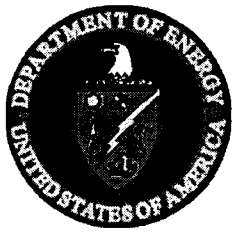
53c

DOE/CD-ETEC-Desoto104

DRAFT DOCKET

FOR THE RELEASE OF MASS SPECTROSCOPY LABORATORY (BUILDING 104) AT THE ROCKETDYNE (BOEING NORTH AMERICAN) DESOTO FACILITY OPERATED BY FORMER ENERGY TECHNOLOGY ENGINEERING CENTER

September 1999



U.S. DEPARTMENT OF ENERGY
OAKLAND OPERATIONS OFFICE
ENVIRONMENTAL RESTORATION

The Boeing Company
Rocketdyne Propulsion & Power
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, CA 91309-7922

September 24, 1999
In reply refer to 99RC-5031

Mr. Michael E. Lopez
US Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, CA 94612-5208

Subject: DE-AC03-99SF21530, Environmental Restoration and Remediation of the former Energy Technology Engineering Center (ETEC) Site Reporting Requirements Checklist, Part III, Section J, Desoto B/104 Draft Certification Docket

Dear Mr. Lopez:

Boeing North American, Inc., Rocketdyne Propulsion and Power (Rocketdyne) hereby submits, for your information and retention, the enclosed Draft Certification Docket pertaining to the decontamination and decommissioning of Mass Spectroscopy Laboratory which was located at Building 104 of Rocketdyne's DeSoto facility. This Draft Docket is composed of a Forward and four exhibits: Exhibit 1 contains the Sitewide Release Criteria documents for SSFL, which are also applicable to the DeSoto facility; Exhibit 2 contains the Independent Verification documentation of the radiological condition of Building 104; Exhibit 3 contains Building 104 Final Report; and Exhibit 4 contains Building 104 final radiological survey documentation.

Should you have any questions concerning this transmittal, please contact the undersigned at (818) 586-5283.

Very truly yours,

RD Meyer for M. Lee

Majelle Lee
Program Manager
Environmental Programs

ML:sns

G.O. 97055

Encl.: RD99-178, Draft Docket for the release of Mass Spectroscopy Laboratory (DeSoto B/104) at ETEC, 2 copies

cc: (w/attach) Office of Scientific and Technical Information, Department of Energy, 175 Oak Ridge Turnpike, P.O. Box 62, Oak Ridge, TN 37831

FORWARD

The purpose of this Docket is to document the successful decontamination & decommissioning of the Mass Spectroscopy Laboratory located in Building 104 at the Rocketdyne (Boeing North American) Desoto complex; and that the facility is suitable for release for unrestricted use as per the Release Criteria, for the Rocketdyne's Santa Susana Field Laboratory, approved by the Department of Energy and the California Department of Health Services. The material in this Draft Docket consists of documents supporting the status that conditions at the former laboratory are in compliance with applicable DOE and proposed Environmental Protection Agency and Nuclear Regulatory Commission standards and criteria established to protect human health, safety, and the environment.

CONTENTS

EXHIBIT I

SITEWIDE RELEASE CRITERIA FOR REMEDIATION OF FACILITIES AT SSFL (APPLICABLE TO THE MASS SPECTROSCOPY LABORATORY AS WELL) AND ASSOCIATED DOCUMENTATION

(8-89)
United States Government Department of Energy

memorandum

DATE: 05 SEP 1996

REPLY TO
ATTN OF: DOE Oakland Operations Office(ERD)

SUBJECT: Radiological Site Release Criteria for ETEC

TO: Sally Robison, EM-44

I am requesting the approval of the radiation site release criteria for the Energy Technology Engineering Center. The release criteria are a critical component in the DOE process for releasing facilities for unrestricted use. The California Department of Health Services has approved the site release criteria in a letter dated August 9 (see attachment 1).

The proposed limits were developed in the following way:

1) Annual exposure dose. Rocketdyne proposes to use a dose limit of 15 mrem/yr to comply with the 100 mrem plus ALARA as required by DOE 5400.5). This limit is also consistent with the anticipated rules of the NRC and EPA.

2) Ambient exposure rate. The proposed limit of 5μR/hr above natural background complies with the limit of 20μR/hr, plus ALARA, as stated in DOE Order 5400.5. This proposed limit is consistent with NRC limits for Rocketdyne facilities at the Santa Susana Field Laboratory. This limit would be imposed for accessible, or potentially accessible, structures and land.

3) Surface contamination. Surface contamination limits comply with DOE Order 5400.5 and specify the potential contaminants present in the Rocketdyne facilities.

4) Generic Limits for Soil and Water. The generic limits for soil and water were established using the DOE pathway analysis code RESRAD.

09/16/96

The proposed site release criteria are included in "Proposed Sitewide Release Criteria for Remediation of Facilities at the SSFL", Revision A, N001SRR140127.

Your approval is requested by September 16,1996.

Laurence McEwen
Acting Director
Environmental
Restoration Division

Attachments

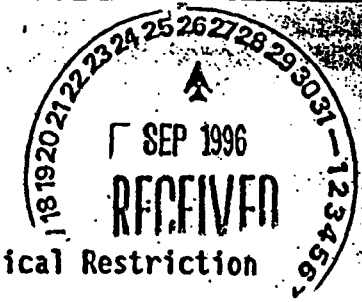
cc: R. Liddle, ESO
M. Lopez, ERD
D. Williams, EM-443

96-ER-095/

United States Government

Department of Energy

memorandum



DATE: SEP 17 1996

REPLY TO ATTN OF: EM-44 (D. Williams, 903-8173)

SUBJECT: Sitewide Limits for Release of Facilities Without Radiological Restriction

TO: R. Liddle, Oakland Operations Office

We have reviewed Rocketdyne's proposed sitewide limits for release of facilities at the Santa Susana Field Laboratory (SSFL) without radiological restriction and are satisfied that our previous concerns and comments have been addressed.

The proposed limits are consistent with the Department of Energy (DOE) Order 5400.5 requirement for a Total Effective Dose Equivalent limit of 100 mrem/yr plus As low As Reasonably Achievable (ALARA) for future occupants, the Nuclear Regulatory Commission proposed a radiological guideline of 15 mrem/yr ALARA, and the Environmental Protection Agency proposed a guideline of 15 mrem/yr for release of properties.

Corrective actions taken by Rocketdyne for the sampling and statistical approach to final survey data validation for DOE projects are now comparable to methodologies or standard practices used at other DOE sites and the requirements of Nuclear Regulatory Commission Nuclear Regulation (NUREG)/CR-5489 (Manual for Conducting Radiological Surveys in Support of License Termination).

We also received a copy of the letter from the California Department of Health Services stating concurrence with the proposed release guidelines and the intent to incorporate these guidelines into Rocketdyne's California Radioactive Material License.

Based upon the above information, the proposed sitewide release criteria for remediation of facilities at the SSFL are hereby approved for use.

If you have any questions, please call Mr. Don Williams of my staff at 301-903-8173.

Sally A. Robison, Ph.D.
Director
Office of Northwestern Area Programs
Environmental Restoration

007857 RC

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY PETE WILSON, Gover

DEPARTMENT OF HEALTH SERVICES
714/744 P STREET
P.O. BOX 942732
SACRAMENTO, CA 94234-7320

(916) 323-2759

96ETEC-DRF-0455

August 9, 1996

Ms. Majelle Lee, Program Manager
Environmental Management
Rocketdyne Division
Rockwell International Corporation
P. O. Box 7930
Canoga Park, CA 91309-7930

Subject: Authorized Sitewide Radiological Guidelines for Release of Unrestricted Use

Dear Ms. Lee:

This letter is to acknowledge the receipt of your letter dated June 28, 1996 requesting concurrence of the above subject. The above mentioned letter and its attachments have been reviewed by the staff of this office. The Radiologic Health Branch (RHB) concurs that the proposed release guidelines provide adequate assurance for the release of the facilities and properties at Rocketdyne's Santa Susana Field Laboratory (SSFL) and DeSoto sites without further radiological restrictions. Your letter dated June 28, 1996 with attachments will be incorporated into Rocketdyne's California Radioactive Material License # 0015-70 upon receipt of a commitment letter signed by Mr. Phil Rutherford.

If you have any questions concerning this matter, please feel free to call Mr. Stephen Hsu of this office at (916) 322-4797.

Sincerely,

Gerard Wong, Ph.D., Chief
Radioactive Material Licensing Section
Radiologic Health Branch

BOEING

Supporting Document

GO NO.	S/A NO.	PAGE 1 OF	TOTAL PAGES	REV. LTR/CHG. NO.	NUMBER
90127		28	28	New	N001SRR140131

PROGRAM TITLE
Radiation Safety

DOCUMENT TITLE
Approved Sitewide Release Criteria for Remediation of Radiological Facilities at the SSFL

DOCUMENT TYPE
Safety Review Report

RELATED DOCUMENTS

ORIGINAL ISSUE DATE
12/18/98

RELEASE DATE
RELEASE 2-19-99 E.M.

APPROVALS — DATE

P. D. Rutherford — 12/16/98

M. E. Lee — 12/16/98

J. Willenberg — 12/18/98

PREPARED BY/DATE	DEPT.	MAIL ADDR
P. D. Rutherford 12/16/98	641	T487

IR&D PROGRAM? YES NO X

IF YES, ENTER AUTHORIZATION NO.

DISTRIBUTION

*	NAME	MAIL ADDR
*	P. D. Rutherford	T487
*	M. E. Lee	T038
*	P. H. Horton	T038
*	J. G. Barnes	T487
*	P. Liddy	T487
*	F. E. Dahl	T100
*	E. R. McGinnis	T487
	S. R. Lafflam	T487
*	Radiation Safety Library	T487

ABSTRACT

This document supersedes revision A of N001SRR140127, "Proposed Sitewide Release Criteria for Remediation of Facilities at the SSFL" issued August 22, 1996. N001SRR140127 was submitted to the Department of Energy (DOE) and the California Department of Health Services (DHS) who subsequently approved the use of these criteria for release of radiological facilities at Rocketdyne for unrestricted use.

A complete set of release criteria for facilities at the SSFL has been developed, and are presented in this report. The various categories of release guidelines include; 1) annual expected dose, 2) soil and water concentration guidelines, 3) surface contamination guidelines, and 4) ambient gamma exposure rate. The guidelines were obtained from regulatory values where available. Where not available, for example for soil, guidelines were calculated by use of the DOE computer code, RESRAD. For these calculations, the annual dose limit is 15 mrem/year, which is consistent with proposed EPA and NRC guidelines and ALARA principles.

* COMPLETE DOCUMENT
NO ASTERISK, TITLE PAGE/SUMMARY OF CHANGE PAGE ONLY.

RESERVED FOR PROPRIETARY/LEGAL NOTICES

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LIST OF TABLES

1. INTRODUCTION

This document supersedes revision A of N001SRR140127, "Proposed Sitewide Release Criteria for Remediation of Facilities at the SSFL" issued August 22, 1996. N001SRR140127 was submitted to the Department of Energy (DOE) and the California Department of Health Services (DHS) who subsequently approved the use of these criteria for release of radiological facilities at Rocketdyne for unrestricted use. Copies of approval letters from DOE and DHS are included in Appendix B.

At several locations at the Santa Susana Field Laboratory (SSFL), low levels of radiological contamination in buildings and in soil have occurred and have been or will be cleaned up for eventual release for use without radiological restrictions. The DOE requirements for allowable residual radioactivity in sites suitable for release without radiological restrictions ("unrestricted release") are established in DOE Order 5400.5 (Ref. 1). Specific guidelines are given in 5400.5 for surface contamination and for direct gamma exposure. However, except for radium and thorium in soil, no specific guidelines are provided for residual contamination in soil or water. It became clear that a set of DOE-authorized limits for the SSFL would greatly facilitate the process of determining that a facility is acceptably clean, and verifying this with a confirmatory survey. Approval of such a set of authorized limits is provided for in DOE Order 5400.5, Chapter IV, Section 5, and in draft 10 CFR 834.301(c).

The purpose of this report is to document the set of approved guideline values for the release without radiological restriction of DOE facilities at the SSFL. The various categories of release guidelines include; 1) annual expected dose, 2) soil and water concentration guidelines, 3) surface contamination guidelines, and 4) ambient gamma exposure rate. The guidelines presented in this report are for residual radioactivity above background. When feasible, the local background activity of the suspect radionuclides should be determined and these background values subtracted from the measured release survey data.

The goal for these limits is to provide assurance that reasonable future uses of the property will not result in individual doses exceeding 15 millirem per year. This is consistent with current EPA and NRC guidance, and is supported by a generic cost-benefit analysis presented in Reference 2.

2. ANNUAL DOSE LIMITATION

DOE Order 5400.5 specifies a base Total Effective Dose Equivalent (TEDE) limit of 100 millirem per year for any potential future occupant of a remediated site. The Order also requires the use of the As Low As Reasonably Achievable (ALARA) principle to establish Authorized Limits at a level that is below the base limit. Rocketdyne will apply a value of 15 millirem per year for the calculation of derived limits for the cleanup of DOE sites at the SSFL, consistent with EPA and NRC guidance. A limit of 15 millirem per year (mrem/year) is adopted to assure that future uses will contribute small doses compared to natural background doses, which are in the range of 250-400 mrem/year (Ref. 3). This limit is considered to be as low as reasonably achievable below the basic DOE dose limit of 100 mrem/year. The 15 mrem/year value corresponds to a calculated increased lifetime cancer risk to a potential future user of the site of 3×10^{-4}.

For any reasonable assigned cost per person-rem, further reduction of anticipated dose due to exposure to residual radioactivity at the site is difficult to justify. For example, the EPA proposed TEDE of 15 mrem/year was arrived at after extensive ALARA analysis of cleanup costs and benefits at sixteen "Reference Sites" representing a wide range of conditions found at contaminated sites throughout the United States. Their analyses assumed a residential use of the decontaminated sites, and their conclusions were that the 15 mrem/year limit represented the most effective value considering all the technical and socio-political issues involved.

Furthermore, at the SSFL, conservative choices in the development, measurement, and interpretation of limits and final surveys provide a firm bias towards overestimation of the remaining risk. These include, 1) a conservative residential scenario for the pathway analyses, 2) use of calibration sources that tend to underestimate the detector efficiency for the likely contaminants, and 3) both qualitative and quantitative tests that provide assurance that the decommissioned facility is suitable for release without radiological restrictions.

3. SOIL AND WATER GUIDELINES

Since there are no federal or state regulatory limits for soil contamination for many of the potential or actual radionuclides of concern at SSFL, site-specific guidelines must be developed. This development is done, as required by the DOE Order, by use of a "pathways" analysis program, which estimates the radiological dose (total effective dose equivalent) that a future user of the property might receive, considering the residual radioactivity and various conditions of use. An effort is made to make these use conditions as reasonable for the use and the local area as can be achieved, without greatly over-estimating or under-estimating potential doses.

To establish these guidelines for cleanup operations at SSFL, the pathways analysis program RESRAD (Ref. 4), developed at Argonne National Laboratory (ANL) for use by DOE, has been used to calculate single radionuclide guidelines for the radionuclides of potential concern at SSFL.

For soil, a dose limit of 15 millirem per year is used. For consideration of radiological contamination in water, which may be collected from wells, sumps, below-grade seepage, or surface water, concentration guidelines were calculated from the Dose Conversion Factors (DCFs) in RESRAD, using the EPA limit of 4 millirem per year for ingested drinking water (Ref. 5), and the EPA assumed intake of water, 2 liters per day. These limits are more restrictive than those imposed on releases from operating facilities, as provided by DOE Order 5400.5 (Ref. 1), NRC (Ref. 6), the State of California (Ref. 7), and EPA for uranium mines and mills (Ref. 8).

3.1 Pathway Analysis

Pathways analysis involves calculating the doses received by a person through several pathways: direct radiation exposure; inhalation of airborne radioactivity; drinking water containing radioactivity; eating foods that have accumulated radioactivity, through uptake of water with radioactivity from the soil, or with airborne radioactivity deposited on the foliage; and ingestion of small amounts of contaminated soil.

The pathways analysis program RESRAD, was developed in the late 1980's for DOE by Argonne National Laboratory for the purpose of performing pathways analysis for a broad range of applications. Considerable flexibility is provided in the program for representing the site-specific conditions of exposure, to permit making the calculation as reasonable for the application as is possible.

Four general types of use may be considered for land for the purpose of calculating dose, other than the obvious zero-dose case of non-use. These may be identified as the industrial scenario, the wilderness scenario (or recreational, such as a park or golf course), the residential scenario, and the family farm scenario. Within these general use scenarios, choices are made for occupancy time (indoors and outdoors), water use, and food sources. Further choices are made to represent the contamination situation, geology, and hydrology. The program comes with a

part of several earlier efforts at the SSFL, a number of screening evaluations were performed using the RESRAD code to determine which of the approximately 80 input parameters required by RESRAD were of significance to the general SSFL area. These screening evaluations also were useful in determining conservative site-specific values for input to the code, when the default values were not used. In general, changes to most of the parameters were found to have a negligible effect on the final results because certain dose pathways were either not applicable or negligible for the given scenarios.

Contaminated Zone Parameters: Default values for the area of contamination (10,000 m^2) and the length parallel to aquifer flow (100 m) were assumed. For the depth of contamination, a conservative value of 1 meter is assumed. Measurements conducted at the site have indicated historical maximum values ranging from about 0.4 to 0.6 m for this parameter.

Occupancy Parameters: The default RESRAD values for occupancy of a residence on an affected site are 50% of the time spent indoors and 25% of the time spent outdoors, on the site. Thus, 25% of the time the occupancy is assumed to be off site. For the residential scenario, assuming 8,760 hours in a year, this translates into 4,380 hours spent indoors, 2,190 hours spent outdoors on the site, and 2,190 hours spent off site. For the industrial scenario, the corresponding percentages are assumed to be 20%, 4%, and 76% respectively. For the wilderness scenario, the corresponding percentages are 0%, 10%, and 90%.

Shielding Factors: The annual dose estimates calculated by RESRAD from either direct exposure or by inhalation (dust) are functions of two "structural" shielding parameters and the fraction of time an individual is assumed to spend inside a structure built on the site. Both shielding factors range from 0 to 1, and may be changed by the user to more appropriately match actual site conditions. For inhalation, the RESRAD default is 0.4, and this value is assumed for the present evaluations. For direct gamma exposure, the RESRAD default is 0.7, which is a rather conservative estimate of gamma shielding by a structure. For the present calculations, this latter value was adjusted from the default, for both the industrial and residential scenarios, to account for local construction practice which dictate a minimum 4-inch (0.1 m) concrete slab under the structure.

The gamma shielding factor used as input to RESRAD was calculated by modeling a typical two-story residential structure, and a single story industrial structure using the computer code MicroShield[1]. MicroShield is a point-kernel gamma shielding code developed for IBM-compatible personal computers, based on the mainframe code ISOSHLD. For the residential structure, a conservative lower bound footprint (area) value of 93 m^2 (1,000 ft^2) was assumed. For the industrial structure, a 186 m^2 (2,000 ft^2) area was assumed. A circular area was used with MicroShield to obtain maximum code accuracy with minimum computational time. Screening

[1] MicroShield, Version 4.0, Grove Engineering, Inc., 15215 Shady Grove Road, Suite 200, Rockville, MD 20850.

calculations indicated no significant differences between the results for circular and square areas of the same volume.

In all cases the contaminated soil was assumed to have a density of 1.5 g/cm^3, and a thickness of 1 meter. Dose calculations were performed for two vertical distances (1m for the ground floor and 3.6 m for the second story) and for three radial distances (center, midpoint, and edge of structure). The isotopic mix input to MicroShield was the same as that used for the present RESRAD calculations, with a concentration of 1 pCi/g for each isotope. Resulting gamma energy groups for this isotope mix ranged from 0.1 to 1.5 MeV. A factor of 0.89 was used to account for gamma shielding from a typical structural wall composed of approximately 1 inch of stucco and 5/8 inch of drywall, and a window area of approximately 10% of the wall area.

Effective gamma shielding factors obtained from the MicroShield calculations are given in Appendix A. For the residential scenario (the most credible), it is assumed that 12 hours are spent inside the structure per day. If it is further assumed that 8 of these hours are spent upstairs in a bedroom, 4 hours are spent downstairs in a family room, and that a person (on average) is located at the midpoint between the center and the edge of the structure, then the effective gamma shielding factor would be: (0.67)(0.61) + (0.33)(0.31) = 0.51. For the industrial scenario, the value is 0.25, which is the shielding value at the midpoint location for the single story structure.

Table 2. Gamma Shielding Factor Calculations for Typical SSFL Structure

	Gamma Shielding Factor	
Radial Location	**1st Floor**	**2nd Floor**
Residential Structure (93 m^2 footprint, two story)		
Center	0.27	0.57
Midpoint[a]	0.31	0.61
Perimeter[b]	0.57	0.71
Industrial Structure (186 m^2 footprint, single story)		
Center	0.22	-
Midpoint[a]	0.25	-
Perimeter[b]	0.58	-

[a]Midpoint between the center and the perimeter of the structure
[b]Edge of the structure.

It should be noted, that these values do not take into account any out-structures such as garages and patios, both of which would result in additional gamma shielding, and both of which would almost certainly be part of any residences built on the site.

Dietary Parameters: Default RESRAD input values for food and water consumption are based on the family farm scenario, where a significant portion of the diet is grown or raised on the site. For the three credible scenarios considered here, these parameters were adjusted as follows: for the residential scenario, it is conservatively assumed that a small fraction (10% of that grown on a family farm) of the fruit and leafy vegetables consumption would be from material grown on site. The values used are 16 kg/year per person and 1.4 kg/year per person, respectively. It was further assumed that water for the residence would be obtained from a well on the site (510 liters/year per person).

For the industrial and wilderness scenarios, it was assumed that no water would be used that was taken from the site; thus, all water pathways were suppressed with the exception of a secondary pathway via plant ingestion. In the industrial case, bottled drinking water is supplied. Since essentially all surface water at present is a result of the current industrial operations, no surface water would be available in the wilderness scenario. It is also assumed that perhaps 1% of the family farm fruit consumption value might be collected from wild sources, thus, 0.14 kg/year is used for these scenarios.

Contaminated Zone Hydrology Data: The SSFL facility is located in the Simi Hills in eastern Ventura County, California. The Simi Hills are in the northern part of the Transverse Range geomorphic province, and are composed primarily of exposures of the Upper Cretaceous Chatsworth Formation. This formation is a marine turbidite sequence of sandstone with interbedded siltstone/mudstone and minor conglomeratic lenses. The Chatsworth Formation is at least 1,800 m thick in locations east and north of the Facility.

The principal geologic units at the SSFL are the Chatsworth Formation and the shallow alluvium which overlies the Chatsworth Formation in some parts of the Facility, notably in Area IV of the SSFL where the decommissioning and decontamination of nuclear sites is taking place. This layer is Quaternary alluvium consisting of mixtures of unconsolidated sand, silt, and clay, and would include the contaminated zone. Drill holes indicate that the layer may be as thick as 6 meters in some locations.

The density of this alluvium layer is approximately 1.5 g/cm^3. The total and effective porosity of the contaminated zone are assumed to be 0.43 and 0.20 based on the average of data for sand, silt, and clay as given in the RESRAD manual. Precipitation at the facility is measured annually by a rain gauge located in the northeastern portion of the SSFL (Ventura County Rain Gauge Number 249). Based on measured data since 1959, the mean annual precipitation at the SSFL is approximately 18.6 inch, or 0.47 meters. In general, the majority of the precipitation occurs during the months of January through March.

Saturated Zone Hydrology Data: There are two groundwater systems at the SSFL: 1) a shallow system in the surficial alluvium and the underlying zones of weathered sandstone and siltstone/claystone, and isolated shallow fracture systems; and 2) a deeper regional system in the fractured Chatsworth Formation. The shallow zone is discontinuous, with depths to groundwater ranging from land surface to over 9 m. For the present study, we assume that this shallow region most conservatively represents the saturated zone, with an average depth to the water table of about 5 m. Hydraulic conductivity in the saturated zone generally ranges from about 30 to 3,000 m/year. Here, the higher value has been assumed.

Typical pumping rates for deep wells in the Chatsworth Formation (rock) range from 60 to 70 m^3/year up to a maximum of about 300 m^3/year. For the shallow (alluvium) region, however, pumping rates are significantly lower, typically about 35 m^3/year. Further, in the shallow region, many wells would be dry for a good fraction of the year as the replenishment rate is generally low. Water table drop rates, therefore, would range up to 10 m as a result of on-site pumping. Without pumping, however, no data is available on any inherent lowering of the water table. For conservatism, therefore, the default value of 0.001 m/year has been assumed.

Radon Pathway: Two default values were modified for the radon pathway. The thickness of the foundation was set at 0.1 m (4 inches) to correspond to the gamma shielding calculations discussed above. Also, the depth below ground surface was also set at 0.1 m, as basement structures are not typical for the local area.

3.4 Calculated Soil and Water Guidelines from RESRAD

The guidelines calculated from the RESRAD code for various single radionuclides are listed in Table 3 for comparison of the three scenarios. Values for each of the scenarios were determined from separate RESRAD calculation runs using the input parameters given in Appendix A. Water guideline values in Table 3 were calculated from the dose conversion factors used in RESRAD for ingestion, using an EPA value of 2 liters/day total water consumption (per person) from the site, and an EPA dose limit of 4 mrem/year (Ref. 5).

