Form AEC-17
(6-57)

U. S. ATOMIC ENERGY COMMISSION

BYPRODUCT MATERIAL LICENSE

Pursuant to the Atomic Energy Act of 1954 and Title 10, Code of Federal Regulations, Chapter 1, Part 30, Licensing of Byproduct Material, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, own, possess, transfer and import byproduct material listed below and to use such byproduct material for the purpose(s) and at the place(s) designated below. This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, and is subject to all applicable rules, regulations, and orders of the Atomic Energy Commission now or hereafter in effect and to any conditions specified below.

Licensee			
1. Name	Department of the Navy U. S. Naval Hospital	3. License number	31-76-6 (E64)
2. Address	Radioisotope Laboratory St. Albans 25, New York	4. Expiration date	May 31, 1964
		5. Reference No.	31-76-4 31-76-5

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
A. Any byproduct material with Atomic Nos. 1 - 83, inclusive. (See page 2)	A. Any	A. 10 millicuries each

9. Authorized use

A. through H. Medical diagnosis, therapy and research.

CONDITIONS

10. Unless otherwise specified, the authorized place of use is the licensee's address stated in Item 2 above.

15. The licensee shall comply with the provisions of Title 10, Part 20, Code of Federal Regulations, Chapter 1, "Standards For Protection Against Radiation".

21. Byproduct material shall be used by, or under the supervision of, individuals designated by the Radioisotope Committee.

23. Byproduct material shall not be used in humans until its pharmaceutical quality and assay have been established.

24. Byproduct material as sealed sources shall not be opened.

(See page 2)

U.S. ATOMIC ENERGY COMMISSION
PRODUCT MATERIAL LICENSE
Supplementary Sheet

License Number 3-76-6
(1664)

Continued from page 1.

6. Byproduct material (element and mass number)	7. Chemical and/or physical form	8. Maximum amount of radioactivity which licensee may possess at any one time
B. Iodine 131	B. Any	B. 500 millicuries
C. Phosphorus 32	C. Any	C. 100 millicuries
D. Strontium 90 - Yttrium 90	D. Any	D. 1000 millicuries
E. Cobalt 198	E. Any	E. 150 millicuries
F. Strontium 90	F. Tracerlab Model RA-1A Sealed Medical Applicator	F. 40 millicuries
G. Iridium 192	G. Stainless Steel Encased Seeds in Nylon Ribbon	G. 1200 millicuries
H. Cobalt 60	H. U. K. Henschke Sealed Sources	H. 25 millicuries

CONDITIONS

26. A. Each sealed source acquired from another person and containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in any form other than gas shall be tested for contamination and/or leakage prior to use. In the absence of a certificate from a transferor indicating that a test has been made within six months prior to the transfer, the sealed source shall not be put into use until tested.

B. Each sealed source fabricated by the licensee shall be tested for contamination and/or leakage immediately after fabrication. If the test reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall repair and/or decontaminate and retest the source. Sealed sources fabricated for distribution and containing byproduct material (with the exception of byproduct material with a half-life not exceeding thirty days, byproduct material in the form of gas, and Iridium 192) shall, in addition to an initial test upon fabrication, be stored for a period of seven days and retested prior to transfer to another person or as otherwise specifically provided for in this license.

C. Each sealed source containing byproduct material, other than Hydrogen 3, with a half-life greater than thirty days and in

(See page 3)

28. Continued:

any form other than gas, shall be tested for leakage and/or contamination at intervals not to exceed six months except that each source designed for the purpose of emitting alpha particles shall be tested at intervals not to exceed three months.

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

E. If the test required by Subsection A or C of this condition reveals the presence of 0.005 microcurie or more of removable contamination, the licensee shall immediately withdraw the sealed source from use and shall cause it to be decontaminated and repaired or to be disposed of in accordance with Commission regulations. A report shall be filed within five days of the test with the Director, Division of Licensing and Regulation, U. S. Atomic Energy Commission, Washington 25, D. C., describing the equipment involved, the test results and corrective action taken. A copy of such report shall also be sent to the Director of the appropriate Regional Office, Division of Compliance, U. S. Atomic Energy Commission:

Region I, Division of Compliance, USAEC, 376 Hudson Street, New York 14, New York

Region II, Division of Compliance, USAEC, 50 Seventh Street, Northeast, Atlanta 23, Georgia

Region III, Division of Compliance, USAEC, 9800 South Cass Avenue, Argonne, Illinois

Region IV, Division of Compliance, USAEC, P. O. Box 15266, Denver 15, Colorado

Region V, Division of Compliance, USAEC, 2111 Bancroft Way, Berkeley 4, California

(See page 4)

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License Number 31-7-6
(E64)

47. Except as specifically provided otherwise by this license, the licensee shall possess and use byproduct material described in items 6, 7 and 8 of this license in accordance with statements, representations and procedures contained in application dated March 22, 1962, and amendment thereto dated May 8, 1962.

For the U. S. Atomic Energy Commission

MAY 28 1962

Initial Signed by
Edwin Bassett
Isotopes Branch
Division of Licensing and Regulation
Washington 25, D. C.

X

Form AEC-417
(4-58)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee
DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans 25, New York

2. Date of inspection
December 24, 1963

3. Type of inspection ~~Reinspection~~ Initial

4. 10 CFR Part(s) applicable
20 - 30

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License No.	Type	Date of Issue	Expiration Date
31-76-6	~~Reinspection~~ Initial	5/29/62	5/31/64

(FOR SCOPE AND CONDITIONS SEE REPORT DETAILS)

6. Inspection findings (and items of noncompliance)

The United States Naval Hospital at St. Albans is a general hospital with 1000 beds attending to the medical needs of naval personnel. Radionuclides are used within the X-ray department for human use and by the Department of Surgery for research on animals. Lieutenant Commander W. O. Pischnotte, a Radiologist, is the RSO. Pischnotte is responsible to the Radioisotope Committee and to Captain W. F. Hansen, Chief of Radiology. A Radioisotope Committee authorizes all use, users and facilities. Direct physical surveys are performed and film badges are used for personnel monitoring. Records were noted to be maintained of receipt of materials, use, surveys and personnel monitoring. The only items of noncompliance noted or observed during the course of the inspection is as set out below:

20.401(b) - records were not maintained of disposals of active waste to the hold-up tank and then to the sewerage system or of surveys made to ensure that other material so disposed did not contain any activity. (See paragraphs 36-38 of report details) Records also were not maintained on evaluation of hazards in work with Sr-90-Y-90. (See paragraphs 27 and 44 of report details.)

(CONTINUED)

7. Date of last previous inspection
April 2, 1959 and
September 14, 1959
(For License No. 31-76-4)

8. Is "Company Confidential" information contained in this report? Yes ☐ No ☒
(Specify page(s) and paragraph(s))

DISTRIBUTION:
Orig. - CO:HQ
1 cy. - DL&R
2 cys. - CO:I

Eugene Epstein
(Inspector)

Approved by:
R. S. Cleveland, Radiation Specialist (Review), Region I,
Division of (Operations office) Compliance

January 24, 1964
(Date report prepared)

If additional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head format, leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under appropriate item.

16—73814-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

ITEM NO. 6 (CONTINUED)

20.201(b) - adequate evaluations were not made of concentrations and total amounts of waste released to the sewer (see paragraphs 36-38 of report details), of the circumstances surrounding and hazards resulting from a spill of Sr-90-Y-90 (see paragraphs 23-28 of report details), of air effluent concentrations from the exhaust hood where Sr-90-Y-90 was used (see paragraph 24 of report details.)

License Condition 28C - in that the licensee has Sr-90, Co-60, and Ir-192 sealed sources which have not been tested for leakage and removable contamination at intervals which did not exceed six months or less. (See paragraphs 29, 31 and 32 of report details.)

License Condition 28D - in that records of leak test results were not maintained in units of microcuries. (See paragraph 30 of report details.)

License Condition 43 - in that the Radioisotope Committee was never informed of the spill of Sr-90-Y-90 in the licensee's "Hot" laboratory as required by the licensee's procedures included in the application of 3/22/62, a part of the license condition. (See paragraphs 24, 39, and 46 of report details.)

10 CFR 20.201(b) and License Condition 43 - in that the Radiological Safety Officer, Lt. Commander W. O. Pischnotte never assessed the Sr-90-Y-90 contamination existing in the "Hot" laboratory nor supervised its decontamination as stated in the licensee's procedures included in the application of 3/22/62, a part of the license condition (See paragraphs 22(c), 24, 26 and 27 of report details.)

PART 30 INSPECTION

DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans 25, New York

Date of Inspection: December 24, 1963 (Announced ~~Reinspection~~) Initial

Persons Accompanying Inspector:

None

Persons Contacted:

Captain Walter F. Hansen, USN, Medical Corps, Chief of Radiology
Margaret Posipanka, Chief Petty Officer, Hospital Corpsman
LCDR W. O. Pischnotte, USN, Medical Corps, RSO
Joseph Beggs, Hospital Man
Robert Van Syke, Hospital Man - 3rd Class

DETAILS

Background Information

9. An initial inspection of the licensee's facility under License 31-76-4 was performed on 4/2 and 9/14/63. Items of noncompliance noted were as follows:

(1) Y-90 was administered to humans without prior independent assay.

(2) Possession of byproduct material without authorization in a specific license.

(3) Failure to perform leak tests on a Sr-90 applicator.

(4) Incineration of animal carcasses containing byproduct material without authorization.

(5) Failure to label containers as required by 10 CFR 20.203 (f)(1) and (4).

(6) Failure to maintain records of surveys.

(7) No records showing releases of byproduct material to the sanitary sewer.

10. Enforcement action was completed June 15, 1960 and License -4 was superseded by License -6, a broad license, on May 24, 1962.

Organization and Administration

11. St. Albans Naval Hospital (SANH) uses radioisotopes in the X-ray Department for human diagnosis and therapy and in the Department of Surgery for research. The hospital has 1000 beds and an out-patient department. Lieutenant Commander W. O. Pischnotte, MC, a Radiologist, is the RSO. Pischnotte took a 12 week course in Radiation Physics at the Naval Hospital, Bethesda, Maryland, Pischnotte reports to Captain Walter F. Hansen, USN, Chief of Radiology, who in turn reports to the Hospital Director, Captain Joseph Yown, MC. Persons who actively perform health physics functions under Pischnotte's direction are CPO Margaret Posipanka, HMC, and Joseph Beggs, SHM and Robert Van Syke, HM-3.

12. An active formal Radioisotope Committee meets weekly to discuss the clinical aspects of radioisotopes for human use. Hansen stated the committee meets weekly to discuss each patient and authorize the use of radioisotopes as well as the user. The members of the committee are as follows:

Captain Haskill Weitheimer, Chief of Surgery, Chairman

Captain A. R. Errion, Chief of Medicine

Captain Charles Rogers, Chief of Oncology

Captain W. F. Hansen, Chief of Radiology

Commander Gino Szakacus, Chief of Pathology

Facilities and Uses of Byproduct Material

13. The scope of the license as listed below was discussed with Posipanka.

	Isotope	Form	Amount Authorized	On Hand	Use
A.	Byproduct material 1-83	any	10 mc each	(1) 4 mc Hg-203	Brain and Renal Scans 5 Scans per week, 5 uc/Kg body weight per Scan.
				(2) 9 uc Co-60	Vitamin B-12 for Schilling Test - 10 tests/week 0.5 uc per test.
				(3) 509 uc H-3 (9/25/63)	In storage - no use to date
				(4) H-3 as Tri-met	100 uc/week for RVC uptake in vitro 0.1 uc per test, 9 tests per week.
				(5) Cr-51 (1 mc)	Blood volume and red cell survival study 20-150 uc/test, 1 test per week.

	Isotope	Form	Amount Authorized	On Hand	Use
B.	I-131	any	500 mc	(1) 3 mc as Iodide	For thyroid uptakes 5-50 uc, 9 tests/week. For hyperthyroid 5-7 mc, 1 patient/week, Carcinoma - none.
				(2) 5 mc as IHSA	For blood circulation rate in dogs - 5 dogs per week - 2 uc/dog.
				(3) 1 mc as Hippurin	Liver absorption study 10 - 50 uc/study, 1 per month.
				(4) 516 uc (Nov. 29, 1963) as triolein and oleic acid.	Fab absorption study not used to date.
C.	P-32	any	100 mc	none, ordered as needed	3.5 mc/patient occasional use for polycythemia.
D.	Sr-90-Y-90	any	1000 mc	15 mc (10/63)	In a Y-90 cow for breast Carcinoma, not used during 1963.
E.	Au-198	any	150 mc	1 mc (11/13/63)	In storage, result of decay, prior use for pleural effusion 1/year.
F.	Sr-90	Tracerlab RA-1A Medical Applicator		40 mc (9/52)	Eye applicator totally in storage
G.	Ir-192	Stainless steel encased seeds in nylon ribbon		1200 mc 14 seeds - 78 mc 2/20/61 (now 8 uc)	Not used, totally in storage
H.	Co-60	U.K. Henscke sealed sources		25 mc - 2 wires 25 mc total 6/2/61	Not used, totally in storage.

14. Radionuclides are used, according to Posipanka in the "Hot" laboratory and in the Surgical Research Laboratory. The "Hot" laboratory was noted to consist of 3 adjoining rooms off a corridor in the sub-basement. The rooms consisted of a combined counting and patient treatment room, a Y-90 area, a refrigerator area, and a storage area. The entire area was designated as restricted. The "Hot" laboratory was equipped with stainless steel table tops, 3 five foot wide Kewaunee filtered exhaust hoods, each with a flow of 1200 cfm, and stainless steel sinks. All liquid waste from the "Hot" laboratory are drained into a metal 500 gallon sub-surface hold-up tank.

15. A separate storage room called the "Radium" room also located in the sub-basement is used to store gamma sources consisting of Co-60 wires and Ir-192 seeds as well as a Sr-90 eye applicator. This room is also restricted.

16. A nonrestricted surgical research laboratory with similar equipment as the "Hot" laboratory is used for dog experiments using 2 uc I-131 as IHSA per dog. The dogs are not sacrificed according to Rogers, who conducts experiments. Rogers stated he uses no more than 1 dog per week.

17. In addition to the above, the licensee has 7 diagnostic X-ray units and 4 X-ray therapy units of 140 KVP, two at 250 KVP and one 1 MEV GE unit. Posipanka stated that 50 mg of radium are also used and stored in the radium room.

Instrumentation and Calibration

18. Posipanka had on hand the following operable survey instruments. A U. S. Navy Model AN/PDR-27C meter range 0-200 mr/hr, AN/PDR-27F meter range 0-500 mr/hr, AN/PDR-18A, 0-500 mr/hr, and a Nuclear Chicago Cutie Pie survey meter, range 0-2500 mr/hr. Posipanka stated the survey meters are calibrated every six months by the calibration facility at the Brooklyn Navy Yard, New York. He stated the instruments are calibrated using standards and checking two points on each scale. The inspector also noted "Sparrow" audible radiation detection instruments being worn by Laboratory personnel.

Safety Precautions and Procedures

A. Instructions

19. Pischnotte stated that all personnel, five doctors and 10 technicians involved with radionuclides, have all taken a course of instruction in radiation physics given at the U. S. Naval Center at Bethesda, Maryland. He stated the course included instruction in the use of radionuclides, counting, equipment, surveys, personnel monitoring, regulations as contained in 10 CFR 20 and 30 and emergency procedures. The licensee was noted to have procedures entitled "Operating Procedure and General Instructions for the Radioisotope Laboratory." Posipanka stated that all persons involved in the use of radioisotopes have received a copy of the referenced instructions. The instructions contained in the license back-up material was noted to contain provisions regulating receipt of materials, storage, shielding, internal transportation, personnel monitoring, emergency procedures, security of material and waste disposal.

20. Posipanka had a copy of the license and copies of 10 CFR 20 and 30 together in one file. He stated the file was available to all users upon request.

B. Surveys

21. Posipanka stated that she performs direct radiation surveys weekly of all restricted areas of use and storage and surrounding unrestricted areas. Records of these surveys were noted to be maintained in a bound book. The last survey was dated 12/13/63 and showed the following:

Storage area in rear of "Hot" laboratory	4.0 mr/hr
At 1 foot distance from Radium Safe (Restricted Area)	46 mr/hr
At surface of hood where Sr-90-Y-90 cow was located (Restricted Area)	4.8 mr/hr
At surface of storage refrigerator	0.16 mr/hr
At all unrestricted areas	0.02 mr/hr

Pischnotte stated that he has left all health physics functions such as surveys, waste disposal, and record keeping up to Posipanka and that, although nominally the RSO, he never functioned as such. He stated that Posipanka had 15 years experience at Bethesda in the Radiotherapy Section and that he never questioned or even reviewed her work.

22. Independent measurements were taken by the inspector using a Serial #5575 NMC thin end window GM survey meter calibrated 10/21/63 and a serial #175 Raychronix ionization chamber calibrated 10/2/63. The following radiation levels were noted:

(a)	At the surface of a floor drain in the center of the "Hot" lab at 1 cm distance	50 mrad/hr beta
(b)	At the surface of a lead brick storage area in the restricted "Hot" laboratory	4 mr/hr gamma
(c)	At 6" distance from the surface of stored waste material, consisting of a hot plate, glassware, and wipe cloths	200 mrad/hr beta and 4 mr/hr gamma
(d)	On a table top near the storage area in the restricted laboratory	20 mrad/hr beta and 1 mr/hr gamma
(e)	At several locations on the floor in the "Hot" laboratory where radiation levels at 1 cm distance from the floor	from 1-5 mrad/hr beta
(f)	The radiation level background in the restricted radium storage room	2 mr/hr beta-gamma
(g)	At 1 foot distance from a safe in the radium storage room where 50 mg radium, 8 uc Ir-192 seeds, and 25 mc Co-60 as wires were stored	50 mr/hr gamma
(h)	Radiation levels in unrestricted areas were noted	less than 0.1 mr/hr beta-gamma

23. The inspector questioned Posipanka, Pischnotte, and Hansen regarding any accidents and spills in the restricted "Hot" laboratory and all three stated they had no knowledge of any spill or accident involving beta emitting material.

24. Robert Van Syke HM-3 stated he knew of a spill occurring approximately over one year ago of Y-90 being chemically separated from the Sr-90-Y-90 solution. He stated that some of the Sr-90-Y-90 solution being heated in a beaker by means of an electric hot plate boiled over and spilled inside the Kewaunee exhaust hood and some of the contents spilled over the floor. He stated he was not involved in the incident nor did he know the identity of the persons involved in the incident since he had heard about it indirectly. He stated that contamination from the above spill still exists inside the exhaust hood and that the exhaust filter is very hot and has not been removed. Pischnotte, the RSO, who was at the SANH during early 1962 at which time the supposed incident occurred, stated that no report was made of any spill or contamination to him or the Radioisotope Committee. He stated they subsequently knew of contamination because Posipanka orally reported to him in early 1963 that there appears to be contamination in the "Hot" laboratory but that smears samples were never taken to determine the extent of the contamination. He also stated no records were ever made to show the identity of the persons involved and that no surveys were made to determine the concentration of Sr-90-Y-90 in the "Hot" laboratory due to the spill and no evaluation was made as to the concentrations of Sr-90-Y-90 effluent to the unrestricted environs via stack discharge from the Y-90 exhaust hood.

25. The inspector took smear samples using filter paper of various areas in the restricted "Hot" laboratory and the radium storage room as well as surrounding unrestricted areas. Analysis by HASL showed:

(a) Ledge projecting from the "Kewaunne" exhaust hood where the Y-90 cow was located - 5552 dpm (equivalent to 2.5×10^{-5} uc/100 cm^2) beta activity. This smear was identified by HASL as containing Sr-90-Y-90 contamination.

(b) Floor in front of the above exhaust hood - 185 dpm (equivalent to 8.5×10^{-5} uc/100 cm^2) beta activity.

(c) Floor near sink near Y-90 hood - 314 dpm (equivalent to 1.4×10^{-4} uc/100 cm^2) beta activity.

(d) Inside floor drain - 1203 dpm (equivalent to 5.5×10^{-4} uc/100 cm^2) beta activity.

(e) Groove in floor between rooms - 928 dpm (equivalent to 4.2×10^{-4} uc/100 cm^2) beta activity.

(f) Other floor areas within the restricted "Hot" laboratory had removable contamination of approximately 898 dpm (equivalent to 4.4×10^{-5} uc/100 cm^2) beta activity.

(g) Unrestricted areas surrounding the "Hot" laboratory had removable contamination noted as 23 dpm (equivalent to 1×10^{-5} uc/100 cm^2) beta activity.

(h) No removable contamination was noted in the restricted radium storage room or surrounding areas.

26. License Condition 43 requires the licensee to possess and use byproduct material in accordance with an application dated 3/22/62 and amendment dated 5/8/62. The licensee's procedures entitled "Operating Procedures and General Instructions for the Radioisotope Laboratory" are included as part of the application of 3/22/62. Paragraph VI of the procedures stated that items shall be considered contaminated if the beta-gamma radiation level in the storage area exceed 7.5 mr/hr or 200 cpm and in other areas of the "Hot" laboratory 1 mr/hr or 50 cpm. In an amendment to the procedures dated 5/8/62 the licensee stated that a gas flow counter with an efficiency of 20% would be used in evaluating contamination and therefore using this efficiency factor the removable contamination in the storage area should not exceed 1000 dpm and in other areas of the "Hot" laboratory not exceed 250 dpm.

27. As noted in paragraph 22(c) of this report, radiation levels from contaminated glassware and a contaminated hot plate in the storage area were 200 mrad/hr beta-gamma at 6" distance from these articles. Removable contamination in other parts of the "Hot" laboratory in excess of 250 dpm were noted at a projection from the Y-90 exhaust hood, floor of sink near Y-90 hood, 2" wide groove in the floor between rooms in the "Hot" laboratory, and inside a floor drain. See Exhibit "A" HASL results. Paragraph VII of the referenced procedures states the Radiological Safety Officer shall assess the extent of the contamination and supervise the necessary decontamination procedures. Pischnotte, the RSO, stated he never knew of the spill that caused the contamination, nor was he ever aware of the resulting contamination or the attempts by HM-3 Van Syke to clean up the "Hot" laboratory. He also stated he knew of no written records which described the spill, any surveys which were made or of any decontamination efforts. He stated he has been at St. Albans for approximately 18 months and the preceding RSO, had left a full three months prior to his arrival, and no records existed for his review to explain the circumstances of the spill.

28. Pischnotte also stated that the contamination noted by the inspector is a small fraction of the total contamination because the floors of the "Hot" laboratory consist of vinyl tiles which are waxed weekly. He stated that most of the contamination must be fixed under layers of wax.

C. Leak Tests

29. License Condition 28 requires sealed sources other than H-3 with a half-life greater than 30 days to be tested at intervals which do not exceed 6 months. Tests shall be sensitive to detect 0.005 microcuries removable contamination. Test results shall be maintained in units of microcuries.

30. Posipanka stated she takes wet filter paper wipes of accessible surfaces of sealed sources and counts the filter paper smears with a GM tube calibrated with a Sr-90 standard or a scintillation detector calibrated with a Cs-137 standard. The inspector examined a written log which Posipanka maintained of leak tests. The results of all tests for leakage of the 40 mc Sr-90 sealed source and the 25 mc Co-60 sealed source were entered only as counts per minute. There were notentries as to disintegrations per minute or units of microcuries or of the efficiency of the detectors used to count smear samples. Posipanka stated these were the only records maintained of tests for leakage.

31. The 25 mc Co-60 source as two sealed wires was received on June 2, 1961 with a test showing it had been tested for leakage within six months prior to transfer. The lead container in which the Co-60 was stored, was wiped with filter paper again on 12/15/61, 2/11/63, and 12/24/63. 28 cpm was noted for the test of 12/24/63.

32. Records of leak tests show that the 40 mc Sr-90 sealed source as an eye applicator received 9/52, was tested for leakage and removable contamination on 2/11/63 and 12/24/63. The 14 Ir-192 seeds in nylon ribbon, 78 mc when received on 2/20/61 were never tested for leakage and removable contamination subsequent to receipt according to Posipanka. She stated no other tests for leakage were ever performed.

33. Certificates were maintained showing that leak tests had been performed by the supplier of the Sr-90 eye applicator and the Ir-192 seeds. Posipanka stated no sealed sources have ever been prepared at the SANH.

Storage and Security of Material

34. All material on hand was noted to be stored either in the rear storage area of the "Hot" lab, or in the "Radium" storage room. Both areas are restricted and locked when not in use. Keys are in the possession of Posipanka and the security division.

Receipt of Materials

35. Posipanka stated that all materials currently used in humans are received from Squibb or Abbott, firms which certify the assay and pharmaceutical quality of radionuclides. She stated that all materials are delivered to a general receiving room, and that immediately upon receipt the Radioisotope Unit is notified and some representative picks up the package and brings the package to the "Hot" lab storage area. She stated all packages are monitored by direct physical surveys before opening.

Waste Disposal

36. Pischnotte stated all liquid waste from the "Hot" laboratory is emptied into a subsurface 500 gallon metal hold-up tank. Pischnotte stated the hold-up tank is emptied by the hospital engineer at periodic intervals, but that no samples are taken of the hold-up tank water to determine the concentration of radionuclides disposed to the sanitary sewer. Pischnotte stated he did not know the quantity of water disposed from the hospital to the sanitary sewer. Pischnotte stated he did not know the intervals at which the hold-up tank was emptied.

37. As previously stated, the inspector noted radiation levels of 50 mrad/hr beta and 0.1 mr/hr gamma existing at 1 cm distance from a floor drain in the "Hot" lab which drains floor water into the hold-up tank. Pischnotte stated it was evident that these levels existed because of the contamination discovered by the inspector of a Sr-90UY-90 spill at an unknown date. Pischnotte stated that no evaluation had been made of the concentration of Sr-90-Y-90 disposed to the sanitary sewer, nor had any records been made of these disposals showing the kind, quantity and date of assay.

38. Posipanka stated that all soluble I-131 liquid wastes are stored for 6 or 7 half-lives and then poured down a sink in the "Hot" lab which also discharges into the hold-up tank. Posipanka stated that no records of these disposals were maintained showing kind, quantity or date of disposal. She also stated that she monitored the liquid I-131 wastes prior to disposal and that the wastes had little or no apparent activity when measured with the end window of an AN/PDR-27C GM survey meter range 0-200 mr/hr with a minimum sensitivity of 0.1 mr/hr. She stated she never made any record of these surveys to show that little or no activity was disposed of.

Personnel Monitoring

39. The SANH has its own film badge service. Dupont 552 double packet films are sent from the National Naval Medical Center at Bethesda, Maryland, and are put into badges worn by eight persons involved with radioisotopes. The film badges are developed each month by Posipanka, according to Pischnotte. The film badge results are maintained on Form DD-1141, a form similar in all respects to AEC-5. The inspector examined the film badge results from 1961 to date of inspection. They showed that Posipanka received a maximum whole body exposure of [illegible] during the third calendar quarter of 1963. A film badge worn by R. Van Syke, HM-3, showed [illegible] beta during July 1963. Van Syke said that this exposure occurred to a wrist badge worn by him when he attempted to clean up beta contamination existing in several areas of the "Hot" laboratory apparently caused by a prior unknown spill of Y-90. Van Syke stated he wore gloves during this clean up. He stated that there were several hot areas in the laboratory particularly

on the floor in the vicinity of the hood containing the Sr-90-Y-90 cow. He stated he did not record these radiation levels or make any smear tests. He stated he orally reported the contamination to Posipanka. Posipanka stated that Van Syke had orally reported to her that there was existing contamination in the "Hot" lab and that he had cleaned it up. She stated she made no further report to her supperiors or to Pischnotte, the RSO. All other film badges showed less than _ mrem whole body exposure per calendar quarter year. Posipanka stated she compares the density of the personnel films she develops against film standards which she received from Bethesda. She said that films are given standard exposures at Bethesda and developed there. These are then sent to her to use in calibrating the films she develops at SANH. She confirmed that the exposed film standards are not representative or a part of the same batch of film she received for use in SANH badges. She stated she uses a standard Navy type Densitometer in comparing the density of film badges against the exposed film standards received from Bethesda. She stated she has no knowledge as to whether the film badges and film standards are of the same emulsion or were even developed by the same method.

Posting and Labeling

40. The inspector noted Form AEC-3, "Notice to Employees" to be posted at the entrances to restricted areas allowing all persons entering, an opportunity to see the notice.

41. The inspector noted all containers to have labels affixed reading "Caution - Radioactive Materials" with symbol and which also noted the kind, quantity and date of assay of contained material. Both restricted areas, the "Hot" lab and the "Radium" storage room were posted with signs reading "Caution - Radiation Area", and "Caution - Radioactive Materials" with conventional symbol.

License Conditions Not Previously Disqussed

License Condition 10

42. Pischnotte stated and the inspector noted that all materials were used at SANH, the address stated in item 2 of the license.

License Condition 21

43. Examination of the minutes of the Radioisotope Committee revealed that only persons who were authorized by the Committee used radionuclides as required.

License Condition 23

44. Byproduct material used in humans was noted to be received from Squibb and Abbott who certify assay and pharmaceutical quality as required. Pischnotte stated that the Y-90 cow was used prior to 18 months ago when he first reported for duty. He stated he believed that an independent assay was performed of all Y-90 used in humans for interstitial implants, but stated he could not verify this since his predecessor Lt. CMDR J. E. Turner left 3 months prior to his arrival with records of Y-90 use in which assay data may have been contained.

License Condition 24

45. Posipanka stated that byproduct material as sealed source have never been opened as required.

License Condition 43

46. The license condition requires the licensee to possess and use byproduct material in accordance with statements noted in an application dated 3/22/62 and amendment dated 5/8/62. An attachment to the application of 3/22/62 entitled NAVHOSP INST. 6470.1 22 DAS, 22 MARCH 1962 subject Radioisotope Committee; establishment of states in PP. 3(i) "The board shall be informed of all spills of activity or of exposure of personnel above the maximum permissible limits. Remedial action concerning these matters shall be reviewed."

47. Pischnotte and Posipanka stated the Radioisotope Board or Committee was never informed of the spill of a large quantity of Sr-90-Y-90 occurring in the "Hot" lab some unknown time in 1962 and totally unreported. Pischnotte again stated that Posipanka was left to her own resources with regard to radioisotopes.

48. The above documents were reviewed with Posipanka and Pischnotte and compliance was noted with respect to all other details except as noted in previous discussion.

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48. The above documents were reviewed with Posipanka and Pischnotte and compliance was noted with respect to all other details except as noted in previous discussion.

I-G

Form AEC-591
(11-62)

UNITED STATES ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE

INSPECTION FINDINGS AND LICENSEE ACKNOWLEDGMENT

DEC 27 1963

1. LICENSEE	2. REGIONAL OFFICE
Department of the Navy U. S. Naval Hospital Radioisotope Laboratory St. Albans 25, New York	U. S. Atomic Energy Commission Region I, Division of Compliance 376 Hudson Street New York, New York 10014
3. LICENSE NUMBER(S) 31-76-7	**4. DATE OF INSPECTION** December 24, 1963 (Initial)

5. INSPECTION FINDINGS

- ☐ A. No Item of noncompliance was found.
- ☐ B. Rooms or areas were not properly posted to indicate the presence of a RADIATION AREA. 10 CFR 20.203(b) or 31.302
- ☐ C. Rooms or areas were not properly posted to indicate the presence of a HIGH RADIATION AREA. 10 CFR 20.203(c)(1) or 31.302
- ☐ D. Rooms or areas were not properly posted to indicate the presence of an AIRBORNE RADIOACTIVITY AREA. 10 CFR 20.203(d)
- ☐ E. Rooms or areas were not properly posted to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(e)
- ☐ F. Containers were not properly labeled to indicate the presence of RADIOACTIVE MATERIAL. 10 CFR 20.203(f)(1) or (f)(2)
- ☐ G. Storage containers were not properly labeled to show the quantity, date of measurement, or kind of radioactive material in the containers. 10 CFR 20.203(f)(4)
- ☐ H. A current copy of 10 CFR 20, a copy of the license, or a copy of the operating procedures was not properly posted or made available. 10 CFR 20.206(b)
- ☐ I. Form AEC-3 was not properly posted. 10 CFR 20.206(c)
- ☐ J. Records of the radiation exposure of individuals were not properly maintained. 10 CFR 20.401(a) or 31.203(b)
- ☒ K. Records of surveys or disposals were not properly maintained. 10 CFR 20.401(b) or 31.303(d)
- ☐ L. Records of receipt, transfer, disposal, export or inventory of licensed material were not properly maintained. 10 CFR 30.41, 40.61 or 70.51
- ☐ M. Records of leak tests were not maintained as prescribed in your license, or 10 CFR 31.105(c).
- ☐ N. Records of inventories were not maintained. 10 CFR 31.106
- ☐ O. Utilization logs were not maintained. 10 CFR 31.107

Eugene Epstein
(AEC Compliance Inspector)

6. LICENSEE'S ACKNOWLEDGMENT

The AEC Compliance Inspector has explained and I understand the items of noncompliance listed above. The items of noncompliance will be corrected within the next 30 days.

WALTER F HANSEN, CAPT. MC. USN

1/ /63
(Date)

(Licensee Representative — Title or Position)

COPIES: ☐ LICENSEE; ☒ COMPLIANCE REGION; ☐ DIV. OF LIC. & REG.; ☐ DIV. OF COMPLIANCE

INSPECTION NOTES

Backup for 591 item of Noncompliance

Inspector E. EPSTEIN

Approved by

DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory

LICENSEE: St. Albans 25, New York

Lic. No. 31-76-7

Type Inspection: (I) (RI) (Announced) (Unannounced)

Date December 24, 1963

I. GENERAL INFORMATION

A. Inspection on : 10 CFR (20) (30) (31) (40) (70)

B. Persons Accompanying:

Name	Position/Organization
1. None	
2.	

C. Persons Contacted: (inc. name, title, rad duties, reports to)

1. Walter F. Hanson, Capt. USN, Chief of Radiology
Experience:

2. William O. Pischnotte, LCDR USN, Radiologist and RSO

Experience: Pischnotte has had courses in radiation safety given by the Bethesda Naval Medical Center.

3.

Experience:

For person(s) acting as RSO summarize authority: Reports to Capt. W. F. Hanson who reports to Capt. Joseph Yown, USN Hospital Commandant.

D. Radiation Safety Comm. (Yes) (No). Meetings Yes Minutes Yes

Members, Position & Who report to.
1. Capt. Haskill Wertheimer, Chief of Surgery
2. Capt. I. Errion, Chief of Medicine
3. Commdr. G. Szakacus, Chief of Pathology

Scope & Authority of Committee
Capt. C. Rogers, Tumor Board
The committee meets weekly and authorizes all use and users.

E. Organization and Administration:

1. Summary of O&A and Program (as pertains to lic. materials)

Neutron Generator used briefly for a ~~six~~ one month period between Sept. 1963 and April 1963x by Dr. James R. Brown, M. D., Radiologist and Dr. L. Zimser, M. D. of Columbia University for activation analysis of rare earths. Generator was on loan from Picker for six months but used only one month.

2. Affiliations: None

F. Facilities & Uses of Byproduct/Source /Special Nuclear Material

1. Isotopes:

Material/Form	Lic. Limit	Qty on Hand	Qty/Assay	Supplier	Use/rate/quantit
A. H-3 Titanium Tritide foil in a Picker-Dresser Industries Model A-6800 neutron generator	5 c	none		Picker	Used 1 afternoon each week for 2 hours ~~between~~ during one month Sept. 27, 1962 and April 1, 196 Returned to Picker 4/1/63

2. Persons using Material(s): (inc.: name, title, duties, training, experience)

(a) Lt. James R. Brown USN, M. D., Director Depat. of Nuclear Medicine trained at Bethesda.

(b) Dr. L. Zimser, M. D., Columbia Medical Center

(c) Generator using reaction $_1T^3 + _1D^2 \rightarrow {}_2He^4 + {}_0N^1 + Q$ was used to irradiate aluminum and Silicon oxides and produced nuclides in generally licensed quantitiesx less of .01 uc of each produced. The generator ahad a flux of 10^8 n/sec with energies of 14.3 MEV.

F. 3. Facilities:

Licensee uses: (X) Lab ( ) Counting room ( ) Fume hood ( ) Dry box

( ) Table/bench (X) remote hand. equip. ( ) protective clothing

( ) other A subbasement room is described in licensee's

Describe checked items: application. Entrance door was interlocked with control console, a red warning light on the outside flashed when the generator was on. Opening of the door would automatically cut off the electrical supply and de-energize the generator

4. Restricted Area Established _____ Describe Yes - The neutron generator room.

5. Summary of Handling Procedures/Operations:

Operation was from without the room by a remote controlled console.

6. Instrumentation & Calibration Procedures:

TWO Picker fast neutron monitors calibrated by Picker prior to installation.

7. Other Notes: for radiographer occupancy factors, exposure times, time spent in high radiation area

G. Radiation Safety Precautions & Procedures (Summary of Scope)

1. Instructions, oral & written: None - only Brown and Zimser under Brown's supervision were allowed to handle unit. A copy of the license together with copies of 10 CFR 20 - 30 were in one folder. Pischnotte stated the file was available to all personnel upon request.

Licensee not complying with written procedures as follows:
N/A

2. Surveys (working areas, storage facilities, etc.) (records & dates)

(a) Direct reading - restricted areas Pischnotte stated no survey records are available. He stated that Picker representatives shortly after installation of the Generator made surveys using neutron survey meters as well as gamma survey meters. He stated that they could detect no neutrons outside of the shielded facility and no gamma levels above background during irradiation. He stated Picker did not leave the results of their surveys with the naval facility.

unrestricted areas as above

(b) Smear samples: (rest. & unrest. areas) NO

(c) Air samples: (rest. & unrest. areas) No

3. Locking/securing of areas: Yes - room completely interlocked and locked when not in use.

H. Procurement Procedures & Control

1. Person ordering/responsible & method: Browne

2. Person insuring limits not exceeded: Brown

3. Supplier: Picker

4. Summary of procurement & receipt method: (records) record maintained showing receipt and transfer

5. ( ) Preassayed:

( ) Sterilized:

( ) Leak Tested:

I. Storage & Security of Material

(Un)restricted Area (Un)locked space Summary: In locked neutron generator room.

J. Waste Disposal (method & quantities involved, records & dates)

1. Sanitary sewer

2. Burial

3. Transfer Yes - to Picker 4/1/63 of generator solid waste generally licensed quantities of Al and Si retained in storage area of "Hot" lab.

4. Incineration

K. (X) Posting of Areas CRA CHRA CRM CARA

( ) Labeling Containers ( ) Tagging Sources

(X) AEC-3 posted & where: at entrance to neutron generator room so that all

Summary: persons entering could see the notice.

L. Personnel Monitoring Program (Yes) (No) - ( ) AEC-4 ( ) AEC-5

1. Film Badge: supplier Picker - Neutron badges and U. S. Navy tape

Frequency Dupont double packet baxdges

review of records: (persons & readings)

Picker neutron badges were possessed monthly and showed no neutron tracks. Many film badges were processed monthly at St. Albans and show no more than 150 mrem whole body exppsure for Brown in any calendar quarter yearx who also waws involved at that time in the isotope program. Zimser reported monthly exposure as less than 10 mrem.

