GONE THROUGH ONE OF THE VACUUM PUMPS.

UPON CONSULTATION WITH J. SLOWICK AND N. FRITZ MARTHA LATER (20 MIN) CLOSED VALVE #4 AND TOOK GAS IN WALLACE ~TIERNAN LINE BACK ONTO PYRO #2, AND SHUT OFF ROUGH VACUUM PUMP DUE TO SUSPICION OF VALVES #3 & #14 LEAKING THROUGH.



RESULTS OF LIQUID SCINTILLATION COUNTING OF STACK IMPINGER CONTENTS FOR THE ABOVE MENTIONED SAMPLING PERIOD RECORDED THAT 10.21 CURIES HAD GONE THROUGH THE VACUUM SYSTEM.

PRESSURE CHECKS USING HELIUM AT TWICE THE PRESSURE APPARENT IN THE INCIDENT SHOWED THAT VALVES #3 AND #14 HELD. THESE CHECKS WERE RUN FRIDAY 8-29 AND TUESDAY 9-2.

ON TUESDAY 9-2 SEALS ON VALVES #3 AND #14 WERE INSPECTED AND REPLACED. SEALS WERE FOUND TO BE IN EXCELLANT CONDITION.

INVESTIGATIVE MEETINGS WERE HELD ON A FORMAL BASIS ON TUESDAY, 9-3-86 AND 9-4-86 INCLUDING RADIATION COMMITTEE MEMBERS AND THOSE ASSOCIATED WITH GAS HANDLING. THE GAS FILL OPERATOR, MARTHA HIPPENSTIEL WAS INTERVIEWED. THOSE INVOLVED IN FORMAL AND INFORMAL DISCUSSIONS WERE JACK MILLER, LARRY HARMON, JOHN MACHUTCHIN, SCOTT LAUVERE, MARTHA HIPPENSTIEL, JERRY SLOWICK AND NORM FRITZ.

IT WAS DETERMINED THAT ONE OR MORE OF THE FOLLOWING COULD HAVE CAUSED THE TRITIUM GAS LOSS. NO PHYSICAL INDICATIONS WERE FOUND AND NO INFORMATION FROM PERSONNEL INVOLVED WAS SUFFICIENT TO POSITIVELY DEFINE THE CAUSE.

1. LEAK THROUGH OF VALVES #3 & #14 DUE TO FOREIGN MATERIAL AT SEAL POINT
2. VALVE #3 LEFT OPEN & VALVE #14 LEAKED THRU AS IN 1.
3. VALVE #14 LEFT OPEN AND VALVE #3 LEAKED THROUGH AS IN 1.
4. OTHER OPERATOR ERROR INCLUDING MANY POSSIBILITIES OF COMBINATIONS OF ERRORS.
5. OTHER UNDISCOVERED CAUSES

#### STEPS TO PREVENT RE-OCCURANCE -

1. STRESS EXTREME IMPORTANCE OF CHECKING & RE-CHECKING VALVE POSITIONS TO OPERATOR.
2. STRESS IMPORTANCE OF MONITORING GAUGE RESPONSE TO OPERATOR
3. CONTINUE TO KEEP VALVE MAINTENANCE PROGRAM ON SCHEDULE

Norm Fritz

# SAFETY LIGHT CORPORATION

4150-A OLD BERWICK ROAD, BLOOMSBURG, PA 17815  
717-784-4344 FAX 717-784-1402

Attachment 2

6 February 1987

U.S. Nuclear Regulatory Commission  
Region I  
631 Park Ave.  
King of Prussia, PA 19406

ATTN: Dr. J. Piccone.

Dear Dr. Piccone:

Please find enclosed the requested information concerning environmental sampling data currently being conducted under USNRC License No. 37-00030-02. Drawing No. 4003-80, Safety Light Corporation Building Site Drawing, shows the names and locations of the companies currently occupying space as well as legend numbers that correspond to information sheets on environmental data.

Please feel free to contact the undersigned or Dr. John MacHutchin, Radiation Safety Officer, if any information requires further clarification.

Very truly yours,  
SAFETY LIGHT CORPORATION

  
Jack Miller  
President

**SAFETY LIGHT CORPORATION**  
**LEGEND FOR MARKED-UP DWG. NO. 4003-80**

(1) SLC PROCESSING BUILDING - Numerous & frequent H3 contamination surveys conducted routinely - records examined during USNRC inspections. Bldg. posted & kept locked during off-hours.

(2) FORMER GARAGE (FLOOR ONLY REMAINS) - Dirt floor section contaminated (200-2000 DPM/100 sq.cm. removable alpha; 0-1 mrh beta-gamma @ 2"). Cement floor section also contaminated (0.3 - 2 mhr beta-gamma @ 2"). General area posted (See Item 3 below).

(3) CONTAMINATED SOIL AREA - Soil W & SW of former bldg. contaminated (0 - 2 mrh @ 2"). Area posted.

(4) METAL SILO (ABOVE GROUND) - Used for storage of contaminated equipment. Interior contamination level varies with contents of bldg. Entry controlled by Health Physics - Bldg. posted & locked.

(5) SOLID WASTE BUILDING - Surveyed routinely for H3 contamination - records examined during USNRC inspections. Short periods of occupancy only - entry controlled by Health Physics. Bldg. posted & locked during off-hours.

(6) OLD HOUSE - Used only for storage of misc. low-level contaminated items. Low level removable alpha contamination (200-1000 dpm/100 sq.cm.) present in some interior areas. Bldg. posted and kept locked.

(7) LIQUID WASTE BUILDING - Surveyed routinely for H3 contamination - records examined during USNRC inspections. Short periods of occupancy - entry controlled by Health Physics. Bldg. posted & kept locked during off-hours.

(8) 8' X 8' BUILDING - Used for storage of some contaminated equipment. Surveyed routinely for interior removable contamination & exterior radiation - records available for USNRC inspections. Bldg. posted and kept locked.

(9) UTILITY BUILDING - Used for storage of non-radioactive supplies. Bldg. was decontaminated previously, but is surveyed routinely for removable contamination - records are kept available for USNRC inspections. Bldg. posted & locked during off-hours.

(10) FORMER RADIUM VAULT - Bldg. not used. Exterior radiation surveys conducted routinely (0-3 mrh beta-gamma @ 2"). Bldg. sealed and posted.

(11) MACHINE SHOP - Former USRC H3 bldg. Surveyed routinely for removable H3 contamination (since sealed former metal pipe exhaust lines presumably contain some residual H3 contamination). Infrequently find an isolated spot of very low level removable contamination. Bldg. posted & kept locked during off-hours.

## SAFETY LIGHT CORPORATION

(12) CONTAMINATED SOIL AREA - Area shows some detectable above ground beta-gamma contamination (0 - 0.6 mrh @ 2"). Area is posted.

(13 thru 16) CONTAMINATED SOIL AREAS - Detectable levels of beta-gamma soil contamination (most likely one or more of Cs(137), Sr(90) and Ra(226)) have been found generally along the old, filled-in canal bed (and, to a lesser degree, in some areas along the lower plateau). Various areas are posted.

(17) FORMER USRC DISPOSAL PITS (2) - Detectable levels of beta-gamma radiation (0 - 0.5 mrh @ 2" above soil surface) are present within this fenced area. The area is posted & kept locked. Entry is controlled by Health Physics.

(18) EAST LAGOON - Periodic underwater surveys have shown varying levels of gamma contamination (0 - 4 mrh at soil surface) in the lagoon bed. Over the period 8/85 - 8/86, H3 levels in the water presently have ranged from 0 - 25,000 pCi/L.

(19) CARPENTER SHOP - One area of interior wall shows 140-170 mhr beta-gamma (beta window of survey meter open) at contact. This area has a rope barrier & is posted. Beta-gamma field at barrier ranges from 0.1 - 0.7 mrh. Removable beta-gamma contamination levels in the area range from 0 - 4,500 DPM/100 sq.cm. This area is not normally occupied.

(19A) WFLH HOUSE - Dirt floor in this area is alpha contaminated. Area is posted & non-occupied.

(20) FORMER Cs(137) ION EXCHANGE HUT - Hottest spot on exterior wall shows 1.5 - 1.8 mrh beta-gamma at contact. Area is posted & kept locked - entry is controlled by Health Physics.

(21) CONTAMINATED SOIL AREA (UNDER LOADING DOCK) - Highest radiation level at soil surface reads 7 mrh beta-gamma at contact. Area is posted.

(22) CEMENT TROUGH/SEWER GRATE - Radiation field in contact with grate surface is 4 - 5 mrh beta-gamma. Area is posted.

(23A) FORMER HAND APPLICATION APFAS (2ND FLOOR; Ra(226) & H(3) PAINTS) - Attic above this area contains Ra(226)-contaminated ductwork and rafters, underside of roof, etc. show some alpha contaminated. Entry door to attic area is posted.

(23B) MAIN BUILDING (1ST FLOOR) - Several isolated areas show beta-gamma levels up to 0.3 mrh @ contact. These areas not normally occupied. An old drain line used in connection with past Sr(90) operations, exists under concrete floor in one area - no detectable radiation found above this floor.

## SAFETY LIGHT CORPORATION

(24A & 24B) PLANT SIDEWALK APPAS - Past surveys of outdoor sidewalks have indicated isolated areas of detectable contamination, e.g. at contact: 0 - 1.5 mrh beta-gamma & 0 - 4,000 cpm alpha.

(25) FORMER PERSONNEL OFFICE BUILDING - Old well in basement apparently once used for storage or disposal of some type of radioactive material (no record of contents has been found). This well is capped with concrete - beta-gamma levels at cap surface range from 0 - 0.3 mrh. Bldg. is not occupied. Basement area is posted.

(26) FORMER PLANT DUMP (BETWEEN LAGOONS) - Beta-gamma readings at soil surface range from 0 - 0.5 mrh beta-gamma (beta window open). No apparent associated gamma radiation present. Area is posted.

(27) FORMER PIPE SHOP - Removable alpha and beta-gamma contamination exists on many interior surfaces - alpha contamination range is 0 - 150 cpm; alpha-beta-gamma contamination ranges from 0 - 70,000 dpm/100 sq.cm. Area is posted and locked - bldg. is not occupied.

(28) WEST LAGOON - Normally contains no water. Surveys indicate no detectable levels of contamination at soil surface.

(29) FORMER PLANT DUMP - After discovery of this area in 1970, some 78 X 55 gal. drums of contaminated soil, etc. were removed and shipped to an approved radwaste disposal site. Surface radiation levels at contact ranges from 0 - 2 mrh beta-gamma. Area is roped & posted. Highest reading at barrier rope is 0.5 mrh beta-gamma.

(30) FITTING BUILDING - Subfloor of former shipping room (and possibly the soil beneath this) shows removable alpha contamination levels of 0 - 2000 dpm/100 sq.cm. No detectable beta-gamma radiation exists above the floor surface. Area is posted. Area is not occupied.