For radionuclides specifically regulated by the EPA (and the State of California), the Safe Drinking Water Act (and CCR Title 22) limits were used. These are (in pCi/l):

H-3	20,000
Combined Ra-226 and Ra-228	5
Sr-90	8
Gross alpha (not including radon and uranium)	15
Gross beta	50
Uranium (U-234 + U-235 + U-238)	20

For U-234, U-235, and U-238, DOE imposes the EPA regulations in 40 CFR 192 (and parts 190 and 440). Similarly, for Ra-226, Th-228 and Th-232, DOE imposes the limits in DOE Order 5400.5.

3.5 Soil and Water Guidelines

Based on the data in Table 3, conservative guidelines, consistent with the several applicable regulations governing residual radioactivity discussed above, are listed in Table 4. With the exception of uranium, radium, and thorium, the soil guidelines are those calculated from RESRAD for the residential use scenario. For uranium, the guidelines are those adopted by the NRC (30, 30, and 35 pCi/g for U-234, U-235, and U-238, respectively, see Ref. 9). For

Table 3. RESRAD-Calculated Single Isotope Guideline Values

	Soil Guidelines (pCi/g)			
Radionuclide	Industrial	Wilderness	Residential	Water (pCi/l)[a]
Am-241	120	162	5.44	1.50
Co-60	10.9	9.83	1.94	204
Cs-134	18.7	16.9	3.33	74.7
Cs-137	51.9	46.7	9.20	110
Eu-152	25.3	22.8	4.51	845
Eu-154	23.0	20.7	4.11	573
Fe-55	2,370,000	4,780,000	629,000	9,020
H-3	129,000	129,000	31,900	85,600[b]
K-40	162	147	27.6	294
Mn-54	34.4	30.9	6.11	1,980
Na-22	13.0	11.7	2.31	476
Ni-59	1,390,000	1,560,000	151,000	26,100
Ni-63	511,000	572,000	55,300	9,490
Pu-238	140	192	37.2	1.71
Pu-239	127	175	33.9	1.55
Pu-240	127	175	33.9	1.55
Pu-241	4,740	6,430	230	79.9
Pu-242	133	183	35.5	1.63
Ra-226	0.520	13.6	0.199	4.12[b]
Sr-90	370	376	36.0	35.8[b]
Th-228	14.8	14.7	2.81	6.78
Th-232	7.94	7.98	1.53	2.01
U-234	519	647	106	19.3[b]
U-235	163	160	32.1	20.5[b]
U-238	399	445	90.9	20.4[b]

[a]Water guidelines calculated from RESRAD ingestion dose conversion factors, assuming the EPA dose limit of 4 mrem/year (see text).

[b]For these radionuclides, the EPA Safe Drinking Water Act or the State of California CCR Title 22 limits should be used (see Table 4).

Table 4. Soil and Water Guidelines for SSFL Facilities

Radionuclide	Soil Guidelines (pCi/g)	Water (pCi/l)
Am-241	5.44	1.5
Co-60	1.94	200
Cs-134	3.33	75
Cs-137	9.20	110
Eu-152	4.51	840
Eu-154	4.11	570
Fe-55	629,000	9,000
H-3	31,900	20,000[a]
K-40	27.6	290
Mn-54	6.11	2,000
Na-22	2.31	480
Ni-59	151,000	26,000
Ni-63	55,300	9,500
Pu-238	37.2	1.7
Pu-239	33.9	1.6
Pu-240	33.9	1.6
Pu-241	230	80
Pu-242	35.5	1.6
Ra-226	5[c] and 15[c]	4.1
Sr-90	36.0	8[a]
Th-228	5[c] and 15[c]	6.8
Th-232	5[c] and 15[c]	2.0
U-234	30[b]	
U-235	30[b]	total uranium 20[a]
U-238	35[b]	
Gross alpha (not including radon and uranium)		15[a]
Gross beta		50[a]

[a]State of California Maximum Contaminant Levels, CCR Title 22
[b]Generally more conservative NRC limits for uranium isotopes are used.
[c]DOE Order 5400.5 limits are used (5 pCi/g averaged over first 15 cm of soil depth and 15 pCi/g averaged over 15 cm layers below the top 15 cm).

radium and thorium, DOE Order 5400.5 limits are used (5 pCi/g averaged over first 15 cm of soil depth and 15 pCi/g averaged over 15 cm layers below the top 15 cm, see Ref. 1). Guidelines established from the residential use scenario are the most restrictive of the three scenarios considered.

The choice of a basic dose limit of 15 mrem/year for all pathways combined leads to lower limits than would result from the use of the dose limits established by the EPA for the uranium fuel cycle (Ref. 10) and by DOE for unrestricted release of contaminated property (Ref. 1). The water guidelines are those calculated from the RESRAD dose conversion factors, using the EPA values for the basic dose limit and daily water intake, with the Maximum Contaminant Levels (MCL) specified for certain radionuclides by the State of California (Ref. 11).

4. SURFACE CONTAMINATION GUIDELINES

Surface contamination limits are specified in Figure IV-1 of Chapter IV in DOE Order 5400.5. For SSFL facilities, these limits have been modified by specifying the potential contaminants present in the Rocketdyne facilities, and eliminating those that are not pertinent. The proposed guidelines are given in Table 5. As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

Table 5. Surface Contamination Guidelines for SSFL Facilities

Radionuclide	Average over 1 m^2 (dpm/100 cm^2)	Maximum in 100 cm^2 (dpm/100 cm^2)	Removable (dpm/100 cm^2)
Plutonium, Radium	100	300	20
Thorium	1,000	3,000	200
Uranium	5,000	15,000	1,000
Mixed fission products	5,000	15,000	1,000
Activation products	5,000	15,000	1,000
Tritium	-	-	10,000

As included in Table 5, Pu, Ra, U, Th, mixed fission products, and activation products, refer to those forms of radioactive material that comprise the residual activity at the SSFL. Plutonium is predominately Pu-239; Radium is Ra-226. It is assumed that thorium is sufficiently aged that all daughters are in equilibrium, Th-natural. Uranium will occur in depleted, normal, or enriched forms; U-233 is not present. Mixed fission products include Sr-90 and Cs-137 as components of the mixture. Possible activation products include Co-60, Fe-55, Mn-54, Eu-152, Eu-154, Al-26, and similar radionuclides.

Tritium contamination limits are based on interim guidelines for removable surface contamination (Ref. 12). This level of removable contamination insures that any non-removable or volumetric contamination will not cause unacceptable exposures.

These guidelines will be imposed for accessible (or potentially accessible) surfaces and structures.

5. AMBIENT GAMMA EXPOSURE RATE

A guideline of 5 μR/hr above natural background, measured at 1 meter above the surface, is used. This value has been imposed by the NRC for decommissioning research reactors (Ref. 13). It is as low as reasonably measurable, due to variations in background, and is significantly lower than the guideline of 20 μR/hr stated in DOE Order 5400.5, Chapter IV, Section 4.c. This guideline is imposed for accessible (or potentially accessible) structures and land. Our experience has been that this level can be achieved and verified in facilities that would be suitable for continued use.

6. APPLICATION OF GUIDELINES

Note: The survey protocols described below were those employed at the time of issue of N001SRR140127 and have been in use up until the end of 1998. As of the beginning of 1999, MARSSIM protocols will be employed (Reference 19) utilizing the guidelines developed in this report as the DCGLWs (derived concentration guideline limits).

The guidelines presented above should be used in planning any decontamination effort at the SSFL. Analytical capability for detection of each radionuclide should be, if possible, less than one-tenth of the guideline values. That is, the Minimum Detectable Activity (MDA, our LLD) should be less than 0.1 x guideline. Field measurements used to direct removal of contaminated soil should be capable of practical measurements below the guideline value. Survey measurements and sample analyses should be corrected for the local background activity of each radionuclide.

6.1 Soil Guidelines

Sample analysis is necessary to demonstrate the successful decontamination of soil areas. A qualitative scan will be performed using gamma-sensitive and/or beta-sensitive detectors to identify any significant areas of residual contamination. Soil samples will be taken from locations based on a 3x3 meter master grid. One sample will be taken from within a 1x1 meter grid location in each 3x3-meter section, based either on the qualitative scan survey indications at the area of maximum readings or, if no noticeable readings were found, at the location most likely to have residual contamination, by the surveyor's judgment. This selection assures a reasonably uniform sampling of the ground areas, at a sample density of approximately 11 samples per 100 m^2.

Results from individual samples will be compared with the limit for hotspots of 9-m^2 area, that is, 3.3 x the adopted concentration limit. Averages of adjacent samples, covering 100 m^2, will be compared with the average limit. The overall average, assuming that the individual and 100-m^2 area averages satisfy the applicable limits, will be used for a RESRAD confirmatory calculation. This calculation will be performed to demonstrate that the maximum expected annual dose for the indicated reasonable use scenario for the facility *does not exceed* the proposed 15 mrem/year guideline value.

For mixtures of radionuclides in soil, the "Sum of Fractions" rule is used. The sum of the ratios of concentration of each radionuclide to the corresponding guideline must not exceed 1. This value must be satisfied when samples are averaged over each 100-m^2 region. For cases in which the relative concentrations are known or assumed, this method is used to generate combined radionuclide guidelines for each radionuclide in the mixture.

The guidelines are not intended to be spot limits, and should not be applied to individual measurements. If the specific sampling provides only (or fewer than) one measurement per 100-

m^2 area, each measurement becomes, by default, the "average" for that 100-m^2 area, and the guidelines have the effect of acting as spot limits. In cases where an individual sample exceeds the guideline value, additional samples should be taken from within the same 100-m^2 area, and used to define the average contamination in this area.

The maximum concentrations remaining as "hot spots" must have contamination less than that calculated by the hot-spot rule presented in DOE Order 5400.5, Chapter IV, page 4. The average contamination within any area not exceeding 25 m^2 shall not be greater than $\sqrt{100/A}$ guideline, where A is the area in m^2. Reasonable efforts shall be made to remove any soil with contamination that exceeds 30 x guideline (Ref. 4).

6.2 Surface Contamination Guidelines

The proposed surface contamination guidelines would be applied to all accessible surfaces and structures. This would include ceilings, floors, and walls, and other potentially accessible locations such as attics. Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the guidelines established for alpha- and beta-gamma-emitting radionuclides should apply independently. Measurements of average contamination are averaged over an area of 1 m^2. For objects of less surface area, the average should be derived for each such object. The maximum contamination level applies to an area of not more than 100 cm^2. Surfaces of facilities which are likely to be contaminated, but are inaccessible for purposes of measurement, shall be presumed to be contaminated in excess of the applicable limits.

Following a complete qualitative scan of the facility, quantitative surface contamination measurements will be made over a fraction of the structural surfaces, as determined by the designation of the area as affected or unaffected. Affected areas will be surveyed at a nominal fraction of 11%. Unaffected areas will be surveyed at lesser fractions. Locations for the quantitative survey measurements will be based on a 3x3 meter master grid. One sample will be taken from within a 1x1 meter grid location in each 3x3-meter section, based either on the qualitative scan survey indications at the area of maximum readings or, if no noticeable readings were found, at the location most likely to have residual contamination, by the surveyor's judgment. Results from individual locations will be compared with the applicable limits.

Total surface contamination is measured by use of detectors primarily or exclusively sensitive to alpha or beta-gamma radiation. After a qualitative survey of the surfaces of the entire subject area, quantitative measurements are made on 1-m^2 areas selected uniformly throughout the area. These measurements are made with the detectors connected to a scaler set to accumulate counts for a 5-minute period. The detector is slowly scanned over the 1-m^2 grid location and the numerical result, after correction for background, count time, and detector efficiency, yields the 1-m^2 average surface activity. These detectors are calibrated against Th-230 for alpha activity and Tc-99 for beta activity. The emission energies of these radionuclides is generally less than those radionuclides found as contamination at SSFL. This results in an

underestimate of the efficiency of the detectors for the actual contaminant radioactivity and hence an overestimate of the actual measurement.

The amount of removable activity per 100 cm^2 of surface area is determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. Typically at Rocketdyne, a low background gas flow proportional counter is used. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that the total residual surface contamination levels are within the guidelines for removable contamination.

Smear methods for tritium detection are similar to that described above, with the exception that a wet swipe or piece of Styrofoam should be used. If the property has been recently decontaminated, a follow-up measurement (smears) should be conducted to ensure that there is no build-up of contamination with time.

6.3 Ambient Gamma Exposure

Measurements of the ambient gamma exposure rate provides a useful determination of residual volumetric radioactivity that may not be as easily detected by surface measurements or sampling and analysis. For the purpose of demonstrating suitability for release, this measurement provides an additional test.

The DOE established a limit of 20 μR/hr above natural background for screening radium-contaminated property. The NRC has imposed a 10μR/hr limit on the decommissioning of radioactive materials licensees, and a 5μR/hr limit on the decommissioning of research reactors. The 5 μR/hr limit above natural background is proposed for use at Rocketdyne. Because of the variability and differences in natural background, the limit of 5 μR/hr is about as low as can be reasonably implemented.

Quantitative measurements of the ambient gamma exposure rate will be made over a fraction of the structural surfaces, as determined by the designation of the area as affected or unaffected. Affected areas will be surveyed at a nominal fraction of 11%. Unaffected areas will be surveyed at lesser fractions. Locations for the quantitative survey measurements will be based on a 3x3-meter master grid. One measurement, covering one 1-m^2 grid location, will be made at each grid location chosen for the surface contamination measurements. Results from individual locations will be compared with the applicable limits.

At Rocketdyne, gamma exposure rate is generally measured by use of a 1x1 inch NaI(Tl) detector/photomultiplier probe, connected to a scaler to provide objective numerical values. The

detector is placed 1 meter above the local (ground or floor) surface. This instrument is calibrated by reference to a High Pressure Ion Chamber (HPIC) in a background area.

6.4 Statistical Validation of Survey Data

The statistical approach employed at Rocketdyne/ETEC for establishing that survey data meets guideline values is a method referred to as Sampling Inspection by Variables (Ref. 14). This method has been widely applied in industry and the military and is essential where the lot size is impractically large. Application of this method to the remediation of contaminated sites has been discussed in detail elsewhere (see for example, Ref. 15).

In sampling inspection by variables, the number of data points on which measurements are obtained is first chosen to be large so that the parameters of the distribution are likely to have a normal distribution (i.e., Gaussian). The mean of the distribution, $\bar{x}$, and its standard deviation, s, are then related to a "test statistic", TS, as follows:

$$TS = \bar{x} + ks$$

where $\bar{x}$ = average (arithmetic mean of measured values)
s = observed sample standard deviation
k = tolerance factor calculated from the number of samples to achieve the desired sensitivity for the test

TS and $\bar{x}$ are then compared with an authorized acceptance limit, U, to determine acceptance or other plans of action, including rejection of the area as contaminated and requiring further remediation.

The sample mean and standard deviation are easily calculable quantities; the value of k, the tolerance factor, bears further discussion. Of the various criteria for selecting plans for acceptance sampling by variables, the most appropriate is the method of Lot Tolerance Percent Defective (LTPD), also referred to as the Rejectable Quality Level (RQL). The LTPD is defined as the poorest quality that should be accepted in an individual lot. Associated with the LTPD is a parameter referred to as consumer's risk (β), the risk of accepting a lot of quality equal to or poorer than the LTPD (or 10%). NRC Regulatory Guide 6.6 (Ref. 16) states that the value for the consumer's risk should be 0.10. Conventionally, the value assigned to the LTPD has been 10%.

The State of California, Department of Radiological Health Branch, has stated that the consumer's risk of acceptance (β) at 10% defective (LTPD) must be 0.1 (Ref. 17). For those choices of β and LTPD, $K_\beta = K_2 = 1.282$. The number of samples is n. Values of k for each sample size are calculated in accordance with the following equations:

$$k = \frac{K_2 + \sqrt{K_2^2 - ab}}{a}; \quad a = 1 - \frac{K_\beta}{2(n-1)}; \quad b = K_2^2 - \frac{K_\beta^2}{n}$$

where k = tolerance factor,
K_β = the normal deviate exceeded with probability of β, 0.10 (from tables, $K_2 = 1.282$, see Ref. 18),
K_2 = the normal deviate exceeded with probability equal to the LTPD, 10% (from tables, $K_\beta = 1.282$, see Ref. 18)[2], and
n = number of samples.

The statistical criteria for acceptance of a remediated area are presented below.

a) Acceptance: If the test statistic ($\bar{x} + ks$) is less than or equal to the guideline (U), accept the area as clean. If any single measured value exceeds 80% of the limit, decontaminate that location to as near background as is possible, but do not change the value in the analysis.

b) Collect additional measurements: If the test statistic ($\bar{x} + ks$) is greater that the limit (U), but $\bar{x}$ itself is less than U, independently resample and combine all measured values to determine if $\bar{x} + ks \leq = U$ for the combined set; if so, accept the area as clean. If not, the area is contaminated and must be remediated.

c) Rejection: If the test statistic ($\bar{x} + ks$) is greater than the limit (U) and $\bar{x} > = U$, the region is contaminated and must be remediated.

Thus, based on sampling inspection, we are willing to accept the hypothesis that the probability of accepting an area as not being contaminated which is, in fact, 10% or more contaminated is 0.10. Or in other words, the final survey acceptance criteria corresponds to assuring with 90% confidence that 90% of an area has residual contamination below 100% (a 90/90/100 test) of the authorized limit.

7. REFERENCES

1. "RADIATION PROTECTION OF THE PUBLIC AND ENVIRONMENT," DOE Order 5400.5, U. S. Department of Energy, February 8, 1989.

2. "Regulatory Impact Analysis for Radiation Site Cleanup Proposed Rule - Draft", U. S. Environmental Protection Agency, January 17, 1996.

3. "Health Effects of Exposure to Low Levels of Ionizing Radiation -- BEIR V," Committee on the Biological Effects of Ionizing Radiations, Board on Radiation Effects Research, Commission on Life Sciences, National Research Council. National Academy Press, Washington, 1990.

4. "A Manual for Implementing Residual Radioactive Material Guidelines," DOE/CH/8901, U. S. Department of Energy, June 1989.

5. "National Primary Drinking Water Regulations; Radionuclides," 40 CFR 141.15 and .16, U. S. Environmental Protection Agency, July 18, 1991.

6. "STANDARDS FOR PROTECTION AGAINST RADIATION," 10 CFR 20, U. S. Nuclear Regulatory Commission.

7. "CALIFORNIA RADIATION CONTROL REGULATIONS," CCR 17, State of California Department of Health Services.

8. "ORE MINING AND DRESSING POINT SOURCE CATEGORY," Subpart C--Uranium, Radium and Vanadium Ores Subcategory, 40 CFR 440, U. S. Environmental Protection Agency.

9. "Disposal or Onsite Storage of Thorium or Uranium Wastes from Past Operations," Federal Register . Vol. 46, No. 205, pp. 52061-52063, Friday, October 23, 1981. U. S. Nuclear Regulatory Commission.

10. "ENVIRONMENTAL PROTECTION STANDARDS FOR NUCLEAR POWER OPERATIONS," 40 CFR 190, U. S. Environmental Protection Agency.

11. "Environmental Health, Radioactivity," CCR 22, Article 5. State of California Department of Health Services.

12. "Application of DOE 5400.5 Requirements for Release and Control of Property Containing Residual Radioactive Material", DOE Memorandum, DOE-OAK, January 5, 1996.

13. "Order Authorizing Dismantling of Facility and Disposition of Component Parts", Docket No. 50-375, Enclosure to NRC Letter dated February 22, 1983, D. Eisenhut to M. Remley.

14. DOE/CH/8901, A Manual for Implementing Residual Radioactive Material Guidelines, T. L. Gilbert, et al., June 1989.

15. "Statistical Treatment of Radiological Survey Data for Cleanup Decisions and Regulatory Compliance", Proc. Spectrum '92 Conference, Boise, Idaho, August 23 - 27, 1992.

16. "Acceptance Sampling Procedures for Exempted and Generally Licensed Items Containing By-Product Material", U. S. Nuclear Regulatory Commission Guide 6.6, dated June 1974.

17. DECON-1, State of California for Decontaminating Facilities and Equipment Prior to Release for Unrestricted Use, dated June 1977.

18. MIL-STD-414, Sampling Procedures and Tables for Inspection by Variables for Percent Defective, June 11, 1957.

19. NUREG-1575 (EPA 402-R-97-016), "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)", December 1997.

Appendix A

Input Parameters for RESRAD Calculations (Sheet 1 of 3)

Parameter	Value Used for Scenario			RESRAD
	Industrial	Wilderness	Residential	Default
Area of contaminated zone (m^2)	1.000E+04	1.000E+04	1.000E+04	1.000E+04
Thickness of contaminated zone (m)	1.000E+00	2.000E+00	1.000E+00	2.000E+00
Length parallel to aquifer flow (m)	1.000E+02	1.000E+02	1.000E+02	1.000E+02
Basic radiation dose limit (mrem/yr)	1.500E+01	1.500E+01	1.500E+01	3.000E+01
Time since placement of material (yr)	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Times for calculations (yr)	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Times for calculations (yr)	3.000E+00	3.000E+00	3.000E+00	3.000E+00
Times for calculations (yr)	1.000E+01	1.000E+01	1.000E+01	1.000E+01
Times for calculations (yr)	3.000E+01	3.000E+01	3.000E+01	3.000E+01
Times for calculations (yr)	1.000E+02	1.000E+02	1.000E+02	1.000E+02
Times for calculations (yr)	3.000E+02	3.000E+02	3.000E+02	3.000E+02
Times for calculations (yr)	1.000E+03	1.000E+03	1.000E+03	1.000E+03
Times for calculations (yr)	3.000E+03	0.000E+00	3.000E+03	0.000E+00
Times for calculations (yr)	1.000E+04	0.000E+00	1.000E+04	0.000E+00
Cover depth (m)	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Density of cover material (g/cm^3)	not used	not used	not used	1.500E+00
Cover depth erosion rate (m/yr)	not used	not used	not used	1.000E-03
Density of contaminated zone (g/cm^3)	1.500E+00	1.500E+00	1.500E+00	1.500E+00
Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	1.000E-03	1.000E-03
Contaminated zone total porosity	4.300E-01	4.300E-01	4.300E-01	4.000E-01
Contaminated zone effective porosity	2.000E-01	2.000E-01	2.000E-01	2.000E-01
Contaminated zone hydraulic conductivity (m/yr)	3.000E+03	3.000E+03	3.000E+03	1.000E+01
Contaminated zone b parameter	5.300E+00	5.300E+00	5.300E+00	5.300E+00
Humidity in air (g/cm^3)	8.000E+00	8.000E+00	8.000E+00	8.000E+00
Evapotranspiration coefficient	5.000E-01	5.000E-01	5.000E-01	5.000E-01
Precipitation (m/yr)	4.700E-01	4.700E-01	4.700E-01	1.000E+00
Irrigation (m/yr)	2.000E-01	2.000E-01	2.000E-01	2.000E-01
Irrigation mode	overhead	overhead	overhead	overhead
Runoff coefficient	2.000E-01	2.000E-01	2.000E-01	2.000E-01
Watershed area for nearby stream or pond (m^2)	1.000E+06	1.000E+06	1.000E+06	1.000E+06
Accuracy for water/soil computations	1.000E-03	1.000E-03	1.000E-03	1.000E-03
Density of saturated zone (g/cm^3)	1.500E+00	1.500E+00	1.500E+00	1.500E+00
Saturated zone total porosity	4.300E-01	4.300E-01	4.300E-01	4.000E-01
Saturated zone effective porosity	2.000E-01	2.000E-01	2.000E-01	2.000E-01
Saturated zone hydraulic conductivity (m/yr)	3.000E+03	3.000E+03	3.000E+03	1.000E+02
Saturated zone hydraulic gradient	2.000E-02	2.000E-02	2.000E-02	2.000E-02
Saturated zone b parameter	5.300E+00	5.300E+00	5.300E+00	5.300E+00
Water table drop rate (m/yr)	1.000E-03	1.000E-03	1.000E-03	1.000E-03
Well pump intake depth (m below water table)	1.000E+01	1.000E+01	1.000E+01	1.000E+01

Input Parameters for RESRAD Calculations (Sheet 2 of 3)