2. Wrist badge: supplier No Frequency

Records:

3. Dosimeters: Supplier: No Read by:

Records (persons & readings)

4. Surveys: ( ) Bioassay ( ) Breath Anal. ( ) other

Describe: No

5. Further information on AEC-4, -5, other related to personnel program:

No

AEC CONTRACTS ( ):

M. For Radiographers:

1. Leak tests: (31.105)

(a) performed by:

(b) persons lic. to perform:

(c) description of method:

2. Instrument & Calibration Procedures (31.104)

3. Quarterly Inventory (31.106)

4. Utilization Logs: description - identity - site (31.107)

5. Securing of sources & container records (31.303)

6. Dosimeter & film badge records (31.203)

7. License Conditions:

8. Per 31.102, 103 - Devices/containers properly locked & stored.

9. Status & compliance with operating & emergency procedures (31.202)

10. Per 31.201 Limitations on radiographers & assistant rad. followed.

11. Security and surveillance during rad. operations (31.301)

12. Radiation levels on devices & containers (31.101) - (inspectors survey readings)

Note: Describe noncompliance items on back & reference applicable section of Part I.

II. Compliance with 10 CFR

A. 10 CFR 20:

N/C	OK	NA	Paragraph	Topic
—	X	—	101(a)	Exposure limits in Rest. Area
—	—	X	101(b)	Exposure exceptions - AEC-4
—	—	X	102(b)	Determ. Acc. Dose & AEC-4
—	—	X	102(c)	Records & Prep. of AEC-4
—	—	X	103	Exp. to Conc. in Restr. Area
—	—	X	104(a)(b)	Exposure of Minors - Material/Airborne
—	X	—	105(a)(b)	Levels in Unrestricted Areas - Except 2 mr/hr, 100 mr
—	—	X	106	Effluents in Unrestricted Areas
—	—	X	108	Orders Requiring Bioassays
—	X	—	201(b)	Surveys - 201(a) describes
—	X	—	202(a)	Personnel Monitoring Requirements
—	—	X	203(b)	Posting Rad. Areas w/CRA
—	X	—	203(c)	" High Rad. Areas w/CHRA
—	—	X	203(d)	" Airborne " w/CARA
—	X	—	203(e)	" Require. Rooms/Areas w/CRM
—	X	—	203(f)	Labeling Containers (ref. Append C) CRM
—	—	X	204	Lists posting exceptions - sealed/hospitals/ 8 hour limit
—	—	X	205	Exceptions for RM shipments
—	X	—	206(a)	Instruction of Personnel in Restr. Area
—	X	—	206(b)	Procedures, Regulations, License Available
—	X	—	206(c)	AEC-3 posted in/near Restr. Area
—	—	X	207	Storage Security of Licensed Material
—	—	X	301	Gen. Waste Disposal Requirements
—	—	X	302	Methods of obtaining approval for waste disposals
—	—	X	303(b)	Disposal to Sanit. Sewer - daily limits
—	—	X	303(c)(d)	" " " " - monthly/yearly limit
—	—	X	304	" by burial - limits in (a)(b)(c)
—	—	X	305	" " incineration - must be licensed
—	—	X	401(a)	Records - AEC-5 for persons req. per 202
X	—	—	401(b)	Survey records per 20.201(b)
—	—	X	401(b)	Disposal records per 302, 303, or 304
—	—	X	402	Reports of theft or loss
—	—	X	403(a)(b)	Notification of incidents (a) (b)
—	—	X	404	Report to former employees of exposure
—	—	X	405	Report of overexposure/excessive levels
—	—	X	406	Employees request for annual exposure

ITEM of NONCOMPLIANCE

20.401b - in that the licensee did not maintain records showing the results of surveys required under 20.201b. (See paragraph G-2).

B. 10 CFR 30

N/C	OK	NA	Paragraph	Topic
—	X	—	3	License requirements - use as lic. stipulates
—	—	—	9	Exempt Concentrations per 30.73
—	X	—	23	Reg. for issuance of specific lic. - general
—	—	—	24	Reg. " " " " " - specific i.e., human use by inst. & phys, radiographers etc
—	X	—	41(a)	Records - receipt, transfer, export, disposal

C. License Conditions: (refer by no.)

10.	—	X	—	use at location listed in item 2 of the license.
12.	—	X	—	byproduct material was used under the supervision of James R. Brown.
13.	—	—	—	use in accordance with license and application of July 11, 1962
	—	—	—	
	—	—	—	

D. Previous N/C, status, & discussed with:

—	—	—
—	—	—
—	—	—
—	—	—
—	—	—

E. 10 CFR 31 - Radiographic operations

—	—	—	101	Limit of rad. level for devices & containers
—	—	—	102	Locking requirements for " " "
—	—	—	103	Storage precautions
—	—	—	104	Instruments, calibration & calib. record
—	—	—	105(a)	Auth. personnel handle etc. sealed source
—	—	—	105(b)	Leak test - 6 mo. interval
—	—	—	105(c)	Detectable level .005 uc - record of tests
—	—	—	105(d)	Level greater than .005 uc - withdraw & report
—	—	—	105(e)	Tag for loose sealed source (i.e. not in/fastened
—	—	—	106	Quarterly Inventory
—	—	—	107	Utilization Logs (description/person/site)
—	—	—	201(a)	Qualifications for radiographer
—	—	—	201(b)	" " asst. radiographer
—	—	—	202	Licensees operating & emergency procedures
—	—	—	203(a)	Film badge & dosimeter requirements for rad.
—	—	—	203(b)	Badge & dosimeter records
—	—	—	301	Security of high rad. areas
—	—	—	302	Posting radiographic areas
—	—	—	303(a)	Calibrated & Operable instr. at exposure site
—	—	—	303(b)	Survey of device after each exposure
—	—	—	303(c)	Survey when securing device & also contain
—	—	—	303(d)	Records of surveys conducted per 303(c)

Note: Explain L&R's meaning of an adequate instrument calibration procedure. Check sources not adequate.

E. R. Price, Assistant Director
Division of Licensing and Regulation, HQ

JAN 24 1964

R. S. Cleveland, Radiation Specialist (Review)
Region I, Division of Compliance

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT -
10 CFR 30

CO:I:RE

Transmitted herewith is a license inspection report involving noncompliance:

DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans 25, New York

License No. 31-76-6

The items of noncompliance were discussed at a conference on December 24, 1963 with Captain Walter F. Hansen, USN, Chief of Radiology and Acting Base Commander in the absence of Captain J. Town USN, Base Commandant. Hansen indicated his willingness to comply with the regulations and to take appropriate corrective action.

It was pointed out to Hansen that failure to maintain records of sewerage disposals and failure to perform tests for leakage at intervals not to exceed six months were recurrent deficiencies which had been noted at our inspection of License No. 31-76-4 on 9/14/59. Hansen and Pischnotte, the RSO, who also attended the conference, both stated they never saw the results of the previous inspection or the letters from DL&R dated 12/30/59 listing the items of noncompliance and the licensee's corrective action in the letter of 1/8/60. Hansen stated that this is partly due to the fact that supervisory control suffers from transfer of personnel without arrival of replacements for considerable time. He stated he would search for all the correspondence and stated prompt corrective action would be taken.

The items of noncompliance listed for failure to make an adequate evaluation of a spill of Sr-90-Y-90 and of the concentrations of Sr-90-Y-90 and I-131 disposed to the sanitary sewerage system were also discussed. It was pointed out to Hansen that, although the Sr-90-Y-90 spill occurred approximately two years ago, the floor drain through which floor washings are disposed still shows signs of removable beta contamination and it was evident that a large quantity of Sr-90-Y-90 had been disposed of without any record or evaluation of concentration.

Hansen stated they will no longer use the present hold-up tank. He stated that all operations will cease until the laboratory is thoroughly decontaminated with all washings collected and contaminated items disposed of by burial or transfer. He stated a new hold-up tank would be installed and that a full evaluation of concentrations and activity involved would be made of the hold-up tank's contents before release to the sanitary sewerage system.

Management control of the radioisotope program was also discussed with Hansen. The inspector pointed out that there appeared to be a breakdown in management control when they are not informed of spills of radioactive material, where decontamination efforts are made by subordinates without management knowledge and where it appears for periods of time there is no management control due to transfer of naval personnel. It was also pointed out that a subordinate assumed the duties of RSO without any supervision from the actual RSO. Hansen stated he would institute strict control and it was evident to him that there was a breakdown in management of the radioisotope program.

The licensee's administrative instructions were also reviewed with Hansen. It was pointed out that on page 4 of the instructions emergency dose of 10R and 25R are permitted. It was pointed out that these radiation doses exceed the limits

as expressed in 10 CFR 20.101(b). Item V on page 4 of the instructions refers to general surface contamination as being maintained below tolerance levels in 10 CFR 20. It was pointed out that 10 CFR 20 does not list specific limits of surface contamination. It is recommended that these procedures be further considered by L&R as to whether or not they should still be approved and required to be followed by License Condition 43.

It is felt that the licensee's method of evaluating personnel film badges is very inappropriate and subject to gross errors. Since the density on a developed film is affected by the strength of developer, temperature of developer, time in developer, and character of specific emulsion used in a given batch of film, it is most difficult to validly evaluate a given film without comparing it with other films of the same emulsion batch which have been given known exposures and developed under the same conditions (preferably along side) the film being analyzed. It is felt that this matter raises a question as to whether the licensee's film badges can be considered as "appropriate personnel monitoring equipment" meeting the requirement of 10 CFR 20.202 and that this may need to be discussed by L&R with the licensee.

It is believed that the items of noncompliance do not currently involve a substantial hazard. However, a reinspection will be scheduled to be performed in about six months.

Form AEC-592 was not issued to the licensee because two of the items of noncompliance noted during this inspection were deficiencies which remained uncorrected after the last inspection and because of the other control deficiencies discussed above.

License No. 31-76-7 was also inspected at the same time. Form AEC-591 was issued to the licensee involving one item of noncompliance, a record keeping deficiency.

Enclosure:
1 cy of Rpt.

cc: CO:HQ
w/orig. of Rpt.

FORM NY-99
REV. 8-1-59

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

HEALTH AND SAFETY LABORATORY
376 HUDSON STREET
NEW YORK 14, N. Y.

SAMPLE REQ. D 3713

DATE SENT
DATE RECEIVED 12/27/63
DATE REPORTED 12/31/63

Exhibit "A"

PLANT: St. ALBANS Naval HOSPITAL

MAILING ADDRESS:

ROUTE RESULTS TO: Compliance

ANALYZE FOR: Sr^{90}-Y^{90} B

TYPE OF SAMPLE: Smear

METHOD OF DETERMINATION: Manual & Scintillation Counter

SAMPLE NO.	DATE	HOUR START	HOUR STOP	SAMPLE DESCRIPTION	SAMPLING RATE	SAMPLING TIME	Dpm		RESULTS
0 881	12/24			Ledge of hood (Y^{90} cow) 100 cm²			5552		
1 880				floor in front of Y^{90} hood			148		
2 878				floor under sink			314		
3 1				rut between rooms			928		
4 2				sink tray (stainless)			713		
5 3				floor near Y^{90} cow			185		
6 4				floor near rear storage room			91		
7 5				top side floor drain grill			98		
8 6				underside floor drain grill			1203		
9 7				Inside floor drain			1072		

COLLECTED BY: E. Epstein

ANALYZED BY: J. W. Atkins

SURVEYOR TO RETAIN LAST COPY—RETURN ALL OTHERS TO HEALTH AND SAFETY LABORATORY

GPO 959255

FORM NY-99
REV. 8-1-59

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

HEALTH AND SAFETY LABORATORY
376 HUDSON STREET
NEW YORK 14, N. Y.

SAMPLE REQ. D 3714
DATE SENT 12/27/63
DATE RECEIVED 12/27/63
DATE REPORTED 12/30/63

PLANT: St ALBANS Naval Hosp

Exhibit "A"

TYPE OF SAMPLE: Smears.

MAILING ADDRESS:

METHOD OF DETERMINATION: β Scintillation γ-well Counter
c β phosphor

ROUTE RESULTS TO: Compliance

ANALYZE FOR: Sr^{90} - Y^{90} — β

SAMPLE NO.	DATE	HOUR START	HOUR STOP	SAMPLE DESCRIPTION	SAMPLING RATE	SAMPLING TIME	Dpm		RESULTS
0 8	12/24			floor around drain			49		
1 9				UNRESTRICTED Hall			23		
2 879				floor near sink			186		
3				IR 192 γ					
4 10				wipe IR 192 container			0.0		
5 11				wipe lead pig			0.0		
6				~~Co~~ Co γ					
7 12				wipe floor Storage Room			0.0		
8 ~~13~~				Co^{60} γ			~~0.0~~		
9 13				wipe pig containing Co^{60} wires			0.0		

COLLECTED BY: E. EPSTEIN

ANALYZED BY: [illegible]

SURVEYOR TO RETAIN LAST COPY—RETURN ALL OTHERS TO HEALTH AND SAFETY LABORATORY

GPO 959255

JAN 24 1964

E. R. Price, Assistant Director
Division of Licensing and Regulation, HQ

R. S. Cleveland, Radiation Specialist (Review)
Region I, Division of Compliance

TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT -
10 CFR 30

C:I:SE

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DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans 25, New York

License No. 31-76-6

The items of noncompliance were discussed at a conference on December 24, 1963 with Captain Walter F. Hansen, USN, Chief of Radiology and Acting Base Commander in the absence of Captain J. York USN, Base Commandant. Hansen indicated his willingness to comply with the regulations and to take appropriate corrective action.

It was pointed out to Hansen that failure to maintain records of sewerage disposals and failure to perform tests for leakage at intervals not to exceed six months were recurrent deficiencies which had been noted at our inspection of License No. 31-76-4 on 9/14/59. Hansen and Picchnotte, the RSO, who also attended the conference, both stated they never saw the results of the previous inspection or the letters from DL&R dated 12/30/59 listing the items of noncompliance and the licensee's corrective action in the letter of 1/8/60. Hansen stated that this is partly due to the fact that supervisory control suffers from transfer of personnel without arrival of replacements for considerable time. He stated he would search for all the correspondence and stated prompt corrective action would be taken.

OFFICE ▶	C O M P L I A N C E					
SURNAME ▶	EPSTEIN:PC	CLEVELAND				
DATE ▶	1-24-64					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

The items of noncompliance listed for failure to make an adequate evaluation of a spill of Sr-90-Y-90 and of the concentrations of Sr-90-Y-90 and I-131 disposed to the sanitary sewerage system were also discussed. It was pointed out to Hansen that, although the Sr-90-Y-90 spill occurred approximately two years ago, the floor drain through which floor washings are disposed still shows signs of removable beta contamination and it was evident that a large quantity of Sr-90-Y-90 had been disposed of without any record or evaluation of concentration.

Hansen stated they will no longer use the present hold-up tank. He stated that all operations will cease until the laboratory is thoroughly decontaminated with all washings collected and contaminated items disposed of by burial or transfer. He stated a new hold-up tank would be installed and that a full evaluation of concentrations and activity involved would be made of the hold-up tank's contents before release to the sanitary sewerage system.

Management control of the radioisotope program was also discussed with Hansen. The inspector pointed out that there appeared to be a breakdown in management control when they are not informed of spills of radioactive material, where decontamination efforts are made by subordinates without management knowledge and where it appears for periods of time there is no management control due to transfer of naval personnel. It was also pointed out that a subordinate assumed the duties of RSO without any supervision from the actual RSO. Hansen stated he would institute strict control and it was evident to him that there was a breakdown in management of the radioisotope program.

The licensee's administrative instructions were also reviewed with Hansen. It was pointed out that on page 4 of the instructions emergency dose of 10R and 25R are permitted. It was pointed out that these radiation doses exceed the limits

as expressed in 10 CFR 20.101(b). Item V on page 4 of the instructions refers to general surface contamination as being maintained below tolerance levels in 10 CFR 20. It was pointed out that 10 CFR 20 does not list specific limits of surface contamination. It is recommended that these procedures be further considered by L&R as to whether or not they should still be approved and required to be followed by License Condition 43.

It is felt that the licensee's method of evaluating personnel film badges is very inappropriate and subject to gross errors. Since the density on a developed film is affected by the strength of developer, temperature of developer, time in developer, and character of specific emulsion used in a given batch of film, it is most difficult to validly evaluate a given film without comparing it with other films of the same emulsion batch which have been given known exposures and developed under the same conditions (preferably along side) the film being analyzed. It is felt that this matter raises a question as to whether the licensee's film badges can be considered as "appropriate personnel monitoring equipment" meeting the requirement of 10 CFR 20.202 and that this may need to be discussed by L&R with the licensee.

It is believed that the items of noncompliance do not currently involve a substantial hazard. However, a reinspection will be scheduled to be performed in about six months.

Form AEC-592 was not issued to the licensee because two of the items of noncompliance noted during this inspection were deficiencies which remained uncorrected after the last inspection and because of the other control deficiencies discussed above.

License No. 31-76-7 was also inspected at the same time. Form AEC-591 was issued to the licensee involving one item of noncompliance, a record keeping deficiency.

Enclosure:
1 cy of Rpt.

cc: CO:HQ
w/orig. of Rpt.

3ND-NH59-5276/1

U. S. NAVAL HOSPITAL
ST. ALBANS L. I., 25. N. Y.

ADDRESS REPLY TO
COMMANDING OFFICER
AND REFER TO:

12 February 1964

U. S. Atomic Energy Commission
Region I, Division of Compliance
376 Hudson Street
New York, New York

Lic-31-76-6

Attention: Mr. Eugene Epstein

Dear Sir:

Radioassay of contents in the liquid storage tank in our laboratory was performed on 31 January 1964 using both a Nuclear-Chicago Gas-Flow Counter and a Scintillation Well-type Counter. Counts received from the gas-flow counter were 0.0004 microcuries and those from the scintillation counter were less than 0.0004 microcuries. The samples were removed from the storage tank after an opening (provided with a closing valve) was installed into the top of the tank which allowed for adequate mixing of all contents. No radioactivity has been dispensed into this tank since 24 December 1963.

An extensive radiation safety program has been established since your inspection of 24 December 1963. Some of the procedures being conducted are listed below.

1. Daily radioassay of liquid contents in storage tank.
2. Swipe tests of all areas twice weekly.
3. Storage of radioactive wastes and non-disposal until at least ten half-lives have elapsed.
4. Maintenance of records on all of the above procedures.

In addition to the above, calibration and leak tests on the Cobalt-60 wires and the Strontium-90 Medical Applicator are currently being performed by the Radium Chemical Company and Tracerlab Corporation. Report of these tests will be forwarded to you as soon as the results are received by this laboratory.

Decontamination of the floor spaces in the Radiation Controlled Area using Radiacwash solution have been conducted 2-3 times weekly for the last 2 months. Results of swipe tests show that counts received are now within normal background range.

We hope the above data is the information you requested.

Sincerely yours,

W. F. HANSEN
CAPT MC USN
Chief of Radiology

FORM NT-99
REV. 8-1-59

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

HEALTH AND SAFETY LABORATORY
376 HUDSON STREET
NEW YORK 14, N. Y.

SAMPLE REQ. D 3713

DATE SENT
DATE RECEIVED 12/27/63
DATE REPORTED 12/31/63

Exhibit "A"

PLANT: St. ALBANS Naval HOSPITAL

MAILING ADDRESS:

TYPE OF SAMPLE: Smear

METHOD OF DETERMINATION: Manual & Scintillation Counter

ROUTE RESULTS TO: Compliance

ANALYZE FOR: Sr^{90}-Y^{90} B

SAMPLE NO.	DATE	HOUR START	HOUR STOP	SAMPLE DESCRIPTION	SAMPLING RATE	SAMPLING TIME	Dpm		RESULTS
0 881	12/24			Ledge of hood (Y^{90} cow) 100 cm²			5552		
1 880				floor in front of Y^{90} hood			148		
2 878				floor under sink			314		
3 1				rut between rooms			928		
4 2				sink tray (stainless)			713		
5 3				floor near Y^{90} cow			185		
6 4				floor near rear storage room			91		
7 5				top side floor drain grill			98		
8 6				underside floor drain grill			1203		
9 7				Inside floor drain			1072		

COLLECTED BY: E. Epstein

ANALYZED BY: J. W. Hawkins

SURVEYOR TO RETAIN LAST COPY—RETURN ALL OTHERS TO HEALTH AND SAFETY LABORATORY

GPO 959255

FORM NY-99
REV. 9-1-59

UNITED STATES ATOMIC ENERGY COMMISSION
NEW YORK OPERATIONS OFFICE

HEALTH AND SAFETY LABORATORY
376 HUDSON STREET
NEW YORK 14, N. Y.

SAMPLE REQ. D 3714
DATE SENT 12/27/63
DATE RECEIVED 12/27/63
DATE REPORTED 12/30/63

PLANT: St ALBANS Naval Hosp

MAILING ADDRESS:

Exhibit "A"

TYPE OF SAMPLE: Smears.

METHOD OF DETERMINATION: β Scintillation, γ-well Counter, α β phosphor

ROUTE RESULTS TO: Compliance

ANALYZE FOR: Sr^{90} - Y^{90} — β

SAMPLE NO.	DATE	HOUR START	HOUR STOP	SAMPLE DESCRIPTION	SAMPLING RATE	SAMPLING TIME	Dpm		RESULTS
0 8	12/24			floor around drain			49		
1 9				UNRESTRICTED Hall			23		
2 879				floor near sink			186		
3				IR^{192} γ					
4 10				wipe IR^{192} container			0.0		
5 11				wipe lead pig			0.0		
6				~~Co^{60}~~ γ					
7 12				wipe floor Storage Room			0.0		
8 ~~13~~				Co^{60} γ			~~0.0~~		
9 13				wipe pig containing Co^{60} wires			0.0		

COLLECTED BY: E. EPSTEIN

ANALYZED BY: [illegible]

SURVEYOR TO RETAIN LAST COPY—RETURN ALL OTHERS TO HEALTH AND SAFETY LABORATORY

GPO 859259

MEMO ROUTE SLIP
Form AEC-98 (Rev. May 14, 1947)

☐ See me about this. ☐ Note and return. ☐ For concur[illegible] ☐ For signatur[illegible] ☐ For action. ☐ For information.

TO (Name and unit)	INITIALS / DATE	REMARKS
R. G. Page, Chief Enforcement Branch DL&R,HQ		Attached is a copy of a letter dated 2/12/64 showing corrective action on items of noncompliance noted for the U. S. Naval Hospital, St. Albans, N. Y.
TO (Name and unit)	INITIALS / DATE	License 31-76-6 on form AEC-417 transmitted 1/24/64. Enclosure: cy ltr dtd 2/12/64
TO (Name and unit)	INITIALS / DATE	
FROM (Name and unit)		REMARKS
R. S. Cleveland, Radiation Specialist (Review) CO:I		
PHONE NO. X-382	DATE 2/14/64	

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO 683 16 - 77649 - 1

U. S. Naval Hospital
St. Albans, New York

License No. 31-76-6

During an inspection on December 24, 1963, the question of contamination limits came up. The limits for removable contamination submitted by the licensee are non-specific and therefore cannot be used as a basis for enforcement action. The inspection report and transmittal memo dated January 24, 1964 should be reviewed at the time of license renewal.

G. W. Kerr

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-106

GWK

UNITED STATES GOVERNMENT

Memorandum

TO : E. R. Price, Assistant Director
Division of Licensing and Regulation, HQ

DATE: JAN 24 1964

FROM : R. S. Cleveland, Radiation Specialist (Review)
Region I, Division of Compliance

RSC

SUBJECT: TRANSMITTAL OF LICENSE COMPLIANCE INSPECTION REPORT - 10 CFR 30

CC:I:EE

Transmitted herewith is a license inspection report involving noncompliance:

DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans 25, New York

License No. 31-76-6

The items of noncompliance were discussed at a conference on December 24, 1963 with Captain Walter F. Hansen, USN, Chief of Radiology and Acting Base Commander in the absence of Captain J. Yown USN, Base Commandant. Hansen indicated his willingness to comply with the regulations and to take appropriate corrective action.

It was pointed out to Hansen that failure to maintain records of sewerage disposals and failure to perform tests for leakage at intervals not to exceed six months were recurrent deficiencies which had been noted at our inspection of License No. 31-76-4 on 9/14/59. Hansen and Pischnotte, the RSO, who also attended the conference, both stated they never saw the results of the previous inspection or the letters from DL&R dated 12/30/59 listing the items of noncompliance and the licensee's corrective action in the letter of 1/8/60. Hansen stated that this is partly due to the fact that supervisory control suffers from transfer of personnel without arrival of replacements for considerable time. He stated he would search for all the correspondence and stated prompt corrective action would be taken.

The items of noncompliance listed for failure to make an adequate evaluation of a spill of Sr-90-Y-90 and of the concentrations of Sr-90-Y-90 and I-131 disposed to the sanitary sewerage system were also discussed. It was pointed out to Hansen that, although the Sr-90-Y-90 spill occurred approximately two years ago, the floor drain through which floor washings are disposed still shows signs of removable beta contamination and it was evident that a large quantity of Sr-90-Y-90 had been disposed of without any record or evaluation of concentration.

Hansen stated they will no longer use the present hold-up tank. He stated that all operations will cease until the laboratory is thoroughly decontaminated with all washings collected and contaminated items disposed of by burial or transfer. He stated a new hold-up tank would be installed and that a full evaluation of concentrations and activity involved would be made of the hold-up tank's contents before release to the sanitary sewerage system.

Management control of the radioisotope program was also discussed with Hansen. The inspector pointed out that there appeared to be a breakdown in management control when they are not informed of spills of radioactive material, where decontamination efforts are made by subordinates without management knowledge and where it appears for periods of time there is no management control due to transfer of naval personnel. It was also pointed out that a subordinate assumed the duties of RSO without any supervision from the actual RSO. Hansen stated he would institute strict control and it was evident to him that there was a breakdown in management of the radioisotope program.

The licensee's administrative instructions were also reviewed with Hansen. It was pointed out that on page 4 of the instructions emergency dose of 10R and 25R are permitted. It was pointed out that these radiation doses exceed the limits

Touchy subject

as expressed in 10 CFR 20.101(b). Item V on page 4 of the instructions refers to general surface contamination as being maintained below tolerance levels in 10 CFR 20. It was pointed out that 10 CFR 20 does not list specific limits of surface contamination. It is recommended that these procedures be further considered by L&R as to whether or not they should still be approved and required to be followed by License Condition 43.

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It is believed that the items of noncompliance do not currently involve a substantial hazard. However, a reinspection will be scheduled to be performed in about six months.

Form AEC-592 was not issued to the licensee because two of the items of noncompliance noted during this inspection were deficiencies which remained uncorrected after the last inspection and because of the other control deficiencies discussed above.

License No. 31-76-7 was also inspected at the same time. Form AEC-591 was issued to the licensee involving one item of noncompliance, a record keeping deficiency.

Enclosure:
1 cy of Rpt.

cc: CO:HQ
w/orig. of Rpt.

OPTIONAL FORM NO. 10
MAY 1962 EDITION
GSA GEN. REG. NO. 27

5010-106

UNITED STATES GOVERNMENT

Memorandum

TO : E. Epstein, Region I - Division of Compliance DATE: January 20, 1964

FROM : N. Y. Chu, Chemist NYC
Radiochemistry Division - HASL

SUBJECT: ST. ALBANS NAVAL HOSPITAL SMEAR SAMPLE #881 -- REQUISTION D-3713.

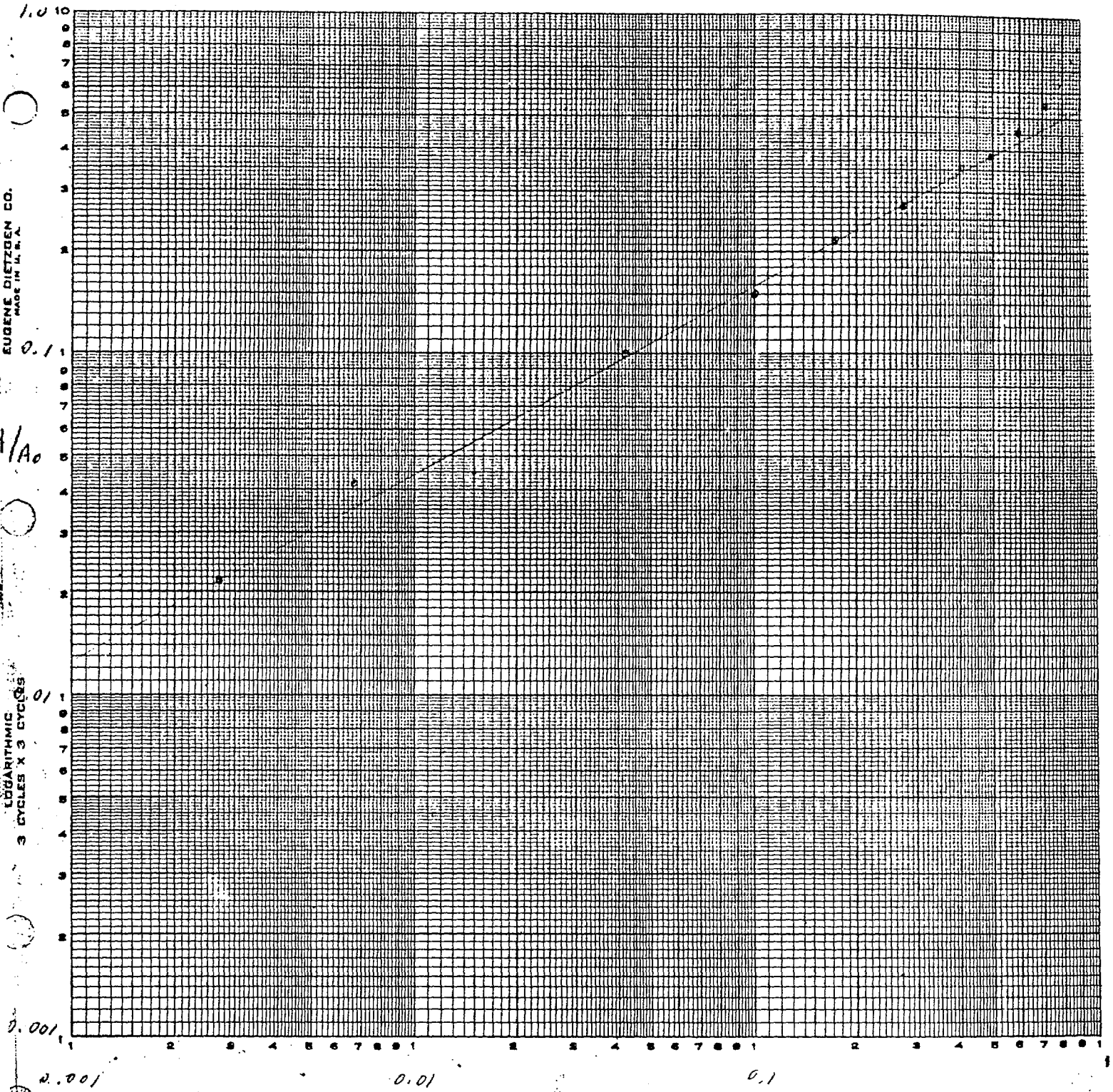
HSC:NYC

A beta absorption curve was run on Smear Sample #881 and the contamination was found to be purely Sr^{90}-Y^{90}. A Sr^{90} standard was used to check the sample. Copies of the curves obtained are attached.

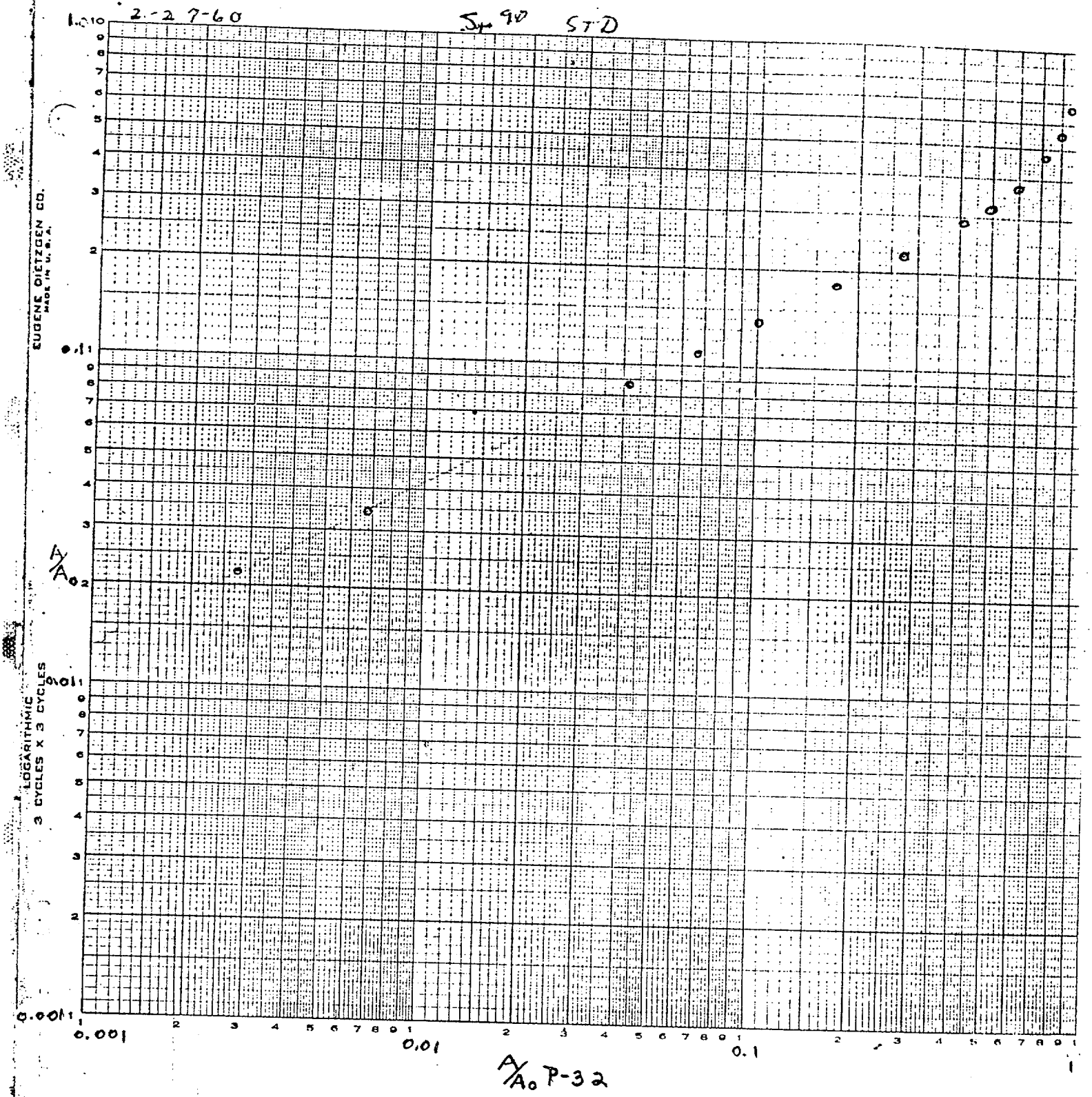
Enclosures - 2

JAN 20, 19

D-3713-881



P-32


2-27-60
Sp 90 STD
EUGENE DIETZGEN CO.
MADE IN U.S.A.
LOGARITHMIC
3 CYCLES X 3 CYCLES
A/Ao
1.010
0.11
0.011
0.0011
0.001
0.01
0.1
1

A/Ao P-32

3ND-NH59-5216/1

U. S. NAVAL HOSPITAL

ST. ALBANS L. I., 25. N. Y.

ADDRESS REPLY TO
COMMANDING OFFICER
AND REFER TO:

12 February 1964

U. S. Atomic Energy Commission
Region I, Division of Compliance
376 Hudson Street
New York, New York

LIC-31-76-6

Attention: Mr. Eugene Epstein

Dear Sir:

Radioassay of contents in the liquid storage tank in our laboratory was performed on 31 January 1964 using both a Nuclear-Chicago Gas-Flow Counter and a Scintillation Well-type Counter. Counts received from the gas-flow counter were 0.0004 microcuries and those from the scintillation counter were less than 0.0004 microcuries. The samples were removed from the storage tank after an opening (provided with a closing valve) was installed into the top of the tank which allowed for adequate mixing of all contents. No radioactivity has been dispensed into this tank since 24 December 1963.

An extensive radiation safety program has been established since your inspection of 24 December 1963. Some of the procedures being conducted are listed below.

1. Daily radioassay of liquid contents in storage tank.
2. Swipe tests of all areas twice weekly.
3. Storage of radioactive wastes and non-disposal until at least ten half-lives have elapsed.
4. Maintenance of records on all of the above procedures.

In addition to the above, calibration and leak tests on the Cobalt-60 wires and the Strontium-90 Medical Applicator are currently being performed by the Radium Chemical Company and Tracerlab Corporation. Report of these tests will be forwarded to you as soon as the results are received by this laboratory.

Decontamination of the floor spaces in the Radiation Controlled Area using Radiacwash solution have been conducted 2-3 times weekly for the last 2 months. Results of swipe tests show that counts received are now within normal background range.

We hope the above data is the information you requested.

Sincerely yours,

W. F. HANSEN
CAPT MC USN
Chief of Radiology

20545

LR:GWK
31-76-6

FEB 24 1964

Commanding Officer
U. S. Naval Hospital
St. Albans 25, New York

Dear Sir:

This refers to the inspection conducted on December 24, 1963, of your activities authorized under AEC Byproduct Material License No. 31-76-6.

It appears that certain of your activities were not conducted in full compliance with license conditions and the requirements of the AEC's "Standards for Protection Against Radiation," Part 20, Title 10, Code of Federal Regulations, in that:

1. Contrary to 10 CFR 20.201(b), "Surveys," surveys were inadequate to determine:

   a. the quantities and concentrations of radioactive materials disposed of by release into the sanitary sewerage system;

   b. the radiation hazards incident to a spill of strontium 90-yttrium 90 in the "Hot" laboratory which reportedly occurred during 1962; and

   c. the quantity and airborne concentrations of strontium 90-yttrium 90 released from the exhaust hood into unrestricted areas as a result of the spill of strontium 90-yttrium 90 during 1962.

2. Contrary to 10 CFR 20.401(b), "Records of surveys, radiation monitoring and disposal":

   a. records were not maintained showing the materials disposed of via the sanitary sewerage system; and

OFFICE	REGISTERED MAIL RETURN RECEIPT REQUESTED					
SURNAME ▶						
DATE ▶						

Form AEC-318 (Rev. 9-53)

U. S. GOVERNMENT PRINTING OFFICE 16—69781-2

FEB 24 1964

2. continued

b. records were not maintained of surveys made pursuant to 10 CFR 20.201(b) in connection with the possession and use of strontium 90-yttrium 90.

3. Contrary to License Condition No. 43, which incorporates your license application dated March 22, 1962:

a. the radiological safety officer did not assess the extent of the strontium 90-yttrium 90 contamination following the spill which reportedly occurred during 1962, and did not supervise the decontamination of the affected area as specified in Section VII of your "Operating Procedure and General Instructions for the Radioisotope Laboratory;" and

b. the radiological safety officer did not inform the Radioisotope Committee of the spill of strontium 90-yttrium 90 referred to above as specified in paragraphs 3(f) and 3(g) of NAVHOSP INST. 6470.2.

4. Several sealed sources containing byproduct material had not been leak tested at intervals of six months or less as required by License Condition No. 28(C). Also, records of those tests conducted were not maintained in units of microcuries as required by License Condition No. 28(D).

This notice is sent to you pursuant to the provisions of Section 2.201 of the AEC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of which is enclosed. Section 2.201 requires you to submit to this office, within twenty (20) days of your receipt of this notice, a written statement or explanation in reply including (1) corrective steps which have been taken by you, and the results achieved; (2) corrective steps which will be taken; and (3) the date when full compliance will be achieved.