Former H3 Watch Dial Screening Room - This area was partially decontaminated earlier, but some removable H3 contamination still remains in some areas, e.g. 0 - 115,000 dpm/100 sq.cm. Residual removable H3 contamination in former exhaust system filter banks has been reduced to the 0 - 5,000 dpm/100 sq.cm. range; interior surfaces of plenum chamber now show no detectable H3 contamination. Residual H3 contamination levels existing inside exhaust ducts proper are not known at this time. Area is posted & not occupied.

Random wipe tests made in the Fitting Building attic show removable alpha contamination levels in the 0 - 1000 dpm/100 sq.cm. range.

## **SAFETY LIGHT CORPORATION**

The former maintenance area (wire mesh enclosed) has a 12" thick concrete floor poured over an old Ra(226) contaminated drain line - no detectable radiation exists above this floor. Area is not occupied.

(31) FORMER H3 EXIT SIGN ASSEMBLY AREA - This area of the Etching Building shows no detectable levels of residual contamination; however, a large number of old metal die assemblies are stored here, many of which show detectable levels of alpha-beta-gamma contamination. Area is posted & not occupied.

(32A - 32D) DRAIN LINES USED FOR PREVIOUS USPC OPERATIONS - These presently unused drain lines presumably still contain varying degrees of contamination residual from previous operations.

Urgent ☒

UNITED STATES NUCLEAR REGULATORY COMMISSION  
REGION I LABORATORY  
SAMPLE RECORD SHEET

Serial No. 301159

On Routine ☐ Date Needed \_\_\_\_\_

Sample From: Safety Light  
Collected By: Thompson Date Sent: \_\_\_\_\_  
Organization: NMSS

Samples Received: \_\_\_\_\_  
Analysis Completed: \_\_\_\_\_  
Notified: \_\_\_\_\_ Date: 7/1/86

Analyzed By: MEL

Approved By: YOK

Sample		Sample Description		Anal. for	Inst. used	Quant. used	Date cntd.	Count time	Gross count	Bkgd.	Net count	Eff.	Results $\pm 1\sigma$
No.	Date	Hour											
1				<sup>3</sup> H	LSC	wipe	6/28/86	10 min	7080	176	6904	0.358	1928 $\pm$ 24
2									2919		2743		766 $\pm$ 5
3									2417		2241		626 $\pm$ 14
4									8324		8148		2276 $\pm$ 26
5									14402		14226		3974 $\pm$ 34
6									13453		13277		3709 $\pm$ 33
7									9249		9073		2534 $\pm$ 27
8									6468		6292		1757 $\pm$ 23
9									8750		8733		24394 $\pm$ 83
10									417		241		6507
11									10415		10239		2860 $\pm$ 29
12									265614		285438		79731 $\pm$ 149
13									30117		29941		8363 $\pm$ 49
14									191025		190849		53310 $\pm$ 122
15									14486		14310		3997 $\pm$ 34
16									10533		10357		2893 $\pm$ 21

Attachment 3

\*Random uncertainties reported are  $\pm 1$  standard deviation, for small negative and other results  $\leq 2\sigma$  are interpreted by NRC as including "zero" or as not detected. If appropriate, estimates of possible systematic errors are reported in parentheses.



**Urgent** \_\_\_\_\_

UNITED STATES NUCLEAR REGULATORY COMMISSION  
REGION I LABORATORY  
SAMPLE RECORD SHEET

Lon Routine \_\_\_\_\_ Date Needed \_\_\_\_\_

Serial No. 301154

Sample From: _____	Samples Received: _____	Analyzed By: _____
Collected By _____ Date Sent _____	Analysis Completed: _____	Approved By: _____
Organization _____	Notified: _____ Date: _____	

[illegible]

\* Random uncertainties reported are 1 standard deviation. 10. Small negative and other results  $\leq 3\sigma$  are interpreted by NRC as "not detected." If appropriate estimates of possible systematic errors are reported in parentheses.

1-10

# Attachment E

## NUCLEAR PRODUCTION BUILDING: TRITIUM GAS PROCESSING AREA

Initials: RET

Date: 6/20/86

Time: 1500

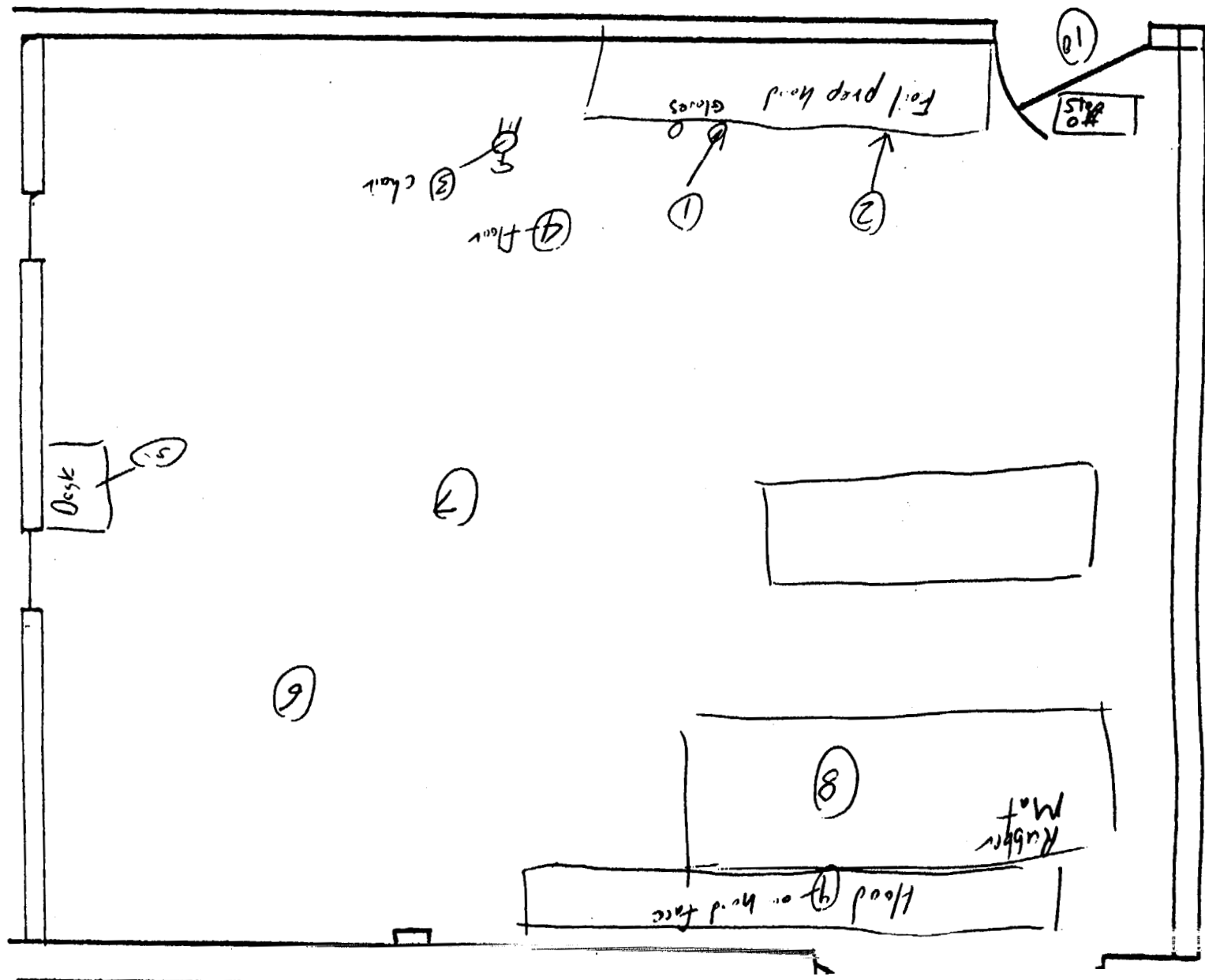
INSTRUMENT

BACKGROUND

Data results:

dpm/100cm<sup>2</sup>  
alpha-beta-gamma

R = recount  
< = section  
\* = over-tolerance



# Attachment F

NUCLEAR PRODUCTION BUILDING: PUMPING STATION ROOM

Smears 11-20

Initials: RET

Date: 6/20/86

Time: \_\_\_\_\_

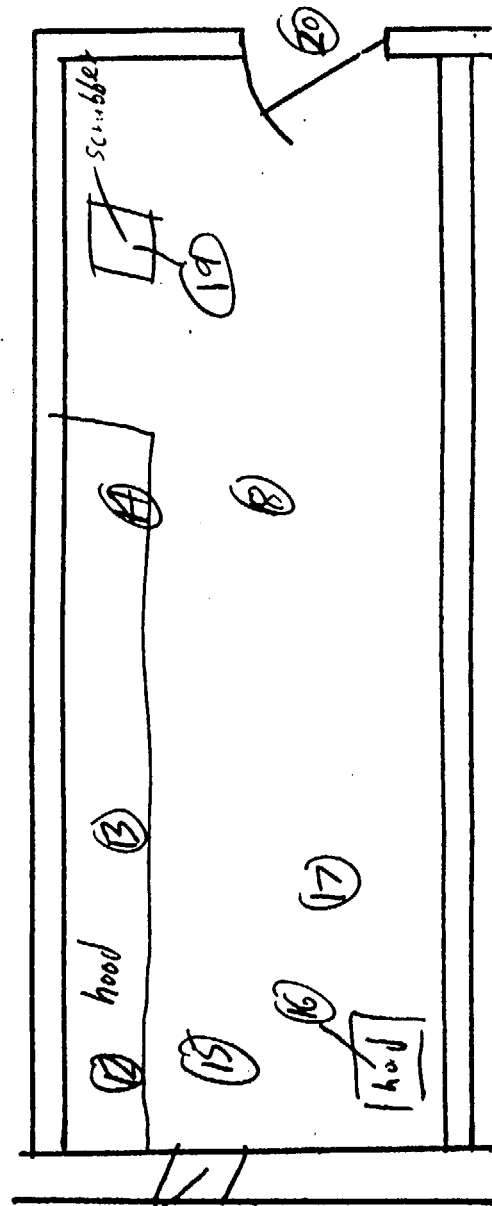
INSTRUMENT

BACKGROUND

Data results:

dpm/100cm<sup>2</sup>  
alpha-beta-gamma

R = recount  
X = section  
\* = over-tolerance



Smears 11-20

INITIALS: TKT  
 DATE: 6/20/86  
 TIME: \_\_\_\_\_

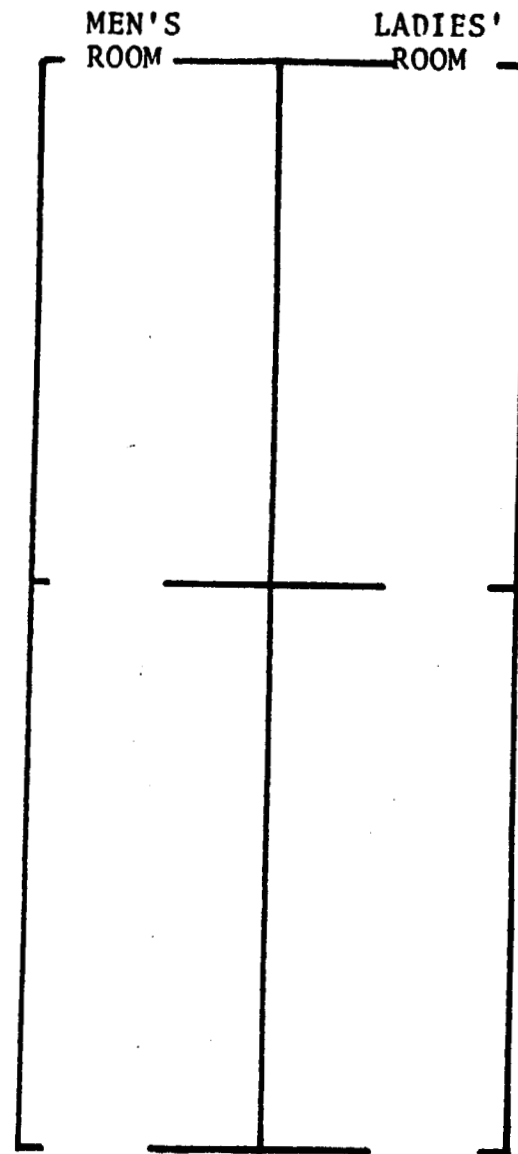
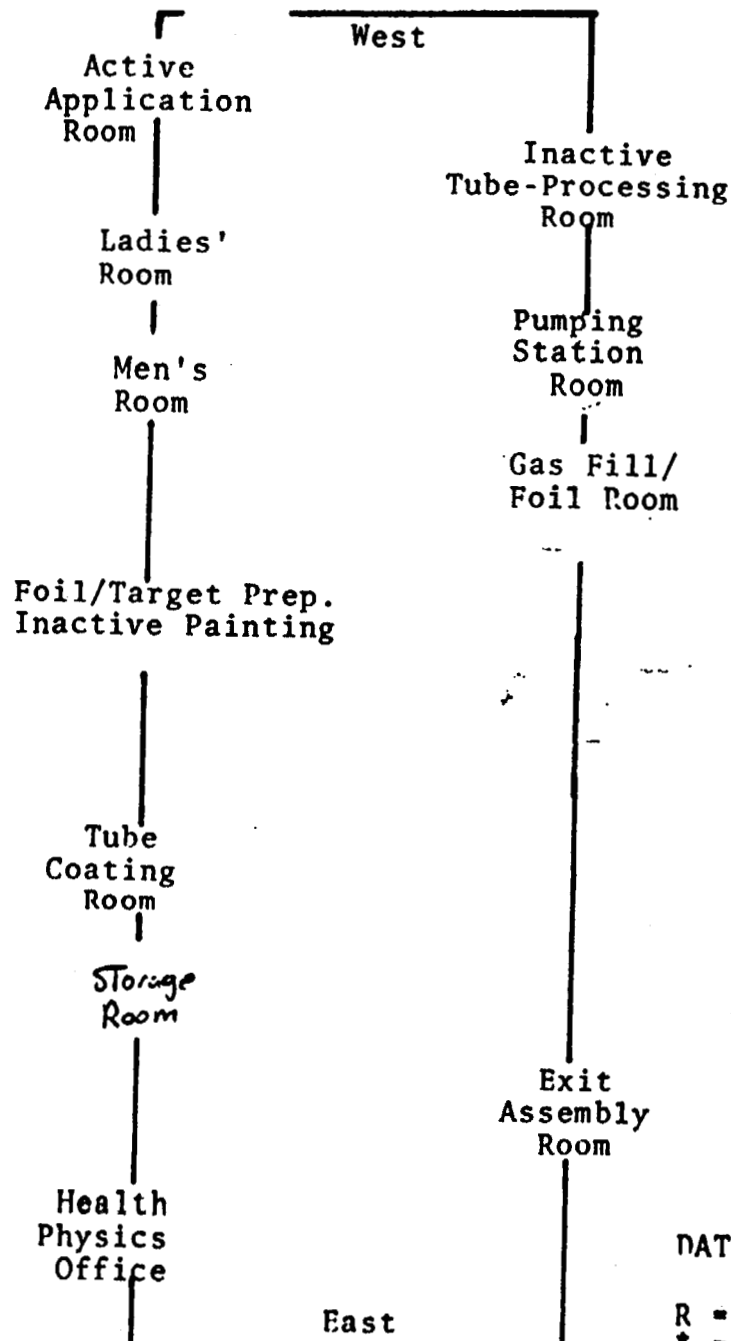
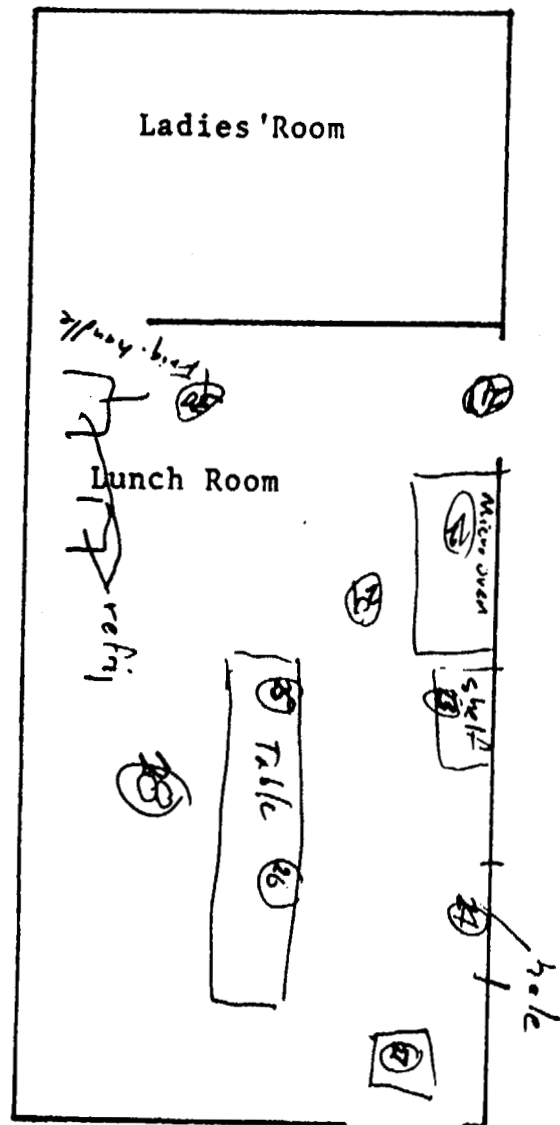
INSTRUMENT: \_\_\_\_\_  
 BACKGROUND: \_\_\_\_\_

# Attachment G

## SAFETY LIGHT PRODUCTION BUILDING HALLWAY

5m cars

21-30



DATA RESULTS: DPM/100 cm<sup>2</sup> Alpha-Beta-Gamma

R = Recount  
 \* = Over-Tolerance

East  
 Lunch Room

Smcars  
31-40

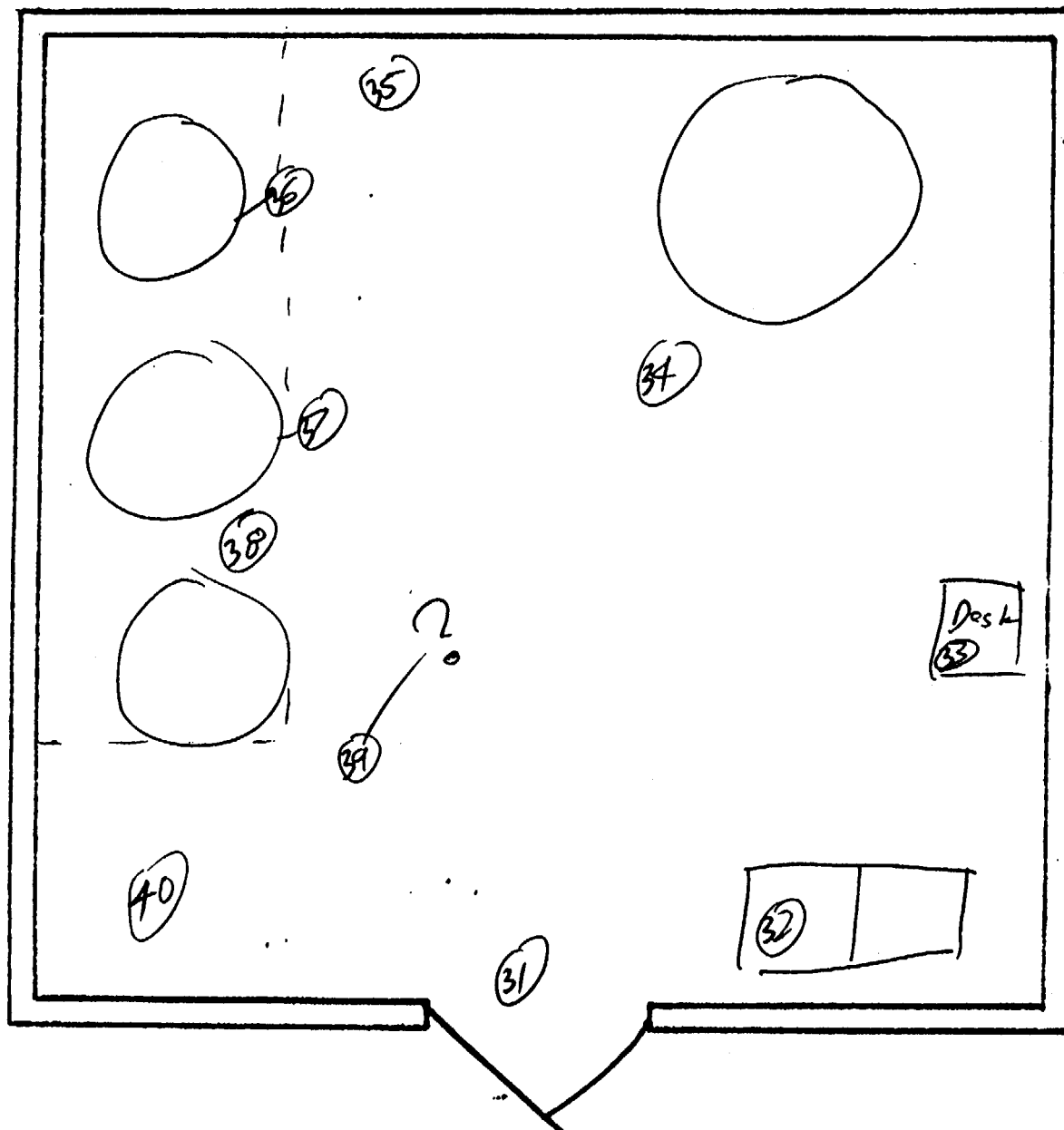
Initials Pat Date 6/24/86 <sup>1711/01/1986 11</sup> Time 1500