Parameter	Value Used for Scenario			RESRAD Default
	Industrial	Wilderness	Residential	
Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	ND	ND
Well pumping rate (m^3/yr)	not used	not used	7.000E+01	2.500E+02
Number of unsaturated zone strata	1	1	1	1
Unsat. zone 1, thickness (m)	4.000E+00	4.000E+00	4.000E+00	4.000E+00
Unsat. zone 1, soil density (g/cm^3)	1.500E+00	1.500E+00	1.500E+00	1.500E+00
Unsat. zone 1, total porosity	4.300E-01	4.300E-01	4.300E-01	4.000E-01
Unsat. zone 1, effective porosity	2.000E-01	2.000E-01	2.000E-01	2.000E-01
Unsat. zone 1, soil-specific b parameter	5.300E+00	5.300E+00	5.300E+00	5.300E+00
Unsat. zone 1, hydraulic conductivity (m/yr)	3.000E+03	3.000E+03	3.000E+03	1.000E+01
Inhalation rate (m^3/yr)	8.400E+03	8.400E+03	8.400E+03	8.400E+03
Mass loading for inhalation (g/m^3)	2.000E-04	2.000E-04	2.000E-04	2.000E-04
Dilution length for airborne dust, inhalation (m)	3.000E+00	3.000E+00	3.000E+00	3.000E+00
Exposure duration	3.000E+01	3.000E+01	3.000E+01	3.000E+01
Shielding factor, inhalation	4.000E-01	4.000E-01	4.000E-01	4.000E-01
Shielding factor, external gamma	2.500E-01	7.000E-01	5.100E-01	7.000E-01
Fraction of time spent indoors	2.000E-01	0.000E+00	5.000E-01	5.000E-01
Fraction of time spent outdoors (on site)	4.000E-02	1.000E-01	2.500E-01	2.500E-01
Shape factor flag, external gamma	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Fruits, vegetables and grain consumption (kg/yr)	1.600E+00	1.600E+00	1.600E+01	1.600E+02
Leafy vegetable consumption (kg/yr)	0.000E+00	0.000E+00	1.400E+00	1.400E+01
Milk consumption (L/yr)	not used	not used	not used	9.200E+01
Meat and poultry consumption (kg/yr)	not used	not used	not used	6.300E+01
Fish consumption (kg/yr)	not used	not used	not used	5.400E+00
Other seafood consumption (kg/yr)	not used	not used	not used	9.000E-01
Soil ingestion rate (g/yr)	3.650E+01	3.650E+01	3.650E+01	3.650E+01
Drinking water intake (L/yr)	not used	not used	5.100E+02	5.100E+02
Contamination fraction of drinking water	not used	not used	1.000E+00	1.000E+00
Contamination fraction of household water	1.000E+00	0.000E+00	1.000E+00	1.000E+00
Contamination fraction of livestock water	not used	0.000E+00	not used	1.000E+00
Contamination fraction of irrigation water	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Contamination fraction of aquatic food	not used	not used	not used	5.000E-01
Contamination fraction of plant food	-1	-1	-1	-1
Contamination fraction of meat	not used	not used	not used	-1
Contamination fraction of milk	not used	not used	not used	-1
Livestock fodder intake for meat (kg/day)	not used	not used	not used	6.800E+01
Livestock fodder intake for milk (kg/day)	not used	not used	not used	5.500E+01
Livestock water intake for meat (L/day)	not used	not used	not used	5.000E+01
Livestock water intake for milk (L/day)	not used	not used	not used	1.600E+02
Livestock soil intake (kg/day)	not used	not used	not used	5.000E-01
Mass loading for foliar deposition (g/m^3)	1.000E-04	1.000E-04	1.000E-04	1.000E-04
Depth of soil mixing layer (m)	1.500E-01	1.500E-01	1.500E-01	1.500E-01
Depth of roots (m)	9.000E-01	9.000E-01	9.000E-01	9.000E-01

Input Parameters for RESRAD Calculations (Sheet 3 of 3)

Parameter	Value Used for Scenario			RESRAD Default
	Industrial	Wilderness	Residential	
Drinking water fraction from ground water	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Household water fraction from ground water	not used	not used	1.000E+00	1.000E+00
Livestock water fraction from ground water	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Irrigation fraction from ground water	not used	not used	not used	1.000E+00
C-12 concentration in water (g/cm^3)	not used	not used	not used	2.000E-05
C-12 concentration in contaminated soil (g/g)	not used	not used	not used	3.000E-02
Fraction of vegetation carbon from soil	not used	not used	not used	2.000E-02
Fraction of vegetation carbon from air	not used	not used	not used	9.800E-01
C-14 evasion layer thickness in soil (m)	not used	not used	not used	3.000E-01
C-14 evasion flux rate from soil (1/sec)	not used	not used	not used	7.000E-07
C-12 evasion flux rate from soil (1/sec)	not used	not used	not used	1.000E-10
Fraction of grain in beef cattle feed	not used	not used	not used	8.000E-01
Fraction of grain in milk cow feed	not used	not used	not used	2.000E-01
Storage times of contaminated foodstuffs (days):				
Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	1.400E+01	1.400E+01
Leafy vegetables	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Milk	not used	not used	not used	1.000E+00
Meat and poultry	not used	not used	not used	2.000E+01
Fish	not used	not used	not used	7.000E+00
Crustacea and mollusks	not used	not used	not used	7.000E+00
Well water	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Surface water	1.000E+00	1.000E+00	1.000E+00	1.000E+00
Livestock fodder	not used	not used	not used	4.500E+01
Thickness of building foundation (m)	1.000E-01	not used	1.000E-01	1.500E-01
Bulk density of building foundation (g/cm)	2.400E+00	not used	2.400E+00	2.400E+00
Total porosity of the cover material	not used	not used	not used	4.000E-01
Total porosity of the building foundation	1.000E-01	not used	1.000E-01	1.000E-01
Volumetric water content of the cover material	not used	not used	not used	5.000E-02
Volumetric water content of the foundation	3.000E-02	not used	3.000E-02	3.000E-02
Diffusion coefficient for radon gas (m/sec):				
in cover material	not used	not used	not used	2.000E-06
in foundation material	3.000E-07	not used	3.000E-07	3.000E-07
in contaminated zone soil	2.000E-06	not used	2.000E-06	2.000E-06
Radon vertical dimension of mixing (m)	2.000E+00	not used	2.000E+00	2.000E+00
Average annual wind speed (m/sec)	2.000E+00	not used	2.000E+00	2.000E+00
Average building air exchange rate (1/hr)	5.000E-01	not used	5.000E-01	5.000E-01
Height of the building (room) (m)	2.500E+00	not used	2.500E+00	2.500E+00
Building interior area factor	0.000E+00	not used	0.000E+00	0.000E+00
Building depth below ground surface (m)	1.000E-01	not used	1.000E-01	-1.000E+00
Emanating power of Rn-222 gas	2.500E-01	not used	2.500E-01	2.500E-01
Emanating power of Rn-220 gas	not used	not used	not used	1.500E-01

Appendix B
Agency Approvals

1. Letter from Gerard Wong (DHS) to Majelle Lee (Rocketdyne), "Authorized Sitewide Radiological Guidelines for Release for Unrestricted Use", 96ETEC-DRF-0455, August 9, 1996.
2. Memorandum from Sally A. Robison (DOE-ER) to Roger Liddle (DOE-OAK), Sitewide Limits for Release of Facilities Without Radiological Restriction", 007857RC, September 17, 1996.

EXHIBIT II

INDEPENDENT VERIFICATION DOCUMENTATION OF THE RADIOLOGICAL CONDITION OF MASS SPECTROSCOPY LABORATORY AT ROCKETDYNE (BOEING NORTH AMERICAN) DESOTO COMPLEX – BUILDING 104

ORISE 99-0983

VERIFICATION SURVEY OF THE DESOTO MASS SPECTROSCOPY LABORATORY (BUILDING 104) ROCKETDYNE PROPULSION AND POWER BOEING NORTH AMERICAN, INC. CANOGA PARK, CALIFORNIA

Prepared by

T. J. Vitkus

Environmental Survey and Site Assessment Program
Radiological Safety, Assessments, and Training
Oak Ridge Institute for Science and Education
Oak Ridge, Tennessee 37831-0117

Prepared for the

Office of Environmental Restoration
U.S. Department of Energy

FINAL REPORT

JUNE 1999

This report is based on work performed under a contract with the U.S. Department of Energy.

VERIFICATION SURVEY
OF THE
DESOTO MASS SPECTROSCOPY LABORATORY (BUILDING 104)
SANTA SUSANA FIELD LABORATORY
BOEING NORTH AMERICAN, INC.
CANOGA PARK, CALIFORNIA

Prepared by: _____ Date: 6/18/99
T. J. Vitkus, Survey Projects Manager
Environmental Survey and Site Assessment Program

Reviewed by: _____ Date: 6/21/99
R. D. Condra, Technical Resource Manager
Environmental Survey and Site Assessment Program

Reviewed by: _____ Date: 7/8/99
A. T. Payne, Quality Assurance/Safety Manager
Environmental Survey and Site Assessment Program

Reviewed by: _____ Date: 6/22/99
E. W. Abelquist, Assistant Program Director
Environmental Survey and Site Assessment Program

Reviewed by: _____ Date: 6/29/99
W. L. Beck, Program Director
Environmental Survey and Site Assessment Program

ACKNOWLEDGMENTS

The author would like to acknowledge the significant contributions of the following staff members:

FIELD STAFF

T. D. Herrera
A. L. Mashburn

LABORATORY STAFF

R. D. Condra
J. S. Cox
M. J. Laudeman

CLERICAL STAFF

D. K. Herrera
K. E. Waters
K. L. Pond

ILLUSTRATOR

T. D. Herrera

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ABBREVIATIONS AND ACRONYMS

µrem/h	microrem per hour
µR/h	microroentgens per hour
AEC	Atomic Energy Commission
ASME	American Society of Mechanical Engineers
BKG	background
cm	centimeter
cm^2	square centimeter
cpm	counts per minute
D&D	decontamination and decommissioning
dpm/100 cm^2	disintegrations per minute per 100 square centimeters
DOE	U.S. Department of Energy
EML	Environmental Measurements Laboratory
EPA	Environmental Protection Agency
ERDA	Energy Research and Development Administration
ESSAP	Environmental Survey and Site Assessment Program
ETEC	Energy Technology Engineering Center
ft	foot
ha	hectare
km	kilometer
m^2	square meter
M&O	Management and Operating
MDC	minimum detectable concentration
mm	millimeter
mrem/yr	millirem per year
NaI	sodium iodide
NIST	National Institute of Standards and Technology
NRC	U.S. Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
SSFL	Santa Susana Field Laboratory

VERIFICATION SURVEY OF THE DESOTO MASS SPECTROSCOPY LABORATORY (BUILDING 104) ROCKETDYNE PROPULSION AND POWER BOEING NORTH AMERICAN, INC. CANOGA PARK, CALIFORNIA

INTRODUCTION AND SITE HISTORY

The DeSoto Building 104, located in Canoga Park, California, was one of several buildings comprising the headquarters of the former Atomics International from 1960 to 1984. In 1984, Atomics International merged with Rocketdyne and since then with Boeing North American, Inc. Rocketdyne operated a Mass Spectroscopy Laboratory within Building 104 which was used to analyze low-level, activated test samples for universities and national laboratories beginning in the 1970's until 1995. Typical radionuclides controlled by the laboratory were activation products such as Mn-54, Mn-56, Co-58, Co-60, Fe-59, Nb-95, and Cs-137. Uranium isotopes were also used. In 1996, the laboratory was relocated to Battelle—Pacific Northwest Laboratories.

Decontamination and decommissioning (D&D) of contaminated Rocketdyne facilities began in the late 1960's and continues as the remaining U.S. Department of Energy (DOE) program operations are terminated. As part of this D&D program, Rocketdyne/Boeing has performed, or is in the process of performing decommissioning and final status surveys of a number of facilities that supported the various nuclear-related operations, most of which were at the Santa Susana Field Laboratory which Rocketdyne operated for the DOE. Environmental management of DOE contaminated properties continues under the termination clause of Rocketdyne's Management and Operating (M&O) contract. D&D activities for the Mass Spectroscopy Laboratory were initiated in 1997, and included removal of all cabinets, furniture, floor tile, ventilation ducting, piping, conduit, dry wall, and ceiling panels. A final survey was completed in 1998 (Boeing 1998a).

DOE's Office of Environmental Restoration Northwestern Area Programs is responsible for oversight of a number of remedial actions that have been or will be conducted at Rocketdyne. It is the policy of DOE to perform independent (third party) verification of remedial action activities conducted within Office of Environmental Restoration programs. The purpose of these independent verifications is to confirm that remedial actions have been effective in meeting established and site-

specific guidelines and that the documentation accurately and adequately describes the radiological conditions at the site. The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) was designated as the organization responsible for this task at Rocketdyne, and has been requested to verify the current radiological status of each of these facilities.

SITE DESCRIPTION

The Mass Spectroscopy Laboratory, is within Building 104 at Boeing North American, Inc.'s DeSoto Facility, which is located at 8900 DeSoto Avenue in Canoga Park, approximately five miles east of the SSFL site (Figures 1 and 2). The laboratory is located in the northeast quadrant of the first floor of Building 104 and includes the offices along the north quadrant that were used during the D&D activities. Figure 3 shows the original laboratory floor plan. Overall, the laboratory contained approximately 460m^2 (4900ft^2) of floor area. The laboratory was constructed with a concrete floor and orginally, concrete walls which separated the laboratory from surrounding offices.

OBJECTIVES

The objectives of the verification process were to provide independent document reviews and measurement and sampling data for use by the DOE in determining the radiological status of the area and whether or not the area meets the guideline requirements for release without radiological restrictions.

DOCUMENT REVIEW

Survey plans and procedures were reviewed for appropriateness and the final data and final status survey report were reviewed for adequacy relative to demonstrating compliance with the DOE requirements for release for unrestricted use (Boeing 1998a and b).

PROCEDURES

A survey team from ESSAP visited the DeSoto facility on September 30, 1998 and performed visual inspections and independent measurements and sampling of the Mass Spectroscopy Laboratory.

The verification survey activities were conducted in accordance with a DOE approved site-specific survey plan and the ORISE/ESSAP Survey Procedures and Quality Assurance Manuals (ORISE 1998a, b, and c). Survey procedures included surface scans, total and removable surface activity measurements, and exposure rate measurements. Additional information regarding survey and analytical equipment and procedures may be found in Appendices A and B.

REFERENCE SYSTEM

Measurement and sampling locations were referenced to the existing grid established by Rocketdyne/Boeing. Measurements and sampling on ungridded surfaces were referenced to the floor and lower wall grids or prominent building features.

SURFACE SCANS

Surface scans for alpha, beta, and gamma activity were performed on 100 percent of the floors and 25 to 50 percent of the lower walls (up to 2 meters) using NaI scintillation and gas proportional detectors coupled to ratemeters or ratemeter-scalers with audible indicators. Particular attention was given to cracks and joints in the floor and walls, ledges, drains, ducts, and other locations where material may have accumulated. Locations of elevated direct radiation levels detected by scans were marked for further investigation.

SURFACE ACTIVITY MEASUREMENTS

Initially, direct measurements were performed on various construction materials in areas of similar construction, but with no history of radioactive materials use in order to obtain construction material specific backgrounds.

Direct measurements, using gas proportional detectors coupled to ratemeter-scalers, for total alpha and total beta surface activity were performed at 30 locations within the laboratory and adjoining areas. Measurement locations were chosen either randomly or based on surface scan results. A smear sample for the determination of removable activity was collected at each direct measurement location. Figures 4 through 7 show measurement locations.

EXPOSURE RATE MEASUREMENTS

Background exposure rate measurements were collected in an area of Building 104 of similar construction but with no history of radioactive materials use. Exposure rates were measured at five locations in the Mass Spectroscopy Laboratory and adjoining areas (Figures 4, 5, and 7). Exposure rates were measured at one meter above the surface using a microrem meter.

SAMPLE ANALYSIS AND DATA INTERPRETATION

Samples and data were returned to ORISE's ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. Sample analyses were performed in accordance with the ORISE/ESSAP Laboratory Procedures Manual (ORISE 1998d). Smears were analyzed using a low-background gas proportional counter. Smear and direct measurement results were then converted to units of disintegrations per minute per 100 square centimeters (dpm/100 cm^2). Exposure rates were reported in units of microroentgens per hour (μR/h). The data generated were then compared with Rocketdyne/Boeing's documentation and the DOE guidelines established for release to unrestricted use.

FINDINGS AND RESULTS

DOCUMENT REVIEW

The procedures used for the final status survey were appropriate for the detection of the contaminants of concern at the guideline levels. The final status survey data provide an adequate description of the radiological status of the Mass Spectroscopy Laboratory and indicate that the guidelines for release for unrestricted use have been satisfied.

SURFACE SCANS

Surface scans identified one location of elevated direct alpha plus beta radiation in excess of the ambient background levels on the floor of the Mass Spectroscopy Laboratory. Follow-up investigations determined that the levels were below acceptable criteria. All remaining area scans did not identify any additional locations of elevated direct radiation.

SURFACE ACTIVITY LEVELS

Surface activity levels are summarized in Table 1. Total alpha activity levels ranged from -14 to 87 dpm/100 cm^2 and total beta activity levels ranged from -340 to 900 dpm/100 cm^2. Removable activity levels ranged from 0 to 2 dpm/100 cm^2 and -6 to 9 dpm/100 cm^2 for gross alpha and gross beta, respectively.

EXPOSURE RATES

Exposure rates at one meter above the surface are summarized in Table 1 and ranged from 9 to 11 μR/h. The background exposure rates within Building 104 averaged 9 μR/h.

COMPARISON OF RESULTS WITH GUIDELINES

A summary of the DOE guidelines for residual radioactive material is included as Appendix C. The primary contaminants of concern for the Mass Spectroscopy Laboratory are uranium and mixed fission and activation products. The applicable surface contamination guidelines for uranium are as follows (DOE 1990 and 1993):

Total Activity

5,000 α dpm/100 cm^2, average in a 1 m^2 area

15,000 α dpm/100 cm^2, maximum in a 100 cm^2 area

Removable Activity

1000 α dpm/100 cm^2

The guidelines for beta-gamma emitters are:

Total Activity

5,000 β-γ dpm/100 cm^2, average in a 1 m^2 area

15,000 β-γ dpm /100 cm^2, maximum in a 100 cm^2 area

Removable Activity

1,000 β-γ dpm/100 cm^2

All surface activity levels were less than the respective total and removable surface activity guidelines.

The DOE's exposure rate guideline is 20 μR/h above background. However, Rockwell has elected to use a more restrictive guideline of 5 μR/h above background. Exposure rates at one meter above the surface were within these guidelines.

SUMMARY

During September 1998, the Environmental Survey and Site Assessment Program performed verification activities for the Rocketdyne/Boeing Mass Spectroscopy Laboratory at the DeSoto facility located in Canoga Park, California. Verification activities included document reviews, surface scans, surface activity measurements, and exposure rate measurements.

The results of the independent verification survey support Rocketdyne/Boeing's final status survey conclusion that the radiological conditions of the Mass Spectroscopy Laboratory satisfy the DOE guidelines. All verification surface activity levels were below applicable total and removable guidelines. In addition, exposure rates were comparable to background levels and satisfied both the DOE and the more restrictive exposure rate guideline that Rocketdyne/Boeing has elected to use.

FIGURES

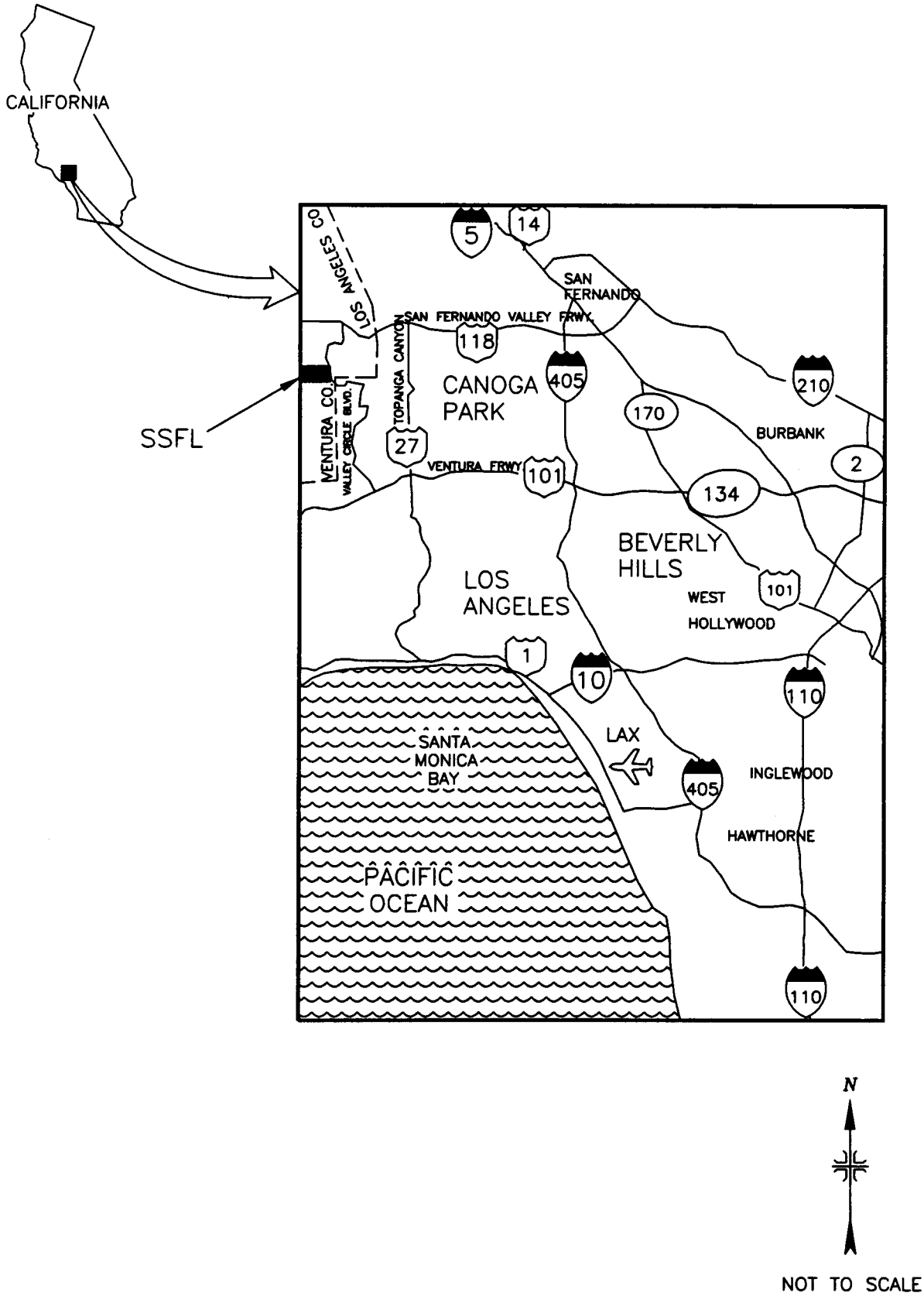

FIGURE 1: Los Angeles, California Area – Location of the Santa Susana Field Laboratory Site