OFFICE ▶						
SURNAME ▶						
DATE ▶						

FEB 24 1964

We understand that your method of evaluating film badges, developed at St. Albans Naval Hospital, involves a comparison of exposed film with film standards furnished by the National Naval Medical Center at Bethesda, Maryland. Your radiological safety officer reportedly did not know whether the film badges and film standards were of the same emulsion and whether the same development procedures were employed in developing the film badges and film standards. We believe that your film badge monitoring program should be re-evaluated to establish that there are no unnecessary errors being introduced in the evaluation of radiation doses received by individuals. We would appreciate clarifying information concerning the adequacy of your film badge monitoring program with your reply to this letter.

We have received a copy of a recent letter from Captain W. F. Hansen to the AEC Regional Compliance office in New York City, which relates to some of the items mentioned above. You may wish to refer to or expand upon the information in this letter in your reply.

Very truly yours,

Eber R. Price
Assistant Director
Division of Licensing
and Regulation

Enclosures:
1. 10 CFR 20
2. 10 CFR 2

cc: Department of the Navy
Chief, Bureau of Medicine and Surgery
Washington 25, D. C.
Attention: Comdr. John H. Schulte, MC
Code: 74 (Cmdr. Bell)

Capt. W. F. Hansen
LCDR. W. O. Fischnotte

bcc: Compliance Div., HQ
Compliance Div., I
Public Document Room

OFFICE ▶	LR:EB	LR				
SURNAME ▶	GWK:bjq:RCP	ERPrice				
DATE ▶	2/19/64					

Form AEC-318 (Rev. 9-53) U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

3KD-N-59-5216/1

PA92

U. S. NAVAL HOSPITAL
ST. ALBANS L. I., [redacted], N. Y. 11425

ADDRESS REPLY TO
COMMANDING OFFICER
AND REFER TO:

22/mp
6470/1
Ser: 22-6

MAR 3 1964

Mr. Eber R. Price
Assistant Director
Division of Licensing and Regulation
U. S. Atomic Energy Commission
Washington 25, D.C.

Dear Sir:

In reference to your letter dated 24 February 1964 relative to non-compliance with AEC's "Standards for Protection Against Radiation", Part 20, Title 10, Code of Federal Regulations, the following corrective procedures have been done. The below statements refer to sub-headings 1, 2, 3 and 4 of your letter.

a. Radioassay of contents in the liquid storage tank was performed on 31 January 1964 using both a Nuclear-Chicago gas flow counter and a scintillation well counter. The samples were removed from the tank after an opening, provided with a closing valve, was installed into the top of the tank which allowed for adequate mixing of all contents. Sample counts with gas flow counter were 0.0004 microcuries/ml. and those from the scintillation counter were less than 0.0004 microcuries/ml. No radioactive material has been dispensed into this tank since the inspection of 24 December 1963.

b. An extensive radiation safety program has been instituted and carried out since inspection of 24 December 1963, utilizing the following corrective measures and procedures.

(1) All areas and floor spaces in the radiation controlled area where contamination was found were decontaminated by Radiacwash solution conducted 2-3 times weekly for the past 2 months with all swipe tests and survey monitoring of areas recorded and logged. Present counts received for these areas are now within the normal background range.

(2) Appropriate storage of radioactive waste for non-disposal until at least 10 half-lives have elapsed.

(3) Daily radioassay and logging of liquid contents in storage tank since 31 January 1964. This now to be conducted at weekly intervals with records maintained.

(4) Maintenance of records on all survey areas, radiation monitoring and disposal of any radioactive material when done.

ACKNOWLEDGED

PDR 3-5-64

22/mp
6470/1
Ser: 132-64

MAR 3 1964

c. No definite information can be found or available to present personnel as to why the Radiological Safety Officer at the time of the alleged spill in 1962 did not inform the Radioisotope Committee of this incident, or as to why the decontamination of the affected areas was not carried out according to Section VII "Operating Procedure and General Instructions for the Radioisotope Laboratory". At present the limited areas where contamination was found have been decontaminated under present Radiation Safety Officer supervision as stated in para. b(1) above. In the future, if any such incident should occur, the Radioisotope Committee and all pertinent personnel shall be so informed and records maintained of all procedures and surveys conducted thereon.

d. In regards to Item 4 of your letter concerning sealed sources containing byproduct material, calibration and leak test on the Cobalt-60 wires were performed by the Radium Chemical Company on 17 February 1964, Test No. WA-109-64. These sources were compared to a radium standard and found to have a gamma equivalent of 11 millicuries each. The leak test showed that Wire #1 counted 0.0036 microcuries and Wire #2 counted 0.0008 microcuries. Calibration and leak test of the Strontium-90 Medical Applicator is currently being conducted by the Tracerlab Corporation. These tests will be conducted at least twice a year with records and certification that the tests have been made maintained in units of microcuries as required by license condition No. 28(D). None of the above sealed sources have been in use for the past year.

The personnel monitoring program conducted at St. Albans involves the wearing of film badges, processed every 4 weeks or less and pocket dosimeters read daily, of all personnel who are working with ionizing radiation or engaged in the handling of radioactive materials and by those entering a radioactive area.

Films for our program are obtained from the U. S. Navy Supply Depot and are of the Dupont SX-222, SN6665-531-2763 type which contain component films No. 508 and 510 for X-ray, beta and gamma radiations. Calibration curves are made from the same type film and emulsion lot number and are provided by the Bureau of Medicine and Surgery. These curves are used in conjunction with a densitometer, Weston Photographic Analyzer in the measurement of the film densities. A minimum of three pairs of unexposed control films are processed simultaneously with each batch of exposed film. The average density of the control film is subtracted from the observed density of each of the processed personnel films. The resulting net densities are then read from the calibration curve and the exposure data in rep or roentgens is obtained.

22/mp
6470/1
Ser: 132-64
MAR 3 1964

A photodosimetry log is maintained of all exposures received. In addition, a permanent and continuous record of exposure is made by entries on Form DD-1141, Record of Exposure to Ionizing Radiation, on each individual. An annual photodosimetry report, NAVMED 1432, Personnel Exposure to Ionizing Radiation, on all personnel exposures is submitted to the Bureau of Medicine and Surgery at the end of each calendar year. In the event of an overexposure to ionizing radiation, NAVMED 1433, Personnel Overexposure to Ionizing Radiation, is forwarded to the Bureau of Medicine and Surgery as soon as possible after overexposure.

It is believed that these series of actions will bring this activity into full compliance with AEC regulations.

Sincerely yours,

J. L. Yon

J. L. YON
CAPT MC USN
Commanding Officer

Copy to:
Chief, BUMED (Code 74)

Form AEC-417 (4-58)

G(1)

UNITED STATES ATOMIC ENERGY COMMISSION

COMPLIANCE INSPECTION REPORT

1. Name and address of licensee	2. Date of inspection
Department of the Navy U. S. Naval Hospital Radioisotope Laboratory St. Albans, New York	12/29/65 and 1/28/66
	3. Type of inspection Reinspection
	4. 10 CFR Part(s) applicable 20 and 30

5. License number(s), issue and expiration dates, scope and conditions (including amendments)

License Number	Type	Date of Issue	Date of Expiration
31-76-6	Reinspection	8/4/64	8/31/66

Amend. 1 (Amends license in its entirety)

6. Inspection findings (and items of noncompliance)

The inspection of the U. S. Naval Hospital at St. Albans, New York on 12/29/65 was a routine re-inspection, where the current status regarding the items of noncompliance resulting from the previous inspection in December 1963 was reviewed. On 1/28/66, the inspector re-visited the naval hospital for the specific purpose of examining the film badge program conducted there in conjunction with the Bureau of Medicine and Surgery of the Department of the Navy.

The only items of noncompliance noted or observed during the course of the inspection on 12/29/65 are as set out below:

1. License Condition 13C

   - The Sr-90 eye applicator and two Co-60 sources were not always leak tested at intervals of six months or less. (See paragraph 27 of report details)

2. 10 CFR 20.301

   - Disposal of waste materials contaminated with readily detectable amounts of radioactive materials has been made to the general trash handling system. (See paragraphs 26 and 40 of report details.)

7. Date of last previous inspection	8. Is "Company Confidential" information contained in this report? Yes ☐ No ☒ (Specify page(s) and paragraph(s))
12/24/63	

DISTRIBUTION:

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Charles F. Stearns
(Inspector)

Approved by: Richard G. Gilbert, Radiation Specialist, Region I, Division of Compliance
(Operations office)

February 24, 1966
(Date report prepared)

'itional space is required for any numbered item above, the continuation may be extended to the reverse of this form using foot to head leaving sufficient margin at top for binding, identifying each item by number and noting "Continued" on the face of form under iate item.

16—73314-2 U. S. GOVERNMENT PRINTING OFFICE

RECOMMENDATIONS SHOULD BE SET FORTH IN A SEPARATE COVERING MEMORANDUM

PART 30 INSPECTION

DEPARTMENT OF THE NAVY
U. S. Naval Hospital
Radioisotope Laboratory
St. Albans, New York

Dates of Inspection: December 29, 1965, January 28, 1966, Announced

Persons Accompanying Inspector:

None

Persons Contacted:

Dr. Walter F. Hansen, Captain, USN, Chief of Radiology (12/29/65, 1/28/66)
Dr. Mario Rosa-Garcia, RSO (12/29/65, 1/28/66)
David Shaw, Chief HMC (12/29/65 only)
James Gatewood, HM-3 (12/29/65 only)
Captain Ralph Faucett, Executive Officer of the Naval Hospital (12/29/65 only)
William Penman, HM-2 (1/28/66 only)
Norman Olsen, HM-3 (1/28/66 only)

DETAILS

Background

9. An inspection of this license on 12/24/63 resulted in a 417. None of the items of noncompliance resulting from that inspection were found to be recurring or uncorrected in the current inspection, except for the citation for failure to leak test sealed sources at intervals of 6 months or less which was found to be recurring (See paragraph 27). In regard to items 1a and 2a of the enforcement letter resulting from the last inspection, the licensee currently performs surveys of radioactive material before releasing to the sanitary sewerage system, and maintains records of these disposals. All of the other items in this letter (viz. 1b, 1c, 2b, 3a, and 3b) refer to a spill of Strontium-90-Ytterium-90 which occurred prior to the last inspection. The licensee has repeatedly cleaned the area where the spill occurred, has performed periodic direct reading surveys of the area, and maintains records of the results of these surveys. (See paragraph 16) (The licensee no longer possesses any Strontium-90-Ytterium-90; the contaminated waste accumulated from this area has been transferred to Radiological Services, Inc.).

10. In addition to the items of noncompliance for which the licensee was cited, the enforcement letter criticized the film badge program at this hospital and requested clarifying information on this

program. In particular, the letter questioned whether film badges and calibration films were always of the same emulsion lot, and whether the same procedures were used in developing the film worn by personnel and calibration films. The licensee's response stated that calibration curves are made from the same type film and emulsion lot number, but the inspector's examination of the film badge program on 1/28/66 did not indicate that new calibration curves actually have been provided for each new emulsion lot of film. (The most recent calibration curves available on 1/28/66 were dated July 1965, and the emulsion lot number was not specified on these curves.) For more details on the U. S. Navy film badge program, see the "Personnel Monitoring" and "Inspector's Evaluation" sections of the report details.

11. At the time of the last inspection, the RSO was Commander Pischnotte, but he was replaced less than 6 months prior to the current inspection, by Dr. Rosa-Garcia. Also, most of the other individuals involved in the use of isotopes at the time of the last inspection had been replaced prior to the current inspection. However, an exception to this is Captain Walter F. Hansen, Chief of Radiology, and head of the Radioisotope Laboratory who was transferred to St. Albans Hospital a few months prior to the last inspection, and is still at St. Albans at the present time. The chain of command for the current staff of personnel involved with isotopes is as follows: Technicians report to David Shaw, Chief HMC. Chief Shaw, as well as doctors at the hospital are responsible to Dr. Rosa-Garcia, as far as the use of isotopes goes. Rosa-Garcia reports to Captain Hansen, who in turn is responsible to the head of the Hospital, Captain John Albrittin, and his executive officer, Captain Ralph Faucett. In addition to being responsible for radiation safety, Dr. Rosa-Garcia actively participates in the use of isotopes. Captain Hansen stated that he had no longer directly participated in the use of isotopes since Rosa-Garcia arrived at the hospital.

Facilities and Uses

12. The rather extensive and completely equipped laboratory facilities for the use of isotopes are the same as those described in previous reports.

13. In general, the extent to which isotopes are currently being used at St. Albans Naval Hospital is appreciably less than at the time of the previous inspection. One reason for this diminished use of isotopes, according to Rosa-Garcia, is the current tendency at this hospital to discourage the choice of an isotope technique for a given application, whenever an acceptable alternative method is available which does not involve the use of isotopes. For example, Rosa-Garcia stated that the written request for authorization to use isotopes therapy, which he is required to submit to the radioisotope committee, must include an explanation of why alternative techniques would not be satisfactory for this particular patient. Also the isotopes may be used only by or under the supervision of individuals designated by the radioisotope committee, as required,

by License Condition 12.

14. From review of use records by the inspector and statements by Shaw, Rosa-Garcia, and Hansen, the scope of the current isotope program is indicated by the following. Since Rosa Garcia arrived in 8/65, I-131 has been used in the treatment of carcinoma twice, for cardiac condition once, and only five times for the treatment of hyperthyroid conditions, even though the frequency of hyperthyroid treatments have previously been on the order of several per month. Similarly, Rosa-Garcia stated that he has had no request for therapy using colloidal gold, colloidal P-32, or soluble P-32 (or any other therapy), even though each of these had been performed on one or more occasions in the year 1964 prior to his arrival. The current frequency of uses other than therapeutic is indicated by the list below for the month of November 1965, from the licensee's records.

Radiomedicine	Application	Total number of Patients in November of 1965
T-3	Thyroid diagnosis (in vitro)	59
I-131 as NaI	Thyroid diagnosis (in vivo)*	
"	2 hour uptake	52
"	4 hour uptake	50
"	24 hour uptake	52
"	Scinti & Photo scans **	102
"	Polaroid Scans **	51
"	Conversion Ratio	48
"	Saliva PBI	47
I-131 as IHSA	Blood Volume	13
I-131 as Hipputope	Renograms	4
Hg-203	Renoscans	5
Au-198	Liver Scans	14
Hg-203	Brain Scans	16
I-131	Lung Scans	2
Co-60 as Vit. B-12	Schilling Test	4
I-131 as Triolein	Fat Studies	3
I-131 as Oleic Acid	Fat Studies	2

* All the invivo thyroid tests are run following a single administration of 50 uc I-131 as NaI, according to Rosa-Garcia.

**"Photo Scans" and "Polaroid Scans" do not represent actual additional scans run on the patient, but instead merely photographic records of the scan on X-ray film and polaroid film respectively.

15. As indicated above, there are several technicians who handle isotopes under the supervision of Chief Shaw. James Gatewood, HM-3 has been at the St. Albans Naval Hospital since June 6, 1964. The handling of isotopes by Gatewood consists primarily of the performance of blood volume determinations and renograms. He is also responsible for the routine duties connected with radiological safety, such as carrying out direct reading surveys, and the processing of film badges. Joseph Carney specializes in thyroid work, which includes thyroid scanning and assisting Dr. Rosa-Garcia in thyroid therapy. Norman Olsen does the routine work connected with all scanning, except for thyroid scanning. William Penman, who

recently arrived at this hospital, carries out special diagnostic tests, such as fat absorption studies, etc. Chief Shaw and all the technicians under him had completed the six month training in isotopes given by the Navy at Bethesda, except for Olsen who took the course at San Diego, which is patterned after the one at Bethesda, according to Gatewood.

Radiological Safety Precautions and Procedures

16. A "Radiation Safety Guide" was drawn up by Captain Hansen and M. C. Posipanka, HMC in April 1964. (Posipanka, who is no longer stationed at this Naval Hospital, had been the counterpart of Chief Shaw; she was also directly responsible to the RSO.) A copy of this "Radiation Safety Guide" is included in the license folder. Inspector review of this guide and license application dated 5/5/64 indicated that byproduct material is possessed and used in accordance with these documents, as required by License Condition 18.

17. Separate written instructions have also been drawn up for each treatment involving the administration of Au-198, P-32, I-131, and so on. These include instructions regarding the hazard from radiation levels near the patient, precautions necessary in handling excretions, and so on. Copies of these instructions have been attached to the inspection notes. Some of the general precautions taken were stated by Rosa-Garcia to be as follows: No one is allowed in the patient's room, except personnel necessary for care of the patient. Linen is monitored, and held for decay if necessary. The 2 mr/hr line is marked on the floor of the patient's room with tape, as determined by direct reading surveys using a GM survey meter. (Records of such surveys were reviewed by the inspector.) Personnel required to be in the patient's room, such as nurses, wear self-reading pocket dosimeters. Specific instructions pertaining to an individual case are written on the patient's chart.

18. Rosa-Garcia stated that he follows a rule requiring that each patient to whom 30 mc or more have been administered will remain hospitalized until only 10 mc or less remain in the patient, even though the official requirements, according to the Radiation Safety Committee and according to License Condition 16, is that the patient remain hospitalized until 30 mc or less remain. License Condition 15 states that patients containing Co-60 and/or Ir-192 shall remain hospitalized until the implants are removed. Captain Hansen stated that neither Co-60 or Ir-192 implants have been used since before the last inspection, and he knows of no case when Co-60 implants have ever been used. License Condition 17 requires that sealed sources containing byproduct material shall not be opened. Hansen and Rosa-Garcia stated that sealed calibration sources are never tampered with in any way, and sealed Co-60 sources for therapy are not used at all.

19. Rosa-Garcia stated that the policy at St. Albans Hospital is to keep the activity of doses administered to patients as low as

practicable. He stated that the dose for treatment of hyperthyroid conditions has usually been 4 - 6 mc, with a maximum of 8 mc. The dose of I-131 administered to each of the two patients treated by Rosa-Garcia for carcinoma of the thyroid was 100 mc. In the case of Au-198, a dose of 100 mc was administered to a patient on 3/17/64 and 80 mc was given to another patient on 4/13/64. In a case where P-32 as sodium phospate was used in the treatment of bone metastases, 1.5 mc was administered intravenously each day for six consecutive days. In a case where P-32 as colloidal chromic phospate was introduced into the pleural cavity of a patient, the dose was 10 mc. The largest dose of byproduct material noted by the inspector to be used for diagnostic purposes was 700 mc Hg-203 for brain scans. (For renal scans, 100 - 150 mc Hg-203 is used.) According to Rosa-Garcia, Hg-197 will henceforth be used instead of Hg-203 for brain and renal scans.

20. Rosa-Garcia stated that Hg-203 is injected into the patient using a disposable syringe. He stated that the process requires only 10 seconds or less, and no exposure has been noted on a self-reading dosimeter (or film badges) worn on the chest pocket following this procedure. Rosa-Garcia stated that this technique is in line with the instructions give to him at the Bethesda Naval Training School, and since leaving this school he has not given any further consideration to an estimation of the dose to which the hand might be exposed in such an administration. The evaluation of the Naval Training School of this technique as being permissible is supported by the inspector's approximate calculation of the exposure to the hands, at least to the extent that it indicates the exposure per calendar quarter should be much less than the limit for the hands in part 20. (This calculation was made using assumptions for time and frequency which are more conservative than the figures for these two parameters obtained from the licensee's records and statements by Rosa-Garcia, as follows: Assuming more than twice the number of injections per quarter than would be derived from the table in paragraph 16, where 16 injections are listed for November 1965; at 30 seconds per injection, compared to Rosa-Garcia's estimate of 10 seconds or less (v.s.); and source-to-hand distance of ½ cm, the total exposure for a calendar quarter would be approximately 3 R.) After discussing this question of exposure to the hand from injecting Hg-203 with the inspector, Rosa-Garcia stated that he would give serious consideration to the use of a wrist badge to estimate the exposure in a future administration such as this.

21. Rosa-Garcia stated that colloidal P-32 and colloidal gold are introduced into cavities of patients by the standard technique whereby a saline solution forces the colloidal isotope by a gravitational feed through a tubing connected to a syringe which had previously been placed properly into the patient. Therapeutic doses of I-131 in the liquid form are administered orally by means of a straw placed in the original bottle in which the radiomedicine was shipped to the licensee.

Instrumentation and Surveys

22. According to Gatewood, a GM survey meter with the Navy designation

ANPDR-27F is used for direct reading surveys. The licensee also possesses many other instruments for surveying and laboratory counting. These are listed on sheets no. 1 and 2 attached to the license application dated 5/5/64. Rosa-Garcia stated that most of these counting instruments are not used; often an instrument would be procured by some predecessor, and then never used after that individual left the hospital. Several calibration sources are available for checking these instruments.

23. Gatewood, Isotope Technician, conducts direct reading surveys, around areas where isotopes are stored and used on a weekly basis. These surveys include readings taken at many specified points, and the results of these readings are recorded on data sheets with diagrams on which these points are designated by numbers. The inspector reviewed records of the results of some of these surveys. For the survey dated 12/27/65, for example, the inspector noted that for most of the readings other than those taken near stored radioactive material or waste were between 0.02 and 0.06 mr/hr, including all readings in unrestricted areas. An exception tothis was the hood where a spill of Sr-90-Y-90 had occurred prior to the last inspection, for which 3 - 5 mr/hr beta was recorded. These reports of routine surveys also include results of swipes taken at some of the points where direct reading surveys are made. In the case of the report of one of the surveys conducted in October 1965, the order of magnitude of all swipe results recorded was 10^{-4} or 10^{-5} uc; the areas swiped included the hood where the readings of 3 - 5 mr/hr beta wasobtained.

24. The inspector conducted a direct reading survey of the isotope lab and the area where waste is stored. According to Rosa-Garcia, these areas are restricted to personnel authorized to handle isotopes, and are kept locked at night. In most areas, no significant reading above background (i.e. less than 0.05 mr/hr) was obtained with AEC No. 5573 GM survey meter, with the following exceptions: (All readings obtained with this AEC #5573 GM meter (end window) with shield off unless otherwise noted) -

Approximately 1 mr/hr maximum at the surface of lead bricks behind which byproduct material is stored in a refrigerator.

Approximately 0.7 mr/hr maximum at the closed door of the refrigerator.

0.2 - 0.3 mr/hr at the table next to the refrigerator.

Approximately 20 mr/hr near a large plastic bottle containing urine being held for decay.

Less than 0.5 mr/hr at the top of the garbage can containing solid waste, with the top removed, and approximately 1 mr/hr at the open top of another such can.

Approximately 0.3 mr/hr at the surface of the lead brick wall in front of these cans (this lead brick wall was approximately 7 bricks high.)

0.2 - 0.3 mr/hr maximum at surface at floor in front of hood where Strontium-90-Yttrium-90 spill had occurred prior to the last inspection.

More than 20 mr/hr at one spot on bottom surface of this hood. (Reading taken with shield off.) Using AEC #5655 Juno survey meter, the radiation level at this spot was found to be approximately 14 mr/hr beta reading, and 1 mr/hr gamma reading.

Waste Disposal

25. Liquid waste is poured into sinks in the hot lab, which are connected to a large metal hold-up tank. Since the licensee was cited following the last inspection for failure to conduct surveys before releasing liquid from this tank to the sanitary sewer, the licensee has been following a practice of counting 1 ml samples from this liquid waste to determine the value of concentrations in uc/ml and maintaining a written record of the results along with the date the determination was made. Rosa-Garcia stated that the value of concentrations for I-131 listed in Table I, Appendix B, of Part 20 (6×10^{-5} uc/ml) has been used as the criterion for release, since this figure is lower than the values of concentrations listed in Table I for all other isotopes that are ever disposed into the sinks at this hospital. Gatewood stated that he measures these concentrations by counting a representative 1 ml sample in a laboratory counter with a GM tube detector. He briefly explained the calculations involved in this determination. The inspector reviewed written records of these results. These records showed, for example, the most recent release from this tank, on October 25, 1965, when it contained 450 gallons of liquid at a concentration of 2.75×10^{-5} uc/ml.

26. Solid waste is stored for decay in two large covered metal trash cans in a room at one end of the isotope labs complex. The stored waste is labeled with kind, quantity, and date. According to Rosa-Garcia and Hansen, direct reading surveys are conducted periodically on this waste held for decay until it is finally disposed along with other hospital trash after the radiation level had decreased to what they consider an acceptable value. (v.i. and paragraph 34) Written records of these surveys include the date of survey, the isotopes included in the waste, the instruments used for surveying, the maximum radiation level found at the surface, and the average radiation level found at the surface. The most recent transfer of solid waste to general hospital trash was on November 30, 1965. The inspector's review of the survey records indicated that the maximum radiation level at the surface of this waste was 3.0 mr/hr, and the average radiation level at the surface was 1.62 mr/hr, using a GM survey meter with the U. S. Navy designation ANPDR-27F.

Leak Tests

27. License Condition 13C states that each sealed source containing

byproduct material, other than tritium, with a half-life greater than 30 days, in any form other than gas, shall be tested for leakage at intervals not to exceed six months. Following the last inspection, the licensee was cited for failure to leak test either the Strontium-90 eye applicator or the two sealed Co-60 sources at intervals of six months or less. At the time of the current inspection, the licensee still possessed the same Sr-90 eye applicator, and the same two sealed Co-60 sources, which are in the form of wires. (Rosa-Garcia stated that the Sr-90 eye applicator is used at a frequency much lower than once a month. He and Captain Hansen concurred in a statement that the sealed Co-60 sources have not been used since the last inspection, and Captain Hansen further stated that he had no knowledge of them ever being used.) Both the Sr-90 source and the Co-60 sources were tested for leakage on the date of the last inspection (12/24/63). Since the last inspection, the Sr-90 source has been leak tested at approximately 6 month intervals except that the most recent test was 6/9/65. In the case of the Co-60 sources, the first leak test subsequent to the last inspection was dated 2/17/64; and the next one more than nine months later on 11/30/64; and finally the most recent test was conducted less than six months later on 5/21/65. Before the inspector left the hospital on the date of inspection, he was shown paper work on which had just been drawn up by Chief Davis for leak tests to be conducted on both the Co-60 sources and the Sr-90 sources. Leak tests have been performed by the Radium Chemical Company, except for leak tests of the Sr-90 sources by Tracerlab. The inspector's review of records of leak tests showed that all results were background ± less than 2 sigma.

Posting and Labeling

28. Rosa-Garcia stated that he knew of no additional signs posted since the last inspection. Signs noted by the inspector to be posted in the Isotope Lab area were noted to include "Caution - Radioactive Material", "Caution - Radiation Area", and "Caution - High Radiation Area" signs. Stored byproduct material was noted to be labeled with "Caution - Radioactive Material" and the kind, quantity, and date of assay. All signs had the standard symbol and colors. A Form AEC-3 is posted near the entrance to the radioisotope section of the hospital.

Procurement

29. Rosa-Garcia stated that byproduct material is procured from Squibb and Abbott, as per License Condition 14. Orders for byproduct material must be signed by Rosa-Garcia and then counter-signed by Captain Hansen; they are the only two individuals authorized to order radioactive material. When isotopes are received, they are delivered to the receiving station first; they are monitored outside, and then brought directly to the refrigerator in the Isotope Lab where they are stored behind lead bricks. The inspector reviewed records of receipt. These records included notations of the dates when residual quantities were transferred to the "cave" where waste is held for decay.

Personnel Monitoring

30. Film badges are processed at this hospital for the use of all personnel at the hospital who are considered likely to be exposed to radiation, as well as for personnel of many other military facilities. The processing of these film badges, including maintaining records of results, is one of the responsibilities of James Gatewood, Isotope Technician. Exposure results are recorded on forms equivalent to Form AEC-5. Exposures are reported on a monthly basis. The inspector reviewed exposure records for the period subsequent to the last inspection. No quarterly exposures greater than 300 mrem were noted for any personnel using isotopes. The highest exposure for any one month noted by the inspector was 110 mrem for Captain Hansen.

31. Bendix direct readings pocket dosimeters are available for use. Rosa-Garcia stated that these are worn by the personnel likely to receive an exposure in the course of the therapeutic use of isotopes.

32. On 1/28/66, the inspector returned to the St. Albans Naval Hospital to obtain additional information regarding the film monitoring program carried on there in conjunction with Bu Med. Shortly after the inspector's original visit there, James Gatewood was transferred and William Penman, HM-2, was selected to replace him. (See paragraph 15)

33. Penman stated that he attempts to run this film badge program according to instructions given by Bu Med in NAVMED P-5055, as supplemented by "Instructions for the Interpretation of Calibrated Curves", which is attached as Exhibit A. According to Penman, he knows of no deviation from these instructions other than the fact that film developing is not done at the specified temperature of 68°F. Instead, an attempt is made to cool the processing solutions to as near 68°F as possible by running tap water in the sink in which the processing tanks are used. He stated that processing is usually carried out at a temperature in the range of 70° - 75°F, and to compensate for this higher temperature, the developing time is decreased below the specified 5 minutes (Item 6, Exhibit A) by an amount indicated by a correction chart furnished by one of his predecessors. (The arrangement for cooling is such that the level of the cooling water in the sink is permitted to rise to a level only 5 inches above the bottom of the processing tanks, whereas the walls of the tanks are approximately 21" high and they are filled with solutions to within less than 1 inch from the top.) Penman stated his intention of trying several measures to increase efficiency of cooling, after discussing this problem with inspector.

34. Penman stated that fresh solutions are made up for the batch of films processed each month. Approximately 100 films are processed each month (over the course of a week), of which a little more than half are films from badges worn by hospital personnel. Penman stated that a control film of the same type and emulsion number

is processed on each rack along with 7 films from film badges. Continuous gentle agitation is provided using large paddles during development. An average of 5 density readings under the shielded portion of the film and 5 readings under the open area are taken relative to the control developed on the same rack. One Weston Model 273 densitometer is used, re-zeroing the instrument immediately before reading each film. The densitometer is checked using density wedges supplied by Bu Med. Penman stated that the agreement is "very good". The exposures corresponding to the density readings obtained are estimated as per instructions on Exhibit A, using calibration curves attached as Exhibits B, C, D, & E. These curves are dated July 1965, and Penman stated that they are the most recent ones supplied to him. As indicated on these curves, Type 556 film is now being used.

35. According to both Penman and Hansen, Bu Med has never provided any exposed calibration films to be developed along with films worn by personnel as a check on the validity of the results obtained when density readings from personnel films are applied to the calibration curves supplied by Bu Med. (Although Penman concurred with the desirability of such checks, Captain Hansen could not understand, at first, why the density wedges supplied by Bu Med did not serve the same purpose.)

36. Penman stated that he was not aware of any check by Bu Med on the manner in which the film badge program was being conducted at the St. Albans Naval Hospital. Neither Penman nor Hansen could give any information on possible improvements in the Navy's procedures for storage and distribution of film designed to ensure that the film delivered to field installations is of the correct emulsion number and fresh. At St. Albans, the "Oak Ridge type" film badges, with one filter, (1 mg cadmium) is still being used.

37. In regard to the reporting of exposures, Hansen stated that the current procedure is to notify the Commission, as well as Bu Med, of film badge exposures exceeding limits specified in Part 20. Also according to Penman, the current procedure for distribution of records of routine film badge exposures is as follows: Annual reports are transmitted to Bu Med, with a copy kept on file at the field installation. In addition, when an individual is transferred to a new duty station, a completed copy of DD-1141 (Exhibit F) is sent to the new duty station with the individual.

<u>Management Discussion</u>

38. The items of noncompliance were discussed with Captain Hansen and Captain Ralph Faucett, Executive Officer. (Captain Faucett is second in Command in the U. S. Naval Hospital under Captain J. Albrittin, who was not available.) Both Hansen and Faucett indicated willingness to comply with the regulations and to take appropriate corrective action.

39. As stated above in the section on leak tests, paper work for the overdue leak tests on Sr-90 and Co-60 sources had already been

drawn up before the end of the inspection, and both Hansen and Faucett stated their intention to ensure that leak tests be conducted henceforth at intervals of not more than six months.

40. In regard to the unauthorized transfers of waste to hospital trash after a direct reading survey revealed a radiation level of many times background near the surface of the waste, Captain Hansen stated that he had considered the radiation levels that had been measured to be low enough to warrant disposal to trash, especially since it was suspected that radium stored in another part of the same room might have contributed to the survey meter readings. However, he stated that no attempt was made to confirm this by taking another reading on the waste after moving it away from the radium before disposing of it. (Actually, the inspector's interpretation of remarks by both Hansen and Rosa-Garcia during the inspection was that both of them judged a reading of 2 mr/hr or so to be low enough to justify the disposal to general trash.) Hansen stated during the management discussion that henceforth waste will either be held until a survey meter gives essentially a background reading, or else transfer it to an authorized waste disposal service.

3ND-NH59-5216-1

U. S. NAVAL HOSPITAL

ST. ALBANS L. I., 25, N. Y.

ADDRESS REPLY TO
COMMANDING OFFICER
AND REFER TO:

E.E. Epstein

13 January 1964

U. S. Atomic Energy Commission
Region I, Division of Compliance
376 Hudson Street
New York, New York

Attention: Mr. Eugene Epstein

Dear Sir:

This is to acknowledge receipt of the Inspection Findings and Licensee Acknowledgement on License Number 31-76-7 dated December 24, 1963.

The Dresser Industries, Inc. Model No. A-6804 accelerator and Model No. A-6800 neutron generator used for research on fast neutron activation analysis as stated in the above license were on loan from the Picker X-ray Corporation. This equipment was returned to Mr. Walter L. Seibyl, Picker X-ray Corporation on April 12, 1963 because of the discontinuance of the research project.

Please advise us if there is anything further to be done at this time.

Sincerely yours,

W. F. Hansen

W. F. HANSEN
CAPT MC USN
Chief of Radiology

WFH:mp

20545

LR:GWK
31-76-6

MAR 19 1964

Your reference:
22/mp
6470/1
Ser: 122-64

Commanding Officer
U. S. Naval Hospital
St. Albans, New York 11425

Dear Sir:

Thank you for your letter of March 3, 1964, informing us of the action taken by you with respect to the matters described in our notice dated February 24, 1964.

Your cooperation with us is appreciated.

Very truly yours,

(Signed)
Eber R. Price, Assistant Director
Division of Licensing and Regulation

Eber R. Price
Assistant Director
Division of Licensing
and Regulation

cc: Department of the Navy
Chief, Bureau of Medicine and Surgery
Washington 25, D. C.
Attention: Comdr. John H. Schulte, MC
Code: 74 (Cmdr. Bell)

bcc: Compliance Div., HQ)
Compliance Div., I) w/cpy ltr 3/3/64
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Form AEC-318 (Rev. 9-53)

U. S. GOVERNMENT PRINTING OFFICE 16—62761-3

-Attach 8

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE

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

Licensee	
1. VA Medical Center in Brooklyn	3. License number 31-02892-06
2. 800 Poly Place Brooklyn, New York 11209	4. Expiration date August 31, 2003 5. Docket No. 03034751 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Strontium 90	A. Contamination	A. 8 millicuries

9. Authorized use:
   A. Decontamination and decommissioning of facilities; packaging of stock material and radioactive waste; storage of radioactive material and packaged radioactive waste prior to shipment.

CONDITIONS

10. Licensed material may be used only at the licensee's facilities located at St. Albans Extended Care Center, 179th Street and Linden Boulevard, Queens, New York.

11. A. Licensed material shall be used by, or under the supervision of, Esfandiar Sarfaraz, Ph. D.

    B. The Radiation Safety Officer for this license is Esfandiar Sarfaraz, Ph. D.

12. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

127749

OFFICIAL RECORD COPY ML10

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
31-02892-06

Docket or Reference Number
030-34751

13. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. The Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Application dated May 7, 1998.

For the U.S. Nuclear Regulatory Commission

Date August 20, 1998

By *Original signed by Steven W. Shaffer*

Steven W. Shaffer
Decommissioning and Laboratory Branch
Division of Nuclear Materials Safety
Region I
King of Prussia, Pennsylvania 19406

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3 Hawthorn Parkway
Vernon Hills, Illinois 60061-1450
847-918-4000 • Fax 847-918-4055

30 December 1999

Mr. Randy Godfrey, Engineering Manager
U.S. Department of the Army
New England District, Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Re: Contract No. DACA31-96-D-0006
Draft Final Status Survey
St. Albans Veterans Administration Extended Care Facility, Queens, New York
WESTON W.O. No.: 10971-219-201-0006
DCN: VAHOSP-1001899-AACB

Dear Mr. Godfrey:

Roy F. Weston, Inc. (WESTON) is pleased to provide to you three (3) copies of the Draft Final Status Survey Report for the St. Albans Veterans Administration Extended Care Center in Queens, New York. This document may be used to support the conclusion that survey units 003, 006, 007, 008, and 009 have been adequately surveyed per initial work plan specifications, and that available characterization data are presentable in Final Status Survey format as recommended through the methods of NUREG-1575. Likewise, data indicate that no areas of these survey units exceed the U.S. Nuclear Regulatory Commission (NRC) approved derived concentration guidelines (DCGLs), and subsequently should not be included with survey units 001, 002 and 004 as NRC-licensed areas of the facility that may require future decontamination. The vast majority of survey unit 005 is acceptable for exclusion from future D&D consideration with the exception of one small area as identified in the subject report. We believe that this document may be submitted, at the request of the NRC, to support the aforementioned conclusions.

Weston is available at your request to respond to NRC comments/questions regarding this and other VAECC submissions. Please feel free to contact me at (847) 918-4137, or Mike Madonia at (847) 918-4087 should you require assistance. We appreciate the opportunity to support you and look forward to continued interaction in 2000.

If you have any immediate questions or wish to discuss this, please do not hesitate to contact me at (847) 918-4137 or Michael Madonia at (847) 918-4087.

Very Truly Yours,

ROY F. WESTON, INC.