INSTRUMENT \_\_\_\_\_ BKGD. \_\_\_\_\_

Data results: dpm/100cm<sup>2</sup> alpha-beta-gamma

R=recount  
X=section  
\*=over-  
tolerance

SOLID WASTE  
BUILDING



Smear  
 41-50

# LIQUID WASTE BUILDING

Initials: Ret  
 Date: 6/20/86  
 Time: 01500

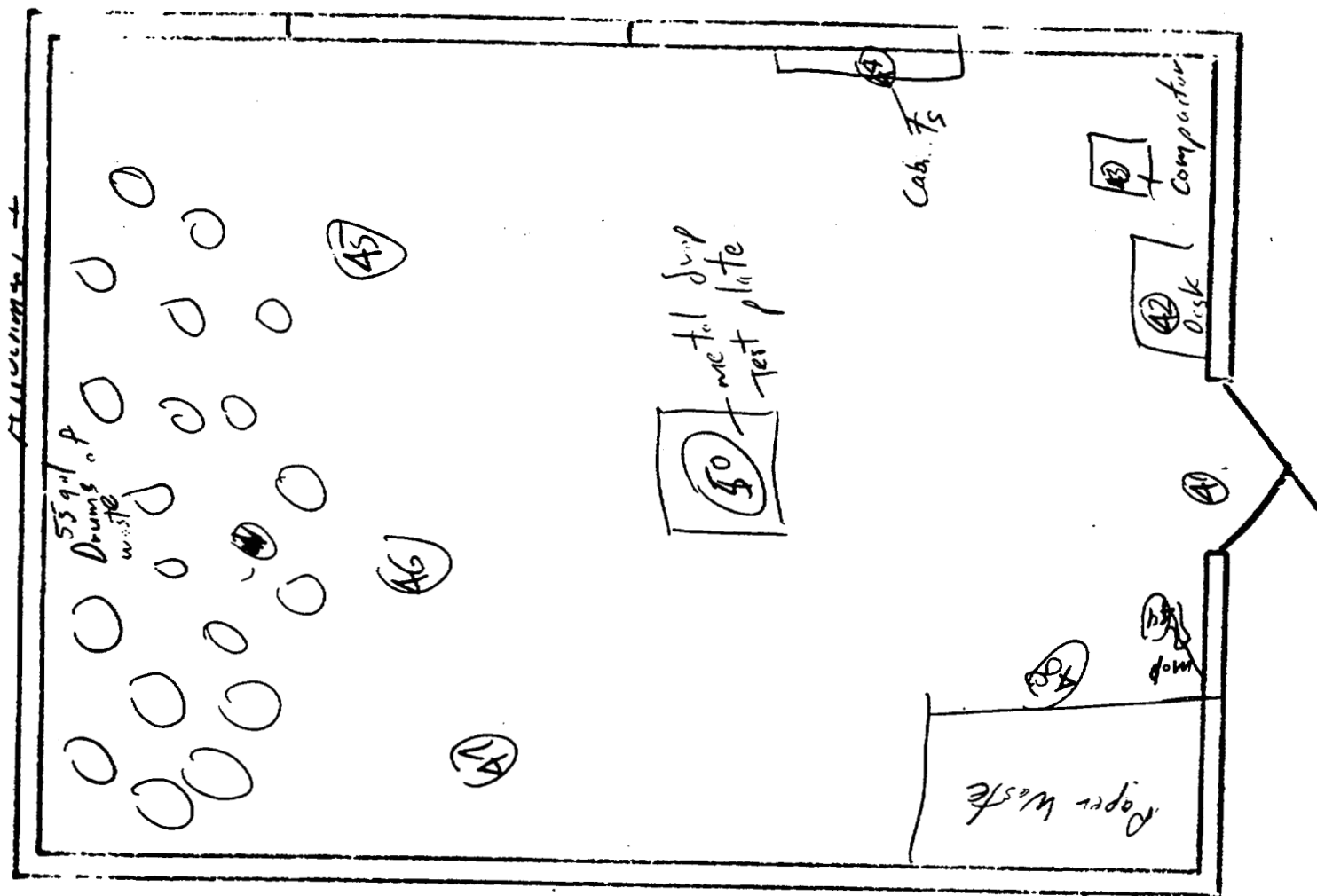
INSTRUMENT

BACKGROUND

Data results:

dpm/100cm<sup>2</sup>  
 alpha-beta-gamma

R = recount  
 X = section  
 \* = over-tolerance



YELLY: L. HF CB

John  
C. H.

10/4/86

TO: JTM

RE: TRITIUM SUMMARY - 1<sup>ST</sup> THREE QUARTERS (1986, 1985 & 1984)

ATTACHED HELETO, FOR INFO, PLEASE FIND COPY OF THREE  
SUMMARYING "TRITIUM PROCESSED" & "TRITIUM RELEASED  
TO ENVIRONMENT" FOR THE PERIODS INDICATED.

YOUR ATTENTION IS DRAWN TO THE HIGH  $3H(OL)$  EMISSIONS  
DURING THE 1<sup>ST</sup> THREE QUARTERS OF 1986. ALTHOUGH THE  
TOTAL OF THIS TOTAL RESULTED FROM THE ACCIDENTAL  
RELEASE OF 1021 Ci OF  $3H(OL)$  WHICH OCCURRED ON 8/29/86  
A.M.

$3H(S)$  EMISSIONS FOR THE 1<sup>ST</sup> THREE QUARTERS OF 1986  
WERE SUBSTANTIALLY LOWER THAN FOR SIMILAR PERIODS IN  
1985 & 1984 - THIS IN SPITE OF INCLUDING "TRITIUM  
PROCESSED" IN 1<sup>ST</sup> THREE QUARTERS OF 1986. THIS WAS DUE  
TO THE (RIM) FILL SYSTEM AND DECREASED USE OF THE  
PUMP FILL SYSTEM DURING THE 1986 & 1985 PERIODS  
REFLECTED IN THE REDUCED  $3H(S)$  EMISSIONS SUMMARY.

John  
R.F.O.

Attachment #1

# 1. TRITIUM PROCESSES:

OPERATION	TIME QUANTERS OF YEAR	
	1986	1987
Primary Fil (G)	255,477	17,134
Static Fil (")	20,461	112,812
Fans/TARGETS, ETC. (")	6,632	11,116
Evaporation (")	0	66
TOTAL:	282,750	141,128

# 2. TRITIUM RELEASED TO ENVIRONMENT:

A. STACK EMISSIONS:	Ci x MPD*	
	1986	1987
3H(I)	0.1	0.01
3H(S)	69.0	6.13
3H(GAS)	27.0	0.48
TOTAL:	96.1	6.62

# 3. LIQUID DISCHARGES:

TOTAL 3H(S) DISCHARGES (Ci)	0.25	0.35
3H(S) H <sub>2</sub> O (Ci)	1.67 x 10 <sup>8</sup>	2.28 x 10 <sup>8</sup>
3H(S) H <sub>2</sub> O (Ci)	1.50 x 10 <sup>-3</sup>	1.54 x 10 <sup>-3</sup>
TOTAL x MPD*	0.50	0.51

NOTE TO MPD'S FOR CONVERSION TO MPD'S  
 1 Ci = 3.7 x 10<sup>10</sup> Bq  
 1 Bq = 2.7 x 10<sup>-11</sup> Ci



Attachment A

SAFETY LIGHT CORPORATION

CR: FOR INFO & YRRLY  
ENVE DISCH. FILE  
JG  
1/20/86

TO: JTM, DJW & LH

1/16/86

RE: Tritium Summary for 1979 - 1985.

Attached hereto for your information, is a copy of the report summarizing "Tritium Processed & Tritium Released To Environment: for the years 1979 thru 1985.

Although the total amount of tritium processed by SLC during 1985 (344,721 Ci) was substantially higher (55%) than that in 1984 (225,735 Ci), the following items are not only noteworthy, but encouraging:

(1) Stack Emissions:

- (a) 1985 emissions (1918 Ci) were lower than 1984 emissions (2193 Ci) by about 12.5%.
- (b) Emissions expressed as "% of Tritium Processed" for 1985 (0.6%) were lower than those of 1984 (1.9%) by approximately 57%.

(2) Liquid Waste Discharges:

Total tritium (as 3H(S)) discharged to the river in 1985 (0.50 Ci) was only slightly higher than in 1984 (0.49 Ci) by about 2%.

With respect to the reductions achieved in total stack emissions during 1985, this is considered to have resulted principally from the fact that the bulk of the tube filling operations during 1985 were conducted on the Rotary Fill System, rather than on the older Static Fill System, as in the past. The increasing use of doubly-encapsulated pyros during 1985 doubtless assisted also in reducing the 3H(S) component of the total emissions.

Based on data presented in our separate reports, in spite of the fact that considerably larger quantities of tritium were processed by SLC in 1985 as compared to previous years, no significant increases in personnel whole body exposures have resulted. This has also provided evidence that our in-house procedures, and attempts to work to ALARA principles, are proving to be successful.



J.G. MacHutchin  
Radiation Safety Officer

TRITIUM PROCESSED/ TRITIUM RELEASED TO ENVIRONMENT  
YEARS 1979 THRU 1985

1. TRITIUM PROCESSED:

OPERATION:	1985	1984	1983	1982	1981	1980	1979
Rotary Fill :	303,710	83,157	-----	-----	-----	-----	-----
Static Fill :	31,451	124,999	114,661	88,439	78,911	100,882	50,861
Foils/Targets, etc :	9,497	14,451	16,294	17,332	20,025	16,494	11,191
Application :	63	128	258	260	386	220	3,008
TOTALS :	344,721	222,735	131,213	106,031	99,312	117,596	65,060

2. TRITIUM RELEASED TO ENVIRONMENT:

A. Stack Emissions:

	1985		1984		1983		1982*		1981*		1980*		1979*	
	Ci	X MPC**	Ci	X MPC**	Ci	X MPC**	Ci	X MPC**	Ci	X MPC**	Ci	X MPC**	Ci	X MPC**
3H(I) :	0.8	0.04	0.1	0.01	0.1	0.01	0.2	0.01	0.2	0.01	0.7	0.04	1.4	0.08
3H(S) :	120.9	6.75	142.7	7.97	174.0	9.78	150.3	8.42	190.4	10.70	227.0	12.75	304.2	17.09
3H(SUB):	1796.5	0.50	2050.4	0.57	2302.0	0.65	1435.5	0.40	2330.0	0.62	2198.0	0.62	434.1	0.1
TOTALS :	1918.2 (0.6%) <sup>1</sup>		2193.2 (1.0%) <sup>1</sup>		2476.1 (1.9%) <sup>1</sup>		1586.0 (1.5%) <sup>1</sup>		2420.6 (2.4%) <sup>1</sup>		2425.7 (2.1%) <sup>1</sup>		739.7 (1.1%) <sup>1</sup>	

B. Liquid Discharges:

	1985	1984	1983	1982	1981	1980	1979
Total 3H(S) Discharged (Ci):	0.50	0.49	0.72	0.90	1.02	9.92	4.91
Total H <sub>2</sub> O Discharged (mL) :	3.1 X 10 <sup>8</sup>	2.6 X 10 <sup>8</sup>	3.6 X 10 <sup>8</sup>	5.8 X 10 <sup>8</sup>	5.7 X 10 <sup>8</sup>	4.0 X 10 <sup>9</sup>	1.7 X 10 <sup>9</sup>
Ave. <sup>3</sup> H(S)/mL H <sub>2</sub> O :	1.6 X 10 <sup>-3</sup>	1.9 X 10 <sup>-3</sup>	2.0 X 10 <sup>-3</sup>	1.6 X 10 <sup>-3</sup>	1.8 X 10 <sup>-3</sup>	2.5 X 10 <sup>-3</sup>	2.9 X 10 <sup>-3</sup>
Ave. X MPC***	0.53	0.63	0.67	0.53	0.60	0.83	0.96

\* See 1/4/83 Summary Report.