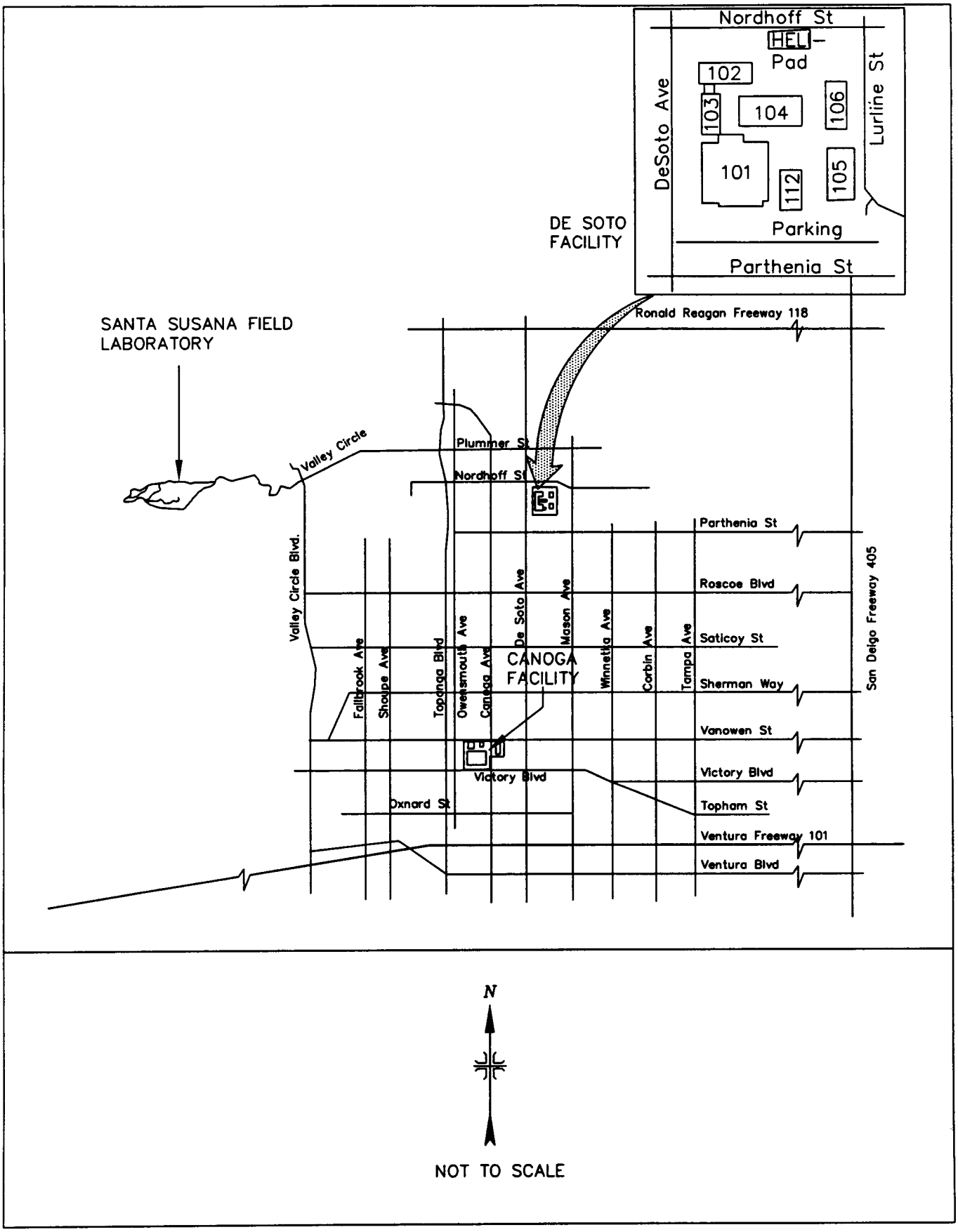

FIGURE 2: Location of the DeSoto Facility and Building 104

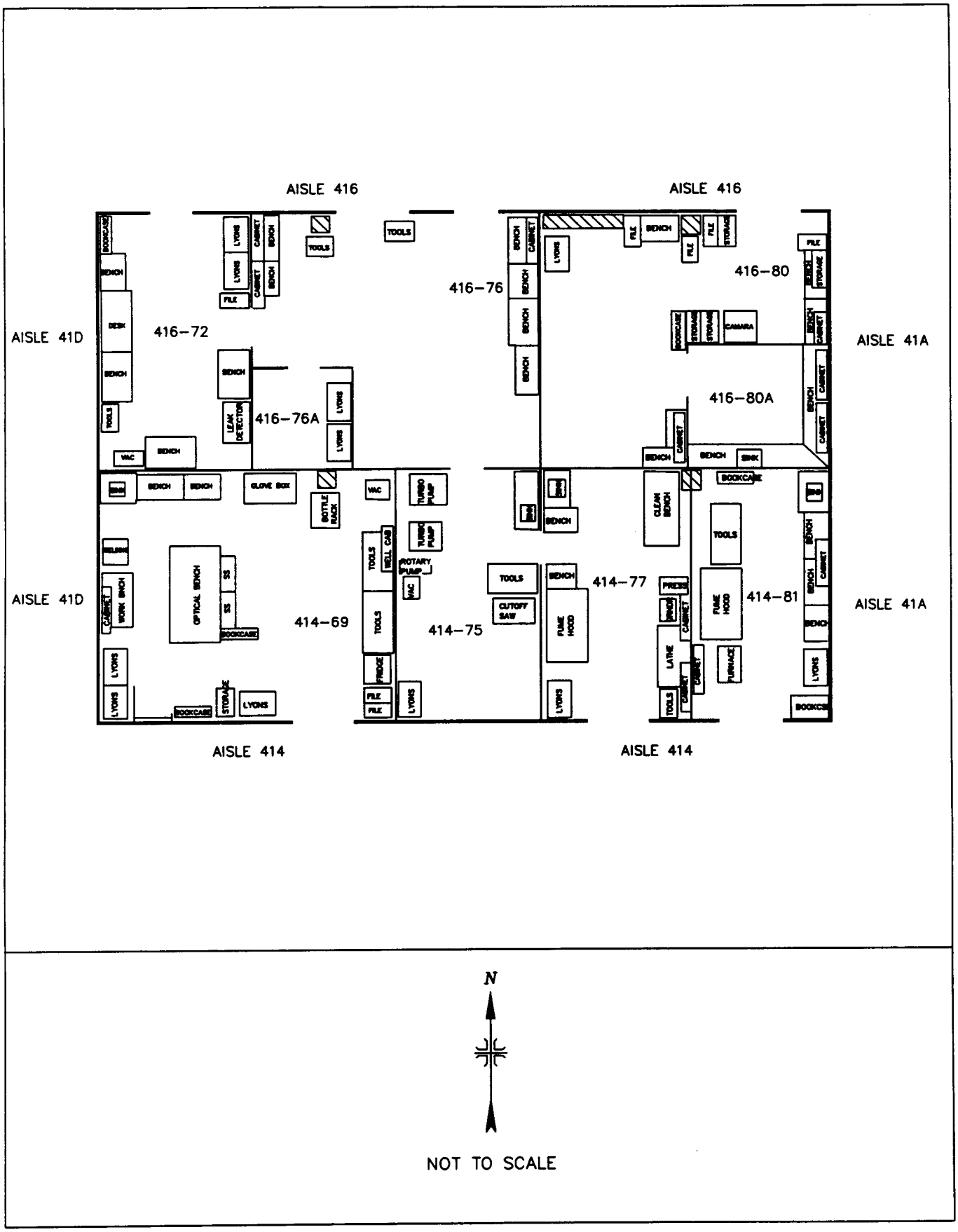

FIGURE 3: Mass Spectroscopy Laboratory – Original Floor Plan

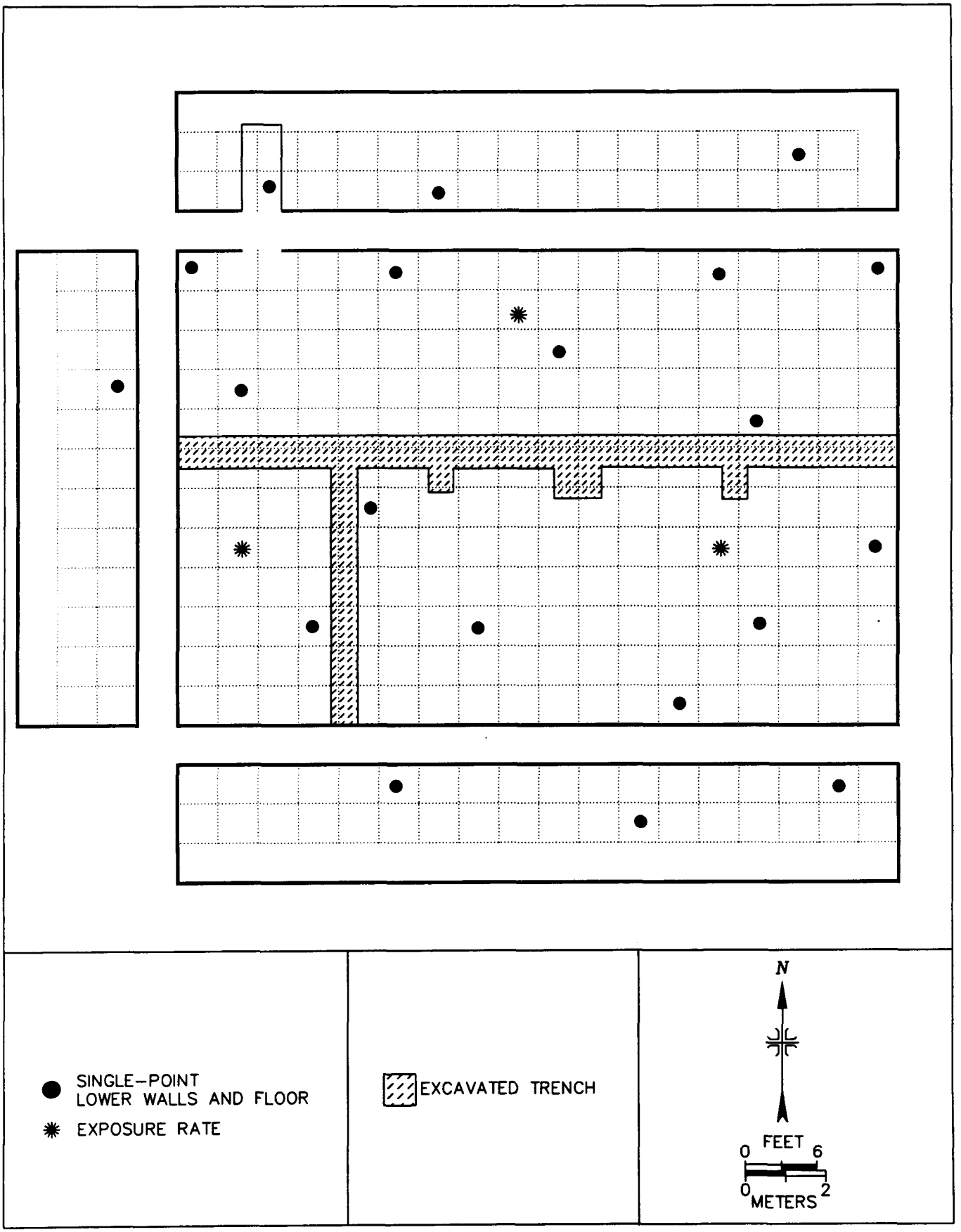

FIGURE 4: Mass Spectroscopy Laboratory – Measurement and Sampling Locations

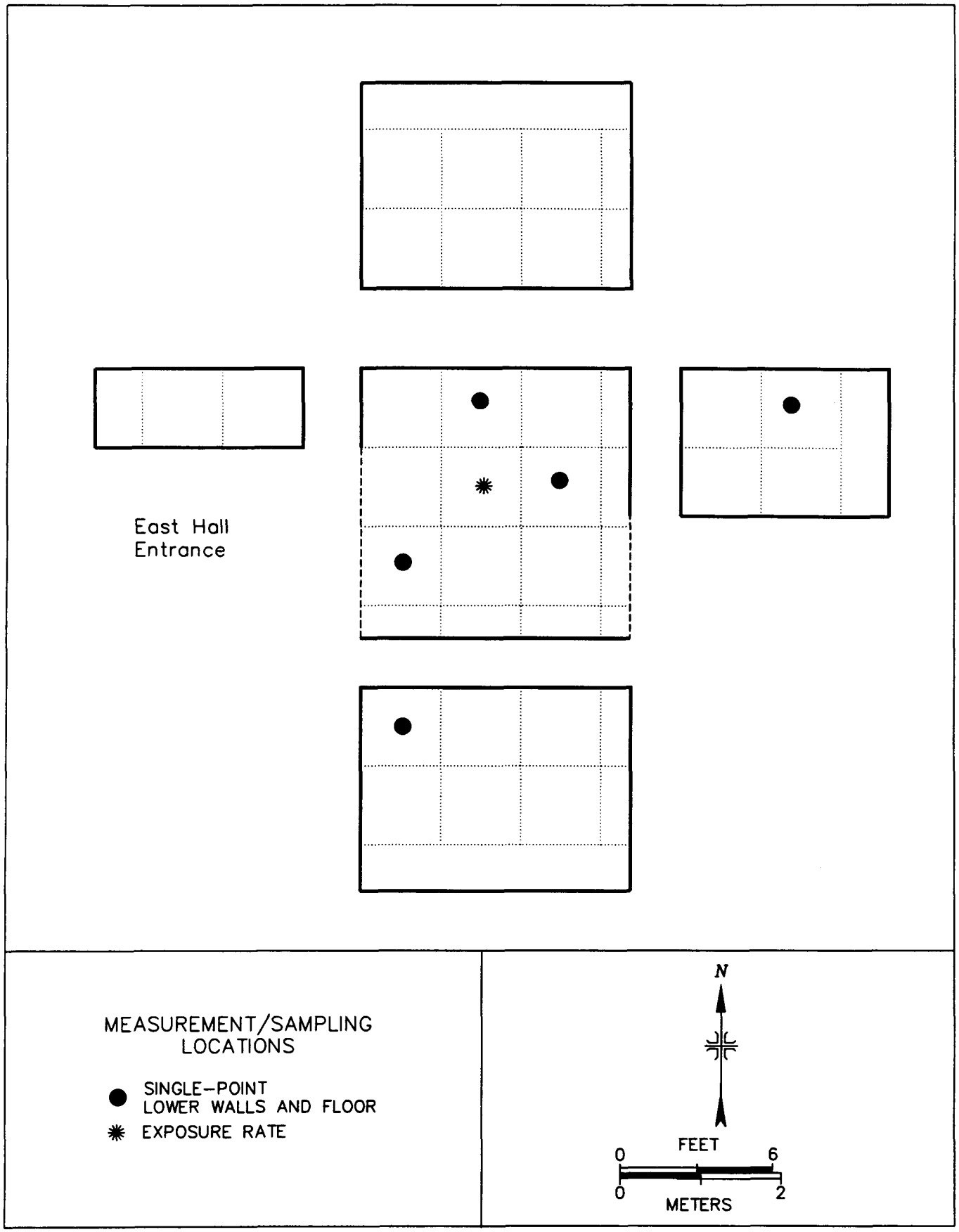

FIGURE 5: Building 104, AB-33 - Measurement and Sampling Locations

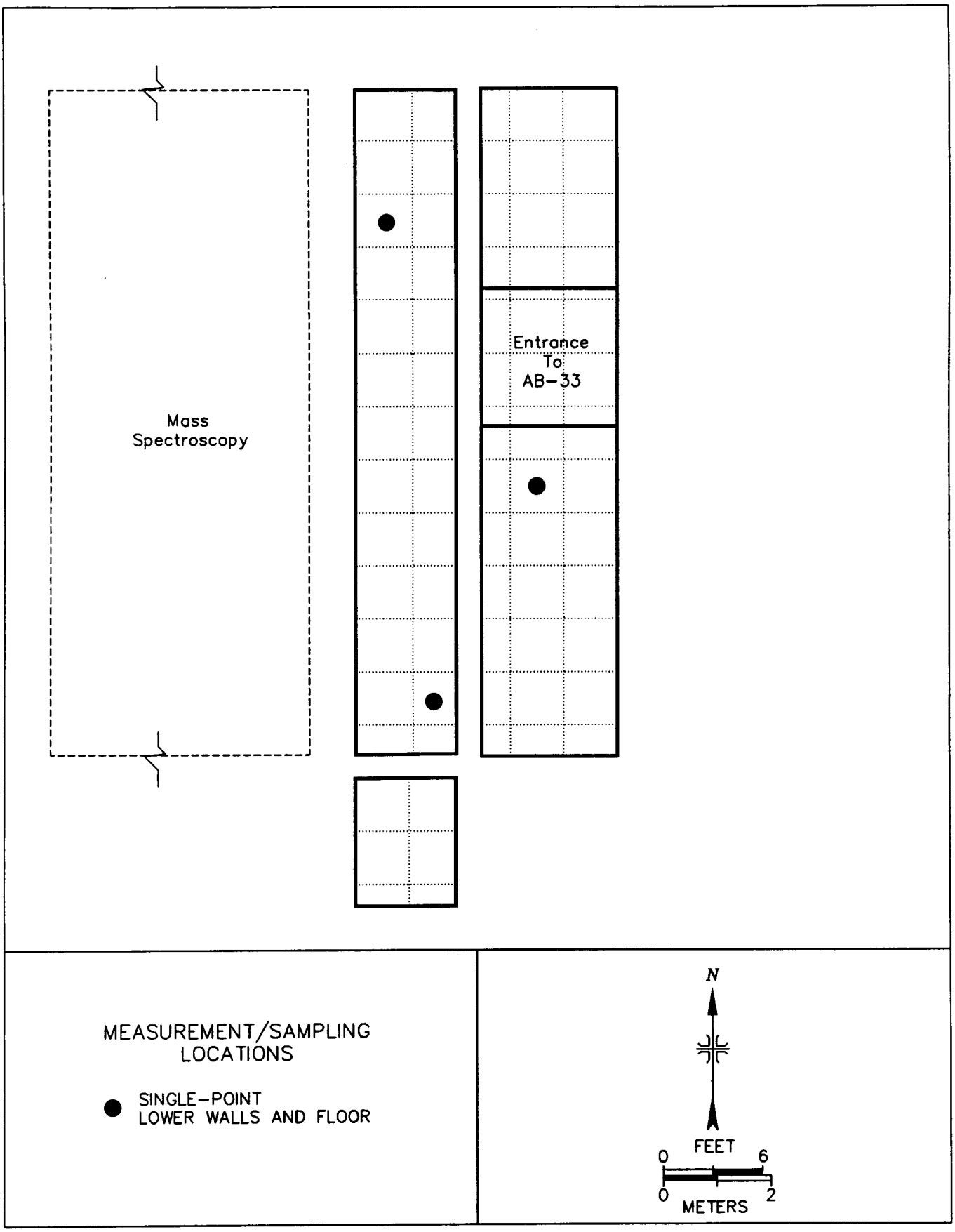

FIGURE 6: Building 104, East Hallway – Measurement and Sampling Locations

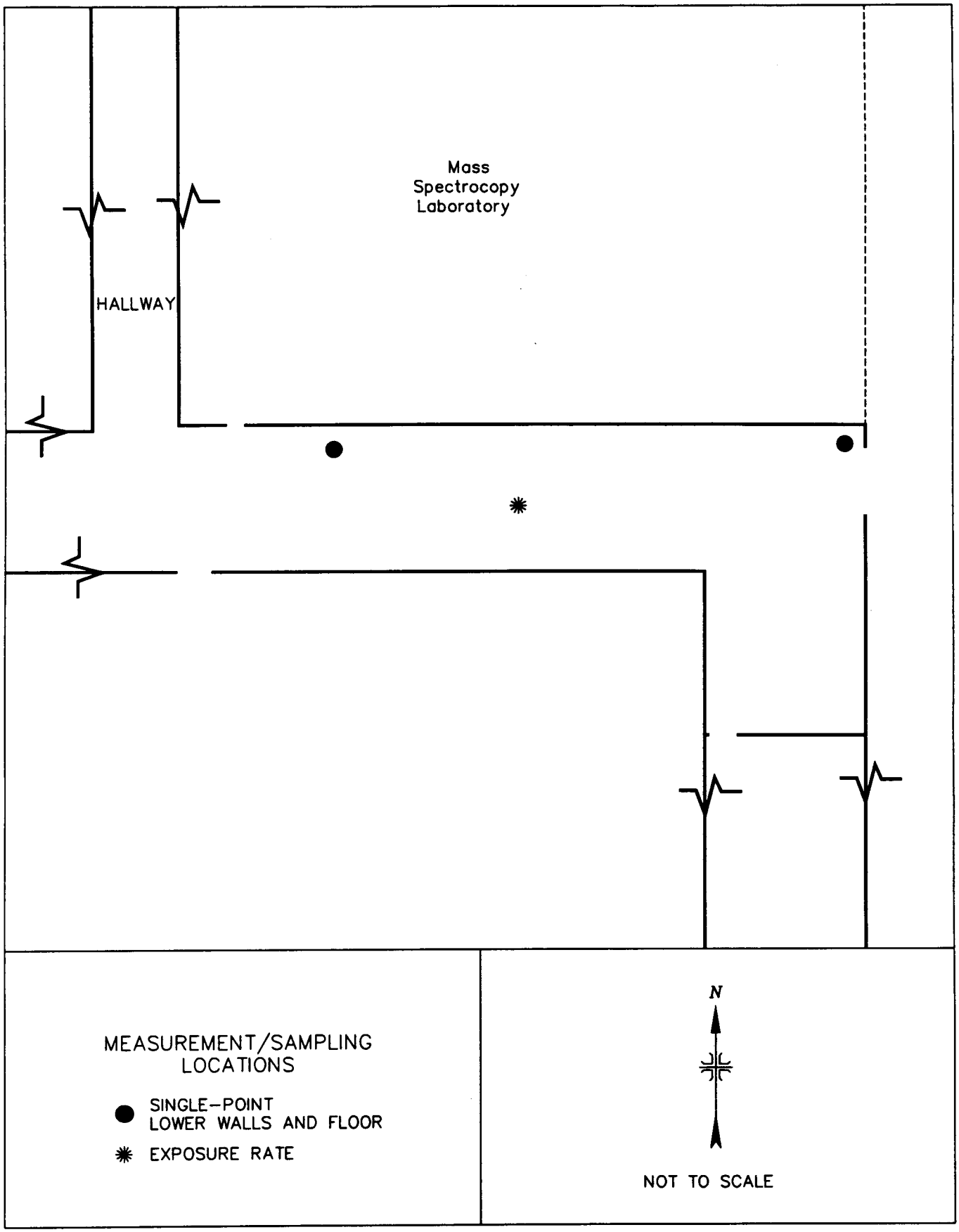

FIGURE 7: Building 104, South Hallway – Measurement and Sampling Locations

TABLE

TABLE 1

SUMMARY OF EXPOSURE RATES AND SURFACE ACTIVITY LEVELS
DESOTO MASS SPECTROSCOPY LABORATORY (BUILDING 104)
SANTA SUSANA FIELD LABORATORY
BOEING NORTH AMERICAN, INC.
CANOGA PARK, CALIFORNIA

Location[a]	Number of Exposure Rate Measurements Locations	Exposure Rate Range (μR/h)	Number of Surface Activity Measurement Locations	Total Activity Range (dpm/100 cm^2)		Removable Activity Range (dpm/100 cm^2)	
			Single-Point	Alpha	Beta	Alpha	Beta
MASS SPEC. LAB							
Floor	3	9 to 10	12	-7 to 87	-8 to 903	0 to 2	-4 to 9
Lower Wall	NA	NA	8	-14 to 7	-339 to 137	0 to 2	-6 to 2
EAST HALLWAY							
Floor	NA	NA	2	0 to 14	82	0	-3 to 1
Lower Wall	NA	NA	1	-7	57	0	1
FOYER							
Floor	1	11	3	0 to 22	30 to 82	0	-3 to 1
Lower Wall	NA	NA	2	0	-19 to 328	0	-2 to 1
SOUTH HALLWAY							
Floor	1	10	2	22 to 29	118 to 156	0 to 2	-1 to 6

[a]Refer to Figures 4 through 7.

REFERENCES

Boeing North American, Inc., Rocketdyne Division. Final Survey Report of the DeSoto Building 104, Mass Spectroscopy Laboratory. Canoga Park, CA; December 16, 1998a.

Boeing North American, Inc., Rocketdyne Division (Boeing). DeSoto Mass Spectrometry Laboratory Final Survey Plan. Canoga Park, CA: July 18, 1998b.

Oak Ridge Institute for Science and Education. Proposed Verification Survey Plan for the DeSoto Mass Spectrometry Laboratory (104), the Building 4019 Test Vault, and the T064 Side Yard, Santa Susana Field Laboratory, Boeing North America, Inc., Ventura County, California. Oak Ridge, TN; September 23, 1998a.

Oak Ridge Institute for Science and Education. Survey Procedures Manual for the Energy/Environment Systems Division, Environmental Survey and Site Assessment Program, Revision 10. Oak Ridge, Tennessee; January 7, 1998b.

Oak Ridge Institute for Science and Education. Quality Assurance Manual for the Energy/Environment Systems Division, Environmental Survey and Site Assessment Program, Revision 8. Oak Ridge, Tennessee; May 1, 1998c.

Oak Ridge Institute for Science and Education. Laboratory Procedures Manual for the Energy/Environment Systems Division, Environmental Survey and Site Assessment Program, Revision 11. Oak Ridge, Tennessee; February 17, 1998d.

U.S. Department of Energy (DOE). Radiation Protection of the Public and the Environment. Washington, DC: DOE Order 5400.5; February 1990 and Change 2, January 1993.

APPENDIX A

MAJOR INSTRUMENTATION

APPENDIX A

MAJOR INSTRUMENTATION

The display of a specific product is not to be construed as an endorsement of the product or its manufacturer by the author or his employers.

DIRECT RADIATION MEASUREMENT

Instruments

Eberline Pulse Ratemeter
Model PRM-6
(Eberline, Santa Fe, NM)

Ludlum Ratemeter-Scaler
Model 2221
(Ludlum Measurements, Inc.,
Sweetwater, TX)

Ludlum Floor Monitor
Model 239-1
(Ludlum Measurements, Inc.,
Sweetwater, TX)

Detectors

Bicron Micro-Rem Meter
(Bicron Corporation, Newburg, OH)

Ludlum Gas Proportional Detector
Model 43-68
Effective Area, 126 cm^2
(Ludlum Measurements, Inc.,
Sweetwater, TX)

Ludlum Gas Proportional Detector
Model 43-37
Effective Area, 550 cm^2
(Ludlum Measurements, Inc.,
Sweetwater, TX)

Victoreen NaI Scintillation Detector
Model 489-55
3.2 cm x 3.8 cm crystal
(Victoreen, Cleveland, OH)

LABORATORY ANALYTICAL INSTRUMENTATION

Low Background Gas Proportional Counter
Model LB-5100-W
(Oxford, Oak Ridge, TN)

APPENDIX B

SURVEY AND ANALYTICAL PROCEDURES

APPENDIX B

SURVEY AND ANALYTICAL PROCEDURES

SURVEY PROCEDURES

Surface Scans

Surface scans were performed by passing the detectors slowly over the surface; the distance between the detector and the surface was maintained at a minimum—nominally about 1 cm. Surfaces were scanned using either a large-area gas proportional floor monitor or small-area (126 cm^2) hand-held detectors. Identification of elevated levels was based on increases in the audible signal from the recording and/or indicating instrument. Combinations of detectors and instruments used for the scans were:

Alpha-Beta - gas proportional detector with ratemeter-scaler

Gamma - NaI scintillation detector with ratemeter

Surface Activity Measurements

Measurements of total alpha and total beta activity levels were performed using gas proportional detectors with portable ratemeter-scalers. Alpha and beta activity measurements were performed on randomly selected areas and at locations of elevated direct radiation, using gas proportional detectors with ratemeter-scalers.

Count rates (cpm), which were integrated over 1 minute in a static position, were converted to activity levels (dpm/100 cm^2) by dividing the net rate by total efficiency ($\epsilon_i \times \epsilon_s$) and correcting for the active area of the detector. Because different building materials (poured concrete, brick, wood, steel, etc.) may have different background levels, average background count rates were determined for each material encountered in the surveyed area at a location within Building 104 having similar construction to the Mass Spectroscopy Laboratory but without a history of radiological use. The respective alpha and beta background count rates for the 126 cm^2 gas proportional detectors were 3 and 510 cpm for unpainted concrete, 2 and 296 cpm for sheet rock and metal, and 1 and 413 cpm

for painted concrete. The 2 π alpha instrument efficiency factor was 0.43 for the gas proportional detector calibrated to Th-230. The 2 π beta instrument efficiency factor was 0.59 for the gas proportional detector calibrated to Tl-204. The source efficiency factors were 0.25 and 0.50 for alpha and beta, respectively. The corresponding total efficiencies were 0.11 for alpha and 0.29 for beta. The alpha minimum detectable concentrations (MDC) ranged from 55 to 80 dpm/100 cm^2, while the beta activity MDCs ranged from 230 to 300 dpm/100 cm^2. The physical probe area for the gas proportional was 126 cm^2.