Michael Van Der Karr, CHP
Senior Health Physicist

MVDK:ts

cc: H. Honerlah, CENAB.
J. Rhyner, WESTON
M. Madonia, WESTON
M. Van Der Karr, WESTON

CH01:WO:W10500:27763LTR.DOC

U.S. Army Corps of Engineers

New England District
Concord, Massachusetts

TECHNICAL SUPPORT SERVICES
ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER
QUEENS, NEW YORK

Contract No. DACA31-D-0006

DRAFT FINAL STATUS SURVEY REPORT

Task Order No. 19
DCN: VAHOSP-123099-AACB

30 December1999

98P-0892

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DRAFT FINAL STATUS SURVEY REPORT
ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER
QUEENS, NEW YORK

Contract No. DACA31-96-D-0006
Task Order No. 19
DCN: VAHOSP-123099-AACB

Prepared for:

U.S. ARMY CORPS OF ENGINEERS
NORTH ATLANTIC DIVISION
NEW ENGLAND DISTRICT
696 Virginia Road
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Prepared by:

Roy F. Weston, Inc.
3 Hawthorn Parkway
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John Rhyner, Project Manager — Date

for John Rhyner — 12-30-99

Michael Madonia, QA Representative — Date

12-30-99

Michael Van Der Karr, Lead Author — Date

12-30-99

30 December 1999

W.O. No. 10971-219-201-0006

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1. INTRODUCTION

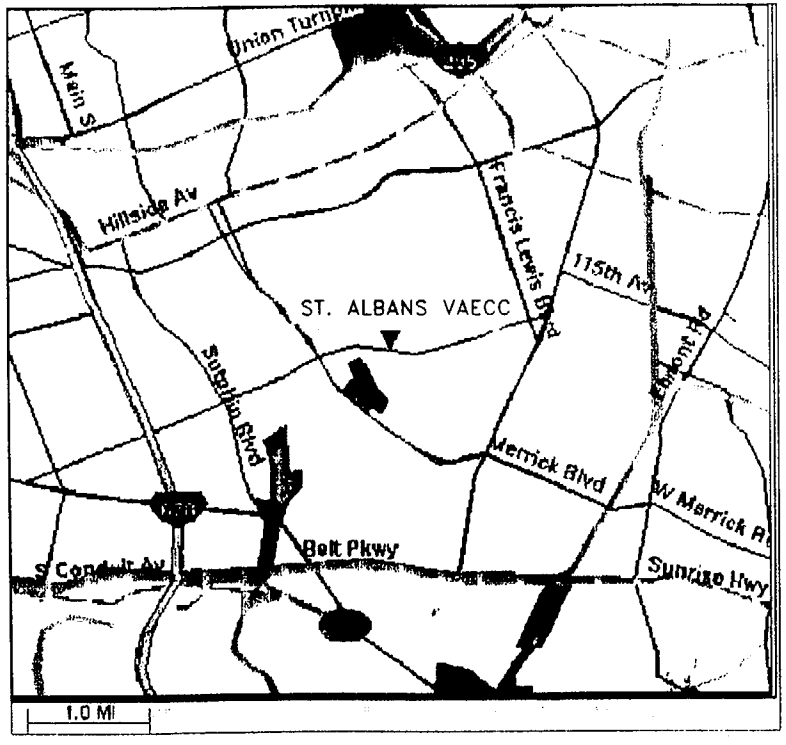
This report describes the radiological surveys managed by Roy F. Weston, Inc. (WESTON®) that constitute a final status survey to release survey units 003, 006, 007, 008 and 009 for unrestricted access and use at the St. Albans Veterans Administration Extended Care Center (VAECC) in Queens, New York. This report also includes survey information for survey unit 005 which may be combined with future remediation surveys to constitute a final status survey. The site location is shown in Figure 1-1. The surveys were performed for the U.S. Army Corps of Engineers (USACE) North Atlantic Division, New England District (CENAE) under contract DACA31-96-D-0006. The VAECC has been issued an U.S. Nuclear Regulatory Commission (NRC) "Possession Only" byproduct materials license number 31-02892-06. This license was issued for residual strontium-90 (Sr-90) contamination present as the result of laboratory research in the early 1960s. Under the conditions of the license, CENAE is facilitating this final status survey to proceed with schedule commitments to achieve license termination. The final status survey for these survey units is comprised of characterization surveys, post-remediation (release) surveys and supplemental tritium surveys.

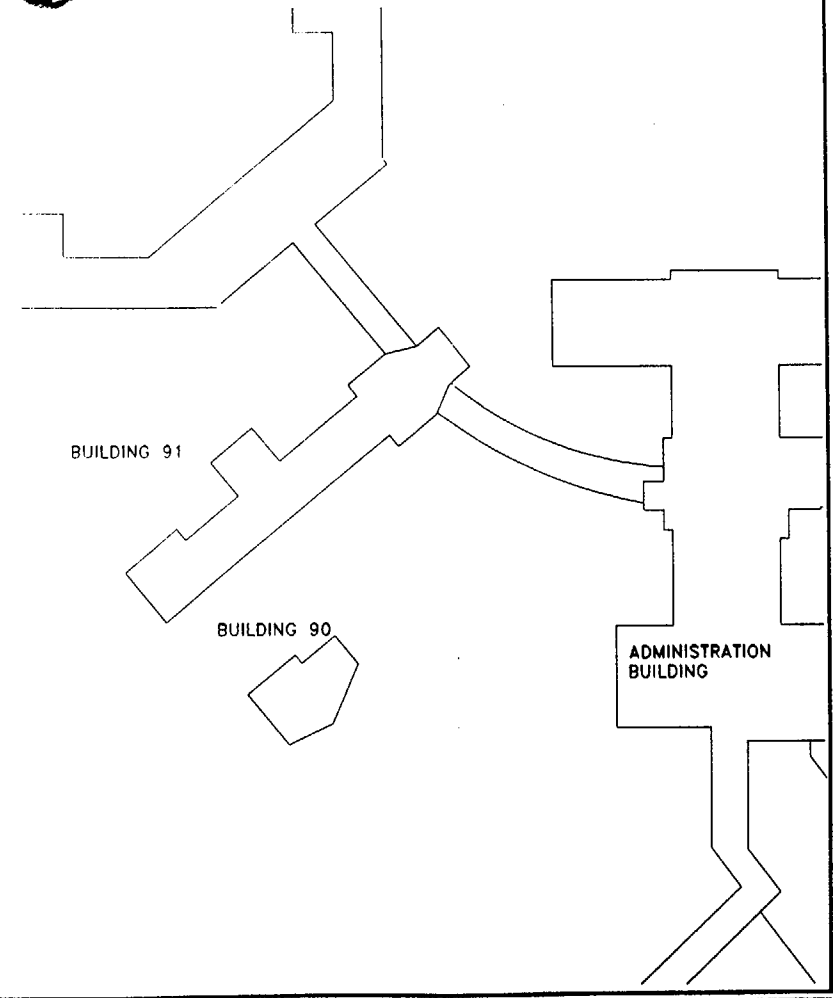
In September 1998, Stone and Webster prepared a Work Plan for Radiological Characterization (Work Plan, S&W 1998). This plan included provisions for using the characterization surveys as a final status survey when possible. Characterization surveys performed from 15 January to 1 March 1999, historical information, and a site description are described in the Radiological Characterization Survey Report (WESTON 1999). They included direct beta-gamma surface contamination surveys, removable surface contamination surveys for alpha/beta, carbon-14 and tritium, gamma exposure rate surveys, drain cleanout surveys, concrete core sampling, and soil sampling through the concrete penetrations. The majority of characterization surveys included the application of an innovative contamination survey technology offered by Millennium Services, Inc. (MSI). The Surface Contamination Monitor – Survey Information Management System (SCM-SIMS) worked efficiently in some of the larger survey areas. Application of the SCM-SIMS survey methodology yielded more data than originally specified, with the data being of high quality and usefulness. The survey coverage of floor areas in survey units 005 through 007 approached 100%. In order that this final status survey report may stand alone to release the

five survey units, applicable survey information from the Characterization Survey Report is also described in this report.

The characterization surveys identified contamination in survey units 001, 002, and 004 through 007 as well as potentially elevated tritium levels in survey units 003 and 009. The contamination identified in survey units 005 through 007 was isolated and sporadic in nature. This was likely due to the transfer from the more contaminated survey units 001 and 002. Test decontamination was performed by WESTON in survey units 005 through 007. WESTON performed post-remediation surveys in these removed areas in February and March 1999. One small area of residual contamination remains in survey unit 005 while contamination is below release levels in survey units 006 and 007. Tritium contamination was found above background levels during characterization in survey units 003 and 009. Supplemental tritium surveys were performed by WESTON personnel in these two survey units on 30 September 1999. The post-remediation survey results and supplemental tritium survey results are presented in this report.

The data demonstrates that survey units 003 and 006 through 009 meet the requirements for unrestricted release. The data for survey unit 005 may be used in conjunction with future survey data to release this unit. Decommissioning is planned for survey units 001, 002, and 004. The survey data and conclusions in this report constitute a final status survey and may be used to achieve free release for the five survey units.





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TITLE SITE VICINITY MAP AND SITE MAP FIGURE 1-1

NO. 1

SCALE (SITE MAP) 1" = 400'

SHEET 1 OF 1

2. FINAL STATUS SURVEY APPROACH

The survey approach combines the characterization surveys with the post-remediation and supplemental tritium surveys. The MSI SCM-SIMS system is used as the basis for total surface contamination release. Where the SCM-SIMS system could not be used due to logistics, the hand-held system results are used. Several small areas and point contamination sources were remediated from the floors in survey units 005 through 007. The post-remediation survey results are used to demonstrate that these previously contaminated areas meet release criteria. Smears were used to assess compliance with removable surface contamination limits. One set of smears was analyzed for beta and alpha radiation while a second set is analyzed for tritium and carbon-14 at an off-site laboratory. In areas with above background tritium levels, the supplemental tritium survey was used in combination with the characterization survey tritium results to show that tritium levels were below the tritium release levels. Corings through the cement foundation and underlying soils demonstrate that there is no contamination present in volume.

License termination is achieved by demonstrating residual contamination is below approved release levels or criteria. Release levels, also referred to as derived concentration guideline levels (DCGLs) in this report, were calculated using a risk-based approach. The DCGL calculations are described in Justification for Modified Derived Concentration Guidelines (WESTON 1999b) and Addendum to Justification for Modified Derived Concentration Guidelines for Strontium-90 Concentrations in Soil (WESTON 1999c). Rationale for a volumetric concrete DCGL is presented in Appendix A of the Draft Final Decommissioning Plan (WESTON 1999f). DCGLs provide the basis for releasing areas for unrestricted use as well as for decontamination activities. The survey methods in the Multi-Agency Radiological Survey and Sampling Investigation Manual (MARSSIM, NRC 1997) were applied to demonstrate residual contamination is below the DCGLs within distinct survey units. These methods are summarized as follows.

The survey effort is based on the contamination potential. The facility was originally divided into survey units based on this contamination potential (S&W 1998). The DCGLs are developed assuming any residual contamination potential is relatively uniform. The required number of data points (discreet measurements) for each survey unit is calculated to enable the statistical tests in the MARSSIM to demonstrate compliance with the DCGLs. Scanning surveys are used to identify small areas of elevated activity.

Where possible, the characterization surveys (WESTON 1999) are used in this report to demonstrate that the five survey units are below the DCGLs. For those areas within survey units that were above the DCGL prior to remediation, the post-remediation release surveys are used to demonstrate that each impacted area is below the DCGL. For those survey units originally exhibiting above-background levels of tritium, the supplemental tritium survey demonstrates that the tritium levels in these areas are below the tritium DCGL.

2.1 REPORTING CONVENTION AND DCGLS

To maintain convention with the Work Plan (S&W 1998), all MSI results for strontium-90 activity are presented as strontium activity, not in terms of the more conventional use of total strontium-90/yttrium-90 activity. Positive results are essentially divided by two to convert the combined activity to strontium-90 activity only. However, all other surface contamination surveys for strontium-90, which include direct measurements with hand-held instruments and smear surveys for removable surface contamination surveys, assume that any activity above background is attributed to strontium-90. This inherently contains a factor of two conservatism while applying the ALARA concept. Surface contamination levels are reported in dpm/100 cm^2. This is calculated using the following formula:

$$\text{Level} = \frac{\text{gross - background}}{\text{eff} \times \text{area factor}}$$

Where Level = the reported surface contamination levels in dpm/100 cm^2

Gross = the gross reading on the instrument or survey meter in cpm

Background = the background reading for the type of material and instrument in cpm

Eff = the efficiency of the instrument to convert cpm to dpm

Area factor = a correction factor for direct surveys to normalize to 100 cm^2

The DCGLs applicable to building surfaces (and soil), discussed in the Justification for Modified Derived Concentration Guidelines (WESTON 1999b) and its addendum (WESTON 1999c) are presented in Table 2-1. The volumetric DCGL for concrete discussed in the Draft Final Decommissioning Plan (WESTON 1999f) is also presented in table 2-1. DCGL values listed are in addition to background. The DCGL for gamma exposure rates is 20 R/hr.

Table 2-1

Derived Concentration Guideline Levels (DCGLs)

Radionuclide	**Surface Contamination Levels - (dpm/100 cm^2)**			**Soil and Concrete Levels (pCi/g)**
	Fixed Plus Removable		Removable	
	Average	Maximum		
Carbon-14	5.000	15.000	1.000	N/A
Tritium	N/A	N/A	1.2×10^7	N/A
Strontium-90	8.700	8.700	870	35

2.2 SURVEY UNITS CLASSIFICATION SCHEME

Based on radiological survey information prior to the characterization surveys, areas of Buildings 64, 90, and 91 were divided into logical "survey units" and designated as Class I or Class III areas. The classification terminology is applied from the MARSSIM. For the VAECC, Class I survey units exhibit surface contamination, or soil or concrete radionuclide concentrations exceeding the DCGLs. Class III survey units are suspected to have elevated levels of contamination above background, but at a fraction of the DCGLs.

Table 2-2 presents the description and classification of the six survey units that are discussed in this report. A detailed description of the MARSSIM process and DCGLs as applied to the original radiological survey plan is described in detail in the Work Plan (S&W 1998).

Table 2-2

Survey Unit Classification for Final Status Survey

Survey Unit #	Building	Classification
003 – Women's Rest Room	90	I
005 – Balance of Building 90 Basement	90	I
006 – Maintenance Shops and Stairwell	91	III
007 – Audiology, Speech Pathology, Maintenance	91	III
008 – Ground Level	90	III
009 – Incinerator	64	III

The MSI approach divided each survey unit into smaller subunits. Their designations followed the convention SAxxyyL where SA represents St. Albans, xx is the survey unit and yy is the subunit. L is a letter that indicates a wall or floor as follows: F indicates floor and E, W, N and S indicates a wall by its direction. As an example, SA0504S represents survey unit 005, subunit 04 and the south wall. In this report, the prefix letters "SA" may not be shown. Figure 2-1 shows the areas covered by survey units 003, 005, 006, and 007. Figure 2-2 shows survey unit 008.

2.3 DIRECT SURFACE CONTAMINATION SURVEYS

Direct surveys were used to perform discreet measurements as well as to scan for elevated contamination levels. The SCM was utilized efficiently in larger survey units where the potential for contamination was limited. These survey units included 005, 006, 007 and 008. The SCM provided both a scanning survey and discrete sampling. The SIM software allows each 25 cm^2 to be treated as a discreet measurement. Instead of laboriously physically mapping dimensions and measuring discreet sampling locations with tape measures and hand held instruments, thousands of discreet values are automatically logged. All survey units were surveyed using the traditional hand-held radiological instrumentation with emphasis on areas shown above DCGL values and areas not reachable by the SCM system.

If some of the discreet measurements are above the DCGL, statistical tests may be applied to demonstrate that residual contamination in the entire area meets the release criteria. While statistical approaches may have been applied to release areas with some contamination levels that are above the DCGL, it was decided that these areas would be remediated to reduce the contamination levels to ALARA. Some areas that approached the DCGL were also remediated as an implementation of ALARA. Post-remediation surveys were performed with hand-held instruments.

2.4 INDIRECT SURFACE CONTAMINATION SURVEYS

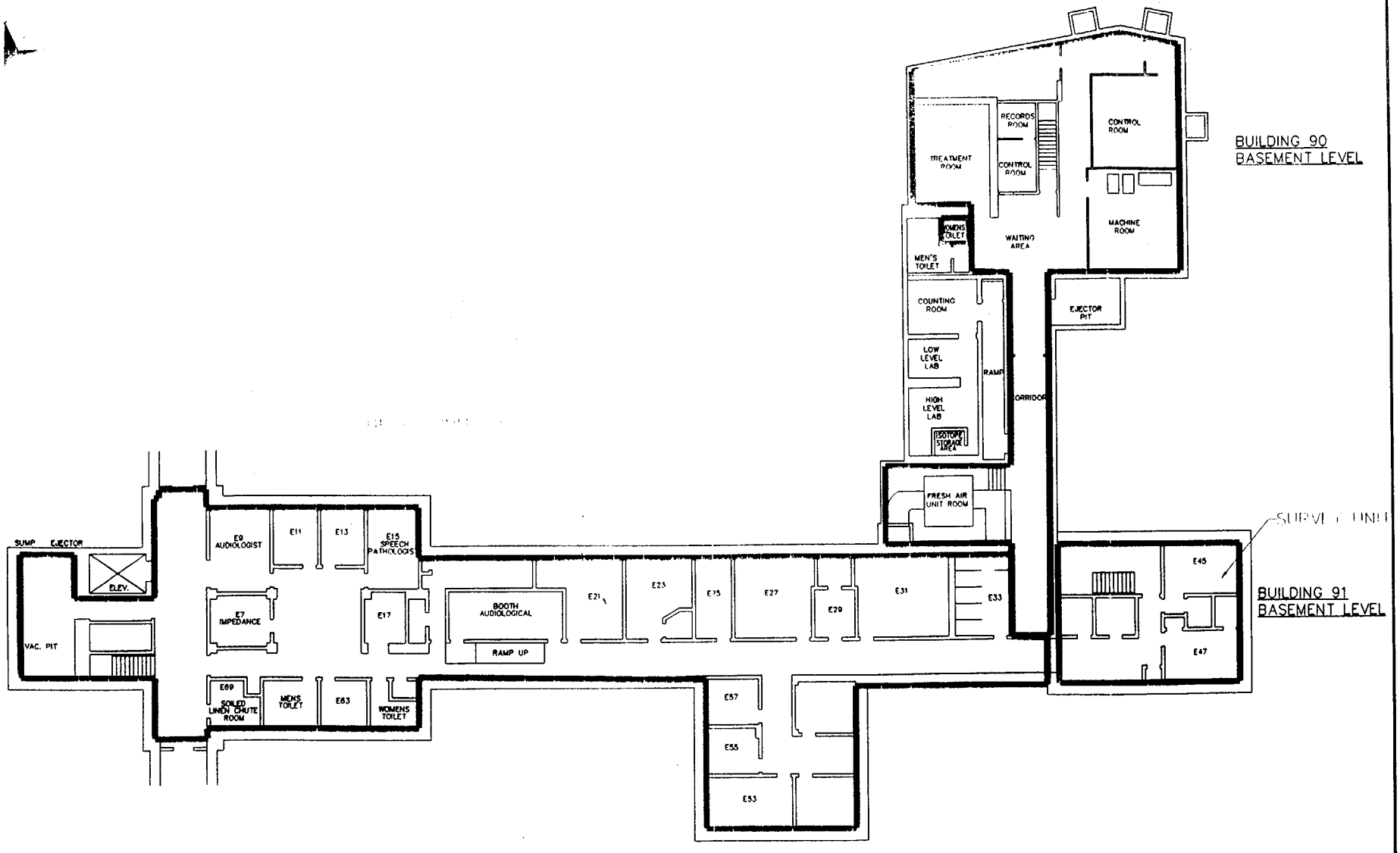
Removable contamination smears were collected and analyzed for alpha and beta radiation. A second set of smears was taken at the same locations and submitted for liquid scintillation analysis of carbon-14 and tritium activity. Additional (supplemental) smears were taken to further characterize tritium in two survey units. Hand-held survey instrumentation can not be used to perform direct measurements for total tritium surface contamination since tritium only emits very low energy (18.6 keV) beta radiation. Consequently, even though measurements of smears are very difficult to interpret quantitatively, tritium smear results are used to determine whether residual tritium surface contamination meets the release criteria.

2.5 QUALITY ASSURANCE PROGRAM AND QUALITY CONTROL

A quality assurance program ensures that unrestricted release decisions will be supported by sufficient data of adequate quality and usability for their intended purpose. It ensures that such data are authentic, appropriately documented, and technically defensible. Quality control during characterization activities included daily function checks, duplicate measurements, duplicate smears and duplicate samples. Independent review of characterization data was used to prepare this FSS. The results of the quality assurance program are discussed in section 6.

2.6 PROJECT DATA MANAGEMENT

For purposes of clarity and transmission, this final status survey report references raw data as maintained in the project file structure shown in Appendix A. Raw data include but are not limited to, equipment calibration records, equipment function check records, raw background survey data, raw survey unit data, logbook records, and analytical laboratory reports. Most of the data are from the characterization surveys. Radiological characterization programs generate a vast array of data that are readily used as a resource only if they are logged systematically. Other survey data includes the WESTON post remediation release survey data and the supplemental tritium survey data. It is not the intent of this report to present all data and records, rather to synthesize and present conclusions appropriate to free release of survey units 003, 006, 007, 008, and 009 as well as survey information that can be used to release survey unit 005 at the St. Albans Facility after future decontamination and decommissioning activities.



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ENGINEER'S SEAL

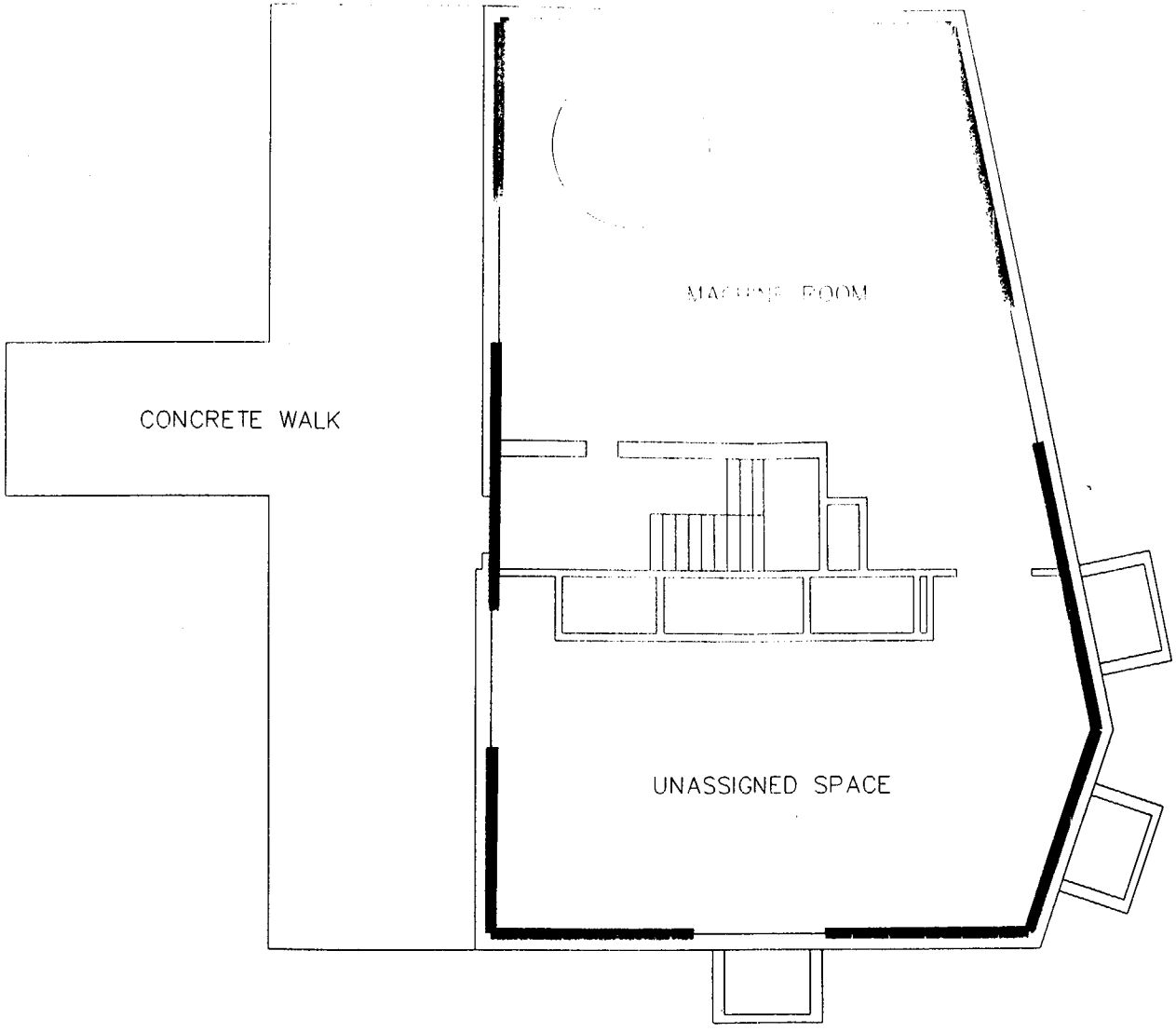
REVISIONS

TITLE BUILDINGS 90 AND 91
BASEMENT LEVEL
SURVEY UNITS 003, 005, 006, & 007
FIGURE 2-1

SCALE NOT TO SCALE

NO. 1

SHEET 1 OF 1



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REVISIONS

TITLE: BUILDING 90
GROUND FLOOR
SURVEY UNIT 008
FIGURE 2-2

NO. 1

SCALE 1" = 40'

SHEET 1 OF 1

3. RADIOLOGICAL SURVEY METHODS

This section explains the type of radiological survey equipment and how it is used to demonstrate that areas are below the DCGLs.

3.1 SCANNING AND DIRECT DISCREET MEASUREMENT SYSTEMS

Scanning and direct discreet surveys for final release were performed with a variety of equipment systems. Large open areas of Class III areas (and the Class I survey unit 005) were surveyed with the SCM-SIMS. The remaining areas were surveyed with hand-held radiation detection equipment manufactured by Ludlum Instruments, Inc.

All equipment systems were operated according to standard operating procedures (SOPs) containing information on preparation, quality control, use, and data interpretations. Project-specific SOPs may be located in project file code 1.4 as defined in Appendix A.

3.1.1 SCM-SIMS

A SCM-SIMS was operated by Millennium Services Inc. (MSI) under an exclusive arrangement with the electronics patent holder, Shonka Research Associates, Inc. The basic operation of the SCM-SIMS is through gas-flow proportional counting.

MSI utilized the SCM-SIMS, a large-area radiological surface contamination monitor capable of rapidly performing surveys of potentially contaminated surfaces in nuclear facilities. Due to its large size and configuration, it lends itself to rapid traverses of potentially contaminated surface areas. The detector location is electronically logged using an inertial positioning system, thus reducing the need for site grid application traditionally required with hand-held radiation survey equipment. The system offers a significant improvement in the quantity and quality of radiological survey data collected. Survey measurements are performed by individual 2" by 2" (25 cm^2) detector elements, with a total measurement capacity of about 400 measurements per square meter. The large number of discreet measurements allows for statistical analyses of contamination levels, whereas traditional methods incorporate "spot" sampling and measurements. This saturation allows analyses that theoretically do away with the representative

sampling requirements developed using the techniques of the MARSSIM (NRC 1997). All data are logged electronically and rapidly converted to report format. The SCM-SIMS provides higher quality data than survey methods using discrete hand-held and floor monitoring systems. Automatic electronic transfer reduced the potential for hand entry and record keeping errors associated with traditional survey methods.

3.1.2 Hand-Held Systems for Characterization Surveys

The Ludlum Model 44-116/Model 2221 counting systems were used in areas not suitable for the SCM-SIM system. These systems were also used for post-remediation surveys to survey the small elevated areas that were removed. This hand-held system utilized beta scintillation principles, and was used in both scaler and count rate mode. The Ludlum 44-116/2221 system was chosen because its detection efficiency was comparable to gas-flow proportional systems, yet did not require a gas source and associated hardware.

To assess the gamma exposure rates in each survey unit, Ludlum Model 19 "uR-meter" survey meters were utilized. Field personnel walked traverses in the associated rooms and corridors, recording the range of detector responses at a distance of one meter from building surfaces.

3.2 CONCRETE CORINGS AND SUBSURFACE SOIL SAMPLING

Coring sample were taken at select locations were residual contamination was found on the floor. These concrete cores were divided into 3" sections. Soil samples were taken after the concrete core samples were removed. Soil samples of the 0-6" and 6-12" strata were collected. Strontium-90 activity was determined using EIChroM Method SRW01 Modified. Sample detection limits were a function of the mass of the sample submitted.

3.3 LABORATORY SMEAR ANALYSIS

Two types of removable contamination smears were collected in the survey units. A standard smear was analyzed on-site using a Ludlum Model 44-10-1/Model 2929 system. The dual-channel phoswhich counting system exhibited excellent applicability in that smears could be simultaneously analyzed for both alpha and beta activity. Since this system is most efficient for beta energies greater than 200 keV, smear results were assumed indicative of removable strontium-90 activity. A collocated smear was collected and placed into a scintillation vial containing a set volume of deionized water for subsequent laboratory analyses. The vials were then logged and shipped for liquid scintillation analyses of carbon-14 and tritium content. Analyses were performed using EPA Method 906.0 Modified. Carbon-14 and tritium sample detection limits ranged from approximately 20 to 80 dpm/100 cm^2.

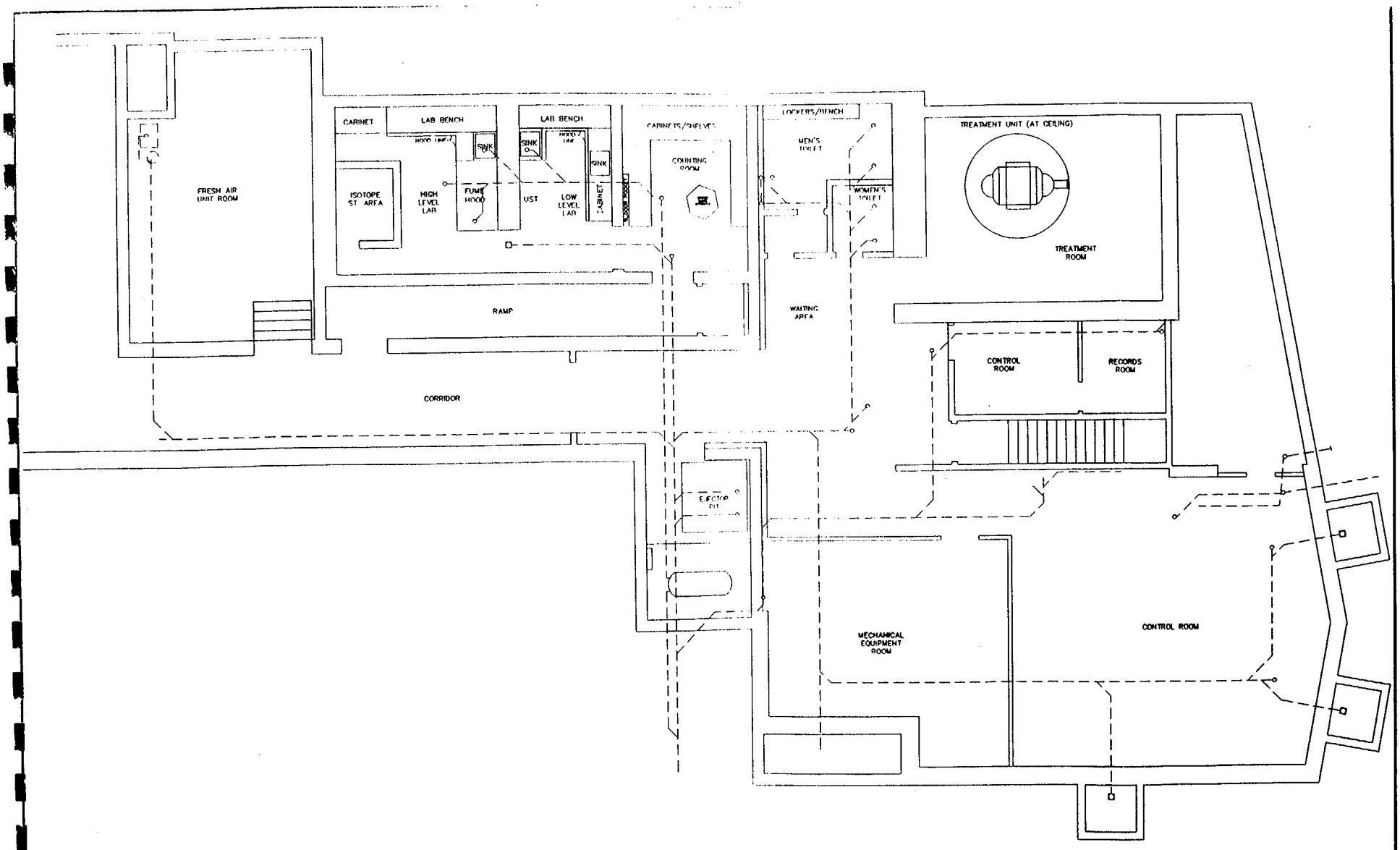
ThermoNUtech of Oak Ridge, Tennessee provided analytical services for characterization surveys. As part of their internal quality assurance program, ThermoNUtech ran matrix spikes and blank samples. The results of these analyses were presented with final laboratory results. All samples were transmitted to ThermoNUtech using chain of custody procedures.

Supplemental tritium smears followed the Supplemental Tritium Characterization Plan (WESTON 1999d). To help minimize the standard deviation of smear results, a template was created to ensure all smears cover exactly the same 100 cm^2 area. To minimize quenching in the liquid scintillation counter, dissolvable smears were utilized. Stan A. Huber Consultants, Inc. (SAHCI) of New Lenox, Illinois provided analytical services for the supplemental tritium surveys.

3.4 DRAIN SYSTEM SURVEYS

Based upon review of the original blueprints for the nuclear medicine facilities at St. Albans, two potentially impacted drain systems were identified. During nuclear medicine operations, all of these systems were routed to the ejector pit so that liquid effluent could be sampled prior to discharge to the sanitary sewer system. The primary line of concern serviced the floor clean-outs and sinks in the nuclear medicine labs. The second line of concern serviced the men's and women's rest rooms. The approximate locations of these drain systems are shown in Figure 3-1.

Many of the clean-out access points have been filled with an epoxy-like substance during previous radiological control activities. Where possible, WESTON personnel performed total and removable contamination surveys on clean-outs in an effort to determine if contaminated solutions had been introduced to a particular section of the drain system.



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ENGINEER'S SEAL:

REVISIONS

TITLE: BUILDING 90
BASEMENT LEVEL
APPROXIMATE DRAIN LINE LOCATIONS
FIGURE 3-1

SCALE 1/4" = 1'-0"

NO. 1

SHEET 1 OF 1

4. BACKGROUND RADIOLOGICAL SURVEY RESULTS

Since background radiation levels are not included in DCGL values, the evaluation of background is a critical factor in determining whether DCGLs are exceeded. Naturally occurring radionuclides such as uranium, thorium and radium in building materials are a constant source of counting interference to portable radiation detectors. Each building material may have a unique background. The interference is caused by alpha, beta or gamma emissions from these naturally occurring radionuclides.

Using traditional survey methods for a limited, finite number of survey locations, it is necessary to develop a representative background detector count rate for each type of material surveyed. This population may be compared to a surveyed population using statistical techniques to identify meaningful differences. WESTON developed background response ranges (count rates) for the hand-held radiation detectors, while MSI acquired similar data with the SCM-SIMS.

4.1 TYPES OF MATERIAL PRESENT

A variety of building materials was encountered at the VAECC. Common materials included: concrete slabs, vinyl floor tile, ceramic floor and wall tile, cinder block walls, brick, metal surfaces, plaster walls, painted wall board, and terrazzo flooring.

4.2 LIMITATIONS

Building materials whose physical appearances are similar may have distinctly different background radionuclide concentrations, and subsequent count rates as measured in the field. Building materials such as concrete and tile may have had variable mixtures of production components. These production components have characteristic naturally occurring background radionuclide concentrations. A typical example is concrete slab pours that have been placed at different times. The aggregate used in the concrete mix almost constantly varies as do the associated uranium and thorium concentrations. This variation can affect background count rates, such that applying a high background result to a lower activity aggregate may result in a calculated surface activity less than zero. Conversely, applying a background count rate that is

lower than the true background of a higher-activity aggregate may result in a false interpretation that a surface is contaminated.

4.3 HAND-HELD SYSTEMS

As previously mentioned, the primary hand-held surface contamination monitoring instrumentation consisted of the Ludlum Model 44-116/Model 2221 system. This system also was used to determine the relative background response of building materials encountered at the VAECC. The typical instrument background (shielded from surfaces/open to air) ranged from 200-250 cpm. As the instrument was passed over uncontaminated building surfaces, the relative count rate changed. Table 4-1 presents the range of count rates encountered for different building materials at the VAECC. Survey units known to contain these building materials are also designated in the table. Count rates are presented in counts per minute (cpm). To reduce the potential for misinterpretation of the background count data, no conversion is made to dpm/100 cm^2.

Table 4-1

Background Surface Count Rates from VAECC Building Materials

Description of Material	Location by Survey Unit	Count Rate Range (cpm)	Count Rate for calculations (cpm)
Vinyl tile	005, 006, 007, 008	300-470	375
Small green ceramic tile (restrooms)	003, 006, 007, 008	560-1000	560, 585
Bare or painted concrete floors	005	330-665	525
Plaster walls	005, 006, 007, 008	280-365	290, 325
Cinder block walls	003, 005, 006, 007, 008	400-550	475
Glazed ceramic wall tile	005, 006, 007	585-1000	925
Poured concrete wall	005	350-665	400
Metal surfaces	006, 007	280-400	310

The highest background building materials encountered at the VAECC included the beige and gray ceramic wall tiles, as well as the smaller green ceramic tile found in some of the older rest rooms and janitor closets. Total count rates from these materials ranged from 3-4 times some of the lower activity materials such as plaster, wood and transite walls. The higher activity associated with the glazed tiles is not unexpected as uranium and thorium are frequently added to improve the application or color quality of the glaze.

Background count rates are specific to the Ludlum Model 44-116/Model 2221. The background count rates will be specific to the type of detection system (e.g., gas-flow proportional, scintillation, Geiger-Mueller), manufacturer (e.g., Ludlum, Eberline, and Bicron), and to a lesser extent the variances of manufacturing for identical equipment models. The tabulated count rates in Table 4-1 are best used in a relative sense.

4.4 SCM-SIMS

The advantage of the SCM-SIMS in this situation is that, due to the large number of measurements performed over a survey area, statistical analyses may be performed on individual square meter (1 m^2) grid blocks or entire survey units. Using stripping algorithms, it is possible to identify individual pixels (25 cm^2 areas) that exceed the background distribution in the designated survey unit. Consequently, no background analysis of discrete parcels (outside of the survey units) was performed using the SCM-SIMS system. MSI developed background surface activity levels using statistical analyses of the large number of data points collected over the building surfaces. Data were reviewed for lognormal or normal distribution after extracting high values that were indicative of contamination that had been introduced to the surface. It could be argued that some of the excluded values could really be high-end components of the background count distribution. If this is the case, the net effect is conservative, since calculated statistical measures (mean, median, and mode) are lower than the true values. Accordingly, calculated net surface activities end up higher due to the subtraction of lower background count rates.

MSI reported background activities for nine materials. Several of the materials had similar characteristics and were grouped into five material categories. The derived background activities for these five categories ranged from 554-2208 disintegrations per area (dpa). The dpa convention is specific to the SCM-SIMS, due to the processing of count data from individual detector locations (pixels). In the survey reports, average dpa is used to report the square meter average disintegrations per minute per 100 cm^2, while maximum dpa is used to report the maximum measured value of dpm per 100 cm^2.

4.5 CONCRETE CORINGS AND SUBSURFACE SOIL SAMPLES

Strontium-90 is a radionuclide that may occur in the environment in trace quantities due to fallout from atmospheric nuclear testing or nuclear accidents such as Chernobyl. It is conservatively assumed that the bulk materials sampled as part of this characterization have a background strontium-90 concentration of 0 pCi/g.

5. RADIOLOGICAL SURVEY RESULTS

5.1 SUMMARY

Alpha surface contamination surveys and gamma exposure rates showed little or no significant variance and are described on a site-wide basis in subsections 5.1.1 and 5.1.2, respectively. Sections 5.2 through 5.7 describe the surface contamination survey, soil and concrete sample results, as well as any post-remediation release surveys or supplemental tritium surveys for the individual survey units 003 and 005 through 009. Features such as floor penetrations, ventilation systems, drain clean-outs, and unusual equipment are described.

Since test decontamination was performed in small areas of elevated activity, all survey grids in survey units 003, 006, 007, 008 and 009 are below DCGLs. The MARSSIM (NRC 1977) states in the chapter on interpretation of survey results that if every measurement in the survey unit is below the DCGL, the survey unit clearly meets the release criteria. Consequently, statistical tests were not performed in these survey units.