<sup>1</sup>Total 3H Emissions as % of Total 3H Processed

\*\* At point of release; Referred to MPC for 'Unrestricted' Areas.

\*\*\* Referred to MPC for 'Unrestricted' Areas.

1/15/86 J.G. MacHutchin

# Attachment: 5

12/1/85  
1/1/86  
1/1/86  
1/1/86  
2/1/86  
2/1/86  
2/1/86  
2/1/86  
2/1/86  
3/1/86

3/14/85 To 3/21/85	≤ BKCD
3/21/85 To 3/28/85	≤ BKCD
3/28/85 To 4/4/85	.0049 x 10 <sup>-7</sup>
4/4/85 To 4/11/85	.0027 x 10 <sup>-7</sup>
4/11/85 To 4/18/85	.0049 x 10 <sup>-7</sup>
4/18/85 To 4/25/85	.0030 x 10 <sup>-7</sup>
4/25/85 To 5/2/85	.0042 x 10 <sup>-7</sup>
5/2/85 To 5/9/85	.0013 x 10 <sup>-7</sup>
5/9/85 To 5/16/85	.0049 x 10 <sup>-7</sup>
5/16/85 To 5/23/85	.0030 x 10 <sup>-7</sup>
5/23/85 To 5/30/85	.0085 x 10 <sup>-7</sup>
5/30/85 To 6/6/85	.0474 x 10 <sup>-7</sup>
6/6/85 To 6/13/85	.0107 x 10 <sup>-7</sup>
6/13/85 To 6/20/85	.0096 x 10 <sup>-7</sup>
6/20/85 To 6/27/85	.0082 x 10 <sup>-7</sup>
6/27/85 To 7/3/85	.0094 x 10 <sup>-7</sup>
7/3/85 To 7/11/85	.0089 x 10 <sup>-7</sup>
7/11/85 To 7/18/85	.0020 x 10 <sup>-7</sup>
7/18/85 To 7/25/85	.0022 x 10 <sup>-7</sup>
7/25/85 To 8/1/85	.0039 x 10 <sup>-7</sup>
8/1/85 To 8/8/85	.0014 x 10 <sup>-7</sup>
8/8/85 To 8/15/85	.0071 x 10 <sup>-7</sup>
8/15/85 To 8/22/85	.0005 x 10 <sup>-7</sup>
8/22/85 To 8/29/85	.0003 x 10 <sup>-7</sup>
8/29/85 To 9/5/85	.0033 x 10 <sup>-7</sup>
9/5/85 To 9/12/85	.0034 x 10 <sup>-7</sup>
9/12/85 To 9/19/85	.0035 x 10 <sup>-7</sup>
9/19/85 To 9/26/85	.0041 x 10 <sup>-7</sup>
9/26/85 To 10/3/85	.0085 x 10 <sup>-7</sup>
10/3/85 To 10/10/85	.0053 x 10 <sup>-7</sup>
10/10/85 To 10/17/85	.0042 x 10 <sup>-7</sup>
10/17/85 To 10/24/85	.0005 x 10 <sup>-7</sup>
10/24/85 To 10/31/85	.0052 x 10 <sup>-7</sup>
10/31/85 To 11/7/85	.0023 x 10 <sup>-7</sup>
11/7/85 To 11/14/85	.0039 x 10 <sup>-7</sup>
11/14/85 To 11/21/85	.0016 x 10 <sup>-7</sup>
11/21/85 To 11/27/85	.0112 x 10 <sup>-7</sup>
11/27/85 To 12/5/85	.0043 x 10 <sup>-7</sup>
12/5/85 To 12/12/85	.0220 x 10 <sup>-7</sup>
12/12/85 To 12/19/85	.0015 x 10 <sup>-7</sup>

East Boundary		West Boundary	
Center	South	Center	South
µci/ml <sup>3</sup> H(S)	µci/ml <sup>3</sup> H(S)	µci/ml <sup>3</sup> H(S)	µci/ml <sup>3</sup> H(S)
.0146 x 10 <sup>-7</sup>	.0075 x 10 <sup>-7</sup>	.0038 x 10 <sup>-7</sup>	
≤ BKCD	≤ BKCD	≤ BKCD	
.0008 x 10 <sup>-7</sup>	.0225 x 10 <sup>-7</sup>	Shipped 1/13/85	≤ BKCD
≤ BKCD	.0036 x 10 <sup>-7</sup>		
≤ BKCD	.0187 x 10 <sup>-7</sup>	.0058 x 10 <sup>-7</sup>	
.0019 x 10 <sup>-7</sup>	.0199 x 10 <sup>-7</sup>	≤ BKCD	
≤ BKCD	.0052 x 10 <sup>-7</sup>	Shipped 2/13/85	≤ BKCD
.0013 x 10 <sup>-7</sup>	.0350 x 10 <sup>-7</sup>		
.0095 x 10 <sup>-7</sup>	.0245 x 10 <sup>-7</sup>	≤ BKCD	
≤ BKCD	.0063 x 10 <sup>-7</sup>	≤ BKCD	
.0193 x 10 <sup>-7</sup>	.0330 x 10 <sup>-7</sup>	.0174 x 10 <sup>-7</sup>	
≤ BKCD	.0051 x 10 <sup>-7</sup>	≤ BKCD	
.0004 x 10 <sup>-7</sup>	.0052 x 10 <sup>-7</sup>	.0300 x 10 <sup>-7</sup>	
.0062 x 10 <sup>-7</sup>	.0124 x 10 <sup>-7</sup>	.0031 x 10 <sup>-7</sup>	
.0032 x 10 <sup>-7</sup>	.0118 x 10 <sup>-7</sup>	.0012 x 10 <sup>-7</sup>	
.0069 x 10 <sup>-7</sup>	.0095 x 10 <sup>-7</sup>		
.0079 x 10 <sup>-7</sup>	.0093 x 10 <sup>-7</sup>	≤ BKCD	
.0058 x 10 <sup>-7</sup>	.0064 x 10 <sup>-7</sup>	.0014 x 10 <sup>-7</sup>	
.0044 x 10 <sup>-7</sup>	.0070 x 10 <sup>-7</sup>	.0019 x 10 <sup>-7</sup>	
.0076 x 10 <sup>-7</sup>	.0167 x 10 <sup>-7</sup>		
.0058 x 10 <sup>-7</sup>	.0077 x 10 <sup>-7</sup>	Shipped 5/13/85 To 5/23/85	
.0350 x 10 <sup>-7</sup>	.0118 x 10 <sup>-7</sup>	.0024 x 10 <sup>-7</sup>	
.0563 x 10 <sup>-7</sup>	.0662 x 10 <sup>-7</sup>	.0107 x 10 <sup>-7</sup>	
.0124 x 10 <sup>-7</sup>	.0152 x 10 <sup>-7</sup>	.1634 x 10 <sup>-7</sup>	
.0142 x 10 <sup>-7</sup>	.0186 x 10 <sup>-7</sup>	.0096 x 10 <sup>-7</sup>	
.0100 x 10 <sup>-7</sup>	.0138 x 10 <sup>-7</sup>	.0100 x 10 <sup>-7</sup>	
.0132 x 10 <sup>-7</sup>	.0129 x 10 <sup>-7</sup>	.0114 x 10 <sup>-7</sup>	
.0100 x 10 <sup>-7</sup>	.0176 x 10 <sup>-7</sup>	.0046 x 10 <sup>-7</sup>	
.0056 x 10 <sup>-7</sup>	.0096 x 10 <sup>-7</sup>		
.0144 x 10 <sup>-7</sup>	.0134 x 10 <sup>-7</sup>	.0027 x 10 <sup>-7</sup>	
.0076 x 10 <sup>-7</sup>	.0117 x 10 <sup>-7</sup>	.0032 x 10 <sup>-7</sup>	
.0058 x 10 <sup>-7</sup>	.0115 x 10 <sup>-7</sup>	Shipped 5/16 To 5/26	
.0102 x 10 <sup>-7</sup>	.0130 x 10 <sup>-7</sup>	≤ BKCD	
.0039 x 10 <sup>-7</sup>	.0094 x 10 <sup>-7</sup>	≤ BKCD	
.0036 x 10 <sup>-7</sup>	.0092 x 10 <sup>-7</sup>	.0024 x 10 <sup>-7</sup>	
.0051 x 10 <sup>-7</sup>	.0104 x 10 <sup>-7</sup>	.0021 x 10 <sup>-7</sup>	
.0073 x 10 <sup>-7</sup>	.0112 x 10 <sup>-7</sup>	.0118 x 10 <sup>-7</sup>	
.0035 x 10 <sup>-7</sup>	.0051 x 10 <sup>-7</sup>	.0025 x 10 <sup>-7</sup>	
.0041 x 10 <sup>-7</sup>	.0051 x 10 <sup>-7</sup>	.0013 x 10 <sup>-7</sup>	
.0036 x 10 <sup>-7</sup>	.0079 x 10 <sup>-7</sup>	.0014 x 10 <sup>-7</sup>	
.0049 x 10 <sup>-7</sup>	.0055 x 10 <sup>-7</sup>		
.0129 x 10 <sup>-7</sup>	.0214 x 10 <sup>-7</sup>		
.0032 x 10 <sup>-7</sup>	.0032 x 10 <sup>-7</sup>	10/10/85 To 10/24/85	
.0475 x 10 <sup>-7</sup>	.0129 x 10 <sup>-7</sup>	.0018 x 10 <sup>-7</sup>	
.0033 x 10 <sup>-7</sup>	.0057 x 10 <sup>-7</sup>	.0055 x 10 <sup>-7</sup>	
.0060 x 10 <sup>-7</sup>	.0067 x 10 <sup>-7</sup>	.0060 x 10 <sup>-7</sup>	
.0032 x 10 <sup>-7</sup>	.0043 x 10 <sup>-7</sup>	.0027 x 10 <sup>-7</sup>	
.0074 x 10 <sup>-7</sup>	.0094 x 10 <sup>-7</sup>		
.0032 x 10 <sup>-7</sup>	.0033 x 10 <sup>-7</sup>	.0120 x 10 <sup>-7</sup>	
.0160 x 10 <sup>-7</sup>	.0190 x 10 <sup>-7</sup>	.0028 x 10 <sup>-7</sup>	
.0010 x 10 <sup>-7</sup>	.0059 x 10 <sup>-7</sup>	.0091 x 10 <sup>-7</sup>	
		.0050 x 10 <sup>-7</sup>	