Removable Activity Measurements

Removable activity levels were determined using numbered filter paper disks, 47 mm in diameter. Moderate pressure was applied to the smear and approximately 100 cm^2 of the surface was wiped. Smears were placed in labeled envelopes with the location and other pertinent information recorded.

Exposure Rate Measurements

Measurements of gamma exposure rates were performed at one meter above surfaces using a microrem meter. Although the instrument displays data in μrem/h, the μrem/h to μR/h conversion is essentially unity.

RADIOLOGICAL ANALYSES

Removable Activity

Smears were counted on a low background gas proportional system for gross alpha and gross beta activity.

DETECTION LIMITS

Detection limits, referred to as minimum detectable concentration (MDC), were based on 3 plus 4.65 times the standard deviation of the background count [$3 + (4.65\sqrt{BKG})$]. When the activity was determined to be less than the MDC of the measurement procedure, the result was reported as less

than MDC. Because of variations in background levels, measurement efficiencies, and contributions from other radionuclides in samples, the detection limits differ from sample to sample and instrument to instrument.

CALIBRATION AND QUALITY ASSURANCE

Calibration of all field and laboratory instrumentation was based on standards/sources, traceable to NIST, when such standards/sources were available. In cases where they were not available, standards of an industry recognized organization were used.

Analytical and field survey activities were conducted in accordance with procedures from the following documents of the Environmental Survey and Site Assessment Program:

- Survey Procedures Manual, Revision 10 (January 7, 1998)
- Laboratory Procedures Manual, Revision 12 (June 22, 1998)
- Quality Assurance Manual, Revision 8 (May 1, 1998)

The procedures contained in these manuals were developed to meet the requirements of DOE Order 5700.6C and ASME NQA-1 for Quality Assurance and contain measures to assess processes during their performance.

Quality control procedures include:

- Daily instrument background and check-source measurements to confirm that equipment operation is within acceptable statistical fluctuations.
- Participation in EPA and EML laboratory Performance Evaluation Programs.
- Training and certification of all individuals performing procedures.
- Periodic internal and external audits.

APPENDIX C

RESIDUAL RADIOACTIVE MATERIAL GUIDELINES SUMMARIZED FROM DOE ORDER 5400.5

APPENDIX C

RESIDUAL RADIOACTIVE MATERIAL GUIDELINES SUMMARIZED FROM DOE ORDER 5400.5

BASIC DOSE LIMITS

The basic limit for the annual radiation dose (excluding radon) received by an individual member of the general public is 100 mrem/yr. In implementing this limit, DOE applies as low as reasonable achievable principles to set site-specific guidelines.

STRUCTURE GUIDELINES

Indoor/Outdoor Structure Surface Contamination

Radionuclides[a]	Allowable Total Residual Surface Contamination (dpm/100 cm^2)[b] Average[c,d]	Maximum[d,e]	Removable[f]
Transuranics, Ra-226, Ra-228, Th-230 Th-228, Pa-231, Ac-227, I-125, I-129 [g]	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000α	15,000α	1,000α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above [h]	5,000β-γ	15,000β-γ	1,000β-γ

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site that has no radiological restriction on its use shall not exceed the background level by more than 20 μR/h and will comply with the basic dose limits when an appropriate-use scenario is considered.

[a] Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contamination should not be averaged over an area of more than 1 m^2. For objects of less surface area, the average should be derived for each such object.

[d] The average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at a depth of 1 cm.

[e] The maximum contamination level applies to an area of not more than 100 cm^2.

[f] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels, if direct scan surveys indicate that total residual surface contamination levels are within the limits for removable contamination.

[g] Guidelines for these radionuclides are not given in DOE Order 5400.5; however, these guidelines are considered applicable until guidance is provided.

[h] This category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90, which has been separated from the other fission products, or mixtures where the Sr-90 has been enriched.

REFERENCES

"U.S. Department of Energy Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites," Revision 2, March 1987.

"DOE Order 5400.5, Radiation Protection of the Public and the Environment," January 1993.

EXHIBIT III

MASS SPECTROSCOPY LABORATORY FINAL REPORT

BOEING

Team Product Document

GO Number	S/A Number	Page 1 of	Total Pages	Rev. Ltr/Chg. No. See Summary of Chg.	Number
97055	36120		26	A	EID-04461

Program Title CLOSURE OF ETEC (R21-RF)

Document Title FINAL REPORT FOR DECONTAMINATION & DECOMMISIONING OF THE DESOTO 104 HELIUM MASS SPECTROMETER LABORATORY

Document Type
D&D Report

Related Documents

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Approvals Date
R. D. Meyer
P. H. Horton
P. D. Rutherford
S. E. Reeder
M. E. Lee

Prepared By/Date	Dept.	Mail/Addr
D. Stelman / July 27, 1999	916	T006

IR&D Program? Yes ☐ No ☒
If Yes, Enter Authorization No.

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*	Name	Mail Addr.
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Abstract

This report documents the activities and results of the decontamination and decommissioning of the DeSoto 104 Helium Mass Spectrometer Laboratory.

* Complete Document
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Supporting Document
Summary of Change

EID-04461	No. Page 1.1 of 25

Rev.	Summary of Change	Approvals and Date
A	This revision updates the Final Surveys, Section 4.5, by incorporating the latest surveys for the facility. Appropriate references are added.	9-7-99 R. D. Meyer for RDR P. D. Rutherford 9-9-99 M. E. Lee 9/9/99

CONTENTS

California
Southern California Region

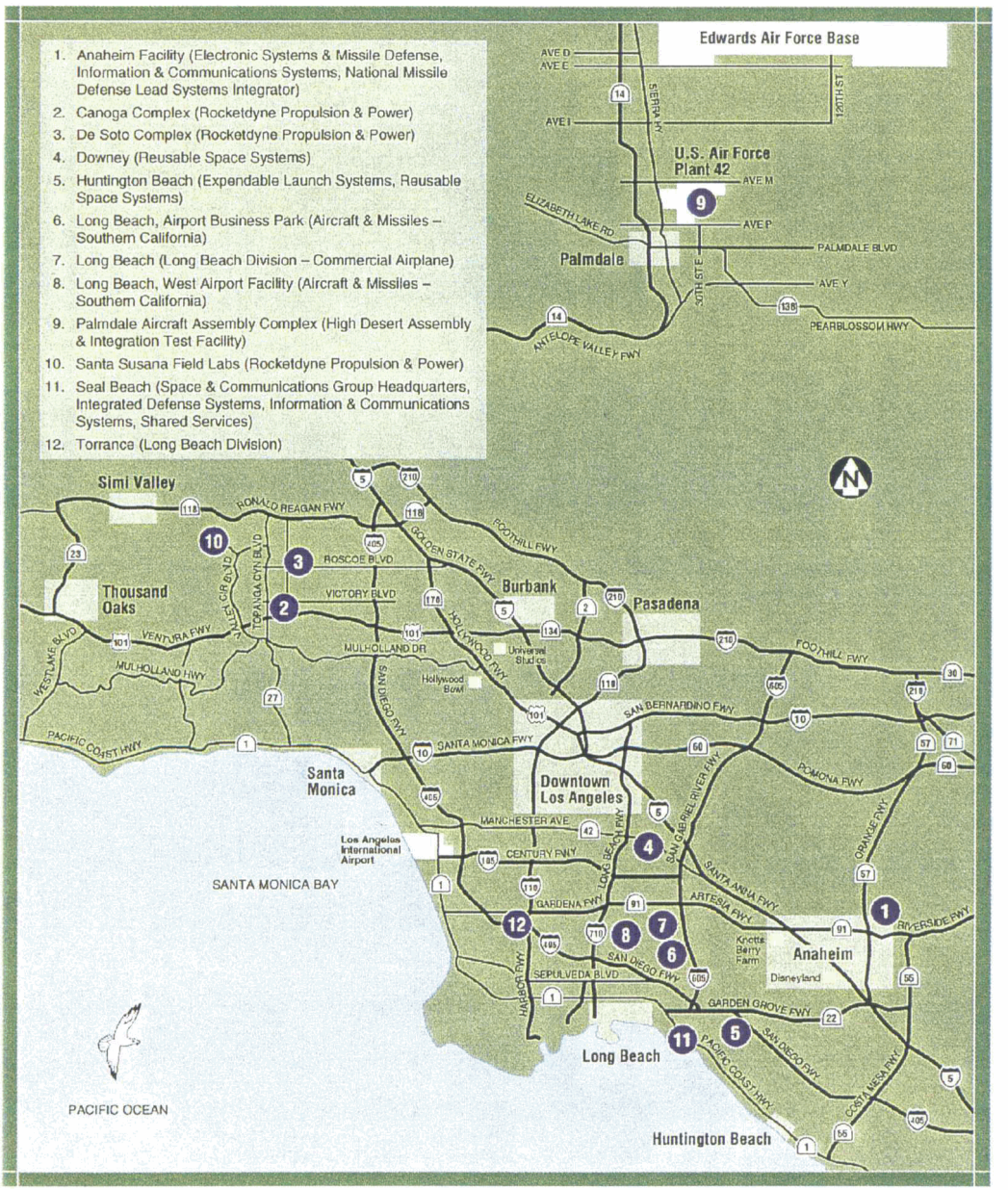

Figure 1. Map of Boeing's operations in the Southern California Region

California – Canoga/De Soto

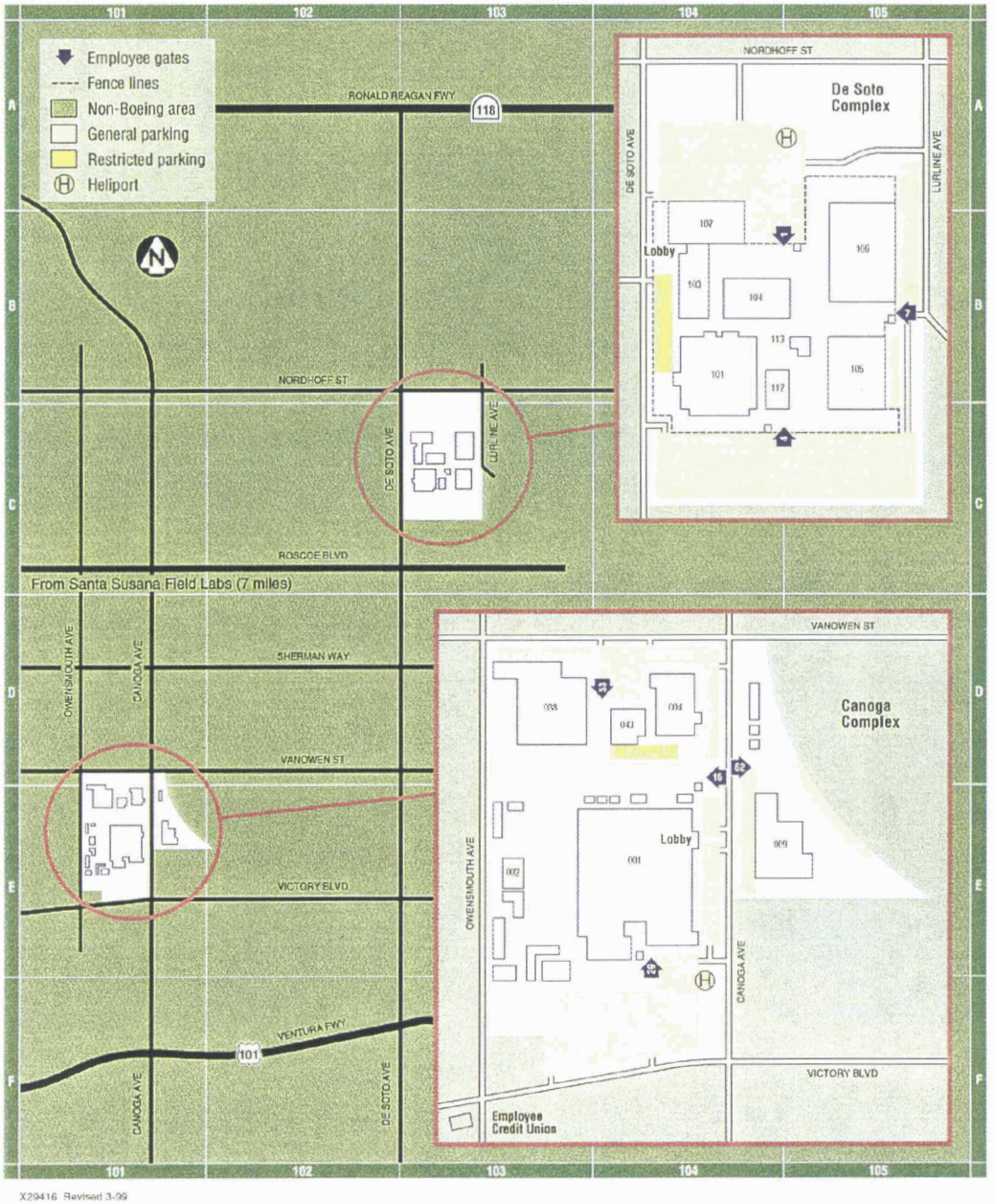

Figure 2. Map of Rocketdyne Propulsion and Power's Canoga and DeSoto Complexes

The Helium Analysis Laboratory consisted of nine rooms occupying approximately 2600 sq. ft. in the northeast quadrant of Building 104. A plan view of the laboratory is shown in Figure 3.

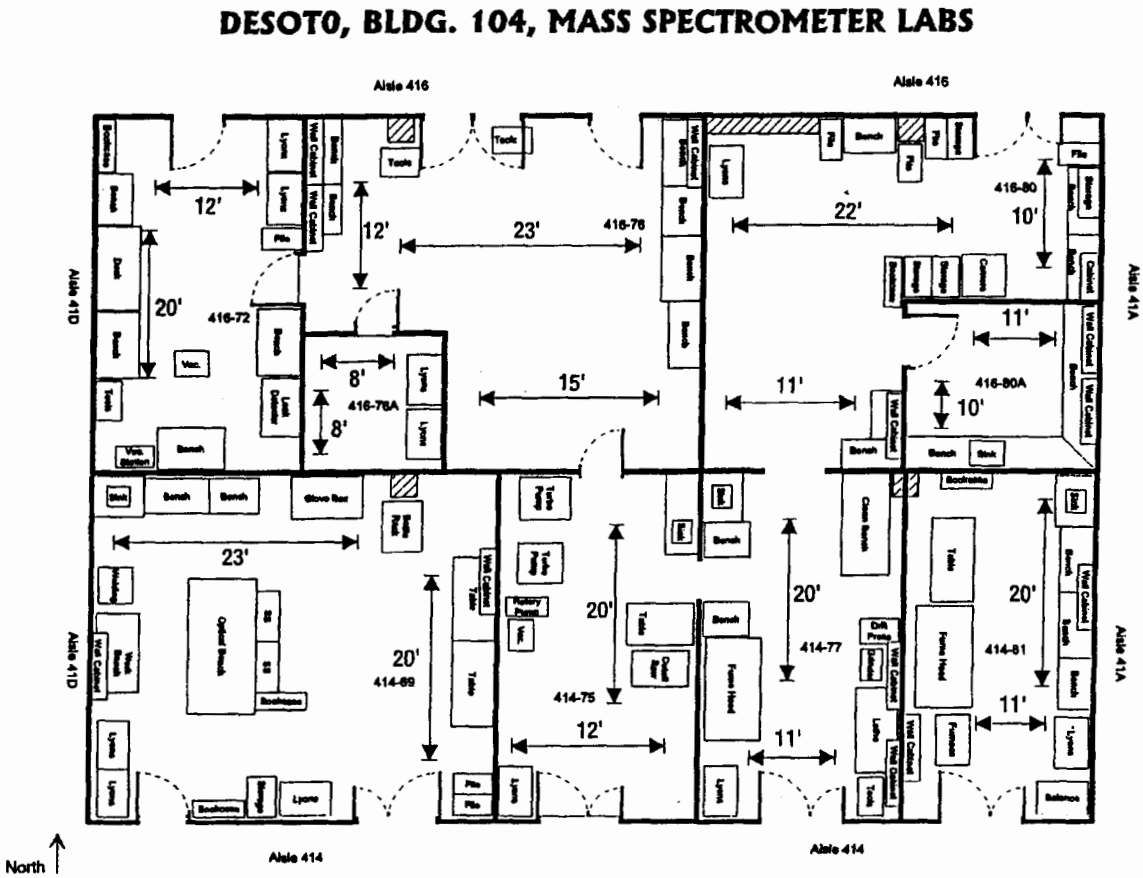

Figure 3. Plan view of the Helium Mass Spectrometer Laboratory

3.0 HELIUM MASS SPECTROMETER LABORATORY OPERATIONAL HISTORY

The laboratory utilized a high precision helium mass spectrometer to analyze milligram-sized metallic specimens irradiated in test reactors to study the effects of helium embrittlement and neutron dosimetry. Analyses conducted in the laboratory were dedicated to the support of DOE, its national laboratories, and other DOE sponsored programs. The laboratory was considered by DOE to be the national center of excellence for helium analysis work.

The test specimens were activated by exposure in test reactors throughout the DOE complex. The analytical technique consisted of vaporizing the specimens and analyzing the amount of helium present in the effluent gas. In the process, the mass spectrometer, the associated vacuum system and HEPA exhaust system were contaminated with small amounts of activation products from the irradiated specimens (typically 90% Co-60, 10% Mn-54 from neutron activated steel). In addition, some contamination of laboratory fume hoods and machine tools occurred in the handling and preparation of samples.

The laboratory was also connected to the facility radioactive water drain system. During remediation of the other radiological laboratories in Bldg. 104 during the 1980s, the radioactive drain system was removed back to the Helium laboratory perimeter. The radioactive drains within the perimeter of the Helium Laboratory were sealed and isolated to prevent further use.

In 1995 the Helium Analysis Laboratory was closed. The mass spectrometer and the majority of the support equipment were DOE property. All work performed in the laboratory was in support of DOE or DOE sponsored programs, predominately fusion reactor related programs in the latter years of operation. The laboratory equipment and the DOE programs associated with the laboratory were transferred to Batelle Northwest Laboratory (BNL) in Richland, WA in 1996.

4.0 DECONTAMINATION AND DISCOMMISSIONING ACTIVITIES

4.1 PLANNING

The planning included developing the approach, performing a safety analysis, determining the prerequisites, laying out the project schedule, developing procedures, planning the disposition of materials and wastes, convening a readiness review board, and special considerations, such as asbestos, lead paint, buried drain lines, and a large HEPA filter system (References 1-7).

In general, this project had more constraints than normally encountered because the D&D operation was performed in an area of an occupied, functional, office facility. The residents had to be kept informed about the project and its impact on normal operations in the building. Controls had to be setup to isolate the remediation work area from the rest of the building. The project was planned to cause the least interference with the occupants, including scheduling certain tasks for off-hours, weekends, or holiday periods. Because the project was indoors, fossil fuel-powered tools were replaced by electric-powered tools whenever possible.

During the planning phase of this project, plans of action were developed for possible accidental events. As a part of that process, a plan of action had been developed in the event a sprinkler head was accidentally broken. The plan provided for a two inch vacuum hose to fit over a broken sprinkler head and divert the sprinkler water outside. The plan also called for a supply of parts on hand to repair a broken sprinkler. Interestingly enough, an active sprinkler head was accidentally broken with a manlift during the D&D activities. Within minutes of the accident, the hose was attached to the broken sprinkler. Protective Services was called to shut down the sprinkler system and the broken sprinkler was replaced with a cap. The sprinkler system was back in service within five minutes. The water from the sprinklers during the first few minutes before the hose was installed was collected and stored in barrels for testing. The test results found the water was not radiologically contaminated. The barrels were sent to the hazardous waste yard for a final determination of disposal.

4.2 GENERAL D&D OF EQUIPMENT AND FIXTURES

The remediation began in November 1997. Prior to the start of remediation activities, a radiological survey identified contamination levels on equipment and materials within the area. Barrier walls were installed to isolate the affected labs from the rest of the facility, as shown in Figures 4 to 6. This prevented non-remediation personnel from entering the area and ensured containment of material within the area. The entrance to the area was enlarged to accommodate the equipment to be employed (i.e. a small forklift and a small tractor-backhoe).

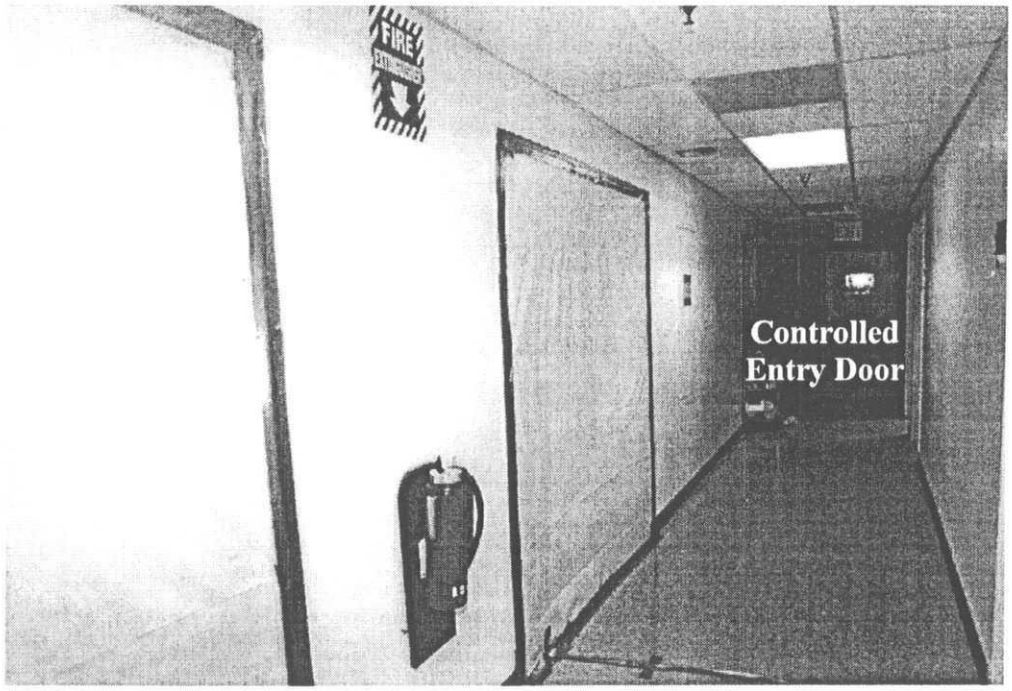

Figure 4. Barriers isolating the remediation area from the rest of the facility.

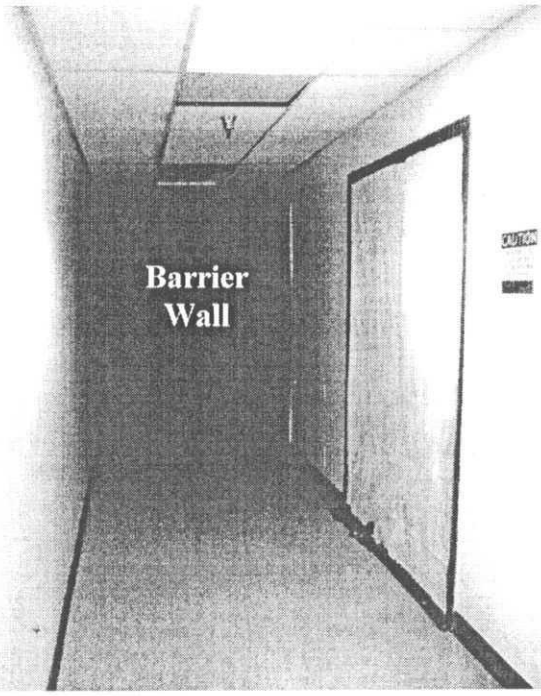

Figure 5. Barriers isolating the remediation area from the rest of the facility.

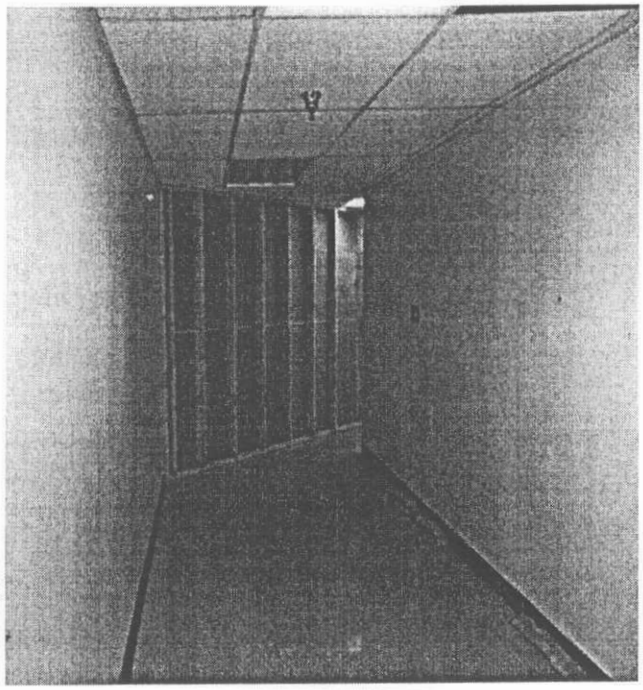

Figure 6. Barriers isolating the remediation area from the rest of the facility.

Figures 7 to 10 show typical furniture, equipment, piping, and ducting in some of the rooms in the former Helium Laboratory.