Documentation for survey units subject to release is listed in the appendixes. Appendix B summarizes all the FSS results in graphical form on survey subunit maps. Appendix C contains a summary of analytical laboratory results. Discrete survey point measurements for areas not covered by the MSI survey and removable surface contamination results are included in Appendix D. The Post-Remediation Survey data and Supplemental Tritium Survey data is contained in Appendix E. Appendix F presents the Concrete Core and Soil Sampling Results. Quality Assurance data for characterization surveys are in Appendix G.

5.1.1 Removable Alpha Contamination Survey Results

Use of the dual-channel phoswhich smear counter allowed evaluation of all smears for both removable beta and removable alpha activity. Alpha activity could be taken as an indicator of high radon/radon daughter contributions. No smear sample alpha count rate exceeded 3 cpm, which at typical alpha efficiencies of 30% equates to approximately 10 dpm/100 cm^2. Thus, no significant removable alpha activity is present in the survey units at the VAECC.

Particulate air samples collected for health and safety purposes during characterization and test decontamination activities were also counted on the dual-channel phoswhich counter. Initial counts of these samples occasionally exhibited very high alpha count rates that decayed to background after approximately three days. This response is indicative of radon daughter decay. The presence of alpha activity was taken to be an indicator of radon/radon daughter activity.

5.1.2 Gamma Exposure Survey Results

Gamma exposure rate surveys were performed in all survey units and demonstrated very limited variation. It can be concluded that there is no significant contribution of gamma-emitting radionuclides (background or otherwise) in the survey units at the VAECC. Through all survey units, gamma exposure rates ranged from 5-15 uR/hr. These levels should be considered at background. The DCGL for gamma exposure rates is 20 uR/hr above background. Assuming the mean background exposure rate is 10 uR/hr in all survey units, the maximum exposure rate above background is 5 uR/h. Specific gamma exposure rate results are therefore not discussed further in this report.

5.2 SURVEY UNIT 003 DISCUSSION

Survey unit 003 consists of the women's rest room that adjoins the former waiting area of survey unit 005. The majority of the floor is covered with a small (1" by 1") ceramic floor tile. The women's rest room covers an approximate floor area of 75 ft^2.

5.2.1 Floor/Wall Surface Contamination

The characterization surveys demonstrate the following. Discreet hand-held instrument surveys showed a mean total surface contamination results of 675 dpm/100 cm^2 with a maximum of 867 dpm/100 cm^2. Thus total beta-gamma contamination measurements on the floors and walls of survey unit 003 did not exceed the strontium-90 DCGL. Likewise, field smears from these locations were analyzed onsite and determined not to exceed the strontium-90 DCGL for removable contamination. However, two removable contamination smears exhibited tritium activities exceeding the proposed removable tritium contamination DCGL of 1,000 dpm/100 cm^2 in the Work Plan (S&W 1998). These values were 1,900 and 25,000 dpm/100 cm^2, respectively. Three other smears exhibited positive activity for tritium above the laboratory detection limit but less than the DCGL. These results are meaningful because the laboratory reported no high-energy strontium-90 interference in the survey unit 003 smear samples. This observation was confirmed through the on-site strontium-90 analyses of smear samples.

Supplemental tritium survey results ranged from –25 to 775 dpm/100 cm^2 with an average of 43 dpm/100 cm^2. This shows that the positive results for tritium were spurious in nature and that tritium levels are below the DCGL for tritium.

5.2.2 Conclusions

Based on characterization field surveys (WESTON 1999), no significant strontium-90 activity is present in the women's rest room. The supplemental tritium surveys demonstrate that tritium levels are below the DCGL for tritium.

5.3 SURVEY UNIT 005 DISCUSSION

Survey unit 005 contained multiple rooms and areas adjacent to survey units 001-004. These rooms included a fresh air room, tunnel 45, waiting area, several treatment rooms, machine room, and storage room. The relatively large area of this survey unit was ideal for application of the SCM-SIMS. The control and records room adjacent to the treatment room were sealed and could not be surveyed.

5.3.1 Floors and Walls

SCM-SIMS floor surveys identified areas of contamination that exceeded the DCGLs in sub-units 0501F, 0503F, 0504F, and 0505F. WESTON hand held surface surveys identified some additional areas in these same survey units that approached the Sr-90 total surface contamination DCGL. These were remediated as well to follow the ALARA principle. Total beta surface contamination results are summarized in Table 5-1. No removable beta-gamma contamination measurements in these areas were noted to exceed the DCGL. No total or removable contamination levels exceeding the DCGLs were noted on the lower or upper walls.

Table 5-1

Final Status Total Beta Surface Contamination Survey Results for SU 005

Survey Unit	MSI Grid Location	Who performed survey	Description	Mean	Max.
				(dpm/100cm^2)	
005	N/A	SCM-SIMS	Tunnel and Adj. Rooms	920 max*	2998
005	N/A	WESTON char	Tunnel and Adj. Rooms	211	463
0501F	3.17	WESTON post	Tunnel 45	31700	31700
0501F	1.8	WESTON post	Tunnel 45	260	260
0503F	1.1	WESTON post	Treatment Room	573	573
0503F	3.1	WESTON post	Treatment Room	433	433
0504F	(2,3&4).5	WESTON post	Fresh Air Room	466	783
0504F	1.3	WESTON post	Fresh Air Room	400	400
0505F	all	WESTON post	South Corridor	505	1040

5.3.2 Post-Remediation Survey Analysis

Post-remediation surveys were performed in small elevated areas that were removed. Removable contamination surveys were performed in areas (0504F and 0505F) that had a potential for removable contamination as indicated by the characterization surveys. Since there was a considerable area remediated in survey unit 0505F, a complete gridded survey was performed. This appears on a separate survey sheet in Appendix H. While background was measured as 565 dpm/100 cm2 in this area, the more conservative value of 490 was used. This leads to three values above 1000. MARSSIM (NRC 1997) Chapter 8 "Interpretation of Survey Results,"

Section 3 "Contaminant not Present in Background" is followed to analyze the results. While the Work Plan (S&W 1998) calculates 15 discreet measurements are required, a total of 37 measurements were taken, exceeding the requirements. The sign test is applied with the results of the test in Appendix H. The number of measurements with positive differences, which is the test statistic S+, from the sign test is 34. The value of 34 is compared to the critical value in Table I.3 of the MARSSIM. For a value for N of 37 and a value of alpha of 0.05 from the Work Plan (S&W 1998), the critical value is 23. Since the test statistic 37 exceeds the critical value 23, the survey unit is below the release criteria DCGL.

5.3.3 Concrete Corings and Soil Sampling

Three discrete soil samples were collected in survey unit 005. Sampling locations included the sump rim in the fresh air room, sump in the machine room, and a drain line in the machine room. The range of strontium-90 concentrations in these samples was –0.43 to 2.9 pCi/g, with all results below the soil DCGL of 35 pCi/g.

Two concrete core profile samples were collected in survey unit 005. These sample locations were chosen in the aforementioned surface contamination areas 0504F and 0505F to determine if there had been migration into the concrete slab. The strontium-90 concentrations in the two samples were 1.20 and 1.60 pCi/g, respectively. The underlying soil was sampled at depth intervals of 0-6" and 6-12", with soil concentrations less than 0.27 pCi/g.

5.3.4 Conclusions

The MSI survey data is combined with the surface contamination post-remediation survey data to demonstrate that contamination levels in all subunits except 0501 are below the DCGL and meet the requirements for final release. The sign test applied to the post-remediation survey results demonstrates that residual contamination levels in subunit 0505 are below the release criteria. The concrete coring and soil data also meet the requirements for final release. Areas that may need additional surveying before final release include the sealed control and records room adjacent to the treatment room, remaining contaminated cleanout in subunit 0501, drain line areas if they are removed for remediation, and areas through which radioactive waste is transported during remediation of other survey units.

5.4 SURVEY UNIT 006 DISCUSSION

Survey unit 006 covers several offices and storage areas in the west end of the Building 91 basement. Surface contamination surveys performed by WESTON and MSI identified only one area in excess of the DCGL. This was located in the terrazzo tile threshold to the back stairwell (MSI survey unit 0601F), with a reading of 15,500 dpm/100 cm^2. No surface contamination levels exceeding the DCGLs were noted on any walls.

The lone hot spot was readily remediated using physical removal techniques. Excluding this removed area, the MSI maximum mean total surface contamination results for any 1m by 1 m grid for the entire survey unit was 467 dpm/100 cm^2 with a maximum in any 100 cm^2 area of 867 dpm/100 cm^2. Hand held surveys demonstrated similar results (383 dpm/100 cm^2 mean and 1050 dpm/100 cm^2 max). The post-remediation survey of the relatively small area along with the MSI survey data demonstrates that this survey unit meets the requirements for release.

5.5 SURVEY UNIT 007 DISCUSSION

Survey unit 007 covered a large portion of the east end of the Building 91 basement. This area is in daily use by audiometry, speech pathology, and maintenance personnel. Surface contamination surveys performed by WESTON and MSI identified two hot spots on floors where the maximum surface contamination readings exceeded the DCGL. One spot was located in the doorway to Room E51 (MSI survey unit 0714F), while the other was located in the doorway to the carpentry shop Room E23 (MSI survey unit 0716F). A spot located in the doorway of the electrical shop Room E29 was very close to the maximum surface contamination DCGL and was also remediated These hot spots were constrained to terrazzo tile interfaces located in doorways. No surface contamination levels exceeding the DCGLs were noted on any walls. No removable contamination exceeding the DCGL was noted in the survey unit.

The isolated hot spots were removed and a post-remediation survey of the relatively small areas was performed. Excluding the removed areas, the MSI maximum mean total surface contamination results for any 1m by 1 m grid for the entire survey unit was 313 dpm/100 cm^2 with a maximum in any 100 cm^2 area of 2668 dpm/100 cm^2. Hand held surveys showed a mean of 10 dpm/100 cm^2 with a maximum of 400 dpm/100 cm^2. The post-remediation survey results are combined with the MSI survey data to fulfill the requirements of a final status survey.

5.6 SURVEY UNIT 008 DISCUSSION

Survey unit 008 includes the ground level of Building 90. The ground level contains two major rooms, one of which was used to control the 1000 kVp x-ray unit, and the second which was used for storage. The control room is a bare concrete floor, while the storage room had recently undergone a tile removal. At the time of the characterization survey, the storage room at the west end of the survey unit contained a large number of file boxes on pallets. Spot hand-held surveys were performed between boxes. Surface contamination surveys performed by WESTON and MSI identified no total or removable levels exceeding the DCGLs. MSI maximum mean total surface contamination results for any 1m by 1 m grid for the entire survey unit was 91 dpm/100 cm^2 with a maximum in any 100 cm^2 area of 1449 dpm/100 cm^2. Hand held surveys showed a mean of -101 dpm/100 cm^2 with a maximum of 482 dpm/100 cm^2. The WESTON and MSI survey data fulfill the requirements of a final status survey.

5.7 SURVEY UNIT 009 DISCUSSION

Survey unit 009 included the incinerator and surrounding area within Building 64. The majority of floor space in Building 64 was used for storage. The incinerator and surrounding area were surveyed using hand-held instruments due to the lack of available large surface area for the SCM-SIM system. Discreet hand-held instrument surveys showed a mean total surface contamination results of 359 dpm/100 cm^2 with a maximum of 1929 dpm/100 cm^2. Thus, total surface contamination survey results were below the DCGLs.

Of the 25 smear locations in survey unit 009, one result exceeded the tritium DCGL proposed in the Work Plan (S&W 1998). The location of the smear was a wall (level-7') directly behind the incinerator. All other tritium results in survey unit 009 are less than detection limits. Supplemental tritium survey results ranged from –14 to 193 dpm/100 cm^2 with an average of 17 dpm/100 cm^2. This shows that the positive results for tritium were spurious in nature and that tritium levels are below the DCGL for tritium.

The survey data fulfill the requirements of a final status survey. Surface contamination levels are below the DCGLs.

6. SUMMARY OF QUALITY ASSURANCE PROGRAM RESULTS

Quality assurance and quality control measures were applied to the use of all radiation monitoring equipment and samples submitted for laboratory analyses.

6.1 RADIOLOGICAL EQUIPMENT

QA/QC measures for radiological monitoring used by WESTON included:

- Use of standard operating procedures and data forms to record raw surveys.
- Review of all equipment calibration forms for proper application.
- Daily background checks for all portable equipment.
- Daily function checks for all equipment using an NIST-traceable check source.
- Charting of function check results for agreement with Poisson distribution.

All equipment-related records are maintained in the project files – codes 1.4, 2.1 and 2.2. All radiological equipment used at the site to perform documented surveys operated within acceptable tolerances.

Similar QA/QC procedures were implemented by MSI while using the SCM-SIMS system. To ensure consistent survey speed and detector response, MSI performed function and distance checks several times each day. These procedures are described in detail in Appendix B of the Radiological Characterization Survey Report (WESTON 1999).

6.2 SAMPLE COLLECTION/ANALYTICAL LABORATORY

Per the requirements of the Work Plan (S&W 1998), duplicate samples were submitted for laboratory analysis. The document specified 60 duplicate samples to be collected at the discrete survey points. Due to the reduction of total discrete measurement locations, the number of QC locations was reduced proportionally. Prior to shipment, all samples were labeled and recorded on chain of custody forms, which are filed under code 3.2.1.

Forty-eight duplicate smears, two duplicate soil samples, and one duplicate concrete sample were collected during characterization and submitted for laboratory analyses. The paired sample results are presented in Appendix G. Given the variable nature of removable contamination, the variance of liquid scintillation results has little significance. All reported soil and concrete sample results are below the strontium-90 detection limit, thus comparisons have little significance other than no spurious high readings were reported.

In the process of analyzing smears via liquid scintillation analysis, ThermoNUtech prepared and analyzed spikes and blanks that were analyzed for carbon-14 and tritium, respectively. Spike and blank analyses are presented on individual laboratory reports as filed under code 3.2.2. All spike and blank results were within acceptable laboratory protocol. ThermoNUtech also reviewed each data set for the potential influence of high-energy beta-emitting radionuclides (strontium-90) and noted this potential on applicable laboratory reports. Laboratory reports presented sample-specific minimum detectable activity, which ranged from 20-80 dpm/100 cm^2 for both carbon-14 and tritium. Given the variable nature of removable contamination, the variance of liquid scintillation results has little significance.

Similar QC measures were implemented in the analysis of solid matrix samples. ThermoNUtech analyzed spike and blank solids for strontium-90 content. All results were within acceptable laboratory protocol. Laboratory reports presented sample-specific minimum detectable activity, which ranged from 0.5 to 1.9 pCi/g for strontium-90.

6.3 MISCELLANEOUS

Prior to all field activities, workers received site-specific training. Copies of this training and attendee lists are filed under code 1.3. All worker training certifications per 40 CFR 1910.120, respirator fit test certificates and supporting documentation are also maintained under this file code.

7. CONCLUSIONS

Characterization activities performed at the VAECC provided data that demonstrate survey units 003, 006, 007, 008 and 009 fulfill the requirements of an FSS and require no further action. Survey unit may be released for unrestricted use pending remediation of one small area. Activities were performed safely and within the requirements of the Site-Specific Health and Safety Plan (SSHASP, WESTON 1999). The combination of traditional surface contamination survey methods, SCM-SIMS surveys, and laboratory analysis of smear and solid samples proved to be a powerful means to support the following conclusions. After limited test decontamination and re-survey (using hand held instrumentation) of these areas, the SCM-SIMS data is combined with the post-remediation survey data to constitute a final status survey.

The application of the SCM-SIMS survey methodology allowed continuous discreet measurements while scanning. The survey coverage of floor areas in survey units 005 through 007 approached 100%. It is reasonable to conclude that the nature and extent of the small contamination areas/hot spots was well defined. The WESTON post remediation release surveys in survey units 006 and 007 demonstrate that those areas identified as contaminated by the SCM-SIMS system are now below the DCGL. The SCM-SIMS surveys with WESTON hand-held surveys for those areas not reachable by the SCM-SIMS system are used to demonstrate that all other surface areas in survey units 006-008 are releasable. Hand-held equipment "scanning" surveys, discrete measurements of total and removable beta-gamma contamination, and supplemental tritium surveys, all of which were performed by WESTON, are used to demonstrate that surface contamination in survey units 003 and 009 are below the DCGL.

Contamination levels in survey unit 005 except 0501 are below the DCGL and meet the requirements for final release. Areas that may need additional surveying before final release include the sealed control and records room adjacent to the treatment room, remaining contaminated cleanout in subunit 0501, drain line areas if they are removed for remediation, and areas through which radioactive waste is transported during remediation of other survey units.

Test decontamination operations executed by WESTON in areas of Building 90 and 91 have now reduced residual surface contamination in those areas of the five survey units below DCGLs (release levels). Concrete coring and soil sample results demonstrate that any potential residual volume contamination in the five units is below the concrete and soil stronitum-90 DCGL.

8. REFERENCES

NRC 1997. Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). U.S. Nuclear Regulatory Commission document NUREG-1575. June 1997

S&W 1998. Draft Final Work Plan for the Radiological Characterization Survey of the St. Albans Veterans Administration Extended Care Center Queens, New York. Prepared for Department of Army, New England District, Corps of Engineers by Stone & Webster Environmental Technology & Services, Boston, Massachusetts. September 1998.

WESTON 1999. Radiological Characterization Survey Report St. Albans Veterans Administration Extended Care Center Queens, New York. Prepared for U.S. Army Corps of Engineers, North Atlantic Division, New England District, by Roy F. Weston, Inc., Carle Place, New York. April 1999.

WESTON 1999b. Justification for Modified Derived Concentration Guidelines (DCGL). WESTON report prepared under Task Order 19, Contract DACA31-96-D-0006. June 1999

WESTON 1999c. Addendum to Justification for Modified Derived Concentration Guidelines for Strontium-90 Concentrations in Soil. WESTON Report. October 1999.

WESTON 1999d. Supplemental Tritium Characterization Plan. WESTON report prepared under Task Order 19, Contract DACA31-96-D-0006. June 1999.

WESTON 1999e. Draft Site-Specific Health and Safety Plan – Radiological Characterization Survey, St. Albans Veterans Administration Extended Care Center – Queens, New York. Prepared for Department of Army, New England District, Corps of Engineers by Roy F. Weston, Inc., Carle Place, New York. January 1999.

WESTON 1999f. Draft Final Decommissioning Plan St. Albans Veterans Administration Extended Care Center Queens, New York. Prepared for U.S. Army Corps of Engineers, North Atlantic Division, New England District, by Roy F. Weston, Inc., Carle Place, New York. December 1999.

APPENDIX A

DATA RETENTION SYSTEM

The information gathered during the course of the Radiological Characterization can be grouped into three main headings, as follows:

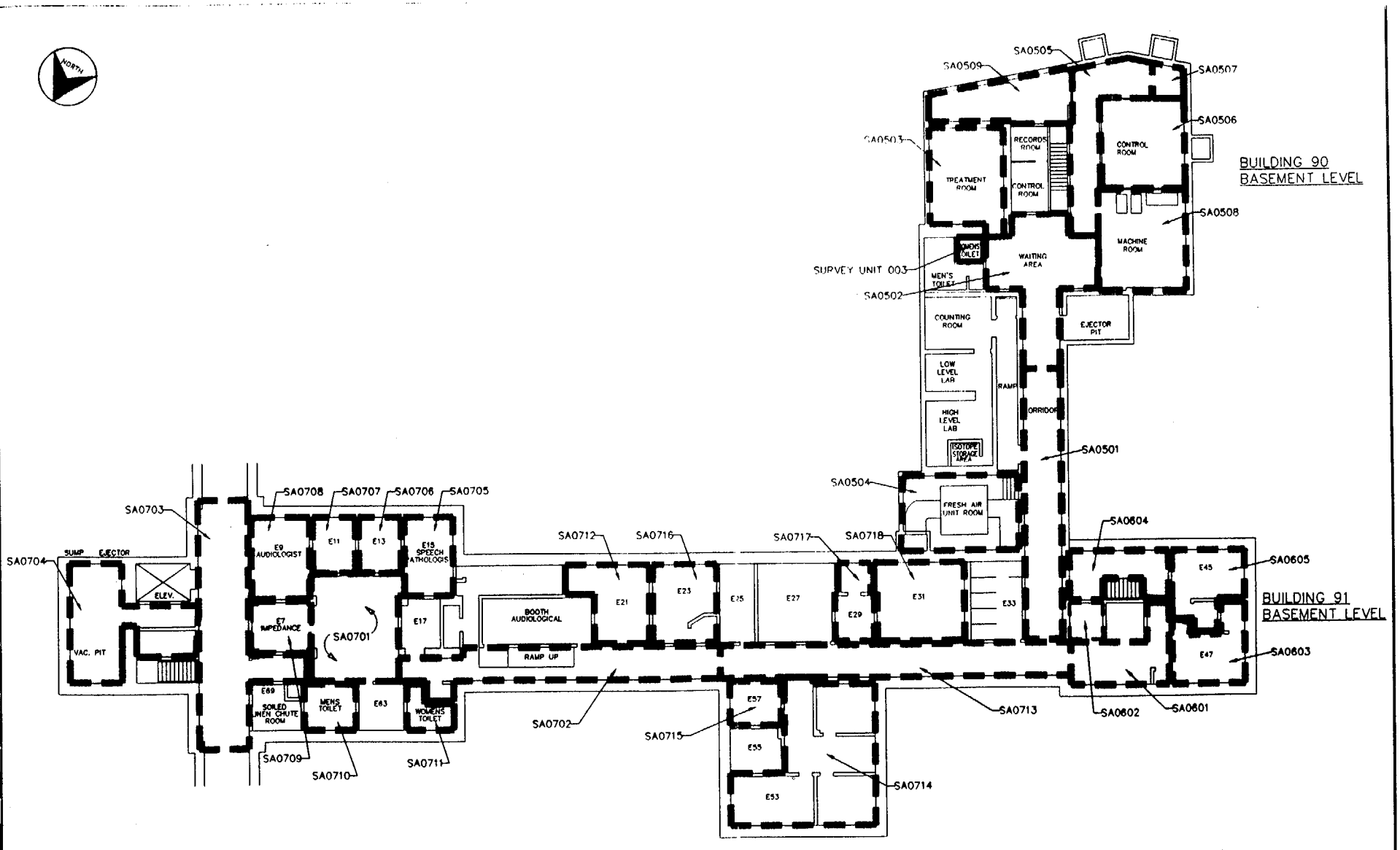
1.0 Preliminary Data
- 1.1 Personnel Data
  - 1.1.1 Medical Clearance
  - 1.1.2 Training Certificates
  - 1.1.3 Fit Testing
  - 1.1.4 Dosimetry Paperwork
- 1.2 Equipment
  - 1.2.1 Requisitions
- 1.3 Site Awareness Training
- 1.4 Procedures

2.0 Field Data
- 2.1 Instrumentation
  - 2.1.1 Calibration Data
  - 2.1.2 Function Checks
- 2.2 Survey Data Collected
  - 2.2.1 Total/Maximum Beta Contamination Survey Forms and
  - 2.2.2 Total Removable Beta Contamination Survey Forms
  - 2.2.3 Gross Beta Air Particulate Forms
  - 2.2.4 Radiation Work Permits
  - 2.2.5 Access Control Logs
- 2.3 Log Book Copies

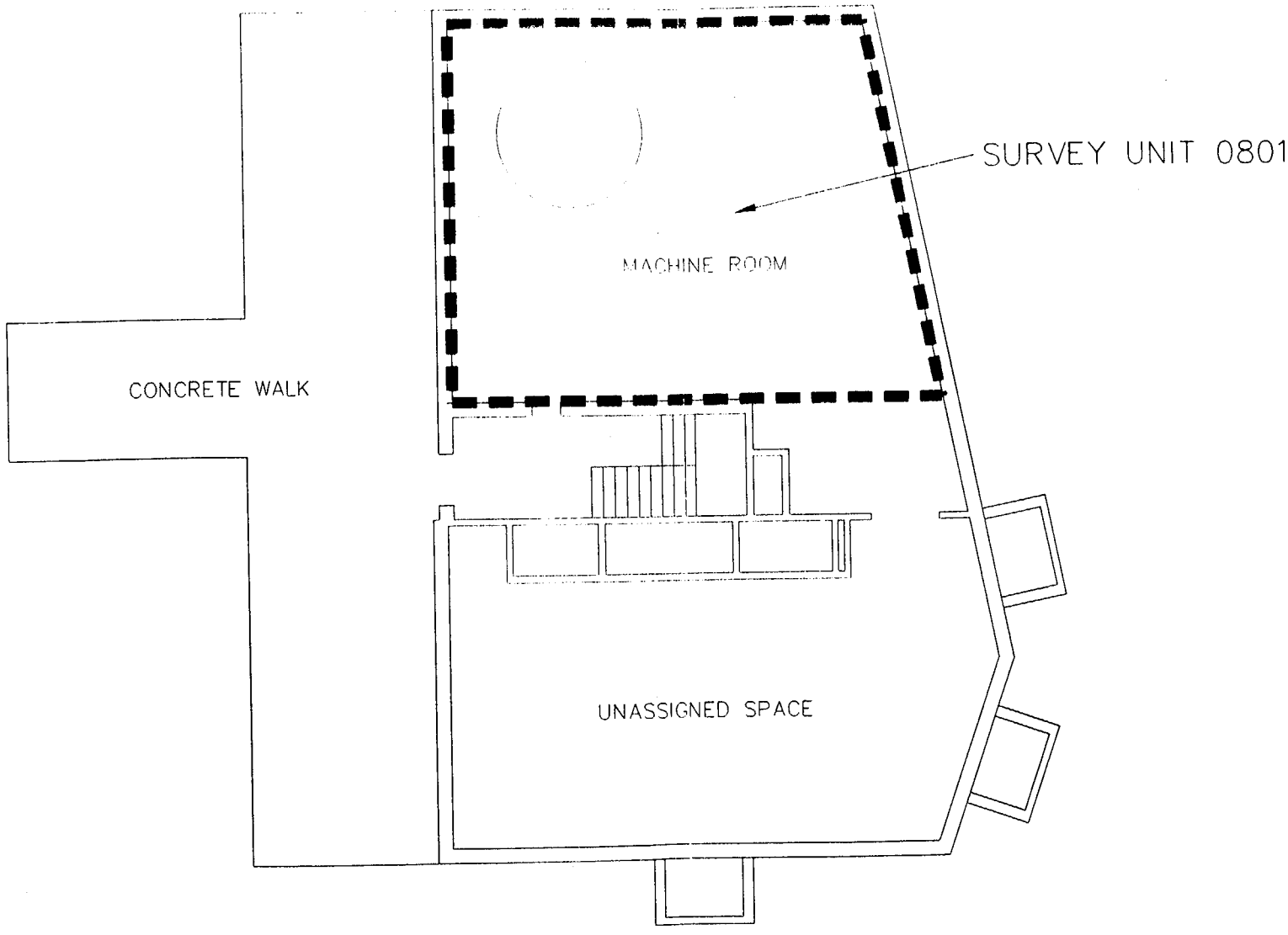
3.0 Results
- 3.1 Millennium Services, Inc. Survey Report
- 3.2 Laboratory
  - 3.2.1 Chain of Custody
  - 3.2.2 Liquid Scintillation Analyses
  - 3.2.3 Solid Matrix, Concrete, Soils
  - 3.2.4 Miscellaneous QA/QC

APPENDIX B

SURVEY DATA SUMMARY0



WESTON MANAGERS DESIGNERS/CONSULTANTS ROY F. WESTON OF NEW YORK, INC.	DESIGN BY DRAWN BY MARIANNE CLUNE CHECK BY MICHAEL VAN DER KARR APPROVED BY	U.S. ARMY CORPS OF ENGINEERS ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER	ENGINEER'S SEAL	REVISIONS	TITLE: BUILDINGS 90 AND 91 BASEMENT LEVEL SURVEY UNIT & MSI SUB-UNIT DESIGNATIONS FIGURE B-1 SCALE: NOT TO SCALE	NO. 1 SHEET 1 OF 1



WESTON
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CHECK BY MICHAEL VAN DER KARR
APPROVED BY

U.S. ARMY CORPS OF ENGINEERS
ST. ALBANS VETERANS ADMINISTRATION EXTENDED CARE CENTER

ENGINEER'S SEAL

REVISIONS

TITLE: BUILDING 90
GROUND FLOOR (SU008)
MSI SUB-UNIT DESIGNATION
FIGURE B-2

SCALE: 1" = 40'

NO. 1

SHEET 1 OF 1

Minimum Dectable Activities for Total Surface Contamination

Eff*: MSI 0.61 2' Floor Detector (SRA-001) WESTON 0.28 44-116 meter
0.66 6' Wall Detector

MSI Survey

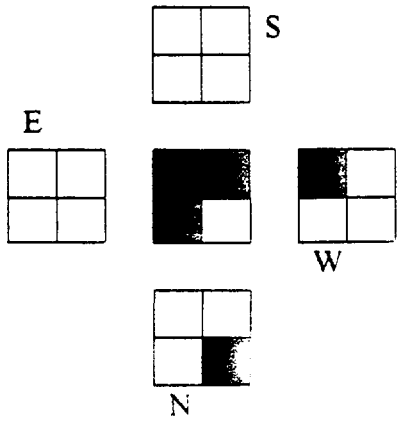
Sub Unit	wall	Background Rate Floors	Background Rate Walls	MDA** Floors	MDA** Walls
SURVEY UNIT 5					
05 01		554	2208	180	340
05 02		554	2208	180	340
05 03		2208	1058	360	230
05 04		1058		250	
05 05	E	1058	2208	250	340
	W		554		170
05 06		554	554	180	170
05 07		554	554	180	170
05 08		1058		250	
05 09		554		180	
SURVEY UNIT 6				0	
06 01		554	2208	180	340
06 02		1058	1058	250	230
06 03		554	1058	180	230
06 04		894	1058	230	230
06 05		554	1058	180	230
SURVEY UNIT 7					
07 01	N	554	2208	180	340
	S,W		554		170
07 02		554	2208	180	340
07 03		554		180	
07 04		554		180	
07 05		554		180	
07 06		554		180	
07 07		554		180	
07 08		554		180	
07 09		554		180	
07 10		1450		300	
07 11		1450	2208	300	340
07 12		554		180	
07 13		554	2208	180	340
07 14		554	2208	180	340
07 15		554		180	
07 16		554		180	
07 17		554		180	
07 18		554		180	

Weston Survey

Sub Unit	wall matl	Background Rate Floors	Background Rate Walls	MDA Floors	MDA Walls
SURVEY UNIT 5					
05 01	tile	470	1000	370	540
	plstr		325		
05 02	tile	470	1000	370	540
	plstr		325		
05 03	tile	435	1000	360	540
	plstr		325		
05 04		490	325	380	
05 05		665	325	440	310
05 06		470	325	370	310
05 07		470	325	370	310
05 08		490	325	380	
05 09		490	325	380	
SURVEY UNIT 6					
06 01		375	325	330	310
06 02		585	325	410	310
06 03		375	325	330	310
06 04		375	325	330	310
06 05		375	325	330	310
SURVEY UNIT 7					
07 01	tile	375	1000	330	540
	plstr		325		310
07 02	tile	375	1000	330	540
	plstr		325		
07 03	tile	375	1000	330	
	plstr		325		
07 04		525	475	390	
07 05		325		310	
07 06		325		310	
07 07		325		310	
07 08		325		310	
07 09		325		310	
07 10		375	925	330	
07 11		375	925	330	520
07 12		375	325	330	
07 13		375	925	330	520
07 14		375	325	330	310
07 15		375	325	330	
07 16		350	325	320	
07 17		350	325	320	
07 18		350	325	320	

*Efficiencies varied from day to day. The most conservative efficiency (lowest value) was used to calculate MDA
**MDA formula: (3+4.65*(SQRT(background count rate * time)))/(efficiency * time) where time is one minute

Surface Survey for Survey Unit 003



= MSI survey

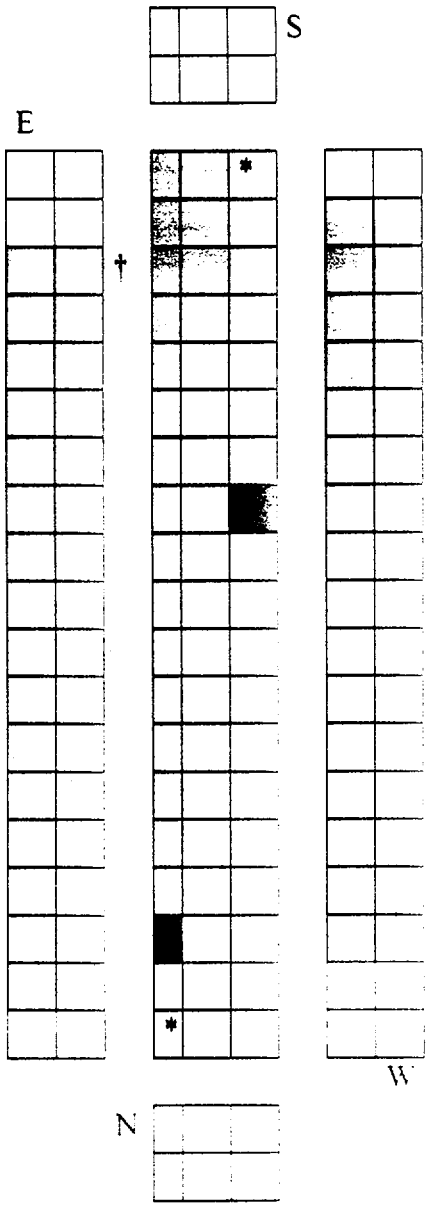
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas
Each result measured below the DCGL
Each grid is approximately 1 m by 1 m

* denotes removable wipe survey location
Note: Does not include supplemental tritium sampling

Surface Survey for Subunit 0501



= MSI survey

= Remedial survey

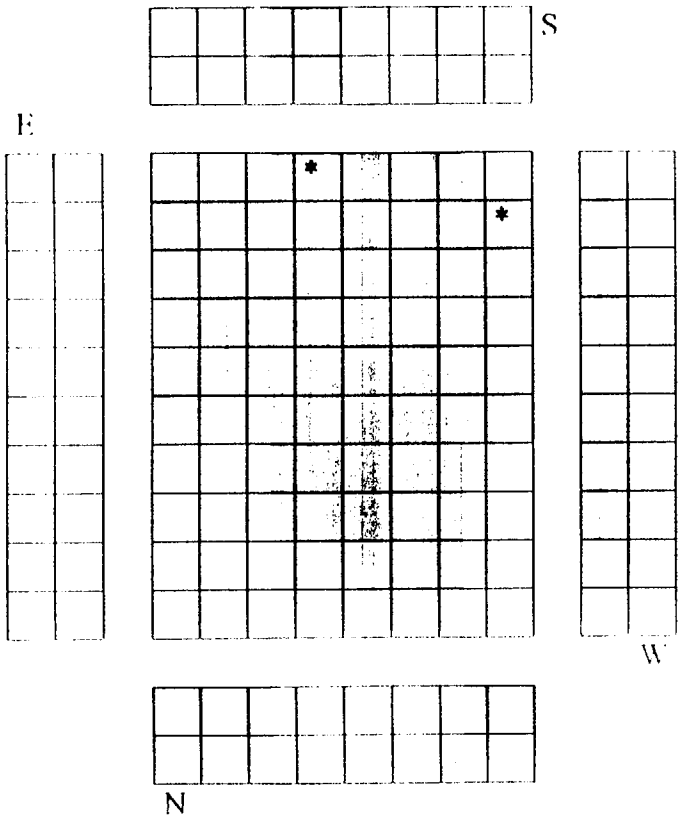
= Unremediated

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey location

† denotes discreet and removable wipe survey on the ceiling

Surface Survey for Subunit 0502



= Doorway, not accessible

= MSI survey

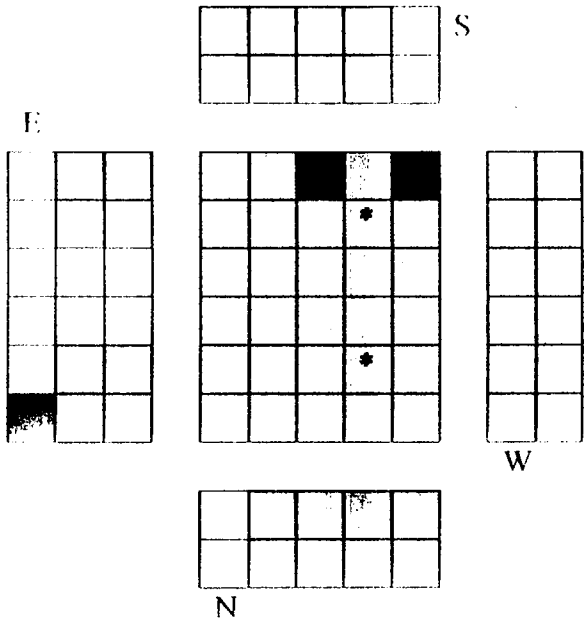
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* indicates removable wipe survey location

Surface Survey for Subunit 0503



= MSI survey

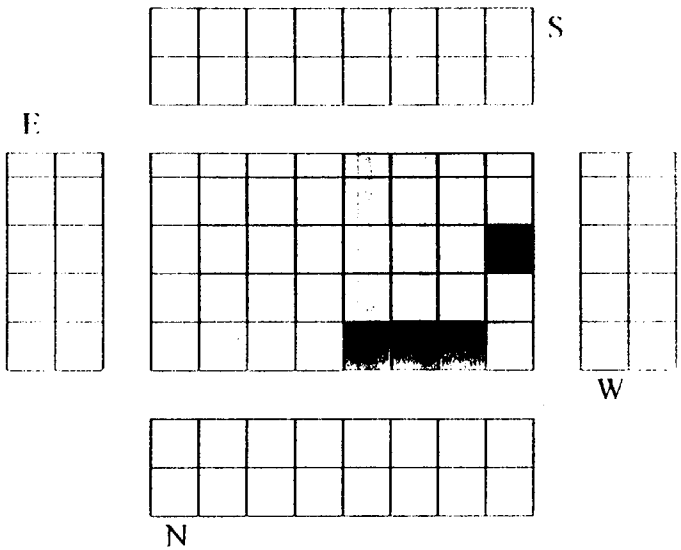
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0504



= MSI survey

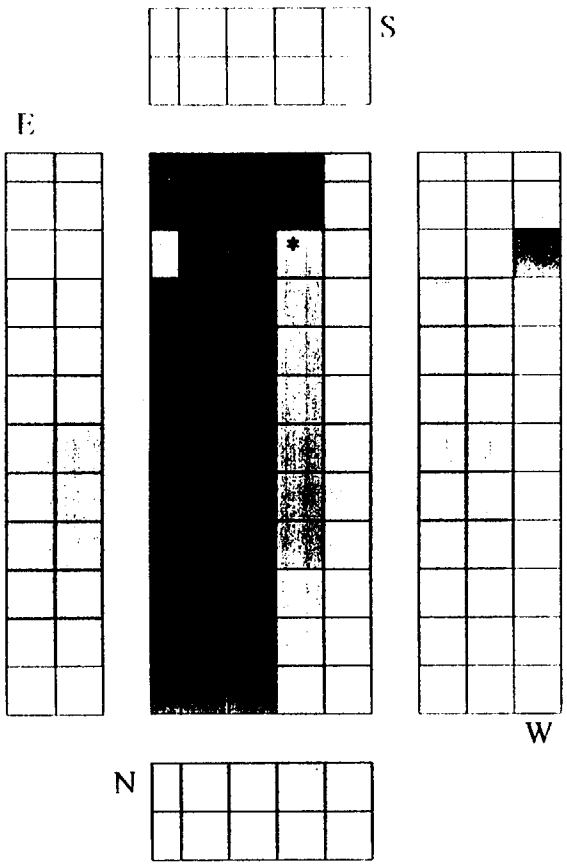
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0505