Date	East Pandry				West Pandry
	North	Center	South	Center	
	$\mu\text{Ci/ml } ^3\text{H}(\delta)$	$\mu\text{Ci/ml } ^3\text{H}(\delta)$	$\mu\text{Ci/ml } ^3\text{H}(\delta)$	$\mu\text{Ci/ml } ^3\text{H}(\delta)$	
12/23/85 To 1/2/86	$.0029 \times 10^{-7}$	$.0056 \times 10^{-7}$	$.0091 \times 10^{-7}$	$.0097 \times 10^{-7}$	
1/2/86 To 1/9/86	$.0063 \times 10^{-7}$	$.0110 \times 10^{-7}$	$.0101 \times 10^{-7}$	$.0099 \times 10^{-7}$	
1/9/86 To 1/16/86	$\leq \text{BKID}$	$.0004 \times 10^{-7}$	$.0019 \times 10^{-7}$	$\leq \text{BKID}$	
1/16/86 To 1/23/86	$.0045 \times 10^{-7}$	$.0104 \times 10^{-7}$	$.0058 \times 10^{-7}$		
1/23/86 To 1/30/86	$.0013 \times 10^{-7}$	$.0042 \times 10^{-7}$	$.0051 \times 10^{-7}$	$.0095 \times 10^{-7}$	
1/30/86 To 2/6/86	$.0020 \times 10^{-7}$	$.0013 \times 10^{-7}$	$.0050 \times 10^{-7}$	$.0008 \times 10^{-7}$	
2/6/86 To 2/13/86	$.0013 \times 10^{-7}$	$.0031 \times 10^{-7}$	$.0052 \times 10^{-7}$	$.0032 \times 10^{-7}$	
2/13/86 To 2/20/86	$.0024 \times 10^{-7}$	$.0022 \times 10^{-7}$	$.0035 \times 10^{-7}$		
2/20/86 To 2/27/86	$.0013 \times 10^{-7}$	$.0093 \times 10^{-7}$	$.0025 \times 10^{-7}$	$.0006 \times 10^{-7}$	
2/27/86 To 3/6/86	$.0056 \times 10^{-7}$	$.0030 \times 10^{-7}$	$.0047 \times 10^{-7}$	$.00008 \times 10^{-7}$	
3/6/86 To 3/13/86	$.0017 \times 10^{-7}$	$.0037 \times 10^{-7}$	$.0048 \times 10^{-7}$	$.0032 \times 10^{-7}$	
3/13/86 To 3/20/86	$\leq \text{BKGD}$	$\leq \text{BKGD}$	$.00045 \times 10^{-7}$		
3/20/86 To 4/3/86	$.00021 \times 10^{-7}$	$.00021 \times 10^{-7}$	$.00049 \times 10^{-7}$		
4/3/86 To 4/17/86	$.00028 \times 10^{-7}$	$.00039 \times 10^{-7}$	$.00034 \times 10^{-7}$		
4/17/86 To 5/1/86	$.00030 \times 10^{-7}$	$.00016 \times 10^{-7}$	$.00035 \times 10^{-7}$		
5-1-86 To 5-15-86	$.00024 \times 10^{-7}$	$.00040 \times 10^{-7}$	$.00051 \times 10^{-7}$		
5-15-86 To 5-29-86	$.00030 \times 10^{-7}$	$.00052 \times 10^{-7}$	$.00098 \times 10^{-7}$		
5-29-86 To 6-12-86	$.00069 \times 10^{-7}$	$.00069 \times 10^{-7}$	$.00103 \times 10^{-7}$		
6-12-86 To 7-2-86	$.00015 \times 10^{-7}$	$.00032 \times 10^{-7}$	$.00075 \times 10^{-7}$		
7-2-86 To 7-24-86	$.00022 \times 10^{-7}$	$.00041 \times 10^{-7}$	$.00074 \times 10^{-7}$		
7-24-86 To 8-7-86	$.00054 \times 10^{-7}$	$.00074 \times 10^{-7}$	$.00099 \times 10^{-7}$		
8-7-86 To 8-21-86	$.00066 \times 10^{-7}$	$.00135 \times 10^{-7}$	$.00113 \times 10^{-7}$		
8-21-86 To 9-3-86	$.00035 \times 10^{-7}$	$.00071 \times 10^{-7}$	$.00136 \times 10^{-7}$		
9-3-86 To 9-18-86	$.00028 \times 10^{-7}$	$.00023 \times 10^{-7}$	$.00051 \times 10^{-7}$		
9-18-86 To 10-2-86	$.00064 \times 10^{-7}$	$.00072 \times 10^{-7}$	$.00159 \times 10^{-7}$		
10-2-86 To 10-23-86	$\leq \text{BKGD}$	$\leq \text{BKGD}$	$.00011 \times 10^{-7}$		
10-23-86 To 11-6-86	$.00020 \times 10^{-7}$	$.00021 \times 10^{-7}$	$.00044 \times 10^{-7}$		

Attachment

UNITED STATES DEPARTMENT OF ENERGY  
IDAHO OPERATIONS OFFICE  
RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY  
SAMPLE RECORD SHEET

SERIAL NO. 13992A

NRC1

\*\*\*\*\*  
\* NRC MOD NO. 305982 \*  
\* ENVIRONMENTAL \*  
\*\*\*\*\*

ROUTINE

SAMPLE DATE 06/20/86  
SAMPLE HOUR 1255 MST  
ORGANIZATION NRC1

SAMPLE SENT 07/14/86  
SAMPLE RECEIVED 07/14/86  
HARDCOPY PRINTOUT 08/26/86

ANALYZED BY: RBR,  
ORIGINAL SIGNED BY: L.Z. BODNAR

COMMENTS:  
NRC1 LIQUID WASTE SAFETY LIGHT.

ANALYZE FOR	INST. USED	QUANTITY USED	DATE COUNTED	COUNT TIME	GROSS COUNTS	READ COUNTS	RESULTS	UNIT
H-3	LS	10 ML	08/14/86	20	329215	400	( 3.70 +/- 0.05;0.10 )E -3	UCI/ML

\* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING 'ZERO' OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.

Nov. 8

1983

Attachment 7

45233	19829
41014	19841
39269	19841
38036	19841
46216	19841

43001	19842
	19842

# - VANCE (FORMERLY NATION) WELL WATER -

H<sub>2</sub>O: 5400 gal  
 300  
 30  
 8  
 1

DATE	GROSS		DATE	GROSS	GROSS	H <sub>2</sub> O
SAMPLED			SAMPLED		(GAL)	
6/79	-		1/17/84	<1.6 (NUS)	42 (NUS)	
7/79	-		"	2/15/84	<1.0 (")	4700 ± 500 (")
7/21/80	0.7 (NUS)		"	3/20/84	<0.8 (")	4800 ± 500 (")
5/5/81	<1.6 (NUS)		"	4/17/84	<1.6 (")	4800 ± 500 (")
6/10/81	-		"	5/22/84	<1.2 (")	4900 ± 500 (")
7/21/81	<1.7 (NUS)		"	6/28/84	<1.1 (")	4400 (SCC)
8/25/81	1.4 ± 1.1		"	7/17/84	<1.3 (")	6900 (")
9/16/81	<1.8		"	8/21/84	0.1 ± 0.6 (CMM)	41 ± 6 (CMM) 6500 (")
10/13/81	<0.9		"	9/18/84	0.2 ± 0.7 (")	2 ± 2 (") 4500 (")
11/17/81	<1.1		"	10/13/84	0.9 ± 0.7 (")	0 ± 2 (") 2600 (")
12/15/81	2.4 ± 1.1		"	11/13/84	-0.2 ± 0.3 (")	0.4 ± 1.5 (") 5400 (")
1/12/82	2.0 ± 1.1		"	12/12/84	0.2 ± 0.7 (")	1 ± 6 (") 9600 (")
2/10/82	<1.7		"	1/15/85	0.1 ± 0.8 (")	2 ± 2 (") ± MDA (")
3/10/82	<2.0 (")	4.9 ± 1.6 (")	3700 ± 400 (")	2/12/85	0.1 ± 0.7 (")	0 ± 2 (") ± MDA (")
4/14/82	<1.2 (")	<2.0 (")	3200 ± 300 (")	3/15/85	0.8 ± 1.0 (")	-2 ± 3 (") ± MDA (")
5/17/82	<1.6 (")	5.0 ± 1.5 (")	3900 ± 300 (")	4/16/85	0.0 ± 0.8 (")	-2 ± 4 (") 1900 (")
6/16/82	-	-	2900 ± 300 (")	5/10/85	-0.9 ± 0.9 (")	0 ± 2 (") 3600 (")
7/20/82	-	-	4200 ± 500 (")	6/14/85	1.1 ± 1.0 (")	1 ± 3 (") 1800 (")
8/18/82	1.2 ± 0.8 (NUS)	1.2 ± 1.2 (NUS)	3100 ± 400 (")	7/12/85	3 ± 2 (CMM)	-3 ± 3 (CMM) ± MDA (")
9/15/82	-	-	2500 ± 300 (")	8/6/85	1 ± 2 (")	-2 ± 3 (") 3700 (")
10/13/82	-	-	2200 ± 200 (")	9/12/85	-0.2 ± 0.5 (")	3 ± 3 (") 3300 (")
11/16/82	-	-	1100 ± 200 (")	10/18/85	-0.4 ± 0.5 (")	-3 ± 3 (") ± MDA (")
12/15/82	<1.6 (NUS)	2.7 ± 1.3 (NUS)	1400 ± 200 (")	11/15/85	0.1 ± 0.8 (")	0 ± 2 (") 11,300 (")
1/18/83	<1.6 (")	<1.9 (")	1500 ± 200 (")	12/13/85	0.6 ± 0.9 (")	1 ± 3 (") ± MDA (")
2/16/83	-	-	1700 ± 200 (")	1/16/86	0.1 ± 0.5 (")	-1 ± 3 (") ± MDA (")
3/16/83	<1.2 (NUS)	<1.9 (NUS)	1500 ± 300 (")	2/13/86	-0.1 ± 0.8 (")	-2 ± 3 (") 30,000 (")
4/19/83	<1.2 (")	1.3 ± 1.3 (")	2800 ± 300 (")	3/10/86	-0.2 ± 0.9 (")	-1 ± 3 (") ± MDA (")
7/12/83	(31 ± 13) (")	<2 (")	4500 ± 500 (")	4/12/86	-0.1 ± 0.9 (")	-2 ± 3 (") 3,600 (")
7/21/83	5.9 ± 4.7 (")	6.2 ± 4.5 (")	4400 ± 500 (")	5/9/86	0.1 ± 0.9 (")	0 ± 3 (") ± MDA (")
1/19/83	<0.8 (")	<2 (")	6200 ± 400 (")	6/13/86	-0.1 ± 0.8 (")	0 ± 3 (") 1,600 (")
2/24/83	1.4 ± 1.2 (")	4.8 ± 1.2 (")	3000 ± 300 (")	7/23/86	-0.2 ± 0.7 (")	0 ± 2 (") 2,100 (")
1/20/83	<1.9 (")	<1.9 (")	4400 (")	8/8/86	-0.4 ± 0.5 (")	-1 ± 2 (") ± MDA (")
1/18/83	<2 (")	2.5 ± 1.2 (")	2500 ± 300 (")	9/13/86	0.5 ± 0.7 (")	-1 ± 2 (") ± MDA (")
1/15/83	-	-	2200 ± 300 (")	10/18/86		± MDA (")
1/14/83	<1.4 (")	<1.7 (")	3200 ± 400 (")			