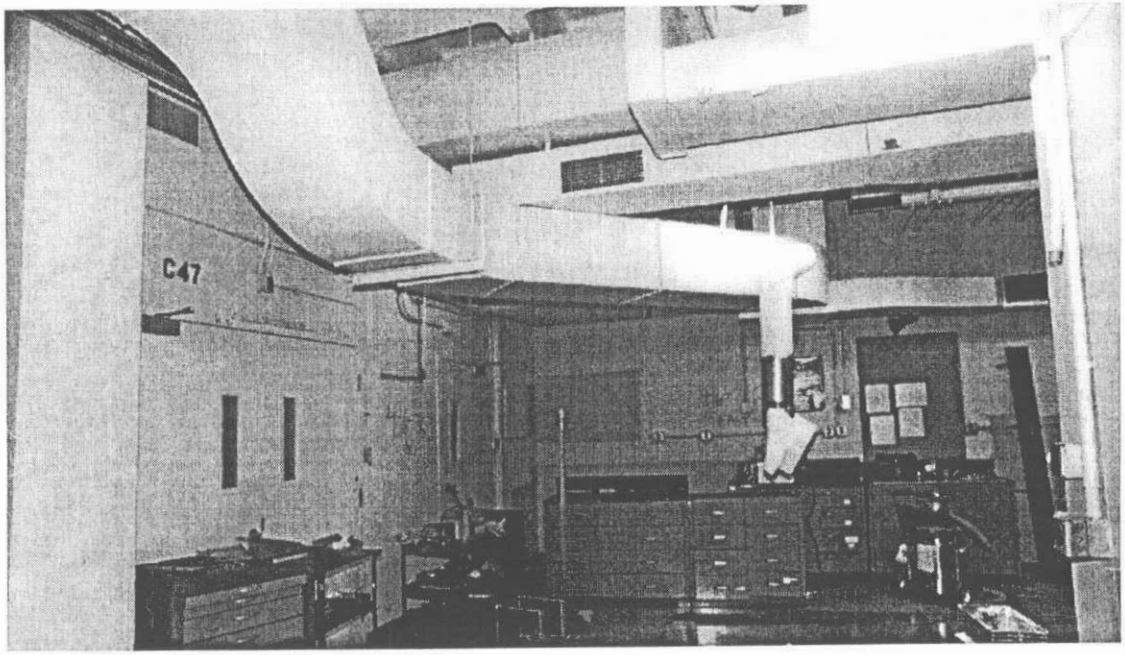

Figure 7. Typical furniture, equipment, piping, and ducting in the former Helium Laboratory.

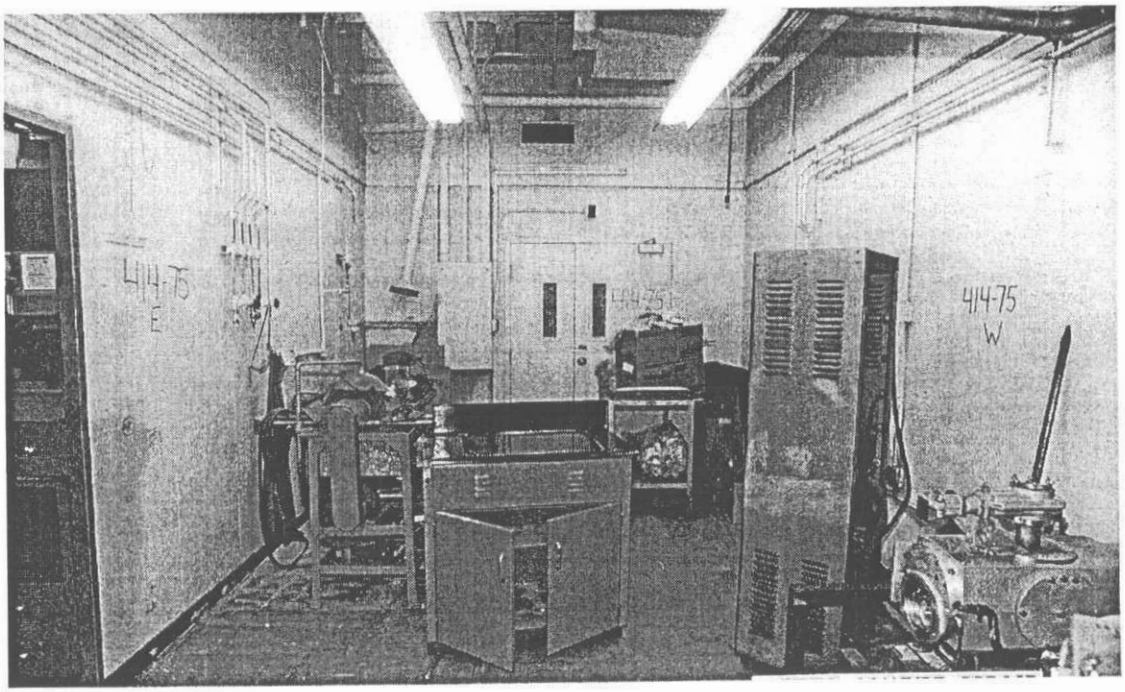

Figure 8. Typical furniture, equipment, and piping in the former Helium Laboratory.

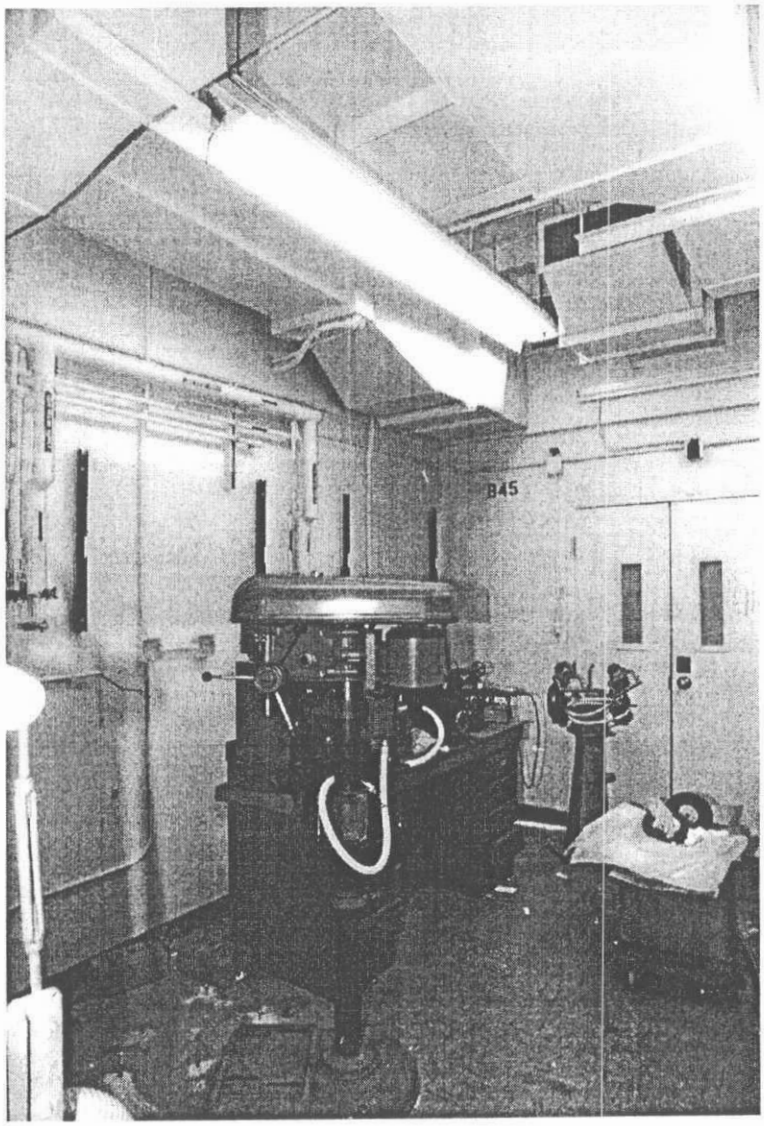

Figure 9. Typical equipment, piping, and ducting in the former Helium Laboratory.

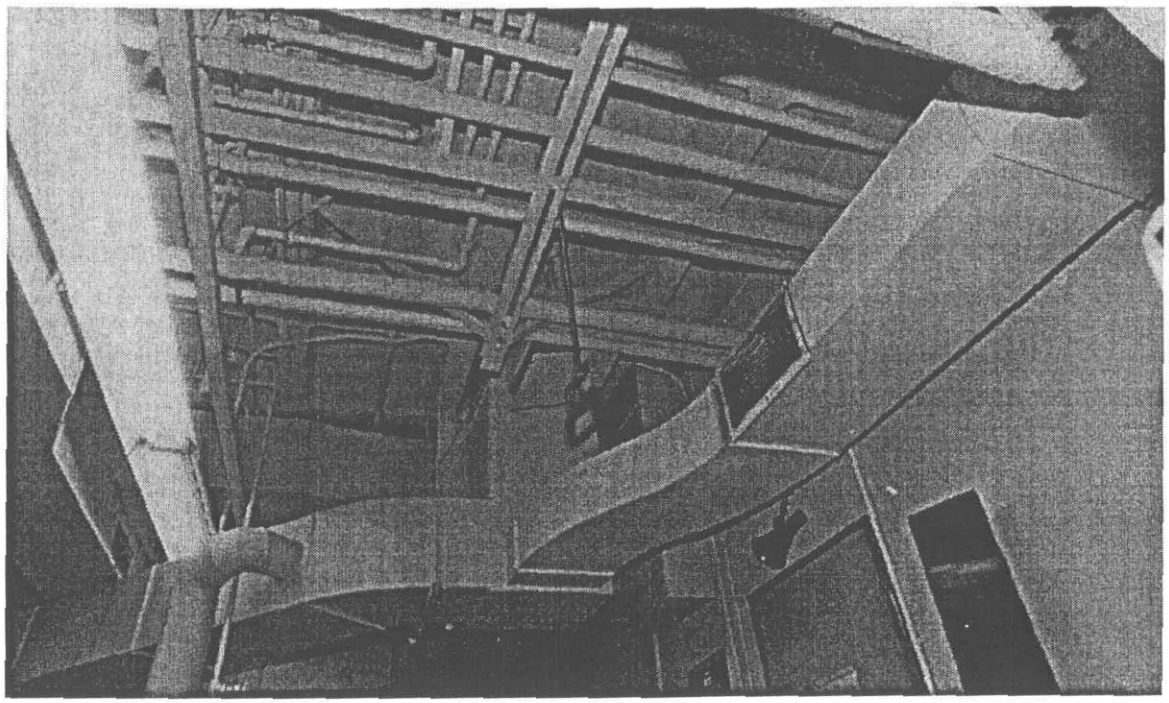

Figure 10. Typical lighting, piping and ducting in the former Helium Laboratory.

All surfaces had to be made accessible for radiological survey. This included removing drawers from furniture, examining notebooks for test samples taped to pages, and disassembling fume hoods and other equipment and structures to expose inaccessible surfaces.

Hazardous materials that had been verified and documented as non-radioactive, i.e., oils, paints, chemicals, were packaged and sent to the hazardous waste yard for disposal. Non-contaminated furniture and equipment were separated for divestment or disposal as conventional waste. Some of the contaminated equipment could be readily decontaminated to below radiological release levels. After verification of decontamination, it was released for divestment or disposal. Equipment that could not be decontaminated was size reduced and/or packaged for disposal as LLW waste in accordance with established procedures. All furniture and equipment was routed through a single checkpoint location.

After the labs were cleared of all furniture and equipment, a licensed contractor sampled and tested the entire area for asbestos containing materials (ACM) and lead paint. The ACM consisted of floor tiles, tile mastic, and some pipe insulation. A certified asbestos abatement contractor removed the ACM. The asbestos abatement was performed between Christmas and New Years when the plant was shut down. Two doors were widened to accommodate the contractor's equipment. The asbestos workers were trained in radiation safety prior to the ACM removal and all equipment used during the abatement was radiologically surveyed prior to release from the area. The ACM was packaged in accordance with established procedures as asbestos containing LLW waste for disposal at

an approved waste site. The steel shot used for bead blasting the tile mastic was also packaged as LLW. Figure 11 to 13 shows the Helium Laboratory after ACM abatement. The asbestos abatement contractor returned later to remove the previously inaccessible areas of the flooring that were exposed when the partition walls between the rooms were removed.

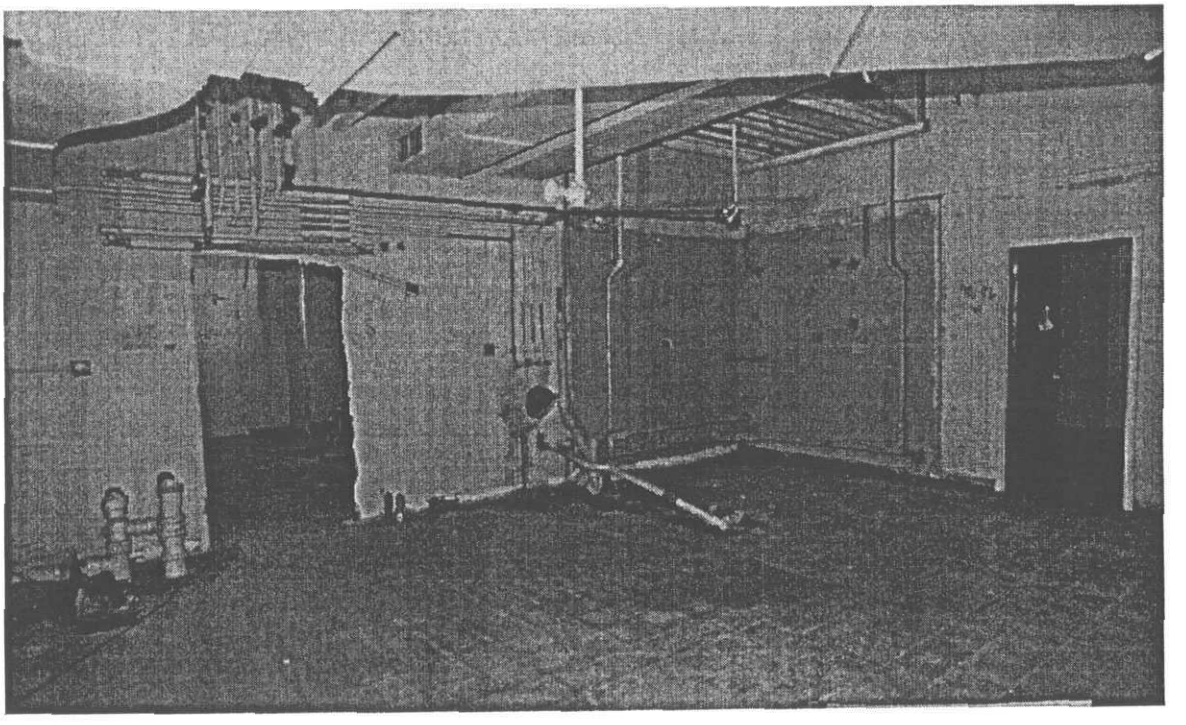

Figure 11. Room 416-76 after removal of the asbestos floor tile and tile mastic.

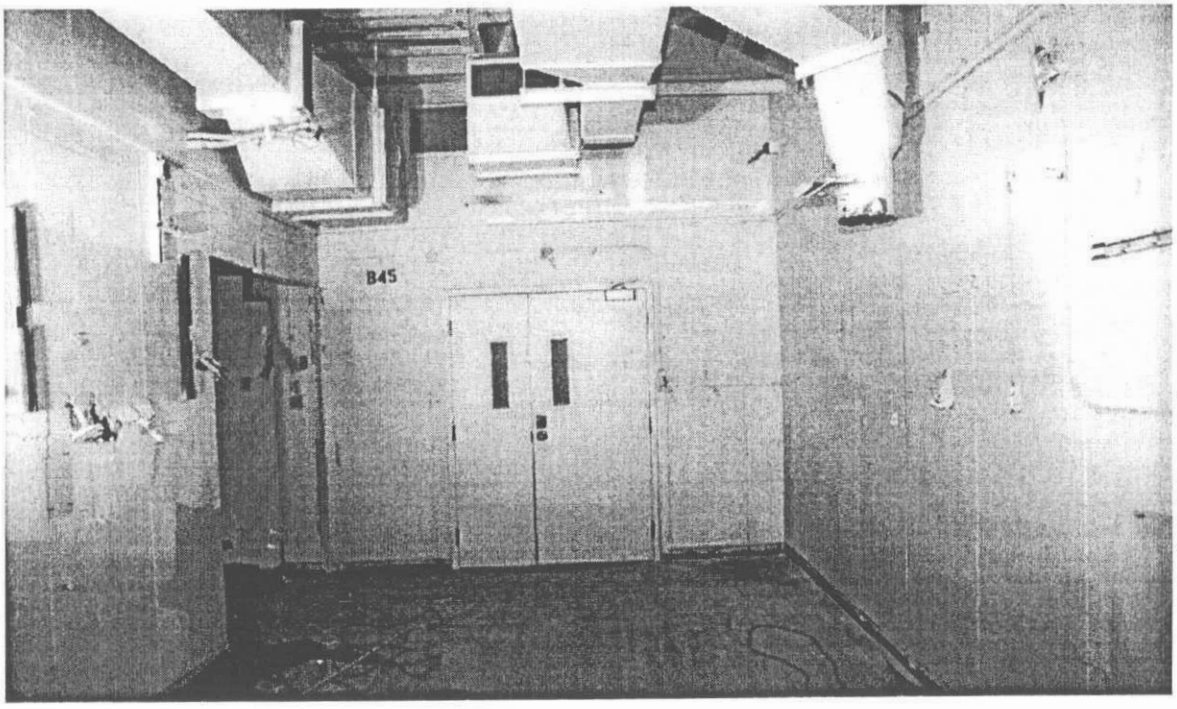

Figure 12. After removal of the asbestos floor tile and tile mastic.

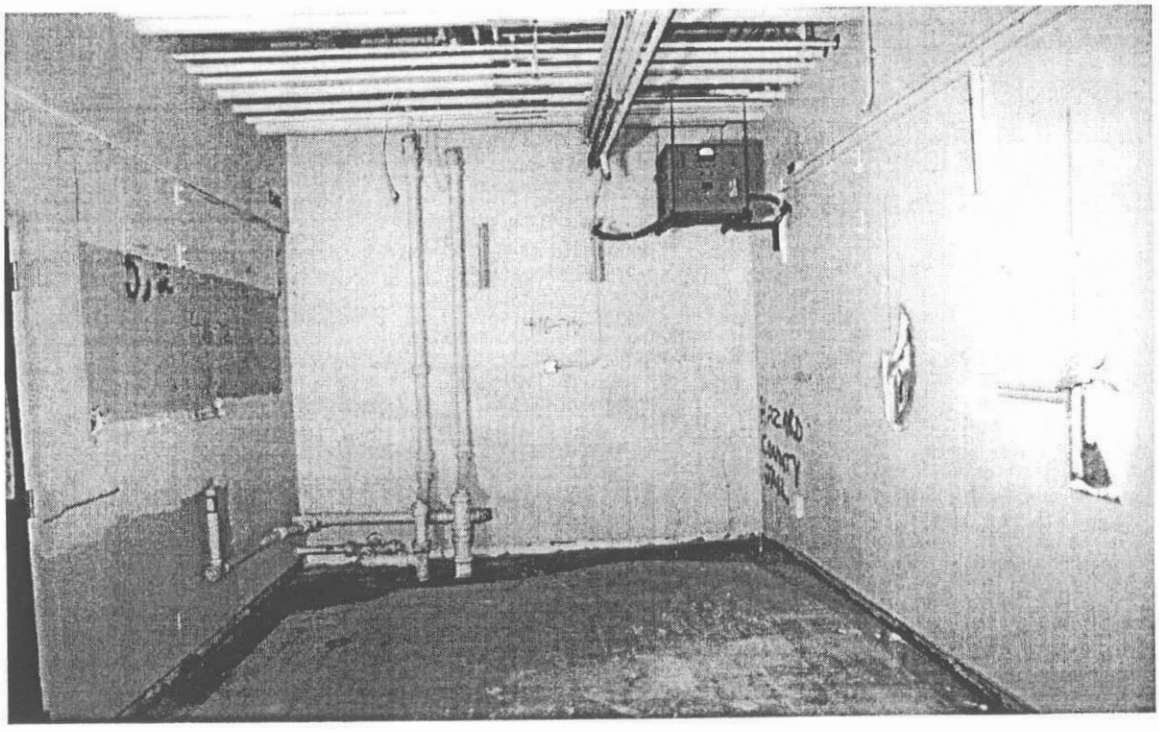

Figure 13. Room 416-72 after removal of the asbestos floor tile and tile mastic.

There were some utilities that did not service the Helium Laboratory, but passed through the Helium Laboratory to service other areas of the building. These utilities were shut down during off-hours and replaced by new re-routed utilities that did not pass through the remediation area. This would allow removal of the old electrical buses and water pipes with the rest of the utilities in the Helium Laboratory.

The remediation area was then isolated from all incoming utilities, i.e., electrical, water, natural gas, except for the fire suppression system. Because of the possible presence of PCB in the light ballasts, the light ballasts were removed and surveyed. The light ballasts were not radiologically contaminated. They were packaged and sent to the hazardous waste yard for disposal.

Fixtures, including lighting, plumbing and electrical, were removed (Figure 14 and 15), surveyed and packaged for disposal per approved procedures. Containment boxes were staged through a fenced temporary holding yard adjacent to the remediation area.

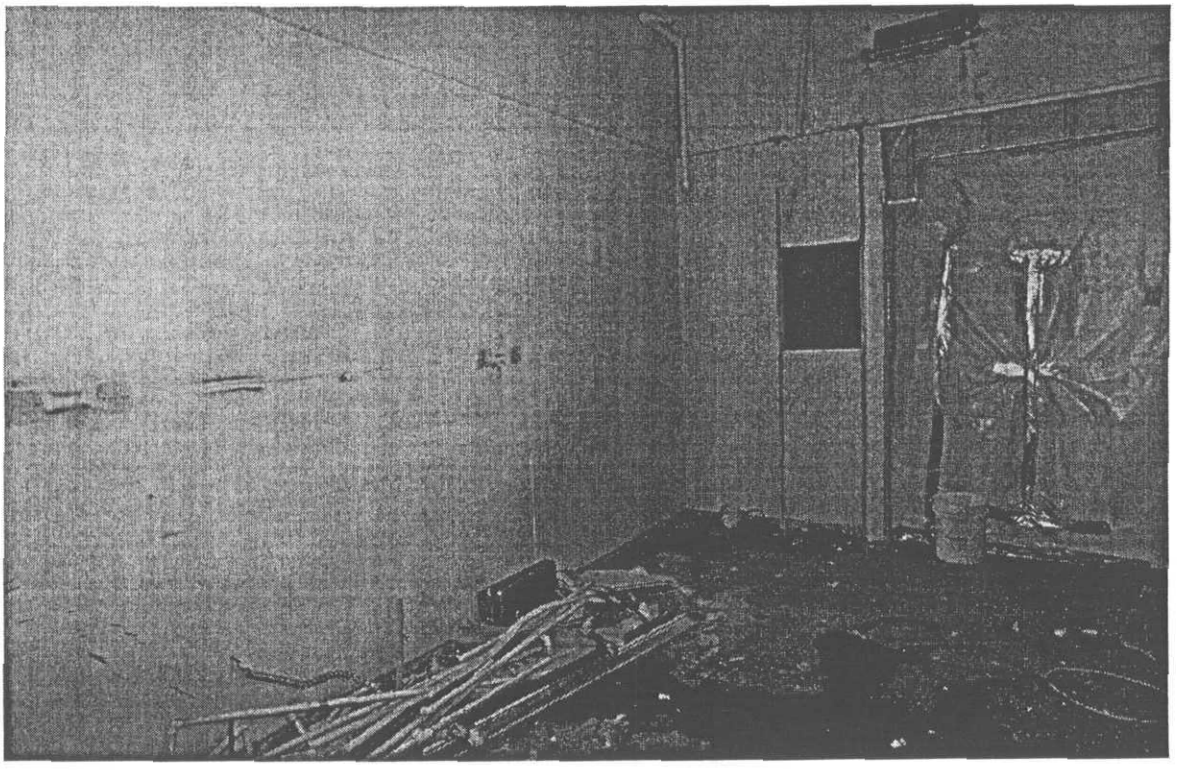

Figure 14. Removing the utilities.

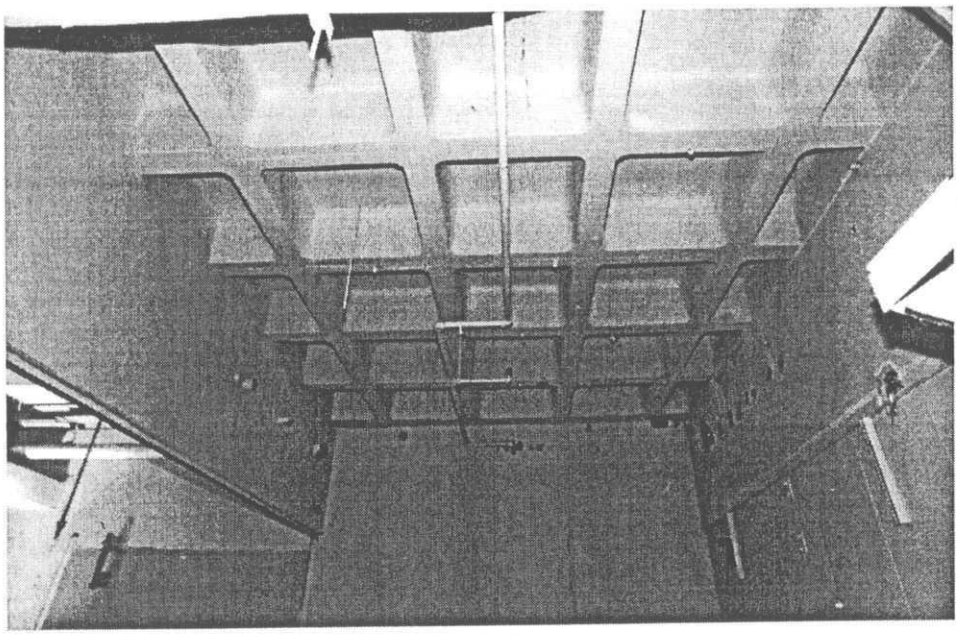

Figure 15. Removal of the utilities.