= Inaccessible area

= MSI survey

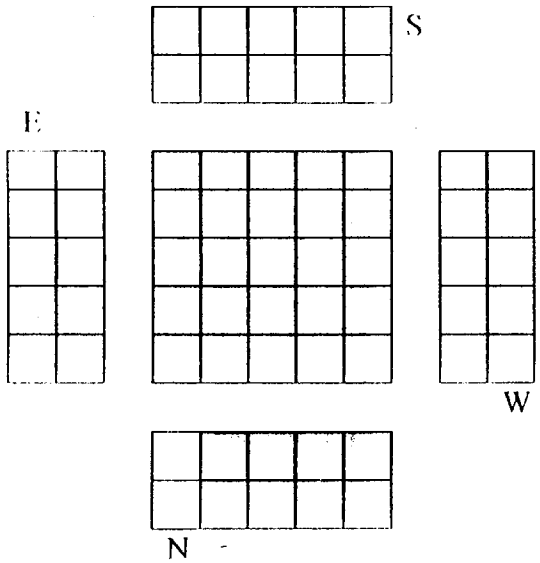
= Remedial survey

Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m

* denotes removable wipe survey
⊗ denotes concrete coring

Surface Survey for Subunit 0506



= Doorway, not accessible

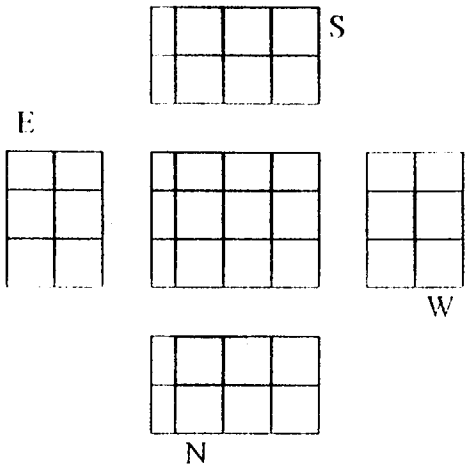
= MSI survey

= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

Surface Survey for Subunit 0507



= Doorway, not accessible

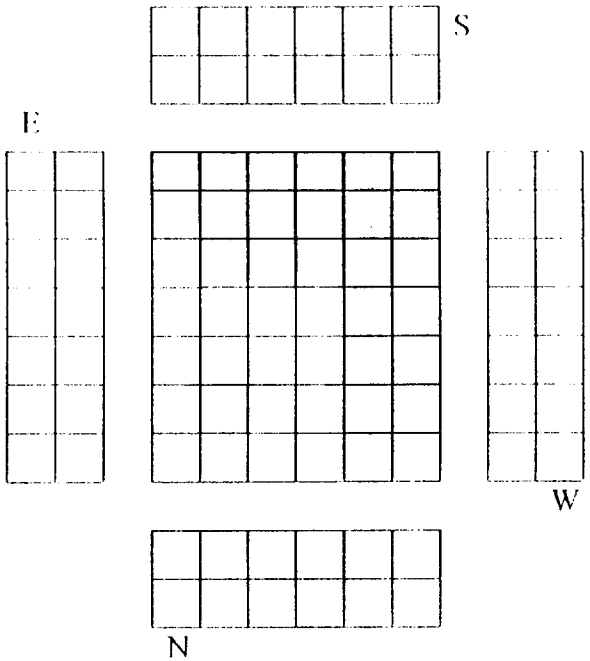
= MSI survey

= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

Surface Survey for Subunit 0508



= not accessible

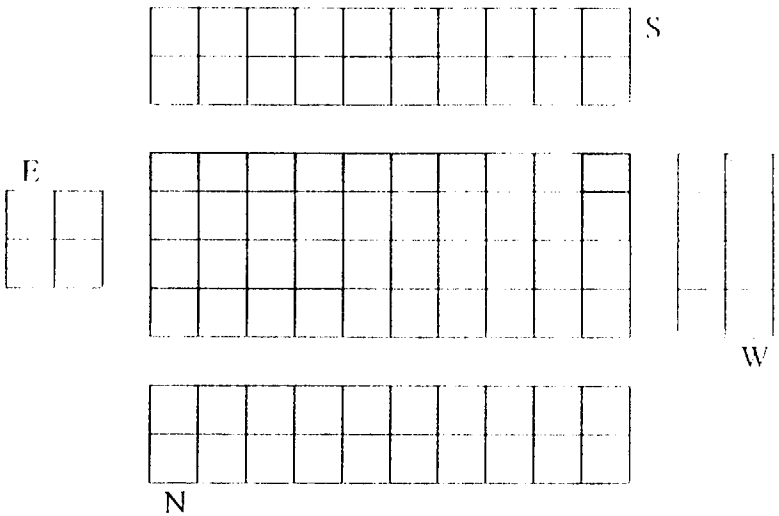
= MSI survey

= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

Surface Survey for Subunit 0509



= not accessible

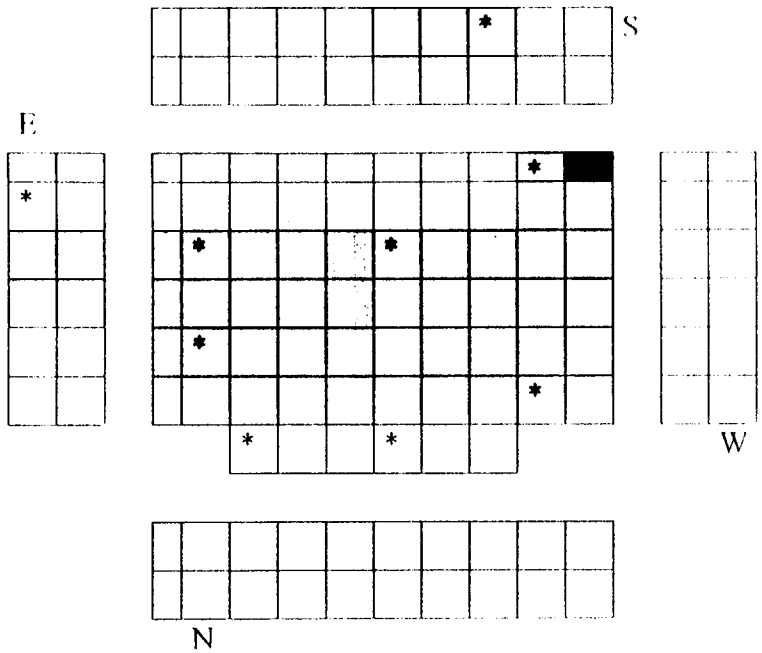
= MSI survey

= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

Surface Survey for Subunit 0601



= not accessible

= MSI survey

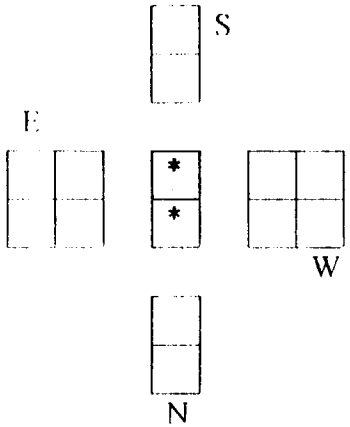
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0602



= MSI survey

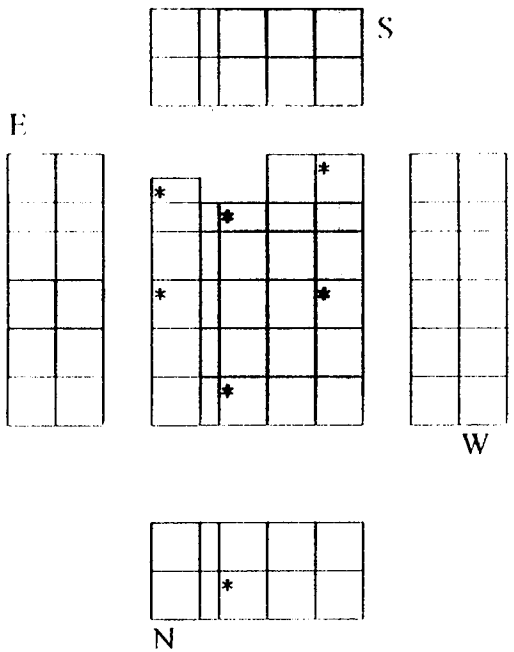
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0603



= not accessible

= MSI survey

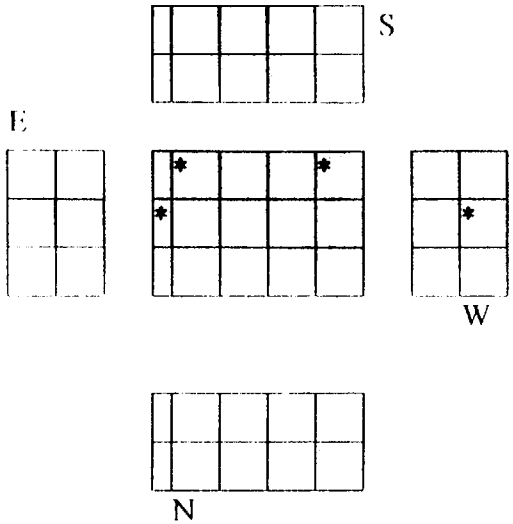
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m

* denotes removable wipe survey

Surface Survey for Subunit 0604



= not accessible

= MSI survey

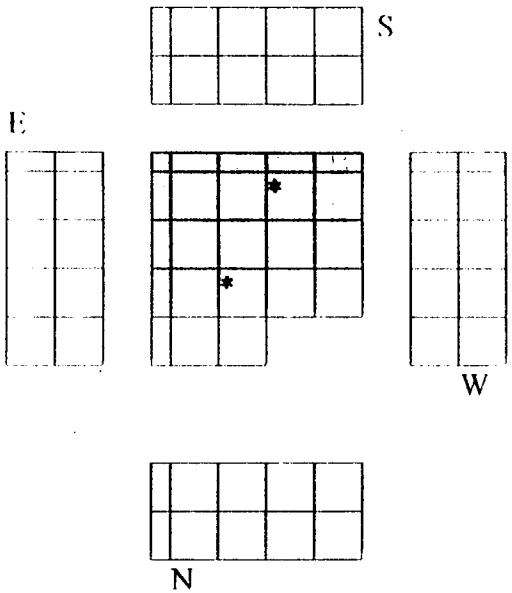
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0605



= not accessible

= MSI survey

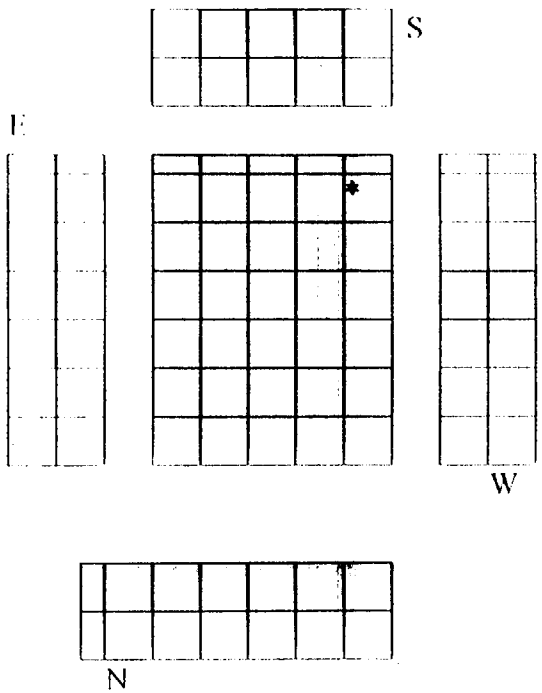
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0701



= not accessible

= MSI survey

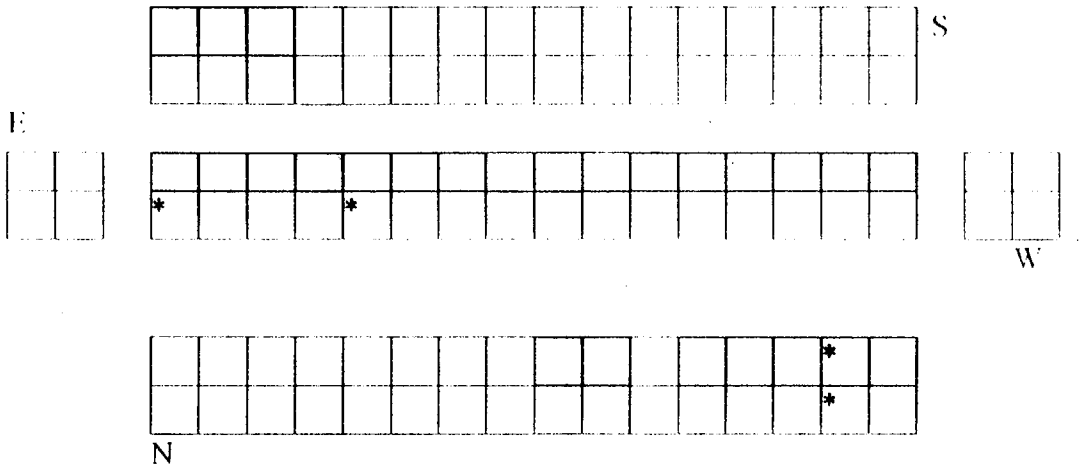
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0702



= not accessible

= MSI survey

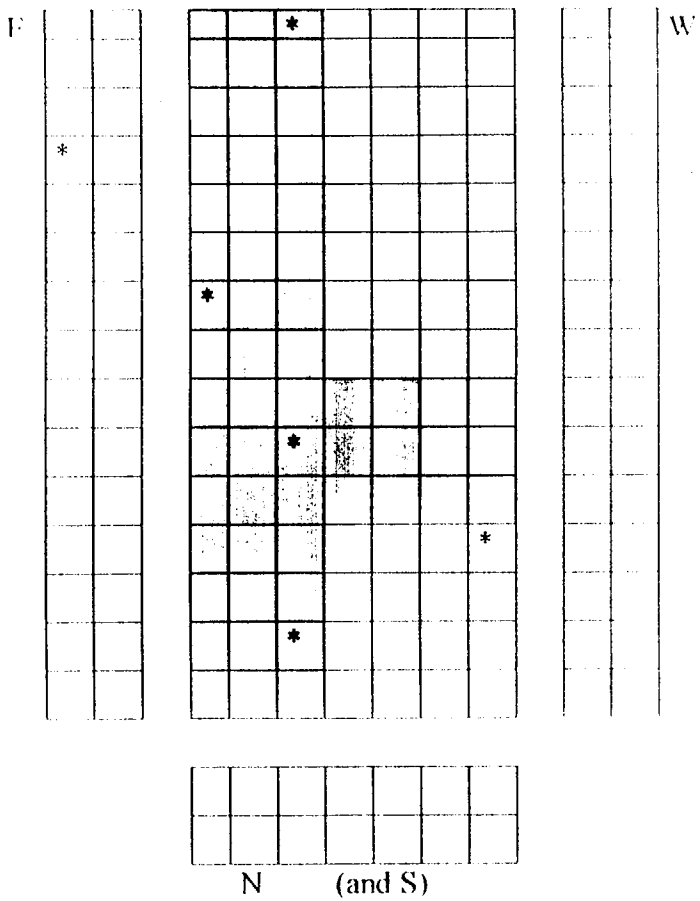
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0703



= Inaccessible area

= MSI survey

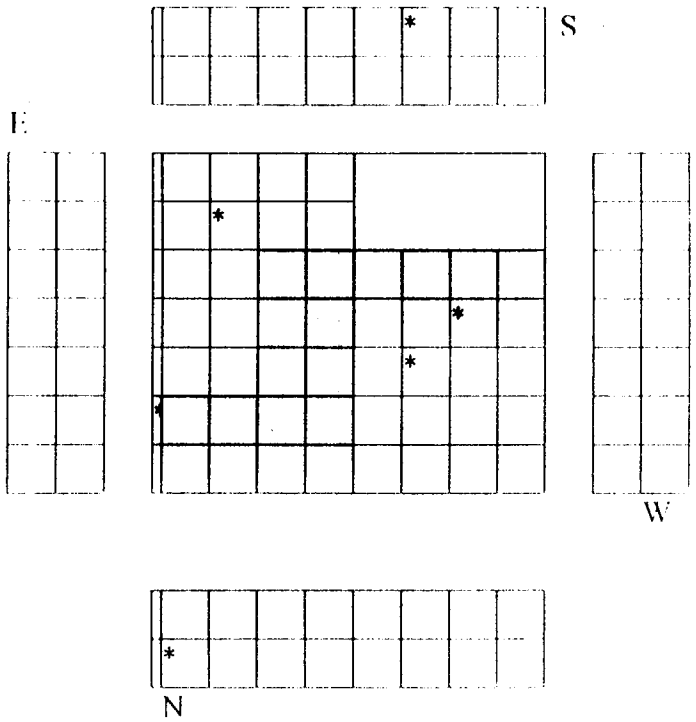
= Remedial survey

Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0704



= not accessible

= MSI survey

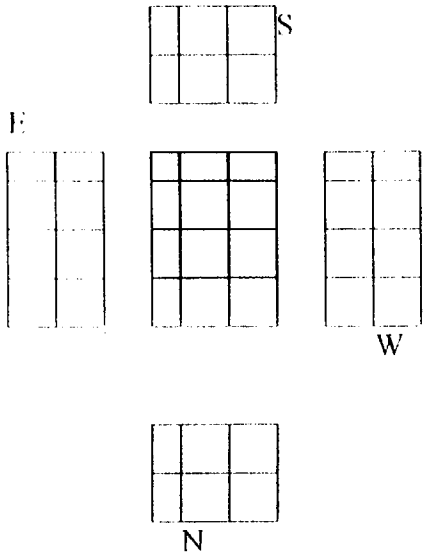
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0705



= not accessible

= MSI survey

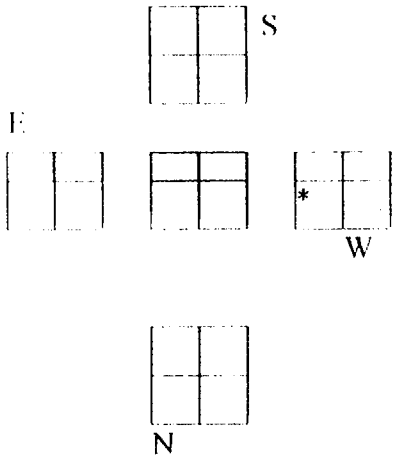
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0706



= not accessible

= MSI survey

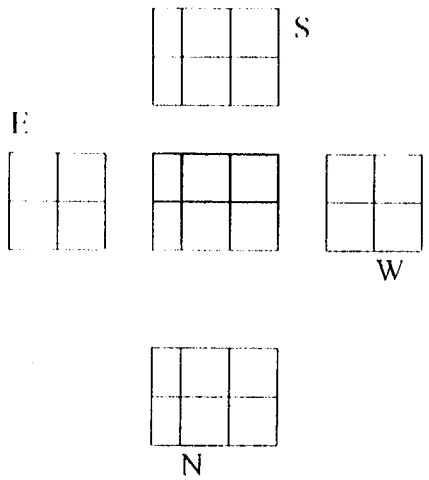
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0707



= not accessible

= MSI survey

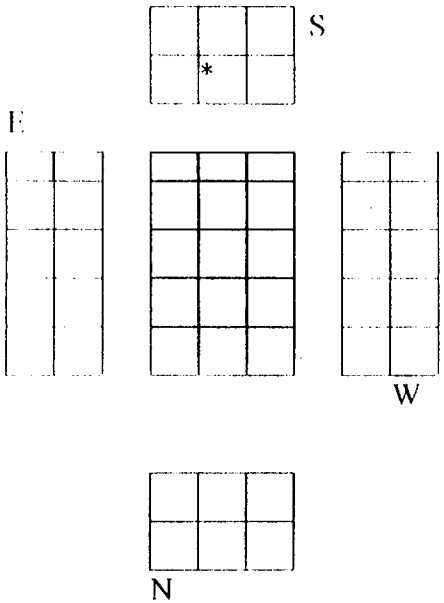
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0708



= not accessible

= MSI survey

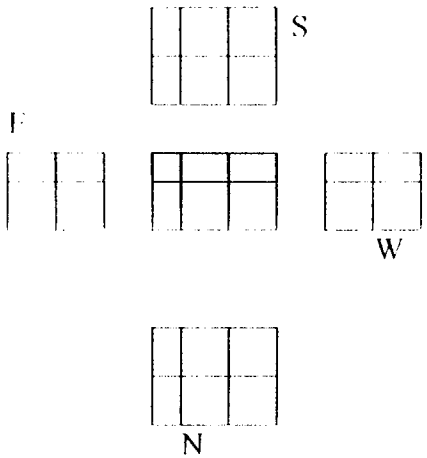
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0709



= not accessible

= MSI survey

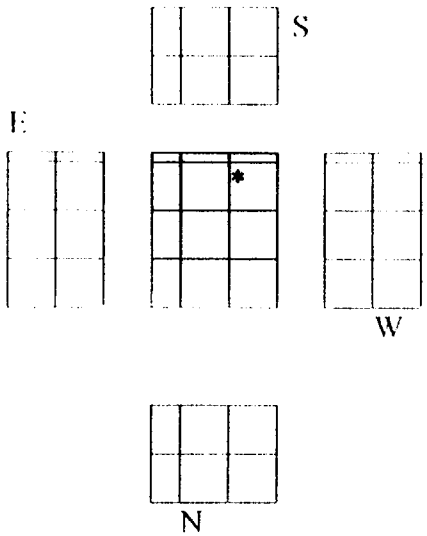
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0710



= not accessible

= MSI survey

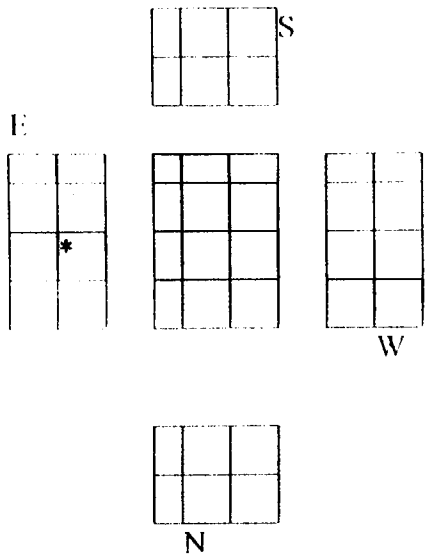
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0711



= not accessible

= MSI survey

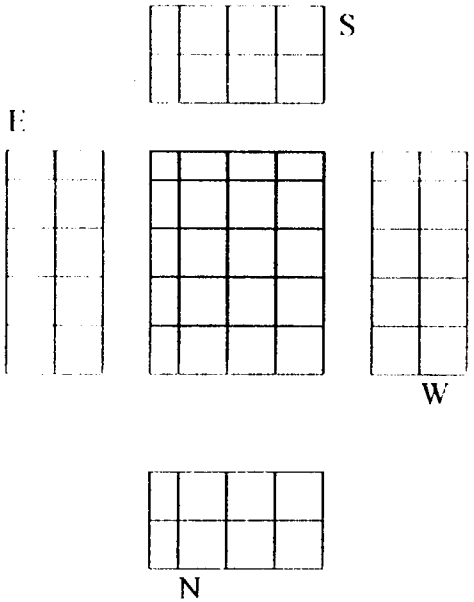
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0712



= not accessible

= MSI survey

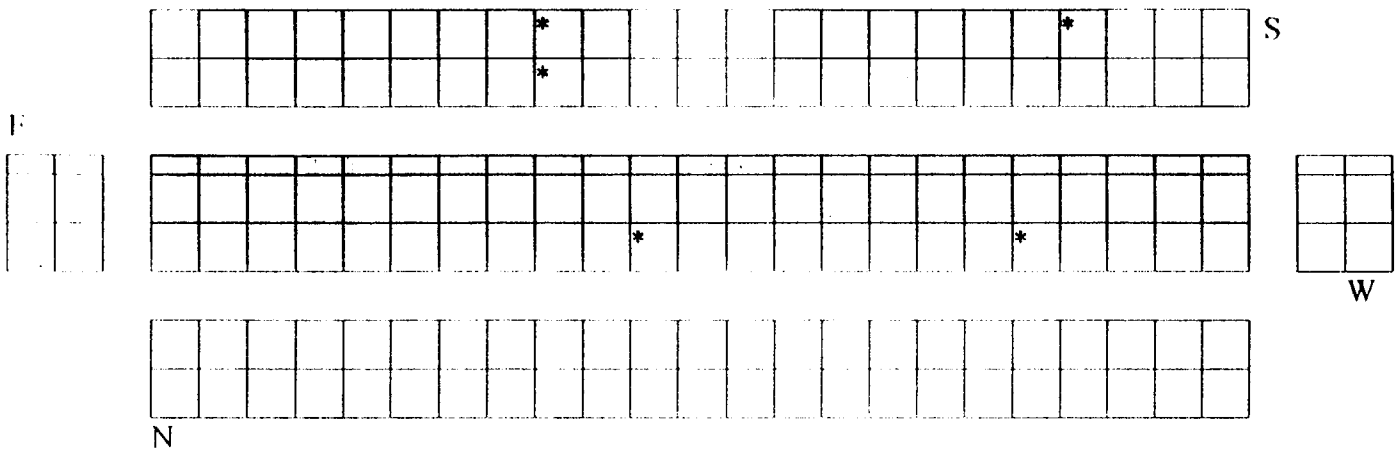
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0713



= not accessible

= MSI survey

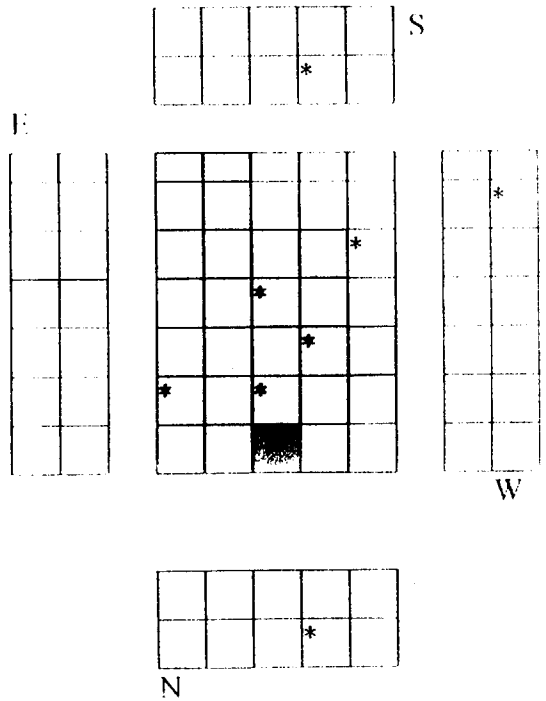
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measeured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0714



= not accessible

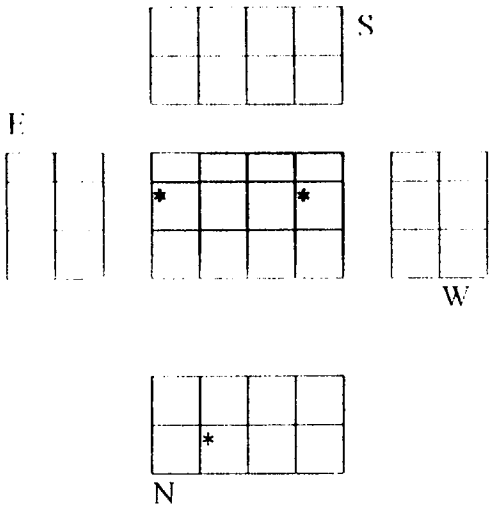
= MSI survey

= Remedial survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0715



= not accessible

= MSI survey

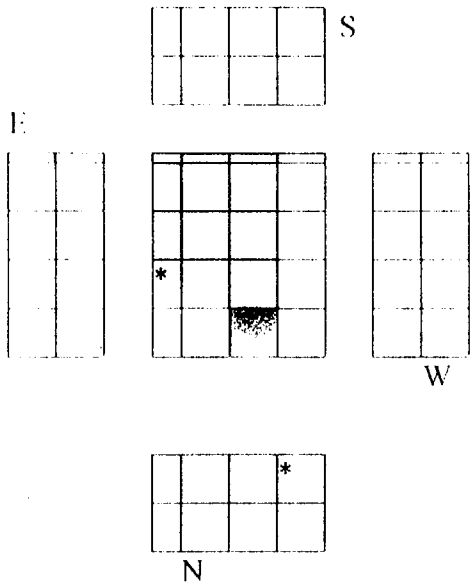
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0716



= not accessible

= MSI survey

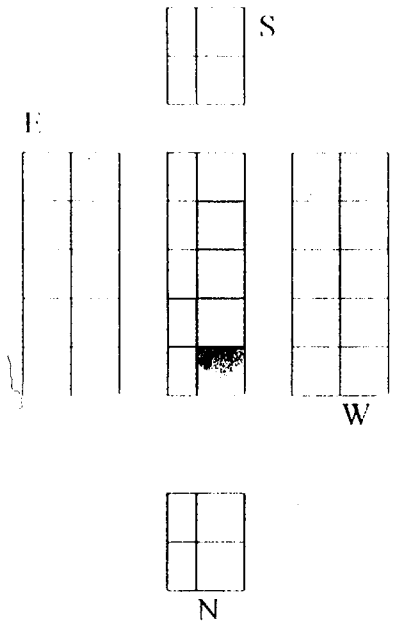
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0717



= not accessible

= MSI survey

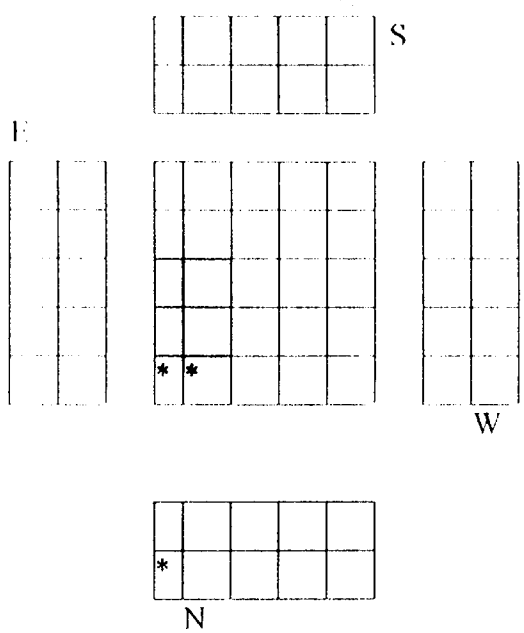
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0718



= not accessible

= MSI survey

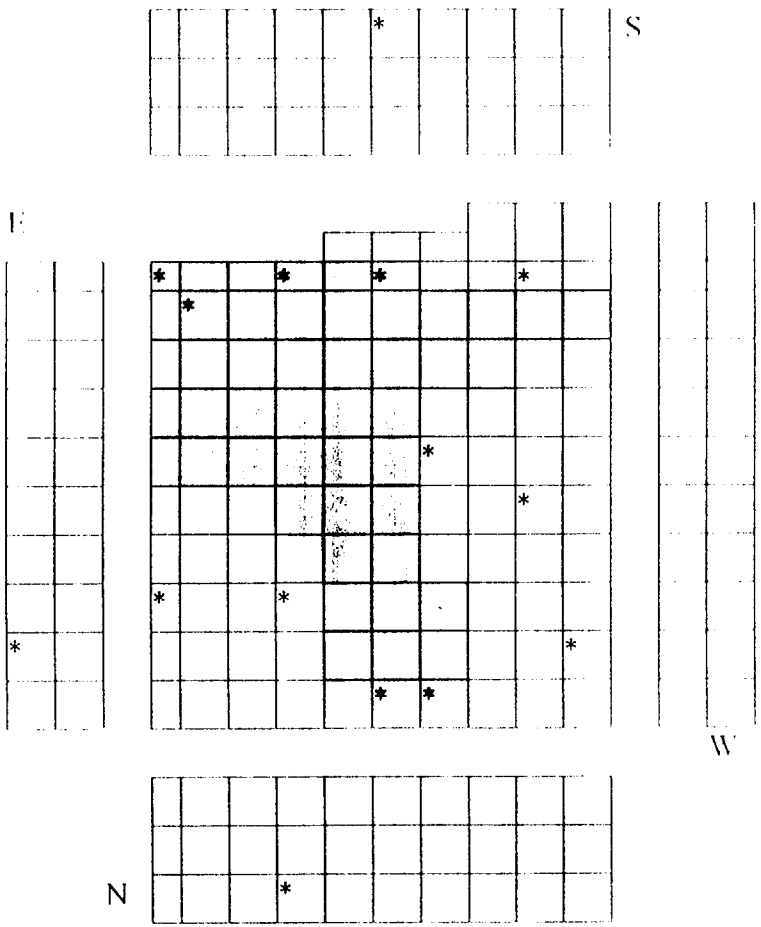
= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

Surface Survey for Subunit 0801



= not accessible

= MSI survey

= Remedial survey

= Characterization survey

Colored areas indicate surveyed areas.
Each result measured below the DCGL.
Each grid is approximately 1 m by 1 m.

* denotes removable wipe survey

APPENDIX C

ANALYTICAL LABORATORY RESULTS

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Womens' Room											
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-8.03	34.92	55.05	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	34.75	54.20	91.60	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	1.47	30.36	50.39	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-7.73	34.00	52.96	dpm/100cm^2
Tunnel											
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-4.72	32.36	53.40	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-6.69	36.38	56.77	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-29.37	38.00	58.60	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-22.55	41.18	63.76	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-1.76	36.20	59.73	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-25.53	41.46	66.62	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-3.50	37.13	59.41	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	8.19	34.43	55.56	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-28.28	29.27	45.77	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	14.86	41.19	66.14	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-15.20	31.11	54.14	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-21.06	25.63	41.66	dpm/100cm^2
West Basement											
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-31.82	33.60	58.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-37.92	36.77	61.22	dpm/100cm^2
Upstairs											
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-1.56	35.07	57.18	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-21.39	33.48	55.90	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-17.77	32.97	54.18	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-29.59	34.53	56.96	dpm/100cm^2
Incinerator											
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	1.71	37.26	61.05	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-6.71	47.62	79.65	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-19.96	47.22	78.98	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-24.51	68.20	109.09	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-16.45	26.36	48.64	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-55.60	40.12	71.25	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-20.29	37.21	65.02	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-31.16	39.43	66.56	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-43.35	82.28	132.17	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-16.22	39.64	65.91	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-23.19	40.02	65.26	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-18.80	40.53	68.76	dpm/100cm^2

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Womens' Room											
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	296.09	55.89	64.85	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	1898.50	152.02	107.91	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-13.26	31.76	59.36	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-43.34	30.64	62.39	dpm/100cm^2
Tunnel											
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	20.51	35.11	60.29	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	28.50	37.89	64.06	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-24.23	34.26	66.15	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	65.88	45.34	71.94	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-8.82	36.43	67.43	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-45.24	37.18	75.17	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	47.38	41.13	67.07	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-26.25	32.15	62.70	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	55.40	30.20	45.97	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-3.72	36.11	66.40	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-9.14	28.95	54.37	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-4.69	22.51	41.82	dpm/100cm^2
West Basement											
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-3.04	29.78	54.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-1.58	31.21	57.05	dpm/100cm^2
Upstairs											
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-6.27	34.48	63.16	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	7.66	34.89	61.74	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-11.88	32.15	59.84	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-32.79	31.95	62.92	dpm/100cm^2
Incinerator											
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	18.90	32.48	55.97	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	11.21	40.99	73.03	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	15.56	41.11	72.42	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	39.92	58.67	100.02	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-206.81	39.71	88.94	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-293.63	58.73	130.27	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-273.03	53.29	118.88	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-236.07	57.13	121.68	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	2916.03	217.10	145.98	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-9.03	39.59	72.81	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-42.93	36.09	72.08	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-28.27	39.62	75.96	dpm/100cm^2