Attachment 8

DATE	GROSS wt	H <sub>2</sub>	DATE	GROSS wt	H <sub>2</sub>
12/16/80	7.06 x 10 <sup>-1</sup> (mg)	199 ± 0.15 (mg)	1/17/84	4.16 (mg)	2.1 ± 1.2 ( " )
4/1/81	22.61 ( " )	2290 ± 230 ( " )	3/25/84	4.10 ( " )	2.25 ± 1.1 ( " )
5/5/81	4.16 (mg)	570 ± 20 (mg)	4/17/84	4.17 ( " )	1.6 ( " )
6/10/81	1.8 ± 1.1 ( " )	8.32 ± 1.0 ( " )	5/22/84	1.0 ± 1.0 ( " )	2.0 ± 1.3 ( " )
7/21/81	2.4 ± 1.3 ( " )	210 ± 20 (mg)	6/26/84	4.13 ( " )	2.5 ± 1.4 ( " )
8/23/81	4.4 ( " )	95 ± 20 ( " )	7/17/84	4.13 ( " )	1.8 ± 1.3 ( " )
9/16/81	41.7 ( " )	190 ± 20 ( " )	8/21/84	-0.4 ± 0.5 (mg)	2 ± 2 (mg)
10/13/81	40.9 ( " )	1600 ± 200 ( " )	9/18/84	0.3 ± 0.6 ( " )	1 ± 2 ( " )
11/17/81	41.1 ( " )	200 ± 20 ( " )	10/13/84	0.2 ± 0.7 ( " )	1 ± 2 ( " )
12/15/81	42.0 ( " )	160 ± 20 ( " )	11/13/84	-0.4 ± 0.4 ( " )	2 ± 2 ( " )
1/12/82	-	190 ± 200 ( " )	12/12/84	0.6 ± 0.7 ( " )	(12 ± 7) ( " )
2/10/82	-	280 ± 40 ( " )	1/15/85	-0.6 ± 0.7 ( " )	-1 ± 2 ( " )
3/10/82	4.2 ( " )	210 ± 40 ( " )	2/12/85	-0.2 ± 0.7 ( " )	1 ± 2 ( " )
4/14/82	-	460 ± 30 ( " )	3/15/85	-0.3 ± 0.8 ( " )	-4 ± 3 ( " )
5/17/82	-	290 ± 30 ( " )	4/16/85	-0.4 ± 0.6 ( " )	-1 ± 4 ( " )
6/16/82	-	600 ± 30 ( " )	5/10/85	-0.9 ± 1.0 ( " )	-3 ± 2 ( " )
7/20/82	-	280 ± 30 ( " )	6/14/85	-0.1 ± 0.7 ( " )	(0.1 ± 0.0) ( " )
8/18/82	-	230 ± 30 ( " )	7/12/85	4.5 ( " )	4.5 ( " )
9/15/82	4.5 (mg)	180 ± 20 ( " )	8/6/85	-0.3 ± 1.0 ( " )	0 ± 3 ( " )
10/13/82	-	180 ± 20 ( " )	9/12/85	-0.2 ± 0.5 ( " )	0 ± 3 ( " )
11/16/82	-	150 ± 20 ( " )	10/18/85	-0.3 ± 0.5 ( " )	-1 ± 3 ( " )
12/15/82	41.5 (mg)	110 ± 20 ( " )	11/15/85	-1.0 ± 0.5 ( " )	1 ± 3 ( " )
1/18/83	-	1300 ± 20 ( " )	12/13/85	0.2 ± 0.7 ( " )	2 ± 3 ( " )
2/12/83	-	160 ± 20 ( " )	1/16/86	0.7 ± 0.5 ( " )	3 ± 3 ( " )
3/16/83	41.2 (mg)	150 ± 30 ( " )	2/3/86	0.3 ± 0.7 ( " )	-1 ± 3 ( " )
4/16/83	-	400 ± 40 ( " )	3/19/86	0.1 ± 0.9 ( " )	0 ± 3 ( " )
5/17/83	-	250 ± 30 ( " )	4/21/86	-0.5 ± 0.8 ( " )	-3 ± 3 ( " )
6/21/83	4.4 ( " )	600 ± 50 (mg)	5/9/86	0.2 ± 0.8 ( " )	2 ± 3 ( " )
7/19/83	-	390 ± 30 ( " )	6/13/86	0.6 ± 1.0 ( " )	-1 ± 3 ( " )
8/24/83	4.2 ( " )	190 ± 210 ( " )	7/13/86	0.7 ± 0.5 ( " )	3 ± 3 ( " )
9/24/83	-	700 ± 50 ( " )	8/8/86	0.1 ± 0.7 ( " )	0 ± 3 ( " )
10/13/83	-	180 ± 20 ( " )	9/12/86	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/83	-	1300 ± 20 ( " )	10/18/86	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/83	-	160 ± 20 ( " )	11/18/86	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/84	-	190 ± 200 ( " )	12/18/86	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/84	-	280 ± 40 ( " )	1/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/10/84	4.2 ( " )	210 ± 40 ( " )	2/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/14/84	-	460 ± 30 ( " )	3/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/84	-	290 ± 30 ( " )	4/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/16/84	-	600 ± 30 ( " )	5/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/20/84	-	280 ± 30 ( " )	6/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/18/84	-	230 ± 30 ( " )	7/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/15/84	4.5 (mg)	180 ± 20 ( " )	8/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/84	-	180 ± 20 ( " )	9/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/16/84	-	150 ± 20 ( " )	10/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/84	-	1300 ± 20 ( " )	11/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/18/85	-	160 ± 20 ( " )	12/18/87	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/12/85	-	160 ± 20 ( " )	1/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/16/85	41.2 (mg)	150 ± 30 ( " )	2/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/16/85	-	400 ± 40 ( " )	3/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/85	-	250 ± 30 ( " )	4/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/21/85	4.4 ( " )	600 ± 50 (mg)	5/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/19/85	-	390 ± 30 ( " )	6/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/24/85	4.2 ( " )	190 ± 210 ( " )	7/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/24/85	-	700 ± 50 ( " )	8/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/85	-	180 ± 20 ( " )	9/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/85	-	1300 ± 20 ( " )	10/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/85	-	160 ± 20 ( " )	11/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/86	-	190 ± 200 ( " )	12/18/88	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/86	-	280 ± 40 ( " )	1/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/10/86	4.2 ( " )	210 ± 40 ( " )	2/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/14/86	-	460 ± 30 ( " )	3/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/86	-	290 ± 30 ( " )	4/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/16/86	-	600 ± 30 ( " )	5/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/20/86	-	280 ± 30 ( " )	6/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/18/86	-	230 ± 30 ( " )	7/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/15/86	4.5 (mg)	180 ± 20 ( " )	8/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/86	-	180 ± 20 ( " )	9/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/16/86	-	150 ± 20 ( " )	10/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/86	-	1300 ± 20 ( " )	11/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/18/87	-	160 ± 20 ( " )	12/18/89	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/12/87	-	160 ± 20 ( " )	1/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/16/87	41.2 (mg)	150 ± 30 ( " )	2/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/16/87	-	400 ± 40 ( " )	3/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/87	-	250 ± 30 ( " )	4/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/21/87	4.4 ( " )	600 ± 50 (mg)	5/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/19/87	-	390 ± 30 ( " )	6/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/24/87	4.2 ( " )	190 ± 210 ( " )	7/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/24/87	-	700 ± 50 ( " )	8/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/87	-	180 ± 20 ( " )	9/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/87	-	1300 ± 20 ( " )	10/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/87	-	160 ± 20 ( " )	11/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/88	-	190 ± 200 ( " )	12/18/90	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/88	-	280 ± 40 ( " )	1/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/10/88	4.2 ( " )	210 ± 40 ( " )	2/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/14/88	-	460 ± 30 ( " )	3/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/88	-	290 ± 30 ( " )	4/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/16/88	-	600 ± 30 ( " )	5/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/20/88	-	280 ± 30 ( " )	6/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/18/88	-	230 ± 30 ( " )	7/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/15/88	4.5 (mg)	180 ± 20 ( " )	8/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/88	-	180 ± 20 ( " )	9/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/16/88	-	150 ± 20 ( " )	10/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/88	-	1300 ± 20 ( " )	11/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/18/89	-	160 ± 20 ( " )	12/18/91	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/12/89	-	160 ± 20 ( " )	1/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/16/89	41.2 (mg)	150 ± 30 ( " )	2/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/16/89	-	400 ± 40 ( " )	3/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/89	-	250 ± 30 ( " )	4/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/21/89	4.4 ( " )	600 ± 50 (mg)	5/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/19/89	-	390 ± 30 ( " )	6/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/24/89	4.2 ( " )	190 ± 210 ( " )	7/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/24/89	-	700 ± 50 ( " )	8/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/89	-	180 ± 20 ( " )	9/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/89	-	1300 ± 20 ( " )	10/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/89	-	160 ± 20 ( " )	11/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/90	-	190 ± 200 ( " )	12/18/92	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/90	-	280 ± 40 ( " )	1/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/10/90	4.2 ( " )	210 ± 40 ( " )	2/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/14/90	-	460 ± 30 ( " )	3/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/90	-	290 ± 30 ( " )	4/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/16/90	-	600 ± 30 ( " )	5/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/20/90	-	280 ± 30 ( " )	6/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/18/90	-	230 ± 30 ( " )	7/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/15/90	4.5 (mg)	180 ± 20 ( " )	8/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/90	-	180 ± 20 ( " )	9/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/16/90	-	150 ± 20 ( " )	10/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/90	-	1300 ± 20 ( " )	11/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/18/91	-	160 ± 20 ( " )	12/18/93	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/12/91	-	160 ± 20 ( " )	1/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/16/91	41.2 (mg)	150 ± 30 ( " )	2/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/16/91	-	400 ± 40 ( " )	3/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/91	-	250 ± 30 ( " )	4/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/21/91	4.4 ( " )	600 ± 50 (mg)	5/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/19/91	-	390 ± 30 ( " )	6/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/24/91	4.2 ( " )	190 ± 210 ( " )	7/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/24/91	-	700 ± 50 ( " )	8/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/91	-	180 ± 20 ( " )	9/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/91	-	1300 ± 20 ( " )	10/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/91	-	160 ± 20 ( " )	11/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/92	-	190 ± 200 ( " )	12/18/94	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/92	-	280 ± 40 ( " )	1/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/10/92	4.2 ( " )	210 ± 40 ( " )	2/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/14/92	-	460 ± 30 ( " )	3/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/92	-	290 ± 30 ( " )	4/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/16/92	-	600 ± 30 ( " )	5/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/20/92	-	280 ± 30 ( " )	6/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/18/92	-	230 ± 30 ( " )	7/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/15/92	4.5 (mg)	180 ± 20 ( " )	8/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/92	-	180 ± 20 ( " )	9/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/16/92	-	150 ± 20 ( " )	10/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/92	-	1300 ± 20 ( " )	11/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/18/93	-	160 ± 20 ( " )	12/18/95	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/12/93	-	160 ± 20 ( " )	1/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
3/16/93	41.2 (mg)	150 ± 30 ( " )	2/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
4/16/93	-	400 ± 40 ( " )	3/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
5/17/93	-	250 ± 30 ( " )	4/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
6/21/93	4.4 ( " )	600 ± 50 (mg)	5/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
7/19/93	-	390 ± 30 ( " )	6/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
8/24/93	4.2 ( " )	190 ± 210 ( " )	7/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
9/24/93	-	700 ± 50 ( " )	8/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
10/13/93	-	180 ± 20 ( " )	9/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
11/15/93	-	1300 ± 20 ( " )	10/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
12/15/93	-	160 ± 20 ( " )	11/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
1/12/94	-	190 ± 200 ( " )	12/18/96	0.0 ± 0.7 ( " )	-3 ± 10 ( " )
2/10/94	-	280 ± 40 ( " )	1/18/97	0.0 ± 0.7 ( " )	-3