The heating and cooling ducting (HVAC) and the HEPA filters were removed up to the perimeter of the Helium Laboratory and sealed off. The HVAC ducting had been repainted in the past and radiological cleanliness could not be verified. It was subsequently packaged for disposal as LLW. Figure 16 shows some of the HVAC ducting during its removal. The HVAC ducting outside of the remediation area was modified to eliminate the impact of this project on the normal activity in the rest of the building.

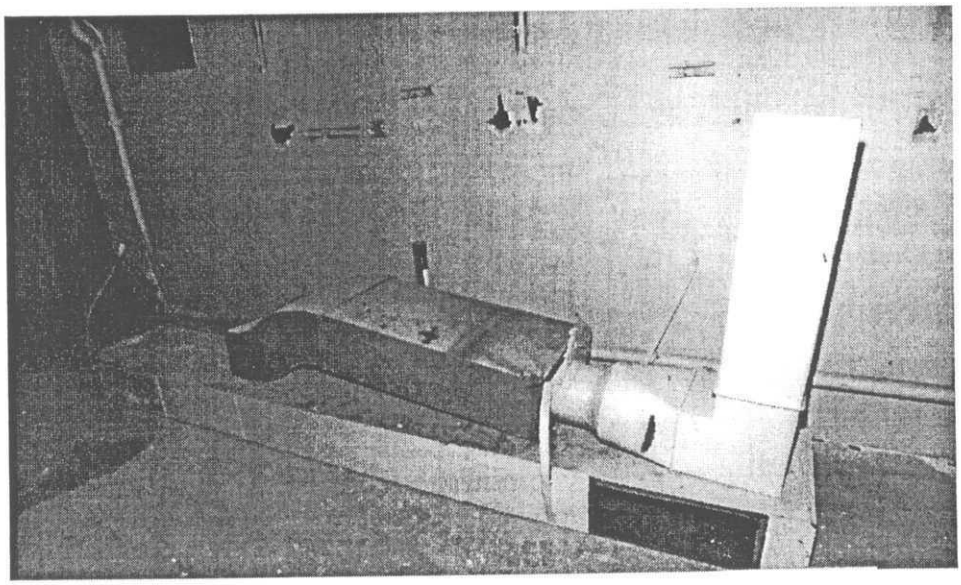

Figure 16. HVAC ducting removal.

When the rest of the building was converted to offices in the 1980's, a new wall, consisting of metal studs and wallboard, was erected around the existing perimeter walls of the Helium Laboratory. The interior walls within the laboratory areas were removed up to that exterior wall erected in the 1980's, as shown in Figures 17 to 19. Since the wall coverings were known to be repainted, all wall covering materials were disposed of as LLW waste.

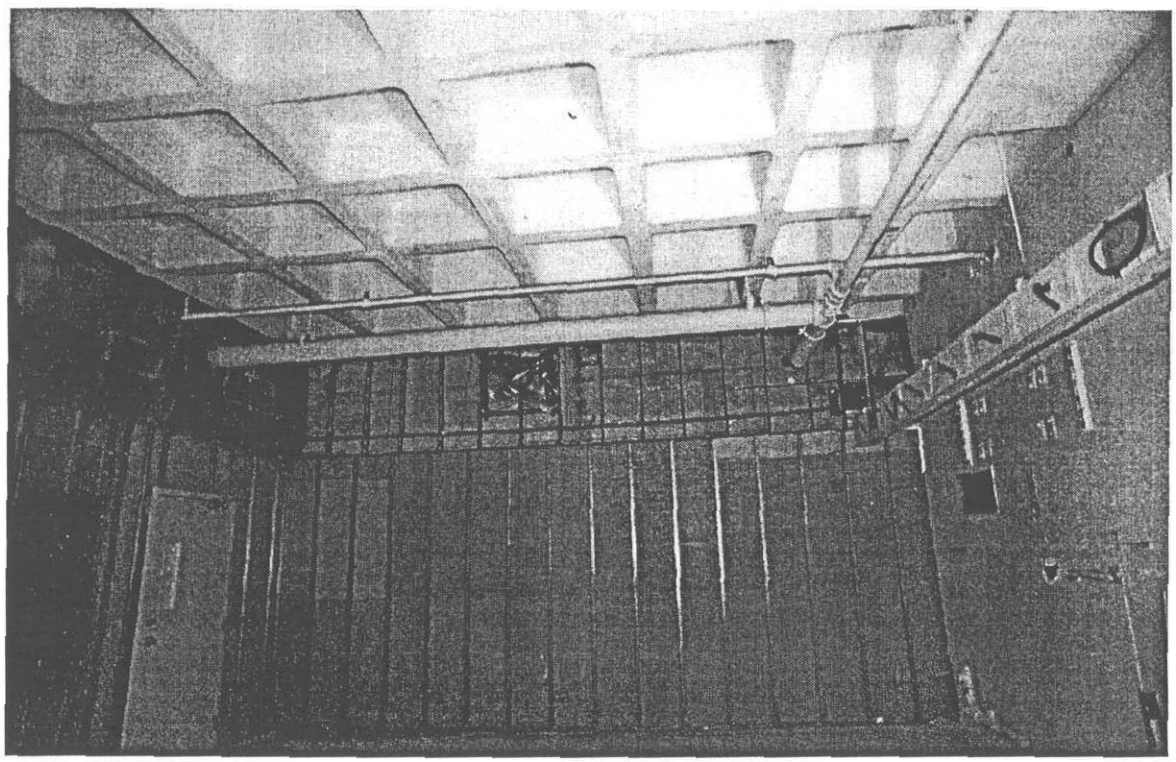

Figure 17. Removing the interior walls.

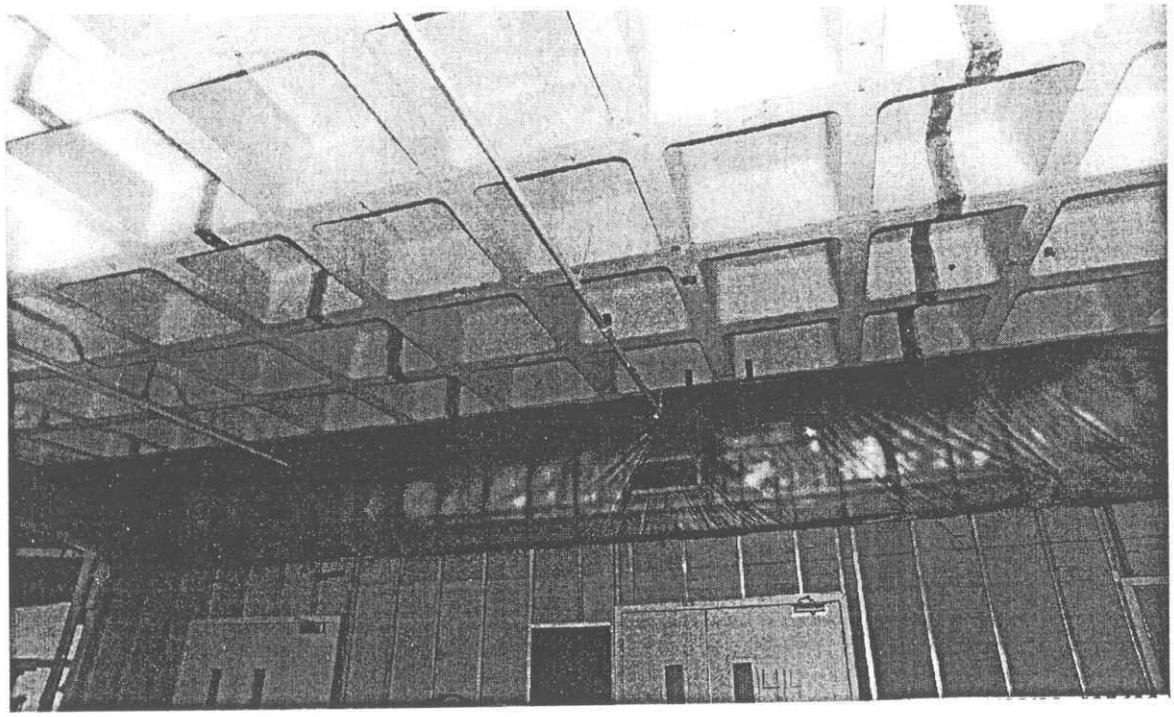

Figure 18. Removing the interior walls.

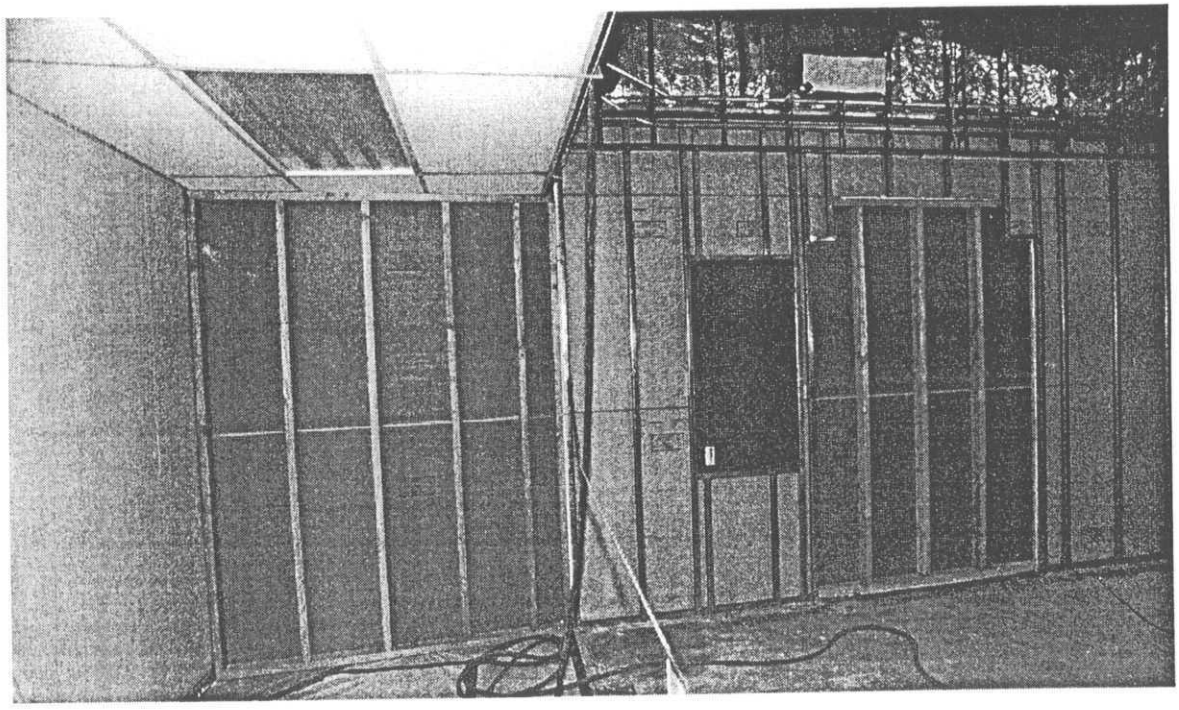

Figure 19. Removing the interior walls.

4.3 DRAIN LINE REMOVAL

There were non-functional remnants of the industrial drain and cooling water return line under the Helium Laboratory slab. The location of the underslab drain lines was marked on the floor according to the building blueprints. Structural Engineering examined the site and verified that saw cutting the slab in the marked locations would not jeopardize the structural integrity of the second floor support columns. The concrete slab was saw cut one foot on either side of the drain (Figure 20). Because the operation was indoors, an electric-powered concrete saw was used instead of a gas-powered saw. The slab was saw cut at night to minimize interference with normal activities in the building. After breakup and removal of the saw cut slab, the trench was excavated to expose the drain line (Figure 21). The initial coarse trenching was done with a small diesel powered tractor-backhoe. The diesel exhaust fumes were vented outside through a portable HEPA filter system. The final digging around the pipes was done with hand tools. During the excavation, the soil in areas that showed any detectable radiation was removed together with the soil from the surrounding area and packaged as LLW. The cooling water return line was surveyed and was not contaminated. The cooling water return line was disposed of as conventional waste. As a safety precaution during the drain removal, the workers wore respirators with cartridges for protection against mercury. The workers were also monitored for mercury exposure with lapel samplers. The results of the exposure monitors were negative. Mercury vapor analyses performed on all drain line systems were negative. The contents of the industrial waste drainline system were characterized as hazardous waste containing radioactive contaminants. It was packaged and sent to the Radioactive Material Handling Facility pending disposition of treatment and final off-site disposal. The leaded pipe joint seals were removed, surveyed, found to be clean, and the lead recycled. The drain line piping was size reduced and packaged for disposal as LLW in accordance with established procedures. Figure 22 shows the trench after the drains were removed.

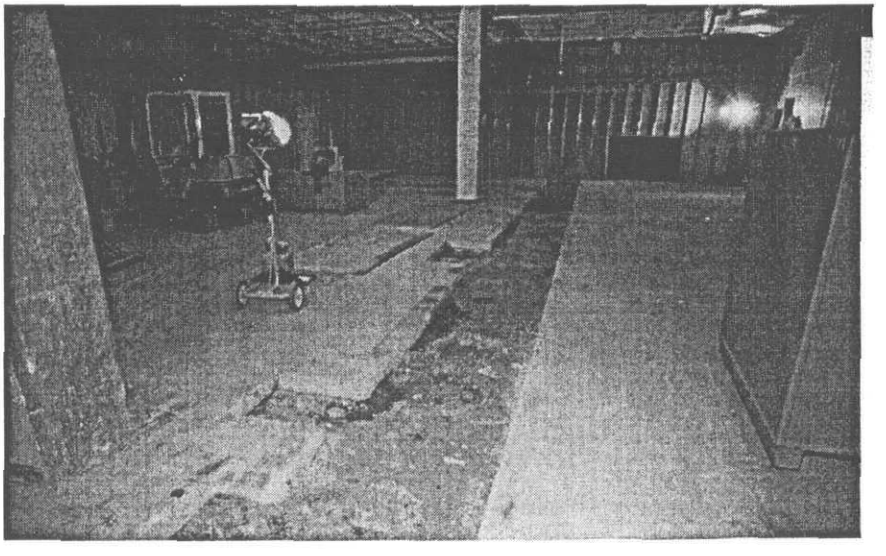

Figure 20. The slab was saw cut and removed from the area over the drains.

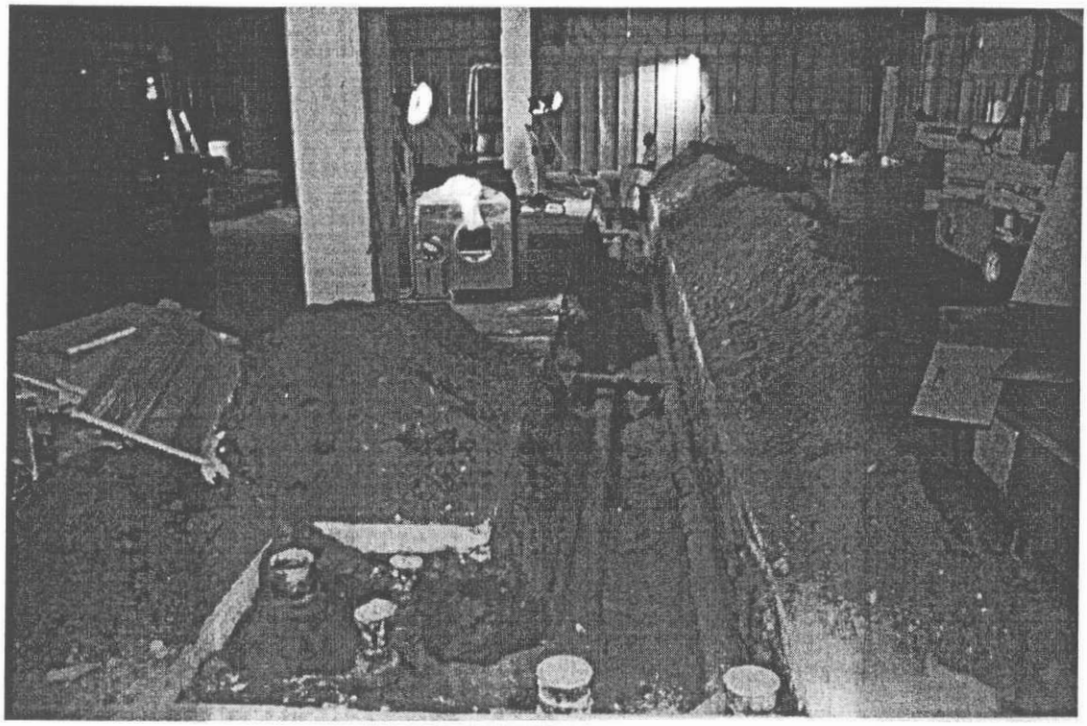

Figure 21. A trench was excavated to expose the drain lines.

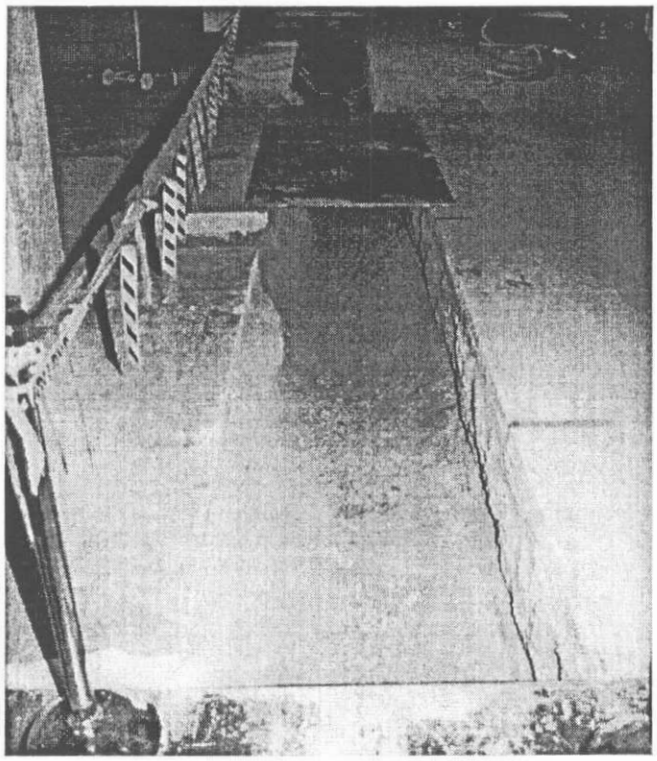

Figure 22. Trench after removal of the drain lines.

4.4 VENTILATION SYSTEM

The radioactive ventilation system consisted of fume hoods and ducting in the Helium Lab, two vertical ducts that ran through the second floor to the roof in a walled in section of the second floor, and a HEPA filter bank on the roof (Figure 23). The fume hoods were removed with the fixtures and equipment. The ducting in the lab was removed back to the vertical ducts. A radiological survey of the inside of the vertical ducts found no radiological contamination. The vertical ducts were cut in sections (during off-hours to minimize disturbance of ongoing office activities). Some of the sections were lowered into the Helium Lab and the remainder were raised to the roof. A portable HEPA ventilation system was installed while the rest of the Helium Laboratory HEPA system was dismantled. Rainwater had entered the original HEPA unit on the roof and was pumped out prior to the demolition of the HEPA unit. The rainwater was characterized as hazardous waste containing radioactive contamination. It was packaged and sent to the Radioactive Material Handling Facility pending disposition of treatment and final off-site disposal.

The existing Helium Laboratory HEPA filters had been changed after the operation of the Helium Laboratory had been terminated. A radiological survey of the system found the radioactive contamination levels were very low. The HEPA filters were removed and packaged as LLW. Because the HEPA housing was 43 feet from the edge of the roof, a helicopter was considered to lift the housing off the roof. However, it was felt the housing could not withstand the stresses involved. The results of the radiological survey indicated that it was practical to cut up and package the HEPA housing in situ. The housing was sectioned and packaged as LLW. Because the structural load limits of the roof would not support a loaded containment box, the HEPA filter housing was cut into small pieces and placed in smaller interim containment boxes whose weight could be safely transported across the roof. These small boxes were transported from the roof and then the contents were transferred within a controlled area to large containment boxes. The dismantling of the HEPA filter system necessarily created openings in the roof. Therefore, this phase of the work was closely coordinated with maintenance to minimize the time the roof was open during survey and D&D.

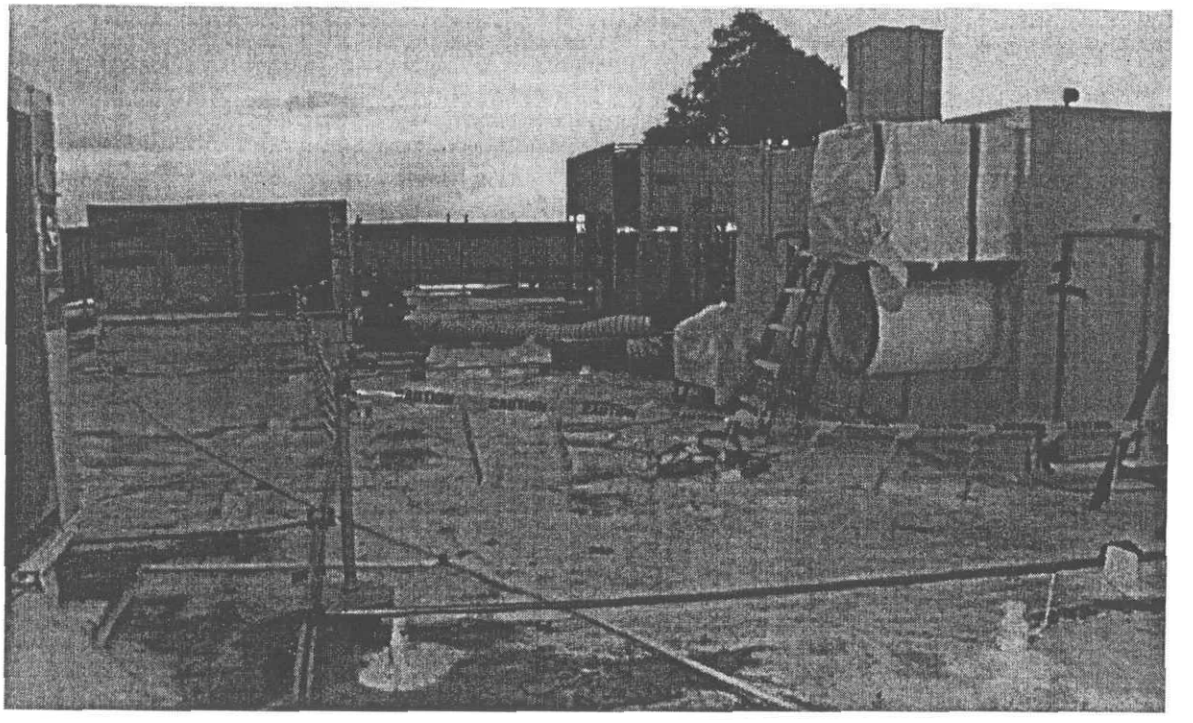

Figure 23. Partially dismantled HEPA filter bank on the roof.

4.5 FINAL CLEANING AND FINAL SURVEYS

The Helium Laboratory was now completely dismantled. A final structural surface cleaning of walls, ceilings and floors was performed using a HEPA-filtered vacuum system.

The Final Radiological Release Survey was initiated in June, 1998, and was completed in September, 1998 (Reference 8). This survey of the Helium Mass Spectrometer Laboratory documented that the D&D project had met its goals. All radiation measurements are below the Rocketdyne release limits approved by the DOE and DHS and the facility is now suitable for unrestricted use.

In September 1998, the Oak Ridge Institute of Science and Education (ORISE) performed a verification survey of the Helium Mass Spectrometer Laboratory. This survey confirmed that the facility met the approved limits for release for unrestricted use (Reference 9).

In October 1999, the Department of Health Services, Radiologic Health Branch (DHS/RHB) performed a verification survey of the facility. This survey confirmed that the facility met the approved limits for release for unrestricted use.

Based on the results of surveys by Rocketdyne, ORISE, and DHS/RHB, the DHS formally released the facility for unrestricted use on August 17,1999 (Reference 10).

Clean soil and building debris generated during the excavation of drain lines and demolition of the interior structure was also surveyed by Rocketdyne and DHS/RHB, and verified the absence of contamination. Based on these surveys the DHS/RHB released the material for unrestricted use (References 11 and 12).

5.0 WASTE GENERATION SUMMARY

The D&D of the Helium Mass Spectrometer Laboratory generated 47 boxes of LLW waste totaling 4,754 cubic feet with a total activity of 0.95 mCi. The LLW was shipped to Hanford in four shipments between March and August 1998.