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Ladies' Room											
99-01197-04	3-1	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	173.67	309.44	495.95	dpm/100cm^2
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-8.03	34.92	55.05	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	34.75	54.20	91.60	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	1.47	30.36	50.39	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-7.73	34.00	52.96	dpm/100cm^2
99-01197-09	3-4	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	22.12	29.31	47.37	dpm/100cm^2
99-01197-10	3-5	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	46.08	37.09	60.73	dpm/100cm^2
99-01197-11	3-6	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-10.32	21.87	35.35	dpm/100cm^2
							avg	-25.24			
							min	-53.15			
							max	-5.14			
Tunnel											
99-01198-07	5-1	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	13.77	36.02	58.38	dpm/100cm^2
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-4.72	32.36	53.40	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-6.69	36.38	56.77	dpm/100cm^2
99-01198-10	5-3	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	5.73	41.71	64.82	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-29.37	38.00	58.60	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-22.55	41.18	63.76	dpm/100cm^2
99-01198-13	5-5	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	7.56	38.47	64.08	dpm/100cm^2
99-01198-14	5-6	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-13.06	28.71	49.21	dpm/100cm^2
99-01198-15	5-7	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-3.22	33.35	54.54	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-1.76	36.20	59.73	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-25.53	41.46	66.62	dpm/100cm^2
99-01198-18	5-9	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	1.78	38.01	60.30	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-3.50	37.13	59.41	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	8.19	34.43	55.56	dpm/100cm^2
99-01199-04	5-11	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-6.41	34.14	57.10	dpm/100cm^2
99-01199-05	5-12	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-16.31	34.88	58.09	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-28.28	29.27	45.77	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	14.86	41.19	66.14	dpm/100cm^2
99-01199-08	5-14	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	0.00	37.21	59.99	dpm/100cm^2
99-01199-09	5-15	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-9.21	40.51	65.57	dpm/100cm^2
99-01199-10	5-16	1/24/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-25.60	36.16	56.97	dpm/100cm^2
99-01199-11	5-17	1/24/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-11.04	34.42	56.15	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-15.20	31.11	54.14	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-21.06	25.63	41.66	dpm/100cm^2
							avg	-7.98			
							min	-29.37			
							max	14.86			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
West Basement											
99-01199-14	6-1	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-4.66	33.19	55.28	dpm/100cm^2
99-01199-15	6-2	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-27.73	39.61	61.72	dpm/100cm^2
99-01199-16	6-3	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-10.16	36.65	60.28	dpm/100cm^2
99-01199-17	6-4	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-21.61	29.35	51.31	dpm/100cm^2
99-01199-18	6-5	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-5.14	36.16	61.00	dpm/100cm^2
99-01199-19	6-6	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-24.52	37.87	67.15	dpm/100cm^2
99-01199-20	6-7	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-24.16	37.51	61.45	dpm/100cm^2
99-01200-04	6-8	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-53.15	33.68	58.85	dpm/100cm^2
99-01200-05	6-9	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-30.30	33.73	58.71	dpm/100cm^2
99-01200-06	6-10	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-21.96	32.97	56.74	dpm/100cm^2
99-01200-07	6-11	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-10.86	35.20	60.11	dpm/100cm^2
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-31.82	33.60	58.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-37.92	36.77	61.22	dpm/100cm^2
99-01200-10	6-13	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-24.17	33.63	58.53	dpm/100cm^2
99-01200-11	6-14	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-45.17	37.51	60.35	dpm/100cm^2
99-01200-12	6-15	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-15.07	34.31	58.39	dpm/100cm^2
99-01200-13	6-16	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-16.47	40.90	70.92	dpm/100cm^2
99-01200-14	6-17	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-12.65	34.24	61.28	dpm/100cm^2
99-01200-15	6-18	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-1.54	33.44	59.61	dpm/100cm^2
99-01200-16	6-19	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-31.72	35.57	61.45	dpm/100cm^2
99-01200-17	6-20	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-17.47	35.91	61.56	dpm/100cm^2
99-01200-18	6-21	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-36.99	34.04	59.72	dpm/100cm^2
99-01200-19	6-22	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-37.54	35.19	63.25	dpm/100cm^2
99-01200-20	6-23	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-28.88	37.20	62.16	dpm/100cm^2
99-01201-04	6-24	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-15.05	31.36	50.00	dpm/100cm^2
99-01201-05	6-25	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	2.85	31.98	47.36	dpm/100cm^2
							avg	-22.46			
							min	-53.15			
							max	2.85			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Main Corridor											
99-01201-06	7-1	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-19.13	31.60	48.89	dpm/100cm^2
99-01201-07	7-2	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	9.05	32.40	50.13	dpm/100cm^2
99-01201-08	7-3	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-11.49	29.66	47.72	dpm/100cm^2
99-01201-09	7-4	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-1.41	30.34	46.95	dpm/100cm^2
99-01201-10	7-5	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-4.14	28.46	45.79	dpm/100cm^2
99-01201-11	7-6	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-2.82	28.46	46.85	dpm/100cm^2
99-01201-12	7-7	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-8.93	29.59	49.43	dpm/100cm^2
99-01201-13	7-8	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	14.35	33.66	52.97	dpm/100cm^2
99-01201-14	7-9	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-18.79	33.35	52.03	dpm/100cm^2
99-01201-15	7-10	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	0.00	32.54	51.21	dpm/100cm^2
99-01201-16	7-11	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	0.00	34.45	53.53	dpm/100cm^2
99-01201-17	7-12	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	8.58	31.45	47.49	dpm/100cm^2
99-01201-18	7-13	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	-10.69	28.33	44.40	dpm/100cm^2
99-01201-19	7-14	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	1.47	29.16	48.70	dpm/100cm^2
99-01201-20	7-15	1/23/99	1/27/99	2/11/99	9901201	Carbon-14	EPA 906.0 Modified	4.40	31.19	48.67	dpm/100cm^2
99-01202-04	7-16	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-13.49	15.18	25.29	dpm/100cm^2
99-01202-05	7-17	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-1.86	13.77	22.11	dpm/100cm^2
99-01202-06	7-18	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-11.79	15.80	24.70	dpm/100cm^2
99-01202-07	7-19	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-1.90	14.00	22.58	dpm/100cm^2
99-01202-08	7-20	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-8.40	13.93	23.00	dpm/100cm^2
99-01202-09	7-21	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-5.76	13.63	22.80	dpm/100cm^2
99-01202-10	7-22	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	3.77	14.14	22.35	dpm/100cm^2
99-01202-11	7-23	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-3.22	14.65	22.91	dpm/100cm^2
99-01202-12	7-24	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-7.16	13.73	23.17	dpm/100cm^2
99-01202-13	7-25	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-7.98	13.08	21.87	dpm/100cm^2
99-01202-14	7-26	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-0.63	14.01	22.33	dpm/100cm^2
99-01202-15	7-27	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-2.60	15.01	23.13	dpm/100cm^2
99-01202-16	7-28	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-1.89	13.15	22.48	dpm/100cm^2
99-01202-17	7-29	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-5.72	13.25	22.64	dpm/100cm^2
99-01202-18	7-30	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-1.82	12.76	21.61	dpm/100cm^2
99-01202-19	7-31	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	2.53	14.05	22.56	dpm/100cm^2
99-01202-20	7-32	1/23/99	1/27/99	2/11/99	9901202	Carbon-14	EPA 906.0 Modified	-2.59	13.07	23.06	dpm/100cm^2
99-01203-04	7-33	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-18.74	33.25	56.63	dpm/100cm^2
99-01203-05	7-34	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-6.33	33.10	57.36	dpm/100cm^2
99-01203-06	7-35	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	3.14	32.97	56.88	dpm/100cm^2
99-01203-07	7-36	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-13.65	32.43	54.99	dpm/100cm^2

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
99-01203-08	7-37	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	6.29	33.88	56.99	dpm/100cm^2
99-01203-09	7-38	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-34.46	34.34	59.50	dpm/100cm^2
99-01203-10	7-39	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-9.53	34.93	57.57	dpm/100cm^2
99-01203-11	7-40	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-33.32	41.38	71.08	dpm/100cm^2
99-01203-12	7-41	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-29.37	35.72	56.05	dpm/100cm^2
99-01203-13	7-42	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-38.70	30.94	56.13	dpm/100cm^2
99-01203-14	7-43	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-7.77	33.92	56.36	dpm/100cm^2
99-01203-15	7-44	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-29.56	33.45	59.54	dpm/100cm^2
99-01203-16	7-45	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-28.33	35.58	57.08	dpm/100cm^2
99-01203-17	7-46	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	8.94	28.32	46.31	dpm/100cm^2
99-01203-18	7-47	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-5.13	35.28	61.95	dpm/100cm^2
99-01203-19	7-48	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-9.83	35.34	59.43	dpm/100cm^2
99-01203-20	7-49	1/23/99	1/27/99	2/14/99	9901203	Carbon-14	EPA 906.0 Modified	-9.93	35.38	60.00	dpm/100cm^2
99-01204-04	7-50	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	0.00	31.61	54.52	dpm/100cm^2
							avg	-7.33			
							min	-38.70			
							max	14.35			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Upstairs											
99-01204-05	8-1	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	9.71	36.30	57.62	dpm/100cm^2
99-01204-06	8-2	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-13.17	37.48	58.61	dpm/100cm^2
99-01204-07	8-3	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-15.34	32.79	54.62	dpm/100cm^2
99-01204-08	8-4	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-4.61	32.43	54.71	dpm/100cm^2
99-01204-09	8-5	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-28.57	36.37	63.58	dpm/100cm^2
99-01204-10	8-6	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-21.89	29.45	51.97	dpm/100cm^2
99-01204-11	8-7	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-12.80	34.35	56.97	dpm/100cm^2
99-01204-12	8-8	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-18.27	32.88	59.15	dpm/100cm^2
99-01204-13	8-9	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-11.19	35.17	56.92	dpm/100cm^2
99-01204-14	8-10	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-11.30	36.36	57.50	dpm/100cm^2
99-01204-15	8-11	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-18.15	32.06	53.85	dpm/100cm^2
99-01204-16	8-12	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-14.55	34.57	57.57	dpm/100cm^2
99-01204-17	8-13	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-15.79	43.93	70.27	dpm/100cm^2
99-01204-18	8-14	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-6.54	48.15	77.63	dpm/100cm^2
99-01204-19	8-15	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-24.24	45.32	71.94	dpm/100cm^2
99-01204-20	8-16	1/23/99	1/27/99	2/14/99	9901204	Carbon-14	EPA 906.0 Modified	-8.87	36.97	63.18	dpm/100cm^2
99-01205-04	8-17	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-14.54	44.96	73.95	dpm/100cm^2
99-01205-07	8-20	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-20.77	36.05	61.62	dpm/100cm^2
99-01205-08	8-21	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-10.98	32.98	55.87	dpm/100cm^2
99-01205-09	8-22	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-38.65	34.01	55.05	dpm/100cm^2
99-01205-10	8-23	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-21.24	36.52	58.19	dpm/100cm^2
99-01205-11	8-24	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-12.75	36.42	56.74	dpm/100cm^2
99-01205-12	8-25	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-13.87	31.82	54.87	dpm/100cm^2
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-1.56	35.07	57.18	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-21.39	33.48	55.90	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-17.77	32.97	54.18	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-29.59	34.53	56.96	dpm/100cm^2
							avg	-15.51			
							min	-38.65			
							max	9.71			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Incinerator											
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	1.71	37.26	61.05	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-6.71	47.62	79.65	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-19.96	47.22	78.98	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-24.51	68.20	109.09	dpm/100cm^2
99-01205-17	9-3	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-16.61	32.72	59.15	dpm/100cm^2
99-01205-18	9-4	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	0.00	36.61	58.11	dpm/100cm^2
99-01205-19	9-5	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-6.55	35.73	58.29	dpm/100cm^2
99-01205-20	9-6	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-1.62	34.23	57.75	dpm/100cm^2
99-01206-04	9-7	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-28.83	36.47	61.58	dpm/100cm^2
99-01206-05	9-8	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-36.57	42.10	70.30	dpm/100cm^2
99-01206-06	9-9	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-52.34	50.00	91.46	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-16.45	26.36	48.64	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-55.60	40.12	71.25	dpm/100cm^2
99-01206-09	9-11	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-10.35	38.99	66.32	dpm/100cm^2
99-01206-10	9-12	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-13.26	43.62	72.83	dpm/100cm^2
99-01206-11	9-13	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-18.81	46.87	80.34	dpm/100cm^2
99-01206-12	9-14	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-15.76	36.43	60.61	dpm/100cm^2
99-01206-13	9-15	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-30.88	33.42	59.36	dpm/100cm^2
99-01206-14	9-16	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-31.71	36.91	60.97	dpm/100cm^2
99-01206-15	9-17	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-12.62	36.57	60.63	dpm/100cm^2
99-01206-16	9-18	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-32.44	39.60	65.65	dpm/100cm^2
99-01206-17	9-19	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-28.00	34.92	63.32	dpm/100cm^2
99-01206-18	9-20	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-32.30	34.97	62.10	dpm/100cm^2
99-01205-05	9-18	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-5.07	57.34	90.33	dpm/100cm^2
99-01205-06	9-19	1/23/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-2.96	60.06	105.49	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-20.29	37.21	65.02	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-31.16	39.43	66.56	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-43.35	82.28	132.17	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-16.22	39.64	65.91	dpm/100cm^2
99-01207-06	9-23	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-11.42	40.18	69.63	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-23.19	40.02	65.26	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-18.80	40.53	68.76	dpm/100cm^2
99-01207-09	9-25	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-26.18	143.45	239.48	dpm/100cm^2
							avg	-20.87			
							min	-55.60			
							max	1.71			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Ladies' Room											
99-01197-04	3-1	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	25413.91	1233.02	584.25	dpm/100cm^2
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	296.09	55.89	64.85	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	1898.50	152.02	107.91	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-13.26	31.76	59.36	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-43.34	30.64	62.39	dpm/100cm^2
99-01197-09	3-4	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	73.39	36.72	55.81	dpm/100cm^2
99-01197-10	3-5	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	381.70	64.63	71.55	dpm/100cm^2
99-01197-11	3-6	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-7.23	22.46	41.65	dpm/100cm^2
							avg	3499.97			
							min	-43.34			
							max	25413.91			
Tunnel											
99-01198-07	5-1	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-17.24	34.80	65.91	dpm/100cm^2
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	20.51	35.11	60.29	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	28.50	37.89	64.06	dpm/100cm^2
99-01198-10	5-3	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-3.83	40.07	73.18	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-24.23	34.26	66.15	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	65.88	45.34	71.94	dpm/100cm^2
99-01198-13	5-5	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	18.93	41.64	72.34	dpm/100cm^2
99-01198-14	5-6	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	10.17	31.60	55.55	dpm/100cm^2
99-01198-15	5-7	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-4.83	33.56	61.57	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-8.82	36.43	67.43	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-45.24	37.18	75.17	dpm/100cm^2
99-01198-18	5-9	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	267.17	56.94	68.07	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	47.38	41.13	67.07	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-26.25	32.15	62.70	dpm/100cm^2
99-01199-04	5-11	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	4.82	31.97	57.34	dpm/100cm^2
99-01199-05	5-12	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	21.26	34.07	58.34	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	55.40	30.20	45.97	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-3.72	36.11	66.40	dpm/100cm^2
99-01199-08	5-14	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	5.07	33.59	60.25	dpm/100cm^2
99-01199-09	5-15	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	22.15	38.28	65.85	dpm/100cm^2
99-01199-10	5-16	1/24/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	4.81	31.89	57.20	dpm/100cm^2
99-01199-11	5-17	1/24/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-6.32	30.35	56.39	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-9.14	28.95	54.37	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-4.69	22.51	41.82	dpm/100cm^2
							avg	17.40			
							min	-45.24			
							max	267.17			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
West Basement											
99-01199-14	6-1	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	0.00	30.50	55.52	dpm/100cm^2
99-01199-15	6-2	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	12.16	35.22	61.98	dpm/100cm^2
99-01199-16	6-3	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	13.57	34.56	60.54	dpm/100cm^2
99-01199-17	6-4	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-4.33	27.88	51.53	dpm/100cm^2
99-01199-18	6-5	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	13.74	34.97	61.27	dpm/100cm^2
99-01199-19	6-6	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-22.68	34.75	67.44	dpm/100cm^2
99-01199-20	6-7	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	41.51	37.75	61.72	dpm/100cm^2
99-01200-04	6-8	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	0.00	30.15	54.84	dpm/100cm^2
99-01200-05	6-9	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	19.75	31.93	54.71	dpm/100cm^2
99-01200-06	6-10	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-8.81	28.20	52.87	dpm/100cm^2
99-01200-07	6-11	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-4.67	30.34	56.01	dpm/100cm^2
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-3.04	29.78	54.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-1.58	31.21	57.05	dpm/100cm^2
99-01200-10	6-13	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-9.09	29.09	54.55	dpm/100cm^2
99-01200-11	6-14	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	0.00	30.92	56.24	dpm/100cm^2
99-01200-12	6-15	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	9.07	30.78	54.41	dpm/100cm^2
99-01200-13	6-16	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-11.01	35.25	66.09	dpm/100cm^2
99-01200-14	6-17	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-7.93	30.61	57.11	dpm/100cm^2
99-01200-15	6-18	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	16.97	32.14	55.55	dpm/100cm^2
99-01200-16	6-19	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	1.59	31.63	57.26	dpm/100cm^2
99-01200-17	6-20	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-19.12	29.62	57.36	dpm/100cm^2
99-01200-18	6-21	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	20.09	32.48	55.65	dpm/100cm^2
99-01200-19	6-22	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	245.51	50.93	58.94	dpm/100cm^2
99-01200-20	6-23	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	24.13	34.10	57.93	dpm/100cm^2
99-01201-04	6-24	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	3.02	25.10	45.73	dpm/100cm^2
99-01201-05	6-25	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	2.86	23.77	43.31	dpm/100cm^2
							avg	12.76			
							min	-22.68			
							max	245.51			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Main Corridor											
99-01201-06	7-1	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	11.81	25.55	44.71	dpm/100cm^2
99-01201-07	7-2	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	7.57	25.68	45.85	dpm/100cm^2
99-01201-08	7-3	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	28.81	26.78	43.64	dpm/100cm^2
99-01201-09	7-4	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	-2.83	22.90	42.94	dpm/100cm^2
99-01201-10	7-5	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	15.20	24.38	41.88	dpm/100cm^2
99-01201-11	7-6	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	8.49	24.17	42.85	dpm/100cm^2
99-01201-12	7-7	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	19.40	26.64	45.20	dpm/100cm^2
99-01201-13	7-8	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	166.27	41.34	48.44	dpm/100cm^2
99-01201-14	7-9	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	9.42	26.84	47.59	dpm/100cm^2
99-01201-15	7-10	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	6.18	26.06	46.83	dpm/100cm^2
99-01201-16	7-11	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	29.08	29.71	48.95	dpm/100cm^2
99-01201-17	7-12	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	18.64	25.60	43.44	dpm/100cm^2
99-01201-18	7-13	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	18.76	24.07	40.61	dpm/100cm^2
99-01201-19	7-14	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	29.40	27.33	44.54	dpm/100cm^2
99-01201-20	7-15	1/23/99	1/27/99	2/11/99	9901201	Tritium	EPA 906.0 Modified	27.91	27.17	44.51	dpm/100cm^2
99-01202-04	7-16	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	0.71	12.87	23.45	dpm/100cm^2
99-01202-05	7-17	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	2.49	11.45	20.50	dpm/100cm^2
99-01202-06	7-18	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	5.57	13.08	22.91	dpm/100cm^2
99-01202-07	7-19	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	7.63	12.21	20.93	dpm/100cm^2
99-01202-08	7-20	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	5.18	12.18	21.33	dpm/100cm^2
99-01202-09	7-21	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	7.06	12.26	21.14	dpm/100cm^2
99-01202-10	7-22	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	-3.15	10.97	20.73	dpm/100cm^2
99-01202-11	7-23	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	-2.58	11.31	21.24	dpm/100cm^2
99-01202-12	7-24	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	5.87	12.33	21.48	dpm/100cm^2
99-01202-13	7-25	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	-4.31	10.59	20.28	dpm/100cm^2
99-01202-14	7-26	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	7.55	12.07	20.70	dpm/100cm^2
99-01202-15	7-27	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	7.16	12.44	21.45	dpm/100cm^2
99-01202-16	7-28	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	-1.90	11.17	20.85	dpm/100cm^2
99-01202-17	7-29	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	7.01	12.18	21.00	dpm/100cm^2
99-01202-18	7-30	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	0.61	11.00	20.04	dpm/100cm^2
99-01202-19	7-31	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	-3.18	11.07	20.92	dpm/100cm^2
99-01202-20	7-32	1/23/99	1/27/99	2/11/99	9901202	Tritium	EPA 906.0 Modified	5.84	12.27	21.38	dpm/100cm^2
99-01203-04	7-33	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	7.83	28.31	50.46	dpm/100cm^2
99-01203-05	7-34	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	28.56	30.79	51.10	dpm/100cm^2
99-01203-06	7-35	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	7.87	28.44	50.68	dpm/100cm^2
99-01203-07	7-36	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	45.65	31.28	49.00	dpm/100cm^2

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
99-01203-08	7-37	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	-6.31	26.94	50.78	dpm/100cm^2
99-01203-09	7-38	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	14.82	30.44	53.01	dpm/100cm^2
99-01203-10	7-39	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	4.78	28.44	51.29	dpm/100cm^2
99-01203-11	7-40	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	13.77	35.95	63.33	dpm/100cm^2
99-01203-12	7-41	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	9.30	28.19	49.94	dpm/100cm^2
99-01203-13	7-42	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	21.74	29.51	50.01	dpm/100cm^2
99-01203-14	7-43	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	20.27	29.47	50.22	dpm/100cm^2
99-01203-15	7-44	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	56.01	34.48	53.05	dpm/100cm^2
99-01203-16	7-45	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	3.16	28.03	50.86	dpm/100cm^2
99-01203-17	7-46	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	12.81	23.82	41.26	dpm/100cm^2
99-01203-18	7-47	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	6.86	30.79	55.20	dpm/100cm^2
99-01203-19	7-48	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	14.80	30.40	52.95	dpm/100cm^2
99-01203-20	7-49	1/23/99	1/27/99	2/14/99	9901203	Tritium	EPA 906.0 Modified	54.78	34.59	53.46	dpm/100cm^2
99-01204-04	7-50	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	64.51	35.11	53.26	dpm/100cm^2
							avg	16.46			
							min	-6.31			
							max	166.27			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Upstairs											
99-01204-05	8-1	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	0.00	30.85	56.29	dpm/100cm^2
99-01204-06	8-2	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	26.42	33.94	57.26	dpm/100cm^2
99-01204-07	8-3	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	3.08	29.55	53.36	dpm/100cm^2
99-01204-08	8-4	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	27.74	31.97	53.45	dpm/100cm^2
99-01204-09	8-5	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-1.79	33.86	62.11	dpm/100cm^2
99-01204-10	8-6	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-13.18	26.46	50.77	dpm/100cm^2
99-01204-11	8-7	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-1.60	30.34	55.66	dpm/100cm^2
99-01204-12	8-8	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-1.67	31.50	57.79	dpm/100cm^2
99-01204-13	8-9	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	8.02	31.28	55.61	dpm/100cm^2
99-01204-14	8-10	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	0.00	30.78	56.18	dpm/100cm^2
99-01204-15	8-11	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-4.55	28.36	52.61	dpm/100cm^2
99-01204-16	8-12	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-3.24	30.49	56.25	dpm/100cm^2
99-01204-17	8-13	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-19.80	35.56	68.65	dpm/100cm^2
99-01204-18	8-14	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	2.19	41.78	75.84	dpm/100cm^2
99-01204-19	8-15	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	190.51	54.46	70.28	dpm/100cm^2
99-01204-20	8-16	1/23/99	1/27/99	2/14/99	9901204	Tritium	EPA 906.0 Modified	-21.36	31.59	61.73	dpm/100cm^2
99-01205-04	8-17	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	10.41	38.07	67.82	dpm/100cm^2
99-01205-07	8-20	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	26.03	33.50	56.51	dpm/100cm^2
99-01205-08	8-21	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	7.87	28.76	51.24	dpm/100cm^2
99-01205-09	8-22	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	-3.10	27.17	50.49	dpm/100cm^2
99-01205-10	8-23	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	19.66	31.14	53.36	dpm/100cm^2
99-01205-11	8-24	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	25.57	31.00	52.04	dpm/100cm^2
99-01205-12	8-25	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	20.09	29.52	50.32	dpm/100cm^2
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-6.27	34.48	63.16	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	7.66	34.89	61.74	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-11.88	32.15	59.84	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-32.79	31.95	62.92	dpm/100cm^2
							avg	9.41			
							min	-32.79			
							max	190.51			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Incinerator											
99-01205-05	9-18	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	-27.98	42.01	82.85	dpm/100cm^2
99-01205-06	9-19	1/23/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	-8.91	51.75	96.75	dpm/100cm^2
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	18.90	32.48	55.97	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	11.21	40.99	73.03	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	15.56	41.11	72.42	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	39.92	58.67	100.02	dpm/100cm^2
99-01205-17	9-3	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	9.99	30.62	54.23	dpm/100cm^2
99-01205-18	9-4	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	21.27	31.25	53.28	dpm/100cm^2
99-01205-19	9-5	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	32.82	32.48	53.44	dpm/100cm^2
99-01205-20	9-6	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	13.01	30.23	52.94	dpm/100cm^2
99-01206-04	9-7	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-168.64	55.69	112.58	dpm/100cm^2
99-01206-05	9-8	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-308.04	56.82	128.53	dpm/100cm^2
99-01206-06	9-9	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-357.82	76.54	167.22	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-206.81	39.71	88.94	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-293.63	58.73	130.27	dpm/100cm^2
99-01206-09	9-11	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-278.48	54.35	121.25	dpm/100cm^2
99-01206-10	9-12	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-317.23	58.99	133.16	dpm/100cm^2
99-01206-11	9-13	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-362.49	64.28	146.88	dpm/100cm^2
99-01206-12	9-14	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-226.04	51.38	110.81	dpm/100cm^2
99-01206-13	9-15	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-263.20	47.79	108.53	dpm/100cm^2
99-01206-14	9-16	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-240.11	50.93	111.47	dpm/100cm^2
99-01206-15	9-17	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-259.35	49.40	110.85	dpm/100cm^2
99-01206-16	9-18	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-273.96	53.91	120.03	dpm/100cm^2
99-01206-17	9-19	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-262.59	52.09	115.77	dpm/100cm^2
99-01206-18	9-20	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-259.14	50.99	113.53	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-273.03	53.29	118.88	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-236.07	57.13	121.68	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	2916.03	217.10	145.98	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-9.03	39.59	72.81	dpm/100cm^2
99-01207-06	9-23	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-21.00	40.81	76.92	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-42.93	36.09	72.08	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-28.27	39.62	75.96	dpm/100cm^2
99-01207-09	9-25	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-124.70	135.53	264.51	dpm/100cm^2
							avg	-53.66			
							min	-362.49			
							max	2916.03			

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Concrete Cores											
98-02168-13	C5-1A	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	34.27	1.60	0.75	PCI/G
99-03013-07	C5-1B	2/18/99	3/2/99	3/8/99	9903013	Total Strontium	ElChroM SRW01 Modified	-0.20	0.34	0.92	PCI/G
98-02168-16	C5-2A	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	11.21	1.20	1.18	PCI/G
99-03013-08	C5-2B	2/18/99	3/2/99	3/8/99	9903013	Total Strontium	ElChroM SRW01 Modified	0.21	0.28	0.66	PCI/G
Soils											
99-01188-01 K	KNOWN	1/27/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	22.42	0.47		PCI/G
99-01188-01 S	SPIKE	1/27/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	19.95	1.27	0.82	PCI/G
99-01188-02 B	BLANK	1/27/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	-0.22	0.29	0.81	PCI/G
99-01188-05	SU005-1	1/25/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	0.23	0.31	0.72	PCI/G
99-01188-06	SU005-2	1/25/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	-0.43	0.19	0.62	PCI/G
99-01188-09	SU005-3	1/25/99	1/27/99	2/4/99	9901188	Total Strontium	ElChroM SRW01 Modified	2.85	0.54	0.76	PCI/G
98-02168-14	C5-1D	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	-0.11	0.27	0.72	PCI/G
98-02168-15	C5-1E	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	0.11	0.26	0.62	PCI/G
98-02168-17	C5-2E	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	0.29	0.28	0.63	PCI/G
98-02168-18	C5-2F	2/18/99	2/23/99	2/26/99	9802168	Total Strontium	ElChroM SRW01 Modified	-0.33	0.22	0.66	PCI/G

APPENDIX D

DISCRETE LOCATION SURVEY RESULTS

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU003	Purpose:	Date: 1/25/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 50 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
3-1	Stall Floor 16" from S. Wall - Small Tile	N/A	35	-15	-33		N
3-2	Stall Floor Middle of North End - Small Tile	N/A	30	-20	-43		N
3-3	Stall Floor - Center (small Tile)	N/A	60	10	22		N
3-4	Floor under sink (small tile)	N/A	40	-10	-22		N
3-5	Wall tile At floor inside Door	N/A	35	-15	-33		N
3-6	Plaster upper wall behind door	N/A	55	5	11		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU003Rf.XLS

ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM

Location: SU003	Purpose:	Date: 1/25/99

BETA CONTAMINATION SURVEY INFORMATION
Probe Model #: 44-116 Serial #: 142893
Meter Model #: 2221 Serial #: 149938
Efficiency (E): 0.30 cpm/dpm Isotope: SY90
Background (B) varies (see below) cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
3-1	Stall Floor 16" from S. Wall - Small Tile	N/A	800	240	800		N
3-2	Stall Floor Middle of North End - Small Tile	N/A	760	200	667		N
3-3	Stall Floor - Center (small Tile)	N/A	820	260	867		N
3-4	Floor under sink (small tile)	N/A	800	240	800		N
3-5	Wall tile At floor inside Door	N/A	750	190	633		N
3-6	Plaster upper wall behind door	N/A	375	85	283		N

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1
(3) If total dpm/100 cm^2 is >1000 then smear is required

Surveyor's Remarks:
Backgrounds: Plaster 290, Tiles 560

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU005	Purpose:	Date: 1/23/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 40 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
5-1	Tunnel Northmost Cleanout (Vinyl)	0501F	50	10	22		N
5-2	Tunnel - Next Cleanout (Vinyl)	0501F	60	20	43		N
5-3	Threshold - Mid Tunnel (Vinyl)	0501F	45	5	11		N
5-4	Threshold to Control Rm. (west) (Vinyl)	0502F	40	0	0		N
5-5	Threshold to Control Rm. (east) (Vinyl)	0505F	55	15	33		N
5-6	3' from Threshold (east) (Painted Concrete)	0505F	55	15	33		N
5-7	2' outside door to RT-4-B (Painted Concrete)	0505F	55	15	33		N
5-8	NW corner @ Control Room Window (Painted Concrete)	0505F	40	0	0		N
5-9	Center of Floor outside Control Room (Painted Concrete)	0505F	55	15	33		N
5-10	Crack adj. to Cleanout by Control Room (Painted Concrete)	0505F	65	25	54		N
5-11	Treatment Room (south) (VAT)	0503F	65	25	54		N
5-12	Treatment Room (North) (VAT)	0503F	60	20	43		N
5-13	Fresh Air Room - North End (Concrete)	0504F	60	20	43		N
5-14	Fresh Air Room - Adjacent to Stairs (Concrete)	0504F	50	10	22		N
5-15	General Waiting Area (no hot spot) (by Op's Door) (Vinyl)	0502F	60	20	43		N
5-16	Upper Wall outside Control Room (Plaster)	0505W	50	10	22		N
5-17	Upper Wall in Treatment Room (Tile)	0503E	65	25	54		N
5-18	Ceiling Outside Lab (Plaster)	0501	40	0	0		N
I-1	Fresh Air Room - North Under Pipe	504	36	-10.6	-23.04		N
I-2	Fresh Air Room - North at Pipe End	504	42	-4.6	-10		N
I-3	Fresh Air Room - Sump Edge	504	52	5.4	11.74		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU005Rf.XLS

ATTACHMENT 2

TOTAL BETA CONTAMINATION SURVEY FORM

(Areas not Covered by MSI Survey)

Location: SU005	Purpose:	Date: 1/23/99

BETA CONTAMINATION SURVEY INFORMATION

Probe Model #: 44-116 Serial #: 131321

Meter Model #: 2221 Serial #: 108846

Efficiency (E): 0.30cpm/dpm Isotope: SY90

Background (B) varies, see bottom cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
5-16	Upper Wall outside Control Room (Plaster)	0505W	429	139	463		N
5-17	Upper Wall in Treatment Room (Tile)	0503E	956	-44	-147		N
5-18	Ceiling Outside Lab (Plaster)	0501	385	95	317		N

(1) Net cpm is calculated as Gross cpm - Background cpm

(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1

(3) If total dpm/100 cm^2 is > 1000 then item is not acceptable for release

Surveyor's Remarks:

Backgrounds: Plaster 290, Wall Tiles 1000

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU006	Purpose:	Date: 1/23/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): .46 cpm/dpm Isotope: SY90
Background:(B) 40 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	Max cpm	Exceeds Release? (3)
6-1	Janitor's Closet - small tiles	0602F	55	15	33		N
6-2	Janitor's Closet - small tiles	0602F	40	0	0		N
6-3	Corridor - vinyl tiles	0601F	85	45	98		N
6-4	Corridor - vinyl tiles	0601F	40	0	0		N
6-5	Corridor - vinyl tiles	0601F	50	10	22		N
6-6	Corridor inside cage - vinyl tiles	0601F	45	5	11		N
6-7	Corridor inside cage - vinyl tiles	0601F	30	-10	-22		N
6-8	Corridor - vinyl tiles	0601F	45	5	11		N
6-9	E-47 - Vinyl Tiles	0603F	55	15	33		N
6-10	E-47 - Vinyl Tiles	0603F	30	-10	-22		N
6-11	E-47 - Vinyl Tiles	0603F	35	-5	-11		N
6-12	E-47 Toilet - Small Tiles	0603F	75	35	76		N
6-13	E-47 - Vinyl Tiles	0603F	35	-5	-11		N
6-14	E-47 - Closet - Concrete	0603F	80	40	87		N
6-15	E-45 Toilet - Small Tiles	0605F	45	5	11		N
6-16	E-45 - Vinyl Tiles	0605F	50	10	22		N
6-17	Threshold to Stairwell - Orig. Black tile	0601F	50	10	22		N
6-18	Stairwell - Original Black Tile	0604F	55	15	33		N
6-19	Stairwell - Original Black Tile	0604F	55	15	33		N
6-20	Stairwell Landing - Original Black Tile	0604F	75	35	76		N
6-21	E-47 Wall - Plaster over Cinder	0603N	55	15	33		N
6-22	Corridor Wall - Plaster over Cinder	0601S	40	0	0		N
6-23	Corridor Wall - Plaster over Cinder	0601E	34	-6	-13		N
6-24	Stairwell Wall - Glazed Tile	0604W	40	0	0		N
6-25	Corridor Wall - Plaster over Cinder	0601	65	25	54		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU006Rf.XLS

ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM
(Areas not Covered by MSI Survey)

Location: SU006	Purpose:	Date: 1/23/99

BETA CONTAMINATION SURVEY INFORMATION
Probe Model #: 44-116 Serial #: 131321
Meter Model #: 2221 Serial #: 108846
Efficiency (E): 0.30cpm/dpm Isotope: SY90
Background (B) varies, see bottom cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	Max cpm	Exceeds Release? (3)
6-1	Janitor's Closet - small tiles	0602F	610	25	83		N
6-2	Janitor's Closet - small tiles	0602F	550	-35	-117		N
6-6	Corridor inside cage - vinyl tiles	0601F	470	95	317		N
6-7	Corridor inside cage - vinyl tiles	0601F	460	85	283		N
6-12	E-47 Toilet - Small Tiles	0603F	760	175	583		N
6-14	E-47 - Closet - Concrete	0603F	550	25	83		N
6-15	E-45 Toilet - Small Tiles	0605F	900	315	1050		N
6-21	E-47 Wall - Plaster over Cinder	0603N	490	165	550		N
6-22	Corridor Wall - Plaster over Cinder	0601S	520	195	650		N
6-23	Corridor Wall - Plaster over Cinder	0601E	480	155	517		N
6-24	Stairwell Wall - Glazed Tile	0604W	890	-35	-117		N
6-25	Corridor Wall - Plaster over Cinder	0601	540	215	717		N

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1
(3) If total dpm/100 cm^2 is > 1000 then item is not acceptable for release

Surveyor's Remarks:
Backgrounds: Small tiles 585, Vinyl 375, concrete 525, plaster 325, glazed tile 925

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU007	Purpose:	Date: 1/23/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 40 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
7-1	at E73 Door (red tile)	0703F	46	6	13		N
7-2	at E69 Door (red tile)	0703F	47	7	15		N
7-3	at SW Corner by E-1 (red/black tile)	0703F	40	0	0		N
7-4	at threshold (LHS) by E-5 (old tile)	0703F	43	3	7		N
7-5	Outside E-15 (RHS) old tile	0701F	38	-2	-4		N
7-6	7' in RHS from E-5 - old tile	0703F	43	3	7		N
7-7	Threshold - womens toilet RHS (blk /cer tile	0702F	44	4	9		N
7-8	Across from E-19@ tile color change (red)	0702F	40	0	0		N
7-9	Threshold of E-23 (green/black tile)	0716F	50	10	22		N
7-10	Carpenter Shop E-23 - green tile	0716F	42	2	4		N
7-11	Lower Wall cove base E-23	0716N	45	5	11		N
7-12	Lower Wall under radiator (tile) E-9	0708S	38	-2	-4		N
7-13	Lower Wall E-13 (plaster)	0706W	44	4	9		N
7-14	Lower Wall across from E-21 (cove base)	0702N	39	-1	-2		N
7-15	Middle Wall across from E21 (tiled)	0702N	40	0	0		N
7-16	E25 Threshold (RHS) Black Tile	N/A	46	6	13		N
7-17	E25 Inside (Black Tile/Grey Tile)	N/A	55	15	33		N
7-18	Threshold E25A (black tile)	N/A	50	10	22		N
7-19	Threshold at Rollup Door LHS (blk/wh tile)	713	34	-6	-13		N
7-20	Mid Wall (tile)	0714W	52	12	26		N
7-21	Threshold (beige/Black tile)	0714F	46	6	13		N
7-22	Green Tile Floor	0714F	49	9	20		N
7-23	Mid Wall (plaster)	0714N	33	-7	-15		N
7-24	Inside Room (Blk tile)	0714F	35	-5	-11		N
7-25	Outside at black tile edge	0714F	37	-3	-7		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU007RAf.XLS

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU007	Purpose:	Date: 1/23/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 40 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	Coordinate	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	Max cpm	Exceeds Release? (3)
7-26	Hallway - Black Tile Edge	0714F	40	0	0		N
7-27	Hallway - Black Tile Edge	0714F	45	5	11		N
7-28	E57 Black/Beige Tile	0715F	35	-5	-11		N
7-29	E57 Black/Beige Tile	0715F	55	15	33		N
7-30	E57 Plaster Wall	0715N	45	5	11		N
7-31	Plaster Wall (in Room)	N/A	30	-10	-22		N
7-32	E29 Threshold (LHS) (Black/reen Tile)	0717F	75	35	76		N
7-33	E23 Threshold (Black/Green Tile)	0716F	50	10	22		N
7-34	E27 Threshold (Blakck/Green Tile)	N/A	30	-10	-22		N
7-35	E21 Threshold (black/Beige Tiel)	0718F	60	20	43		N
7-36	E21 Floor (Green Tile)	0718F	35	-5	-11		N
7-37	E21 Door Frame (Plaster)	0718N	35	-5	-11		N
7-38	Tall west of E-31 (black/beige tile)	0713S	45	5	11		N
7-39	Tile inside cage (red/beige) across E31	0713F	55	15	33		N
7-40	Wall (base cove) LHS Between 25/27	0713S	40	0	0		N
7-41	Wall Tile LHS Between 25/27	0713S	60	20	43		N
7-42	E73 Floor Drain (Painted Concrete)	0704F	60	20	43		N
7-43	E73 Closet Concrete Floor	0704F	55	15	33		N
7-44	E73 Wall Cinder Block	0704S	35	-5	-11		N
7-45	E73 Cleanouts Concrete Floor	0704F	35	-5	-11		N
7-46	E73 Painted Concrete Floor	0704F	50	10	22		N
7-47	E73 Painted Cinder block Wall	0704N	35	-5	-11		N
7-48	South of Elevator Wall Tile	0703E	50	10	22		N
7-49	Men's Room RHS Threshold Blk/Small Blue tile	0710F	40	0	0		N
7-50	Ladies Room RHS Wall Tiles	0711E	40	0	0		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU007RBf.XLS

ATTACHMENT 2

TOTAL BETA CONTAMINATION SURVEY FORM

(Areas not Covered by MSI Survey)

Location: SU007	Purpose:	Date: 1/23/99

BETA CONTAMINATION SURVEY INFORMATION

Probe Model #: 44-116 Serial #: 142893

Meter Model #: 2221 Serial #: 149938

Efficiency (E): 0.28cpm/dpm Isotope: SY90

Background (B) varies, (see below) cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
7-6	7' in RHS from E-5 - old tile	N/A	394	19	68		N
7-11	Lower Wall cove base E-23 (red tile)	0716N	424	49	175		N
7-12	Lower Wall under radiator (tile) E-9	0708S	346	-29	-104		N
7-13	Lower Wall E-13 (plaster)	0706W	341	16	57		N
7-14	Lower Wall across from E-21 (cove base)	0702N	462	87	311		N
7-15	Middle Wall across from E21 (tiled)	0702N	915	-10	-36		N
7-16	E25 Threshold (RHS) Black Tile	N/A	474	99	354		N
7-17	E25 Inside (Black Tile/Grey Tile)	N/A	423	48	171		N
7-18	Threshold E25A (black tile)	N/A	352	-23	-82		N
7-20	Mid Wall (tile)	0714W	894	-31	-111		N
7-23	Mid Wall (plaster)	0714N	265	-60	-214		N
7-30	E57 Plaster Wall	0715N	314	-11	-39		N
7-31	Plaster Wall (in Room)	0714N	259	-66	-236		N
7-34	E27 Threshold (Blakck/Green Tile)	N/A (?)	348	-27	-96		N
7-37	E21 Door Frame (Plaster)	0712N	371	46	164		N
7-38	Wall west of E-31 (black/beige tile)	0713S	468	93	332		N
7-39	Tile inside cage (red/beige) across E31	0713F	395	20	71		N
7-40	Wall (base cove) LHS Between 25/27	0713S	487	112	400		N
7-41	Wall Tile LHS Between 25/27	0713S	876	-49	-175		N
7-43	E73 Closet Concrete Floor	N/A	402	-123	-439		N
7-44	E73 Wall Cinder Block	0704S	494	19	68		N
7-47	E73 Painted Cinder block Wall	0704N	413	-62	-221		N
7-48	South of Elevator Wall Tile	0703E	922	-3	-11		N
7-50	Ladies Room RHS Wall Tiles	0711E	878	-47	-168		N