# Attachment 9

H-3 in Well and H-3(s) air Sample

Date	Offsite well H3 (pCi/L)	South Environmental H3 (pCi/ml)	Bore 14 (onsite) (pCi/L)
1/15/85	≤ MDA	$.0225 \times 10^{-7}$	9,200
2/12/85	≤ MDA	$.0052 \times 10^{-7}$	4,600
3/15/85	≤ MDA	$.0051 \times 10^{-7}$	4,600
4/14/85	1,900	$.0095 \times 10^{-7}$	7,600
5/10/85	3,600	$.0167 \times 10^{-7}$	4,700
6/14/85	18,000	$.0186 \times 10^{-7}$	11,900
7/12/85	≤ MDA	$.0096 \times 10^{-7}$	12,400
8/6/85	3,700	$.0115 \times 10^{-7}$	4,700
9/12/85	3,300	$.0051 \times 10^{-7}$	7,700
10/18/85	≤ MDA	$.0032 \times 10^{-7}$	6,600
11/15/85	11,300	$.0043 \times 10^{-7}$	26,200
12/13/85	≤ MDA	$.0059 \times 10^{-7}$	≤ MDA
1/16/86	≤ MDA	$.0058 \times 10^{-7}$	23,600
2/13/86	30,000	$.0085 \times 10^{-7}$	113,000
3/14/86	≤ MDA	$.0045 \times 10^{-7}$	2,300
4/12/86	3,600	$.0034 \times 10^{-7}$	26,300
5/9/86	≤ MDA	$.0051 \times 10^{-7}$	18,700
6/13/86	1,600	$.0075 \times 10^{-7}$	8,400
7/23/86	2,100	$.0074 \times 10^{-7}$	6,400
8/8/86	≤ MDA	$.0113 \times 10^{-7}$	7,100
9/13/86	≤ MDA	$.0051 \times 10^{-7}$	10,900
10/18/86	≤ MDA	$.0011 \times 10^{-7}$	12,500

Attachment 10

RADIOLOG

ENERGY

ES LABORATORY

SERIAL NO. 14109A

NRC1

\*\*\*\*\*  
\* NRC MOD NO. XXXXX? \*  
\* ENVIRONMENTAL \*  
\*\*\*\*\*

SAMPLE DATE 11/12/86 S  
SAMPLE HOUR 1215 MST S  
ORGANIZATION NRC1 H

ANALYZED BY: J.S.MORTON. S.GIMPEL

ORIGINAL SIGNED BY: L.Z. BODNAR

COMMENTS:

NRC COLLECTED BY COSTELLO TOP WATER

COLLECTION DATE: 11/12/86 ANALYSIS DATE: 11/20/86 DECAY TIME 8.0 DAYS\*  
COUNT TIME 60 MIN. DETECTOR NUMBER 6 SAMPLE SIZE 4.00E+02 ml

TOTAL COUNT	GROSS COUNT C/M	BKGD COUNT C/M	MINOR COUNT C/M	NET COUNT C/M	ISOTOPE	RESULTS +/- 1S:0** uCi/ml
7	0.12			0.12	CsD137	( 4 +/- 3; 3 )E -8

\* DECAY CORRECTION OF NATURAL CHAIN DAUGHTERS PER LONGEST LIVED PARENT

\*\* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.

UNITED STATES DEPARTMENT OF ENERGY  
IDAHO OPERATIONS OFFICE  
RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY  
SAMPLE RECORD SHEET

SERIAL NO. 14109A

NRC1

\*\*\*\*\*  
NRC MOD NO. XXXXX? \*  
ENVIRONMENTAL \*  
\*\*\*\*\*

URGENT  
DATE NEEDED 11/21/86  
ROUTINE

SAMPLE DATE 11/12/86  
SAMPLE HOUR 1215 MST  
ORGANIZATION NRC1

SAMPLE SENT 11/17/86  
SAMPLE RECEIVED 11/18/86  
HARDCOPY PRINTOUT 12/04/86

ANALYZED BY: RBR,TT ,  
ORIGINAL SIGNED BY: L.Z. BODNAR

COMMENTS:  
NRC COLLECTED BY COSTELLO TOP WATER

ANALYZE FOR	INST. USED	QUANTITY USED	DATE COUNTED	COUNT TIME	GROSS COUNTS	BKGD COUNTS	RESULTS +/- 1S:0*	UNITS
GROSS A		50	11/19/86	1000	20	19	( 3 +/- 3; 3 )E-11	UCI/ML
GROSS B	TE	100 ML	11/19/86	20	36	36	( 0 +/- 4; 4 )E -9	UCI/ML
H-3	LS	10 ML	11/26/86	20	680	482	( 2.2 +/- 0.4;0.4 )E -6	UCI/ML

\* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION, 1S. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.

UNITED STATES DEPARTMENT OF ENERGY  
 IDAHO OPERATIONS OFFICE  
 RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY  
 SAMPLE RECORD SHEET

SERIAL NO. 14109B

NRC1

\*\*\*\*\*  
 \* NRC MOD NO. XXXXX? \*  
 \* ENVIRONMENTAL \*  
 \*\*\*\*\*

URGENT  
 DATE NEEDED 11/21/86  
 ROUTINE

SAMPLE DATE 11/12/86  
 SAMPLE HOUR 1215 MST  
 ORGANIZATION NRC1

SAMPLE SENT 11/17/86  
 SAMPLE RECEIVED 11/18/86  
 HARDCOPY PRINTOUT 12/11/86

ANALYZED BY: J.S.MORTON, S.GIMPEL  
 ORIGINAL SIGNED BY: L.Z. BODNAR

COMMENTS:  
 NRC COLLECTED BY COSTELLO SPLIT SAMPLE

COLLECTION DATE: 11/12/86 ANALYSIS DATE: 11/20/86 DECAY TIME 8.0 DAYS\*  
 COUNT TIME 60 MIN. DETECTOR NUMBER 6 SAMPLE SIZE 2.00E+02 ml

TOTAL COUNT	GROSS COUNT C/M	BKGD COUNT C/M	MINOR COUNT C/M	NET COUNT C/M	ISOTOPE	RESULTS +/- IS:0** uCi/ml
-6	-0.10			-0.10	Cs137	( -4 +/- 3 ) E -8

\* DECAY CORRECTION OF NATURAL CHAIN DAUGHTERS PER LONGEST LIVED PARENT  
 \*\* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION. IS. SMALL NEGATIVE AND OTHER  
 RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED.  
 FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S, DETECTION IS QUESTIONABLE. RESULTS  
 GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.

UNITED STATES DEPARTMENT OF ENERGY  
IDAHO OPERATIONS OFFICE  
RADIOLOGICAL AND ENVIRONMENTAL SCIENCES LABORATORY  
SAMPLE RECORD SHEET

SERIAL NO. 14109B

NR01  
\*\*\*\*\*  
NR0 MOD NO. XXXXX? \*  
ENVIRONMENTAL \*  
\*\*\*\*\*

URGENT  
DATE NEEDED 11/21/86  
ROUTINE

SAMPLE DATE 11/12/86 SAMPLE SENT 11/17/86 ANALYZED BY: DBM.RBR.TT .  
SAMPLE HOUR 1215 MST SAMPLE RECEIVED 11/18/86  
ORGANIZATION NR01 HARDCOPY PRINTOUT 12/11/86 ORIGINAL SIGNED BY: L.Z. BODNAR

COMMENTS:  
NR0 COLLECTED BY COSTELLO SPLIT SAMPLE

ANALYZE FOR	INST. USED	QUANTITY USED	DATE COUNTED	COUNT TIME	GROSS COUNTS	BKGD COUNTS	RESULTS +/-	IS:0A	UNITS
GROSS A		25 ML	11/19/86	1000	49	6	( 2.5 +/- 0.6:0.6 )	E -9	UCI/ML
GROSS B	TE	50 ML	11/19/86	20	20886	36	( 2.07 +/- 0.07:0.09 )	E -5	UCI/ML
H-3	LS	10 ML	11/26/86	20	1313	482	( 9.4 +/- 0.5:0.5 )	E -6	UCI/ML
SR90	TE	196ML	12/08/86	20	25669	48	( 1.09 +/- 0.03:0.03 )	E -5	UCI/ML

\* ESTIMATED RANDOM UNCERTAINTY REPORTED IS ONE STANDARD DEVIATION. IS. SMALL NEGATIVE AND OTHER RESULTS LESS THAN OR EQUAL TO 2S ARE INTERPRETED BY RESL AS INCLUDING "ZERO" OR AS NOT DETECTED. FOR RESULTS GREATER THAN 2S BUT LESS THAN OR EQUAL TO 3S. DETECTION IS QUESTIONABLE. RESULTS GREATER THAN 3S INDICATE DETECTION. 0 IS THE ESTIMATED OVERALL UNCERTAINTY.