(1) Net cpm is calculated as Gross cpm - Background cpm

(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1

(3) If total dpm/100 cm^2 is > 1000 then item is not acceptable for release

Surveyor's Remarks:

Backgrounds: red or black tile 375, plaster 325, vat 375, cinder block 475, wall tile 925, concrete 525

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU008	Purpose:	Date: 1/23/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #: 43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 40 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
8-1	machine Room Crack	0801F	29	-11	-24		N
8-2	machine Room Crack	0801F	48	8	17		N
8-3	machine Room Hole	0801F	47	7	15		N
8-4	machine Room Corner Crevice	0801F	54	14	30		N
8-5	machine Room on crack behind round wall	0801F	55	15	33		N
8-6	machine Room near door on round wall	0801F	37	-3	-7		N
8-7	machine Room adjacent to ladder	0801F	45	5	11		N
8-8	machine Room - adjacent to conduits	0801F	51	11	24		N
8-9	machine Room - adjacent to electrical junction box	0801F	43	3	7		N
8-10	Corner crack in open area	0801F	50	10	22		N
8-11	Landing at closet	N/A	46	6	13		N
8-12	Floor landing crack by machine room door	N/A	45	5	11		N
8-13	unassigned Space - at door from SW	N/A	47	7	15		N
8-14	unassigned Space - floor crack	N/A	46	6	13		N
8-15	unassigned Space - floor	N/A	46	6	13		N
8-16	unassigned Space - at mastic groove	N/A	43	3	7		N
8-17	unassigned Space - at mastic groove	N/A	41	1	2		N
8-18	unassigned Space - at mastic groove	N/A	51	11	24		N
8-19	unassigned Space - at mastic crack/groove	N/A	37	-3	-7		N
8-20	unassigned Space - at broken concrete	N/A	57	17	37		N
8-21	unassigned Space - cinder block	N/A	43	3	7		N
8-22	Plaster Wall - landing	0801E	36	-4	-9		N
8-23	Machine Room Cinder Block wall	0801N	42	2	4		N
8-24	Machine Room Cinder Block wall	0801S	58	18	39		N
8-25	unassigned Space - Cinder Block Wall	N/A	36	-4	-9		N
8-26	Three Roof Vents **	N/A	75	35	76		N
8-27	Air Handler on Roof **	N/A	50	10	22		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU008Rf.XLS

ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM
(Areas not Covered by MSI Survey)

Location: SU008	Purpose:	Date: 1/23/99

BETA CONTAMINATION SURVEY INFORMATION
Probe Model #: 44-116 Serial #: 142893
Meter Model #: 2221 Serial #: 149938
Efficiency (E): 0.28cpm/dpm Isotope: SY90
Background (B) varies, see bottom cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/100 cm^2(2)	reserved	Exceeds Release? (3)
8-11	Landing at closet	N/A	456	81	289		N
8-12	Floor landing crack by machine room door	N/A	393	18	64		N
8-13	unassigned Space - at door from SW	N/A	409	-116	-414		N
8-14	unassigned Space - floor crack	N/A	413	-112	-400		N
8-15	unassigned Space - floor	N/A	422	-103	-368		N
8-16	unassigned Space - at mastic groove	N/A	390	-135	-482		N
8-17	unassigned Space - at mastic groove	N/A	354	-171	-611		N
8-18	unassigned Space - at mastic groove	N/A	405	-120	-429		N
8-19	unassigned Space - at mastic crack/groove	N/A	488	-37	-132		N
8-20	unassigned Space - at broken concrete	N/A	456	-69	-246		N
8-21	unassigned Space - cinder block	N/A	460	-15	-54		N
8-22	Plaster Wall - landing	N/A	460	135	482		N
8-23	Machine Room Cinder Block wall	0801N	530	55	196		N
8-24	Machine Room Cinder Block wall	0801S	600	75	268		N
8-25	unassigned Space - Cinder Block Wall	N/A	450	-75	-268		N
8-26	Three Roof Vents **	N/A	100	50	172		N
8-27	Air Handler on Roof **	N/A	110	60	207		N

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1
(3) If total dpm/100 cm^2 is > 1000 then item is not acceptable for release

Surveyor's Remarks:
Bkgds: concrete 525, plaster 325, cinder block 475, vinyl tiles 375
** Taken with Ratemeter 102839 and probe 112967, Bkgd 50, Eff. 0.29

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: SU009 - Incinerator	Purpose:	Date: 1/25/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #: 43-10-1 Serial #: 141392
Meter Model #: 2929 Serial #: 137620
Efficiency (E): 0.46 cpm/dpm Isotope: SY90
Background:(B) 50 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	Coordinate	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	Max cpm	Exceeds Release? (3)
9-1	Left Ash Bin	N/A	50	0	0		N
9-2	Right Ash Bin	N/A	50	0	0		N
9-3	Floor	N/A	65	15	33		N
9-4	Drain Head	N/A	60	10	22		N
9-5	Back Floor	N/A	60	10	22		N
9-6	Stairs	N/A	60	10	22		N
9-7	Air Handler	N/A	40	-10	-22		N
9-8	Upper Floor	N/A	45	-5	-11		N
9-9	Inside Scrubber	N/A	55	5	11		N
9-10	Floor By Bags	N/A	55	5	11		N
9-11	Lower Wall	N/A	70	20	43		N
9-12	Floor Behind Scrubber	N/A	50	0	0		N
9-13	Floor Under Scrubber	N/A	60	10	22		N
9-14	Back Floor	N/A	55	5	11		N
9-15	Back Doorway Floor	N/A	55	5	11		N
9-16	Back Wall - Brick	N/A	55	5	11		N
9-17	Wall behind Scrubber (Brick)	N/A	50	0	0		N
9-18	Floor behind Coal Storage	N/A	50	0	0		N
9-19	Concrete Floor (Middle)	N/A	50	0	0		N
9-20	Brick Wall behind Coal Storage	N/A	45	-5	-11		N
9-21	Top Of Incinerator	N/A	70	20	43		N
9-22	Upper Wall behind Incinerator	N/A	60	10	22		N
9-23	Pump Stand to Scrubber	N/A	70	20	43		N
9-24	Upper Scrubber	N/A	60	10	22		N
9-25	Upper Coal Storage	N/A	45	-5	-11		N

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

SU009Rf.XLS

ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM
(Areas not Covered by MSI Survey)

Location: SU009	Purpose:	Date: 1/23/99

BETA CONTAMINATION SURVEY INFORMATION
Probe Model #: 44-116 Serial #: 131321
Meter Model #: 2221 Serial #: 108846
Efficiency (E): 0.30cpm/dpm Isotope: SY90
Background (B) varies, see bottom cpm

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	reserved	Exceeds Release? (3)
9-1	Left Ash Bin	N/A	850	540	1929		N
9-2	Right Ash Bin	N/A	790	480	1714		N
9-3	Floor	N/A	505	105	375		N
9-4	Drain Head	N/A	350	40	143		N
9-5	Back Floor	N/A	325	-75	-268		N
9-6	Stairs	N/A	475	75	268		N
9-7	Air Handler	N/A	500	190	679		N
9-8	Upper Floor	N/A	600	200	714		N
9-9	Inside Scrubber	N/A	375	65	232		N
9-10	Floor By Bags	N/A	400	0	0		N
9-11	Lower Wall	N/A	400	0	0		N
9-12	Floor Behind Scrubber	N/A	530	130	464		N
9-13	Floor Under Scrubber	N/A	540	140	500		N
9-14	Back Floor	N/A	340	-60	-214		N
9-15	Back Doorway Floor	N/A	340	-60	-214		N
9-16	Back Wall - Brick	N/A	620	70	250		N
9-17	Wall behind Scrubber (Brick)	N/A	465	-85	-304		N
9-18	Floor behind Coal Storage	N/A	530	130	464		N
9-19	Concrete Floor (Middle)	N/A	530	130	464		N
9-20	Brick Wall behind Coal Storage	N/A	600	50	179		N
9-21	Top Of Incinerator	N/A	450	140	500		N
9-22	Upper Wall behind Incinerator	N/A	300	10	36		N
9-23	Pump Stand to Scrubber	N/A	430	120	429		N
9-24	Upper Scrubber	N/A	340	30	107		N
9-25	Upper Coal Storage	N/A	460	150	536		N

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)*PF Note: PF for Ludlum 44-116 PF=1
(3) If total dpm/100 cm^2 is > 1000 then item is not acceptable for release

Surveyor's Remarks:
Backgrounds: Plaster 290, Concrete 400, Metals 310, Cinder Block 475, Brick 550

APPENDIX E

POST-REMEDIATION AND SUPPLEMENTAL TRITIUM RESULTS

ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM

Location: See survey item description below		Purpose: Final Release			Date: 4/1/99		
BETA CONTAMINATION SURVEY INFORMATION		Meter Model #: 2221 Serial #: 117648					
Probe Model #: 44-116 Serial #: 127690		Efficiency (E): 0.30 cpm/dpm Isotope: SY90 Background (B) 490 cpm					
#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	(reserved)	Exceeds Release? (3)
D5-1	0501, Tunnel	3X,17Y	10000	9510	31700		NO
D5-8	0501, Tunnel	1X,8Y	568	78	260		NO
D5-4	0503, Treatment Room	1X,1Y	662	172	573		NO
D5-6	0503, Treatment Room	3X,1Y	620	130	433		NO
D5-1	0504, Fresh Air Unit	1X,3Y	610	120	400		NO
D5-1	0504, Fresh Air Unit	2X,5Y	725	235	783		NO
D5-1	0504, Fresh Air Unit	3X,5Y	678	188	627		NO
D5-1	0504, Fresh Air Unit	4X,5Y	486	-4	-13		NO
NA	0505 (on separate survey sheet)						
D6-1	0601, West Basement Stairwell	1X,1Y	652	162	540		NO
D7-3	0714, Room E-51	3X,7Y	605	115	383		NO
D7-2	0716, Room E-23	1X,5Y	536	46	153		NO
D7-1	0717, Room E-29	1X,4Y	559	69	230		NO

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm2 is calculated as Net cpm/E (cpm/dpm)*PF
(3) If total dpm/100 cm2 is >1000 then item is not releasable
Note: for Ludlum 44-116 PF=1

Surveyor's Remarks: Background here is measured as 490.

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: Back Corridor Floor of SU005 (SA0505F)	Purpose: Final Release	Date: 4/1/99
REMOVABLE BETA CONTAMINATION SURVEY INFORMATION		
Counter Model #:43-10-1 Serial #: 138385	Efficiency (E): 0.48 cpm/dpm Isotope: SY90	
Meter Model #: 2929 Serial #: 132807	Background:(B) 55 cpm Count Time (t) 1 min	

#	SURVEY ITEM/DESCRIPTION	Coordinate	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	(reserved)	Exceeds Release? (3)
1	Floor	3X, 12Y	50	-5	-10		NO
2		4X, 12Y	65	10	21		NO
3		5X, 12Y	80	25	52		NO
4		3X, 11Y	60	5	10		NO
5		4X, 11Y	75	20	42		NO
6		5X, 11Y	45	-10	-21		NO
7		3X, 10Y	50	-5	-10		NO
8		4X, 10Y	60	5	10		NO
9		5X, 10Y	35	-20	-42		NO
10		3X, 9Y	65	10	21		NO
11		4X, 9Y	90	35	73		NO
12		5X, 9Y	50	-5	-10		NO
13		3X, 8Y	30	-25	-52		NO
14		4X, 8Y	90	35	73		NO
15		5X, 8Y	90	35	73		NO
16		3X, 7Y	60	5	10		NO
17		4X, 7Y	90	35	73		NO
18		5X, 7Y	65	10	21		NO
19		3X, 6Y	75	20	42		NO
20		4X, 6Y	85	30	63		NO
21		5X, 6Y	55	0	0		NO
22		3X, 5Y	50	-5	-10		NO
23		4X, 5Y	45	-10	-21		NO
24		5X, 5Y	70	15	31		NO
25		3X, 4Y	55	0	0		NO
26		4X, 4Y	80	25	52		NO
27		5X, 4Y	70	15	31		NO
28		3X, 3Y	50	-5	-10		NO
29		4X, 3Y	35	-20	-42		NO
30		1X, 2Y	80	25	52		NO
31		2X, 2Y	45	-10	-21		NO
32		3X, 2Y	55	0	0		NO
33		4X, 2Y	50	-5	-10		NO
34		1X, 1Y	40	-15	-31		NO
35		2X, 1Y	80	25	52		NO
36		3X, 1Y	65	10	21		NO
37		4X, 1Y	75	20	42		NO

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is <200 then item is acceptable for release

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ATTACHMENT 2
TOTAL BETA CONTAMINATION SURVEY FORM

Location: Back Corridor Floor of SU005 (SA0505F)	Purpose: Final Release	Date: 4/1/99
BETA CONTAMINATION SURVEY INFORMATION	Meter Model #: 2221 Serial #: 117648	
Probe Model #: 44-116 Serial #: 127690	Efficiency (E): 0.30 cpm/dpm Isotope: SY90 Background (B) 490 cpm	

#	SURVEY ITEM/DESCRIPTION	MSI Designation	Gross cpm	Net cpm(1)	dpm/ 100cm^2(2)	(reserved)	Exceeds Release? (3)
1	Floor	3X, 12Y	746	256	853		NO
2		4X, 12Y	862	372	1240		NO
3		5X, 12Y	598	108	360		NO
4		3X, 11Y	740	250	833		NO
5		4X, 11Y	722	232	773		NO
6		5X, 11Y	618	128	427		NO
7		3X, 10Y	628	138	460		NO
8		4X, 10Y	650	160	533		NO
9		5X, 10Y	755	265	883		NO
10		3X, 9Y	755	265	883		NO
11		4X, 9Y	802	312	1040		NO
12		5X, 9Y	620	130	433		NO
13		3X, 8Y	658	168	560		NO
14		4X, 8Y	642	152	507		NO
15		5X, 8Y	620	130	433		NO
16		3X, 7Y	752	262	873		NO
17		4X, 7Y	584	94	313		NO
18		5X, 7Y	629	139	463		NO
19		3X, 6Y	590	100	333		NO
20		4X, 6Y	594	104	347		NO
21		5X, 6Y	586	96	320		NO
22		3X, 5Y	690	200	667		NO
23		4X, 5Y	734	244	813		NO
24		5X, 5Y	602	112	373		NO
25		3X, 4Y	776	286	953		NO
26		4X, 4Y	670	180	600		NO
27		5X, 4Y	799	309	1030		NO
28		3X, 3Y	501	11	37		NO
29		4X, 3Y	660	170	567		NO
30		1X, 2Y	610	120	400		NO
31		2X, 2Y	470	-20	-67		NO
32		3X, 2Y	472	-18	-60		NO
33		4X, 2Y	608	118	393		NO
34		1X, 1Y	600	110	367		NO
35		2X, 1Y	470	-20	-67		NO
36		3X, 1Y	467	-23	-77		NO
37		4X, 1Y	460	-30	-100		NO

(1) Net cpm is calculated as Gross cpm - Background cpm
(2) dpm/100 cm2 is calculated as Net cpm/E (cpm/dpm)*PF
(3) If total dpm/100 cm2 is >1000 then item is not releasable
Note: for Ludlum 44-116 PF=1

Surveyor's Remarks: Background here is measured as 490.

su0505tot_110199f.xls

ATTACHMENT 2
REMOVABLE BETA CONTAMINATION SURVEY FORM

Location: Back Corridor Floor of SU005 (SA0505F)	Purpose: Final Release	Date: 3/29/99

REMOVABLE BETA CONTAMINATION SURVEY INFORMATION
Counter Model #:43-10-1 Serial #: 127690
Meter Model #: 2929 Serial #: 117648
Efficiency (E): 0.47 cpm/dpm Isotope: SY90
Background:(B) 55 cpm Count Time (t) 1 min

#	SURVEY ITEM/DESCRIPTION	Coordinate	Total Counts	Net cpm(1)	dpm/ 100cm^2(2)	(reserved)	Exceeds Release? (3)
1	Southwest End of Large Hot Spot	1X,3Y	70	15	32		NO
2	Middle of Large Hot Spot	2X,5Y	47	-8	-17		NO
3	Northwest end of Large Hot Spot	3X,5Y	52	-3	-6		NO
4	Small Hot Spot by Stairs	4X,5Y	52	-3	-6		NO

(1) Net cpm is calculated as (Gross counts/count time) - Background cpm
(2) dpm/100 cm^2 is calculated as Net cpm/E (cpm/dpm)
(3) If total dpm/100 cm^2 is >200 then item is not acceptable for release

Surveyor's Remarks:

STAN A. HUBER CONSULTANTS, INC.

200 NORTH CEDAR ROAD -- NEW LENOX IL 60451-1751 -- PHONE 815-485-6161

REMOVABLE CONTAMINATION WIPE TEST RESULTS

REPORT DATE: 11/08/99

FACILITY: ROY F. WESTON, INC.
VERNON HILLS IL

BACKGROUND: 23 EFFICIENCY : 0.644

SAMPLE DESCRIPTION	RADIONUCLIDE	MAX. CPM	NET CPM	DPM	uCi
A	H-3	38	15	23	0.000010
B	H-3	33	10	16	0.000007
C	H-3	40	17	26	0.000012
D	H-3	14	0	0	0.000001
E	H-3	21	0	0	0.000001
F	H-3	147	124	193	0.000087
G	H-3	33	10	16	0.000007
H	H-3	48	25	39	0.000017
I	H-3	24	1	2	0.000001
J	H-3	27	4	6	0.000003
K	H-3	21	0	0	0.000001
L	H-3	37	14	22	0.000010
M	H-3	17	0	0	0.000001
N	H-3	22	0	0	0.000001
O	H-3	26	3	5	0.000002
P	H-3	17	0	0	0.000001
Q	H-3	21	0	0	0.000001
R	H-3	21	0	0	0.000001
1	H-3	57	34	53	0.000024
2	H-3	13	0	0	0.000001
3	H-3	104	81	126	0.000057
4	H-3	13	0	0	0.000001
5	H-3	522	499	775	0.000349
6	H-3	18	0	0	0.000001
7	H-3	39	16	25	0.000011
8	H-3	13	0	0	0.000001
9	H-3	17	0	0	0.000001
10	H-3	20	0	0	0.000001
11	H-3	24	1	2	0.000001
12	H-3	41	18	28	0.000013
13	H-3	43	20	31	0.000014
14	H-3	144	121	188	0.000085
15	H-3	13	0	0	0.000001
16	H-3	16	0	0	0.000001
17	H-3	12	0	0	0.000001
18	H-3	14	0	0	0.000001
Blank 1	H-3	22	0	0	0.000001
Blank 2	H-3	18	0	0	0.000001
Rerun H	H-3	11	0	0	0.000001
Rerun P	H-3	12	0	0	0.000001
Rerun 12	H-3	7	0	0	0.000001
Rerun 15	H-3	29	6	9	0.000004

ANALYSIS PERFORMED USING:
Packard 1900CA Tri-Carb Liquid Scintillation Analyzer Model #A1900 Serial #101464
Parckard H-3 Standard 270100 dpm on June 16, 1988 154

WIPE TESTS PERFORMED BY: Mike Van Der Karr C.H.P. DATE: 09/30/99

ANALYSIS PERFORMED BY: S. A. HUBER CONSULTANTS INC. DATE: 11/08/99

ATTACHMENT 2

Application of the Sign Test for Post-Remediation Survey of Survey Unit 0505F

DCGL= 1000

#	SURVEY ITEM/DESCRIPTION	MSI Designation	dpm/ 100cm^2(1)	dcgl-result	positive results	(reserved)	(reserved)
1	Floor	3X, 12Y	853	147	1		
2		4X, 12Y	1240	-240	0		
3		5X, 12Y	360	640	1		
4		3X, 11Y	833	167	1		
5		4X, 11Y	773	227	1		
6		5X, 11Y	427	573	1		
7		3X, 10Y	460	540	1		
8		4X, 10Y	533	467	1		
9		5X, 10Y	883	117	1		
10		3X, 9Y	883	117	1		
11		4X, 9Y	1040	-40	0		
12		5X, 9Y	433	567	1		
13		3X, 8Y	560	440	1		
14		4X, 8Y	507	493	1		
15		5X, 8Y	433	567	1		
16		3X, 7Y	873	127	1		
17		4X, 7Y	313	687	1		
18		5X, 7Y	463	537	1		
19		3X, 6Y	333	667	1		
20		4X, 6Y	347	653	1		
21		5X, 6Y	320	680	1		
22		3X, 5Y	667	333	1		
23		4X, 5Y	813	187	1		
24		5X, 5Y	373	627	1		
25		3X, 4Y	953	47	1		
26		4X, 4Y	600	400	1		
27		5X, 4Y	1030	-30	0		
28		3X, 3Y	37	963	1		
29		4X, 3Y	567	433	1		
30		1X, 2Y	400	600	1		
31		2X, 2Y	-67	1067	1		
32		3X, 2Y	-60	1060	1		
33		4X, 2Y	393	607	1		
34		1X, 1Y	367	633	1		
35		2X, 1Y	-67	1067	1		
36		3X, 1Y	-77	1077	1		
37		4X, 1Y	-100	1100	1		
		Average=	505		34	=sum of positive results	
		Standard Deviation=	345				

(1) dpm/100 cm2 is copied from post-remediation survey sheet
su0505_110499SIGNTEST1f.xls

APPENDIX F

CONCRETE CORE AND SOIL SAMPLING RESULTS

ST ALBANS VAECC CONCRETE AND SOIL CORING

Date: 2/18/99

BETA CONTAMINATION SURVEY INFORMATION
Probe Model #: 44-116 Serial #: 131321
Meter Model #: 2221 Serial #: 108846
Efficiency (E): 0.22cpm/dpm Isotope:SY90
Background 70 cpm

Sample Number	Location	Approx. Depth	Reading (Top) (gross cpm)	Top (net cpm)	Cpm/ 100cm	Reading (Bottom)	Bottom (net cpm)	Cpm/ 100cm	Lab Results (pCi/G)	Lab Error
C5-1A	South Corridor	0-3"	280	210	955	60	-10	-45	34.27	1.60
C5-1B		3-3.5	40	-30	-136	40	-30	-136	-0.20	0.34
C5-1C		3.5-5	85	15	68	-			N/A	N/A
C5-1D		soil 0-6"	40	-30	-136				-0.11	0.27
C5-1E		soil 6-12"	20	-50	91				0.11	0.26
C5-2A	Fresh Air Room	0-2.5"	400	330	1500	50	-20	-91	11.21	1.20
C5-2B		2.5-4"	40	-30	-136	40	-30	-136	0.21	0.28
C5-2C		4-4.5	30	-40	182	30	-40	-182	N/A	N/A
C5-2D		5-bottom	80	10	45				N/A	N/A
C5-2E		soil 0-6"	100	30	136				0.29	0.28
C5-2F		soil 6-12"	50	-20	91				-0.33	0.22

N/A = Not Analyzed

APPENDIX G

QUALITY CONTROL SAMPLES

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Womens' Room											
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-8.03	34.92	55.05	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	34.75	54.20	91.60	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	1.47	30.36	50.39	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Carbon-14	EPA 906.0 Modified	-7.73	34.00	52.96	dpm/100cm^2
Tunnel											
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-4.72	32.36	53.40	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-6.69	36.38	56.77	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-29.37	38.00	58.60	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-22.55	41.18	63.76	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-1.76	36.20	59.73	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-25.53	41.46	66.62	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	-3.50	37.13	59.41	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Carbon-14	EPA 906.0 Modified	8.19	34.43	55.56	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-28.28	29.27	45.77	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	14.86	41.19	66.14	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-15.20	31.11	54.14	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Carbon-14	EPA 906.0 Modified	-21.06	25.63	41.66	dpm/100cm^2
West Basement											
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-31.82	33.60	58.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Carbon-14	EPA 906.0 Modified	-37.92	36.77	61.22	dpm/100cm^2
Upstairs											
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-1.56	35.07	57.18	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-21.39	33.48	55.90	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-17.77	32.97	54.18	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-29.59	34.53	56.96	dpm/100cm^2
Incinerator											
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	1.71	37.26	61.05	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-6.71	47.62	79.65	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-19.96	47.22	78.98	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Carbon-14	EPA 906.0 Modified	-24.51	68.20	109.09	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-16.45	26.36	48.64	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-55.60	40.12	71.25	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-20.29	37.21	65.02	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Carbon-14	EPA 906.0 Modified	-31.16	39.43	66.56	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-43.35	82.28	132.17	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-16.22	39.64	65.91	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-23.19	40.02	65.26	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Carbon-14	EPA 906.0 Modified	-18.80	40.53	68.76	dpm/100cm^2

Lab ID	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	Error	MDA	Units
Womens' Room											
99-01197-05	3-2	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	296.09	55.89	64.85	dpm/100cm^2
99-01197-06	3-2 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	1898.50	152.02	107.91	dpm/100cm^2
99-01197-07	3-3	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-13.26	31.76	59.36	dpm/100cm^2
99-01197-08	3-3 QC	1/25/99	1/27/99	2/6/99	9901197	Tritium	EPA 906.0 Modified	-43.34	30.64	62.39	dpm/100cm^2
Tunnel											
99-01198-08	5-2	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	20.51	35.11	60.29	dpm/100cm^2
99-01198-09	5-2 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	28.50	37.89	64.06	dpm/100cm^2
99-01198-11	5-4	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-24.23	34.26	66.15	dpm/100cm^2
99-01198-12	5-4 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	65.88	45.34	71.94	dpm/100cm^2
99-01198-16	5-8	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-8.82	36.43	67.43	dpm/100cm^2
99-01198-17	5-8 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-45.24	37.18	75.17	dpm/100cm^2
99-01198-19	5-10	1/23/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	47.38	41.13	67.07	dpm/100cm^2
99-01198-20	5-10 QC	1/26/99	1/27/99	2/6/99	9901198	Tritium	EPA 906.0 Modified	-26.25	32.15	62.70	dpm/100cm^2
99-01199-06	5-13	1/23/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	55.40	30.20	45.97	dpm/100cm^2
99-01199-07	5-13 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-3.72	36.11	66.40	dpm/100cm^2
99-01199-12	5-18	1/24/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-9.14	28.95	54.37	dpm/100cm^2
99-01199-13	5-18 QC	1/26/99	1/27/99	2/8/99	9901199	Tritium	EPA 906.0 Modified	-4.69	22.51	41.82	dpm/100cm^2
West Basement											
99-01200-08	6-12	1/23/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-3.04	29.78	54.72	dpm/100cm^2
99-01200-09	6-12 QC	1/26/99	1/27/99	2/11/99	9901200	Tritium	EPA 906.0 Modified	-1.58	31.21	57.05	dpm/100cm^2
Upstairs											
99-01207-10	8-26	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-6.27	34.48	63.16	dpm/100cm^2
99-01207-11	8-26 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	7.66	34.89	61.74	dpm/100cm^2
99-01207-12	8-27	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-11.88	32.15	59.84	dpm/100cm^2
99-01207-13	8-27 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-32.79	31.95	62.92	dpm/100cm^2
Incinerator											
99-01205-13	9-1	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	18.90	32.48	55.97	dpm/100cm^2
99-01205-14	9-1 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	11.21	40.99	73.03	dpm/100cm^2
99-01205-15	9-2	1/25/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	15.56	41.11	72.42	dpm/100cm^2
99-01205-16	9-2 QC	1/26/99	1/27/99	2/11/99	9901205	Tritium	EPA 906.0 Modified	39.92	58.67	100.02	dpm/100cm^2
99-01206-07	9-10	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-206.81	39.71	88.94	dpm/100cm^2
99-01206-08	9-10 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-293.63	58.73	130.27	dpm/100cm^2
99-01206-19	9-21	1/25/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-273.03	53.29	118.88	dpm/100cm^2
99-01206-20	9-21 QC	1/26/99	1/27/99	2/13/99	9901206	Tritium	EPA 906.0 Modified	-236.07	57.13	121.68	dpm/100cm^2
99-01207-04	9-22	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	2916.03	217.10	145.98	dpm/100cm^2
99-01207-05	9-22 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-9.03	39.59	72.81	dpm/100cm^2
99-01207-07	9-24	1/25/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-42.93	36.09	72.08	dpm/100cm^2
99-01207-08	9-24 QC	1/26/99	1/27/99	2/13/99	9901207	Tritium	EPA 906.0 Modified	-28.27	39.62	75.96	dpm/100cm^2

LETTER OF TRANSMITTAL

ROY F. WESTON OF NEW YORK, INC.
Suite 430
One Old Country Road
CARLE PLACE, L.I., NEW YORK 11514-1807
(516) 873-3800 • FAX: (516) 873-3850

TO Todd Jackson
NRC - Region 1
475 Allendale Rd.
King of Prussia, PA
19406-1415

DATE 5-13-99	JOB NO.
ATTENTION Todd Jackson	
RE:	

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

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1	4/99		Radiological Characterization Survey Report
			Vols. I and II of II

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REMARKS _____

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27 April 1999

Mr. Randy Godfrey, Engineering Manager
U.S. Department of the Army
New England District, Corps of Engineers
696 Virginia Road
Concord, MA 01742-2751

Re: Contract No. DACA31-96-D-0006
Final Radiological Survey Report
St. Albans Veterans Administration Extended Care Facility, Queens, New York
WESTON W.O. No.: 10971-219-001-0070
DCN: VAHOSP-042799-AAAZ

Dear Mr. Godfrey:

Enclosed please find five (5) copies of the above-referenced report, which consists of two (2) volumes. Volume 1 consists of the final Survey Report and Volume 2 consists of Appendices A-F. We also have included a formal comment/response resolution summary from the previous review cycle.

If you have any immediate questions or wish to discuss this, please do not hesitate to contact me at (847) 918-4087 or John Rhyner (516) 873-3814.

Very truly yours,

ROY F. WESTON, INC.

Michael Madonia
Senior Client Service Manager

MM/sr
Enclosure

cc: D. Brouwer, CENAN, one (1) copy of report (both volumes)
H. Honerlah, CENAB, one (1) copy of report (both volumes)
J. Mallen, VA Medical Center, three (3) copies of Vol. 1, three (3) copies of Vol. 2 of report
R. Kraybill, WESTON
J. Rhyner, WESTON
M. Clune, WESTON
M. Madonia, WESTON
DCN Files

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WESTON

RESPONSE TO COMMENTS
DEPARTMENT OF VETERANS AFFAIRS

Comment – Section: Executive Summary

- The presence of asbestos-containing materials and its associated hazards should be characterized and included in the decommissioning plan. Survey Unit 009 was not included in the asbestos portion of the executive summary and should be included in the asbestos assessment.

Response – Section: Executive Summary

The assessment of asbestos-containing materials is noted as a topic for inclusion to the Decommissioning Plan or its Attachments. Discussion of Survey Unit 009 has been added in the Executive Summary.

Comment – Section 2: General Information

- VAECC is located on a 55-acre (not 10 acre) site.
- The balance of Building 64 is used as a Boiler Plant (not storage of miscellaneous items).

Response – Section 2: General Information

Corrections made as noted.

Comment - Section 5.1: Summary of all Survey Units: Table 5-1

- The current footnote explaining average surface contamination levels is not clear. Based on the information presented in the table, it would appear to the lay person that high contamination readings were present in occupied areas. This may cause a great deal of concern and confusion. Provide a clearer footnote to explain the actual importance or relative hazard of the actual readings.

Response – Section 5.1: Summary of all Survey Units: Table 5-1u

Section rewritten and Table 5-1 modified per discussions with the VA on April 22-23.

Comment – 5.4.2: Survey Unit 003 Discussion/Conclusions

- We were quite surprised to see that another element (tritium) was detected. We would like to see this included in the characterization report. The report suggests further investigation but should the characterization of tritium contamination have been included in the overall characterization plan. Is more work scheduled and will this be cleaned up accordingly?
- Is there sufficient quantity of tritium to warrant amendment the current NRC holding license?

Response – 5.4.2: Survey Unit 003 Discussion/Conclusions

All discussion of future characterization of tritium contamination will be addressed under separate cover. The current data suggest that no amendment to the NRC license will be required.

Comment – Section 5.5.3: Survey Unit 004 Discussion/Conclusions

- Does the entire drain line have to be removed? This will directly impact on the extent of the decommissioning work to be performed in Survey Unit 005.
- What is the depth of contamination in Survey Unit 004.

Response – Section 5.5.3: Survey Unit 004 Discussion/Conclusions

For purposes of the Decommissioning Plan, it is assumed that the subject drain line will be removed. The impact on Survey Unit 005 will be minimized through use of localized removal techniques. No concrete cores were performed in Survey Unit 004. It is assumed that source material was not handled in the restrooms, thus no major potential for infiltration through the concrete exists. Likewise, the majority of contamination was noted on the bathroom floor tiles, which were in relatively good condition. It is assumed that tile removal and minor scabbling will effectively decontaminate the area.

Comment – Section 5.8: Survey Unit 007 Discussion

- Waste volume of 20 ft^3 for core samples appears to be large. Is this correct quantity?

Response – Section 5.8: Survey Unit 007 Discussion

All waste volumes include buffer amounts for waste already present on site, and supplemental waste generated during decontamination. This waste includes protective clothing, equipment fluids and filters, etc.

Comment – Section 5.10: Survey Unit 009 Discussion

- Same comment as before regarding tritium. Will further characterization be conducted? Removal of the tritium should be included in the remediation plan.

Response – Section 5.10: Survey Unit 009 Discussion

All discussion of future characterization of tritium contamination will be addressed under separate cover.

Comment – Section 6.1: Re-evaluation of DGLS to Assess Extent of Decontamination

- Our facility Radiation Safety Officer offers the following comment: Why has the determination of DCGLS not been performed in this work for compliance with 10CFR part 20 subpart E? Particularly, the bulk material for strontium 90 DCGL, 5pCi/g, is adopted from an unreferenced source. This may be questioned by the NRC.

Response – Section 6.1: Re-evaluation of DGLS to Assess Extent of Decontamination

The applicability of current DCGLs (from the Work Plan) will be evaluated as a component of the Decommissioning Plan preparation. If warranted, the DCGLs may be changed.

Comment – Section 6.4.1: Future of Facility

- The VA has no immediate plans to utilize this space. We will not require the replacement of the laboratories.

Response – Section 6.4.1: Future of Facility

Comment noted for future Decommissioning Plan preparation.

Comment – Section 6.4.2: Access Issues

- Any adverse effect of the decommissioning procedures to the structural integrity of the building must be evaluated.

Response – Section 6.4.2: Access Issues

All decommissioning approaches will be reviewed by professional structural and geotechnical engineers where appropriate.

Comment – Section 6.4.3: Radioactive Material Transport Issues

- Transportation of waste must be clearly addressed in the decommissioning plan. The decommissioning contractor must be responsible for transportation and disposal of waste.

Response – Section 6.4.3: Radioactive Material Transport Issues

Comment noted for future Decommissioning Plan preparation.

RESPONSE TO COMMENTS
CENAB, INDUSTRIAL HYGIENE, AND CHEMISTRY SECTION

Comment 1 – Executive Summary

First para. – please correct the reference to USACE Atlantic Engineer District. Should read USACE North Atlantic Division, New England District (CENAE).

Response 1 – Executive Summary

Reference corrected to USACE Atlantic Engineer District.

Comment 2 – Section 3.4.1

Hand Held Systems – second para. – please remove the statement that refers to other unidentified alpha contaminants.

Response 2 – Section 3.4.1

Statement removed as noted.

Comment 3 – Section 3.6

Drain System – second para. – last sentence – "contamination surveys on clean outs to in an effort to." Please delete the first "to."

Response 3 – Section 3.6

Sentence corrected.

Comment 4 – Table 5-1 – Surface Contamination Survey Results

- Correct the description for SU 03 and 04 (they seemed to be switched).
- SU 02 – correct removable β/γ average – typo?
- SU 03 and 04 – insure the reported levels correspond to the correct survey unit.
- SU 07 and 09 – check the total β/γ average – typo?

Response 4 – Table 5-1 – Surface Contamination Survey Results

All Table 5-1 values checked and corrected where necessary. Survey unit designations were determined to be correct – inconsistency identified in Table 3-1 and corrected.

Comment 5 – Section 5.1.2

Removable Alpha – delete other related alpha emitting radionuclides.

Response 5 – Section 5.1.2

Statement removed as noted.

Comment 6 – Table 5-2

LS Results – SU 03 and 04 descriptions contradict Table 3-1. Please correct through out the document.

Response 6 – Table 5-2

See response to comment 4.

Comment 7 – Section 5-2

SU 01 – second para. – identify where the fume hood exited the facility and is that exit point sealed? Is there still vent system to the roof?

Response 7 – Section 5-2

Additional discussion regarding the ventilation system has been added to section 5.2.

Comment 8 – Section 5.2.4

Conclusion – volume for SU 01 is 2,800 ft sq. Should read cubic ft.

Response 8 – Section 5.2.4

Units have been converted to cubic feet (ft^3).

Comment 9 – Section 5.3.3

Conclusion – should read cubic ft.

Response 9 – Section 5.3.3

Units have been converted to cubic feet (ft^3).

Comment 10 – Section 5.4

SU 03 – Should discuss the men's restroom. Please delete reference to women's restroom and correct the discussion to reference men's restroom.

Response 10 – Section 5.4

See response to comment 4.

Comment 11 – Section 5.4.1

Floor/Wall Surface Contamination – Again, this section references SU 04. Please correct.

Response 11 – Section 5.4.1

See response to comment 4.

Comment 12 – Section 5.5

SU 04 – Table 3.1 addresses this as the women's restroom. Please review the entire document and correct the misidentification of SU's 03 and 04.

Response 12 – Section 5.5

See response to comment 4.

Comment 13 – Section 6.1

Re-evaluation of DCGL's – Agree, this section requires some changing due to the latest changes of standards and different models available for assessing the standards. Suggest we discuss this issue in the conference call and make the recommendations to be utilized in the next phase. Some thoughts from the Federal Register: November 18, 1998 (Volume 63, Number 222); gives release criteria for Sr-90 of 8.7 E+03 dpm/100 cm^2 and H-3 of 1.2 E+08 dpm/100 cm^2. Recommend utilizing the RESRAD model to calculate the soil concentrations for free release and possibly the renovation scenario.

Response 13 – Section 6.1

Acknowledge comment as discussion point for preparation of Decommissioning Plan.

Comment 14 – Section 6.4

Complete Decon – third sentence – Decontamination of the men's and women's survey units 002 and 003 restroom ... Fourth sentence – Survey units 001 and 004 .... Please correct the SU number references.

Response 14 – Section 6.4

Survey unit references checked and corrected.

Comment 15 – Table 7-1

Again check reference to SU 03 and 04

Response 15 – Table 7-1

See response to comment 4.

Comment 16 – Section 9

Fourth para. – Please check references to SU numbers.

Response 16 – Section 9

See response to comment 4.

Comment 17 – Appendix B

Summary of work – please correct the abbreviation for USACE.

Response 17 – Appendix B

Abbreviation corrected.

Comment 18 – Appendix B

Summary of work - second set of bullets.

Response 18 – Appendix B

Correction made.

Comment 19 – Section 5.1

Explain reference to Table 4.1 (typo?)

Response 19 – Section 5.1

Correction made.

Comment 20 – Appendix C

Lists the analytical results from the offsite lab. What about the analytical data gathered from the field lab (i.e. Ludlum 2929 Sr-90 removable samples collected and analyzed)

Response 20 – Appendix C

An Appendix D has been added. This appendix contains analytical data summaries as generated from field measurements and laboratory results.

Comment 21 – POC

The POC for the above comments is Hans Honerlah, Health Physicist at (410) 962-9184. I am still reviewing the data sets Appendix B. If I have additional comments I will forward them as soon as possible.

Response 21 – POC

The POC has been noted.