Three hundred twenty five cubic feet of hazardous waste containing radioactive contamination from the project remains at our Radioactive Material Handling Facility pending shipment to an approved site for final treatment and/or disposal.

6.0 COST SUMMARY

The total cost of the project was $775,000. The costs were rounded and summarized in the Table 1.

Table 1. Cost Summary	
Engineering Planning and Supervision	55K
Health Physicist Operations Support	50K
Operations Labor	270K
Final Release Survey and Report	170K
Maintenance and Craft Support	25K
Materials, Leases, Subcontracted Services	130K
Waste Disposal Transportation and Fees	75K
TOTAL	$775K

7.0 EXPOSURES

There was no measurable exposure to the staff from the D&D of the Helium Mass Spectrometer Laboratory.

8.0 REFERENCES

1. ETEC B/104-1, "B/104 Drain System", P. Olsen and P. Waite, 11/24/97

2. 104-AN-0001, "Building 104 Remediation Plan", P. Waite and R. D. Meyer, 12/5/97

3. 104-AN-0002, "Building 104 Safety Analysis Document", P. Waite, W. McDowell, R. D. Meyer, 12/5/97

4. 104-SP-0001, "Building 104 Surface Cleaning Procedure", P. Waite and R. D. Meyer, 12/5/97

5. 104-SP-0002, "Building 104 Drainline Removal", P. Waite, R. D. Meyer, B. Sujata 1/20/98

6. 104-SP-0003, "Building 104 HEPA Exhaust System Removal", P. Waite and T. C. Venable, 2/18/98

7. N001SRR140129, "DeSoto Mass Spectroscopy Laboratory Final Status Survey Plan", P. Liddy, 8/26/98

8. N001SRR140130, "DeSoto 104 Mass Spectroscopy Laboratory Final Status Survey Report", P. Liddy, 12/16/98

9. ORISE Report 99-0983, "Verification Survey of the Desoto Mass Spectroscopy Laboratory (Building 104), Boeing North America Inc., Canoga Park, CA", June 1999

10. Amendment 103 to Radiation Materials License 0015-19 releasing the Mass Spectroscope laboratory for unrestricted use. Letter from J. Rexroth to J. Barnes, untitled, 005024RC, July 30,1999

11. Letter from Gerard Wong to Phil Rutherford, untitled, 005330RC, August 17, 1999

12. Letter from Roger Lupo to Phil Rutherford, untitled, 005427RC, August 20, 1999

EXHIBIT IV

FINAL DOCUMENTATION AND RADIOLOGICAL SURVEY OF MASS SPECTROSCOPY LABORATORY AFTER DECONTAMINATION AND DECOMMISSIONING

BOEING

Supporting Document

GO NO.	S/A NO.	PAGE 1 OF	TOTAL PAGES	REV. LTR/CHG. NO.	NUMBER
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Radiation Safety

DOCUMENT TITLE
De Soto 104 Mass Spectroscopy Laboratory Final Status Survey Report

DOCUMENT TYPE
Final Report

RELATED DOCUMENTS
N001SRR140129, Final Survey Plan

ORIGINAL ISSUE DATE
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RELEASE DATE
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PREPARED BY/DATE

	DEPT.	MAIL ADDR
P. Liddy	641	T487

P. Liddy 11/30/98

APPROVALS

	DATE
P.D. Rutherford	12/4/98
J.D. Willenberg	12/14/98

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ABSTRACT

This document describes the results of the Final Status Survey for the release of the Mass Spectroscopy Laboratory at the De Soto Building 104.

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EXECUTIVE SUMMARY

On August 1998, a Final Status Survey was completed in the Mass Spectroscopy Laboratory of the De Soto Building 104 confirming that the facility meets release limits approved by the Department of Energy, and the Department of Health Services. Accordingly, the facility is suitable for unrestricted use.

During 1998, a comprehensive decontamination and decommissioning effort were conducted in the Mass Spectroscopy Lab. After D&D efforts, a comprehensive Final Status Survey of the facility concluded in September 1998. In the course of the Final Status Survey, measurements were obtained for alpha and beta surface contamination on the interior walls, floors, and ceilings; and ambient gamma exposure rates at 1 meter above the interior floors. Measurements were taken for the concrete slab surrounding the Mass Spectroscopy Laboratory, outside roof area, ventilation ducting, and the pipe trench excavation areas. Contamination measurements were subdivided into two lots: Sample Lot 1 for the Mass Spectroscopy Laboratory of known and suspected contamination or "affected areas", which previously required decontamination, and Sample Lot 2 or outside "unaffected areas", where no decontamination effort was required. All measurements were tested statistically for compliance within the regulatory acceptable derived concentration guideline limits (DCGLs), and ambient exposure rates.

As a result of the Final Status Survey, all areas, affected and unaffected, the highest total alpha measurement found was 31 dpm/100cm^2. The highest removable alpha measurement found was 5 dpm/100cm^2. In all areas, the highest total beta measurement found was 1185 dpm/100cm^2. The highest removable beta found was 27 dpm/100cm^2.

In 21 soil samples removed from the pipe trench, all highest values detected were less than the regulatory limits. The highest level for Cs-137 was 0.13 pCi/gm, and Co-60 was 0.04 pCi/gm. Graphs of the surface contamination results were evenly distributed, and the results were less than the release limits. All tests for surface contamination and soil concentrations confirmed the De Soto building 104 Mass Spectroscopy laboratory is suitable for release without radiological restrictions.

1.0 INTRODUCTION

Rocketdyne Propulsion and Power conducts decontamination and decommissioning (D&D) operations at its former nuclear facilities and sites to demonstrate compliance with dose and risk based regulations. During D&D of these facilities, continuous efforts are made to eliminate or reduce residual radioactive contamination to levels that are as low as reasonably achievable (ALARA). Upon completion of D&D, radiological surveys are performed under established protocols to demonstrate that remaining radioactivity does not exceed the Department of Energy (DOE), Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC), or the State of California regulatory limits.

The regulatory agency responsible for the site confirms whether the building is acceptable for release for "unrestricted use". The Final Status Survey is designed to demonstrate compliance with the regulatory release criterion. The scope of the Final Status Survey includes known and suspected areas of radioactivity. The Final Status Survey is discussed as a single stage of the investigation process using data from other surveys in the planning process. A systematic sampling approach was used based on rules that achieve representative sampling consistency with the application of statistical tests.

The Final Status Survey of the De Soto, building 104 Mass Spectroscopy Laboratory, will demonstrate that all parameters of the established regulatory guidelines and values are satisfied. In this report, the De Soto building 104 confirmation and verification activities include data quality objectives, analytical data, and statistical test results.

2.0 BACKGROUND

2.1 Location and Structure

The Mass Spectroscopy Laboratory was located in the northeast quadrant of the first floor of the De Soto Building 104, in Canoga Park, California. The Building 104 remediation area included the dimensions of the laboratory itself, and offices along the northeast quadrant of the Mass Spectroscopy Laboratory that were part of the work area.

A plan view of the Mass Spectroscopy Laboratory is shown in Figure 1 below. Originally there existed one double and one single door accesses into the laboratory (416-76), and a double door access to the spectrometer at the north wall (416-80). Concrete walls separated the offices from the laboratory. The spectrometer and dark room had an access from the lab (416-76A).

Room number until 1989	Room number after 1989
411A	416-80A
411B	416-80
411-76	416-76
411-76A	416-76A
411-72	416-72
413-69	414-69
413-75	414-75
413-72	414-77
413-81	414-81

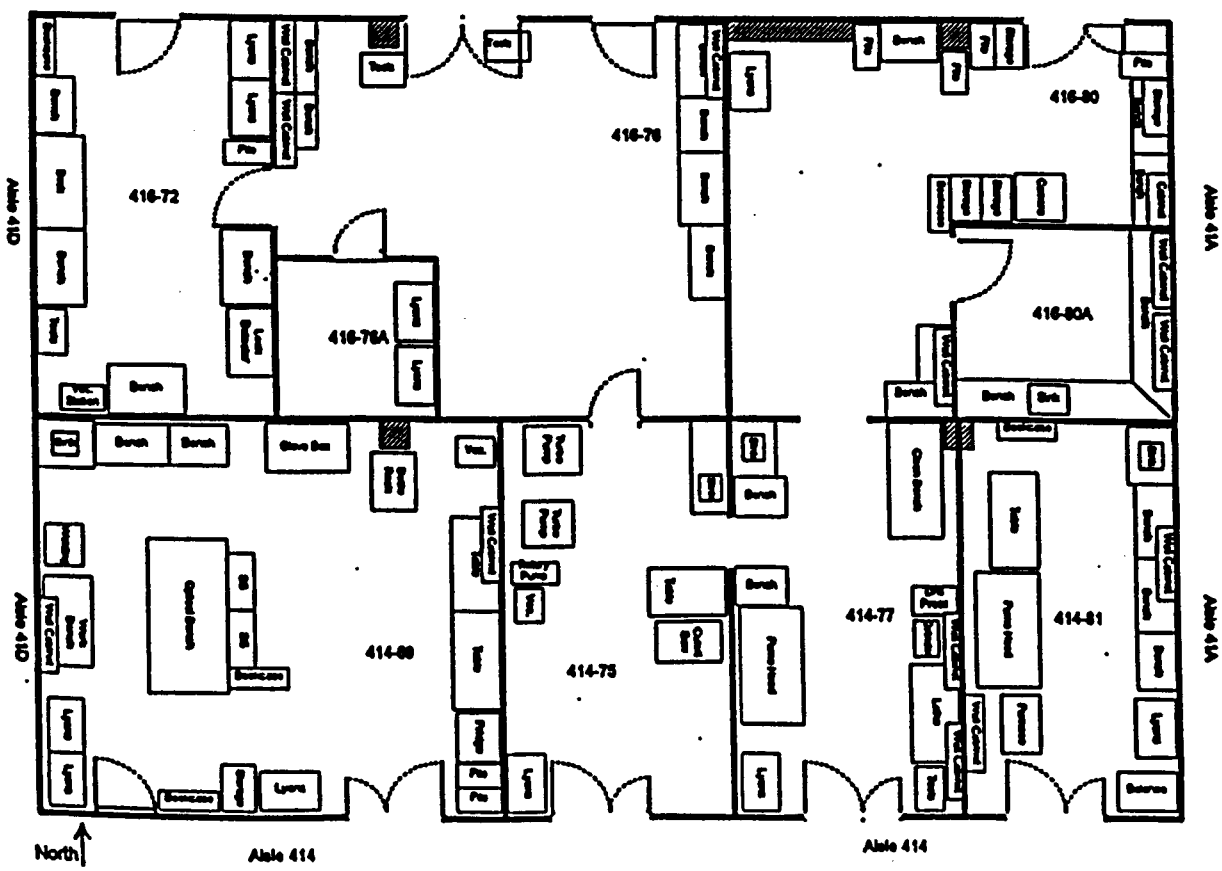


Figure 1 Original Operating Layout

The roof of the building was made up of composition panels with asphalt base topping. The building still exists on a concrete foundation, which extends around the building to form a perimeter walkway and loading dock. The ceiling height of the laboratory was approximately 12 feet. The laboratory itself occupied approximately 4900 sq. feet.

2.2 Operating History

The De Soto Building 104 was one of several buildings comprising the headquarters of the former Atomics International from 1960 to 1984. In 1984, Atomics International merged with Rocketdyne. The Mass Spectroscopy Laboratory analyzed low-level, activated test samples for universities and national laboratories until May 1995, when operations terminated. The laboratory was relocated to Battelle-Pacific Northwest Laboratories (PNL) in early 1996. Low level radioactive materials were stored in the Mass spectroscopy Laboratory until operations ceased.

2.3 Radiological Assessment

The laboratory housed a Helium Mass Spectroscopic Analyzer capable of measuring irradiated metal samples for He-3 / He-4 ratios useful in the evaluation of steels for use in reactor cores. Typical isotopes controlled by the laboratory were mainly activation products, such as Mn-54, Mn-56, Co-58, Co-60, Fe-59, and Nb-95. Quantities of encapsulated radionuclides included Pm-147. Uranium isotopes were also utilized in support of ATR work.

In 1984, surveys which included room 416-72 indicated 344 dpm/100cm^2 average alpha, and 2274 dpm/100cm^2 average beta; under the 5,000 dpm/100cm^2 average limit. The removable alpha was 12 dpm/100cm^2; and removable beta was 84 dpm/100cm^2 under the 1000dpm/100cm^2 limit.

Some contamination was found during the removal of sources, radioactive drums, and debris from the Mass Spectroscopy Laboratory at the end of 1991, and beginning of 1992. In early 1992, a sink under a lab ventilation hood in the same area revealed 4000 dpm/100cm^2 gross contamination. This was decontaminated, and the hood and sink were removed from the area.

In 1995 the offices adjacent to the Mass Spectroscopy Laboratory were surveyed for radiological contamination and found clean, confirming process knowledge that indicated contaminated materials were not worked on or transported outside of the laboratory. All cabinets and furniture were removed. In 1997, a floor survey in room 416-80 showed contamination above releasable limits. Isotopic analysis of the floor smear showed 51 pCi of Co-60, and 100 pCi of Cs-137

In June 1997, the final decommissioning of the Mass Spectroscopy Laboratory began, and all ventilation ducting, piping, conduit, floor tile, dry wall, and ceiling panels were removed. In June 1998, the Final Status Survey began, and was completed in September 1998. The Final Status Survey of the Mass Spectroscopy Laboratory confirmed that that there was no contamination found exceeding any radiological limits.

3.0 SURVEY PREPARATION

3.1 Identifying Survey Units

The De Soto building 104 offices and Mass Spectroscopy Laboratory were divided into two survey units: "affected" and "unaffected" areas. The survey units were then evaluated to determine if surface contamination was below the derived concentration guidelines (DCGLs). A reference coordinate system was established and marked in the laboratory and office areas. Random sampling points were identified in the survey pattern. (Refer to Figure 2, Grid Map Areas). Coordinates that did not fall within the survey unit area or could not be surveyed because of site conditions were replaced with other sample locations.

Scanning was performed to locate small areas of elevated concentrations of residual radioactivity to determine if they met the release criteria. Direct, qualitative scans were conducted for alpha and beta-gamma contamination followed by a cumulative counts and smear surveys of interior surfaces. The percentage of survey conducted for each area is shown in Table 1.

Table 1. Surveys Determined for the Mass Spec Lab.

	Qualitative (Scan Total)		Quantitative[b] (Total)*		Removable[b]		Ambient[b]
Measurements[1]	**Alpha**	**Beta**	**Alpha**	**Beta**	**Alpha**	**Beta**	**Gamma**
Mass Spec Lab (affected areas)	100%	100%	11%	11%	11%	11%	11%
Office Areas (unaffected areas)	100%	100%	11%	11%	11%	11%	11%

[b] 11% indicates measurements taken in each 1 square meter within each 9 square meter grid
*5 minute cumulative counts.

[1]From References 7.0, Item 5: Rocketdyne System of Procedures

3.2 Sampling Locations

For affected areas, such as the laboratory, a direct, qualitative alpha and beta-gamma scan of the floors, walls, and ceilings (100% surface area) was conducted. Following the scans, the entire area was divided into 9 square meter grids portrayed on a scaled survey map (see Figure 2). Within each grid, a one square meter area (1m x 1m) was selected for a cumulative count survey. For surfaces having less than a square meter area (remnant areas), a minimum area of one square meter was surveyed by combining other adjacent remnant areas.

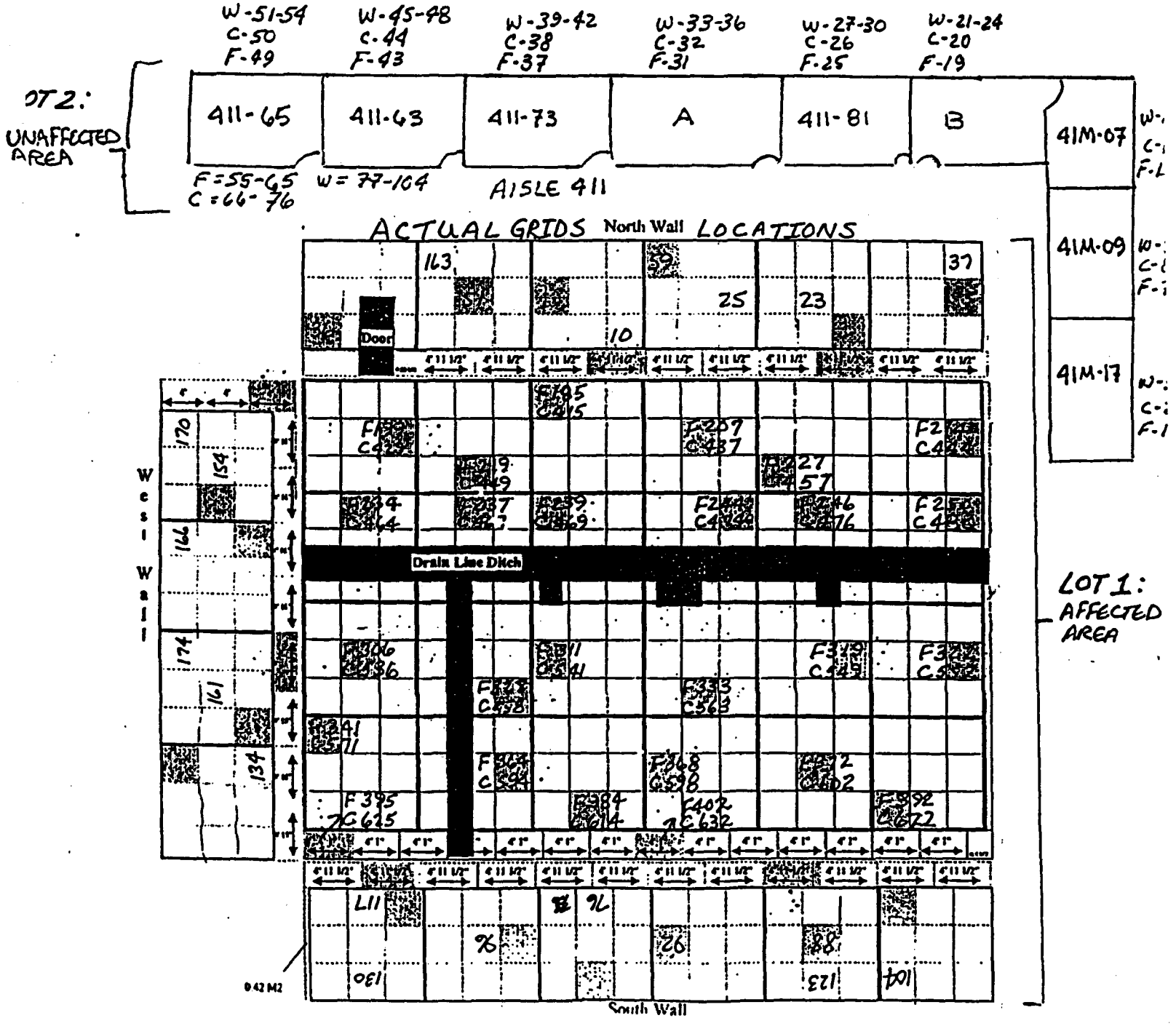


Figure 2: Grid Map Areas

For unaffected areas, such as the office areas, hallways, etc., a direct, qualitative scan (100 % of all surface area) on the floors, walls, and ceilings was conducted. Areas of concern included floor baseboards, windowsills, areas behind file cabinets or furniture, door thresholds, and any other areas where contamination potentially accumulated over time.

Following the surface scan, survey points were selected of the area for the floor, walls, and ceiling for a cumulative count (quantitative) survey. The survey points were calculated based on a surface area of 2000 square feet, and only 45 sample points would have been required as specified in Table 2 below. For conservative purposes, the sample points were increased to104 for the unaffected area.

Table 2: Statistical Sampling Point Population for 95% Reliability

Surface Area (ft^2)	Sample Points[1]
1 to 30	100% scan
31 to 50	30
51 to 100	37
101 to 200	40
201 to 300	43
301 to 400	44
401 to 2000	45
2000 to 100,000	75

Measurements of the average and maximum alpha surface activities were made with alpha scintillation detectors, sensitive only to alpha particles with energies exceeding about 1.5 MeV. Scintillation detectors were calibrated with a Th-230 standard alpha source. Measurements of the average and maximum beta surface activities were made with a thin-window pancake Geiger-Mueller tube calibrated with a Tc-99 standard beta source.

Daily checks and calibrations were performed on all instrumentation to determine acceptable performance. Daily checks and calibration data were entered on the appropriate Instrument Qualification Sheet (IQS).

[1] From Reference 7.0, Item 8: 10CFR32.110, "Acceptance Sampling Procedures under Specific Licenses"

The older 9in.x 9in.floor tiles, which demonstrated sufficient levels of asbestos, were classified as Asbestos Containing Material (ACM), and removed using proper asbestos abatement procedures. The floor mastic used to attach the tile was also considered ACM . In order to facilitate the removal process and determine if a mixed hazardous waste issue existed, a number of floor tiles were randomly selected and removed by trained asbestos abatement personnel. Removed tile and associated sub-floor areas were surveyed for radioactive contamination. If random surveys indicated the flooring material was free of contamination, then the expanse of the floor was considered non-contaminated, and asbestos abatement proceeded without additional radiological controls. No floor tiles, or areas underneath the tiles were contaminated. Surveys on concrete pads were conducted in the same method as floor areas. All sink traps were removed during the D&D project.

Structural surfaces consisting of beams, pipes, conduits, and other surfaces that were not easily assessable were surveyed over twenty percent (20%) of the surface area, and *unaffected areas* over ten percent (10%) of the surface area for contamination. Select surfaces to survey were based on those expected to have the highest contamination levels (e.g. ledges, tops of conduit, etc.). Ventilation systems for the laboratory that were located on the roof of Building 104 were removed as part of the D&D project. Access into any remaining air ducts in both affected and unaffected areas of the D&D project were surveyed for possible contamination. Air conditioning supply ducting was reinstalled following the removal of the HEPA filtration/ ventilation ducting. The work was conducted after a survey of the accessible areas of the supply ducting, and subsequently no contamination was detected.

3.3 Sample Collection

Sample Lot 1 (affected areas)

Sample Lot 1 was composed of measurements taken exclusively from the Mass Spectrometer Laboratory. Measurements were taken for total alpha and beta, removable alpha and beta, and ambient gamma levels. Qualitative measurements were taken for all (100%) of the survey grids, and qualitative measurements for 11% of all the survey grids. This method satisfies the State of California guidelines in DECON-1[1] that a minimum of 10% of an area shall be surveyed. Structural surfaces (pipes, conduit, light fixtures, etc.) were previously removed during the D&D of this area.

[1]References 7.0, item 6: DECON-1, "State of California for Decontaminating Facilities and Equipment Prior to Release for Unrestricted Use", June 1977

Sample Lot 2 (unaffected areas)

Sample Lot 2 was composed of measurements taken in office areas (outside of the laboratory) and hallways. A 100% direct qualitative frisk of each 1 square meter grid was performed using an alpha scintillation probe and a G-M pancake probe. The number of square feet in the unaffected area was calculated to determine the amount of sample points needed for a quantitative survey from the guidelines in Table 2. Subsequently, a quantitative survey for removable alpha and beta activity was conducted within each of the selected grids. Twenty percent of all structural surfaces (pipes, conduit, light fixtures, etc.) were surveyed for total and removable alpha and beta activity.

3.4 Survey Instrumentation and Techniques

A count rate meter with an audible indication was used for both qualitative and quantitative scans. Audible indication during the scan required a detector to be more sensitive than the scalar read-out. For scanning, the detector was moved slowly, at a scan rate of less than 5 cm/sec, over the surface being surveyed. The face of the detector was located near the surface and not more than ½-inch distance away.

Standard 1.75 inch disk smears (1 3/4 NPO, cloth) were used to obtain measurements of removable surface alpha and beta activity by wiping approximately 100 cm^2 of the surface area. The activity was measured on the disks using a low background, gas-flow, Tennelec proportional counter calibrated using Th-230 and Tc-99 standard sources.

The ambient exposure rates were measured at 1-meter from all surfaces using a 1-inch probe, NaI scintillation detector calibrated quarterly, and daily checks made using a Cs-137 source. A standard conversion factor of 215 cpm per μR/hr, based on comparisons with a Reuter-Stokes High Pressure Ion Chamber (HPIC), was used for conversion of counts per minute to μR/hr measurements. All survey data was recorded on Final Status Survey Data Sheets (FSDS).

3.5 Calibrations and Checks

Measurements of total and maximum alpha surface activity were made using an alpha scintillation detector, sensitive only to alpha particles with energies exceeding about 1.5 MeV. The detector was calibrated with a Th-230 alpha source standard traceable to the National Institute of Standards and Technology (NIST). Measurements of the average and maximum beta surface activities were made with a thin-window pancake Geiger-Mueller (G-M) tube. The G-M detector was calibrated with a Tc-99 beta source standard, traceable to NIST.

All portable survey instruments were serviced and calibrated with NIST traceable standards on a quarterly basis. In addition, daily source, background, and performance checks were done on all instrumentation, when in use, to determine acceptable performance and establish a background value for the instrument on that day. Calibration records for the survey instruments used are maintained in the Radiation Safety Department files.

The gas-flow proportional counters, used to measure removable contamination, were calibrated using Th-230 and Tc-99 standard sources, traceable to NIST.

The ambient exposure rates at 1m from surfaces were measured using a one-inch by one-inch (1-in x 1-in) probe NaI scintillation detector. These instruments were calibrated against a Reuter-Stokes high-pressure ionization chamber, and daily checks were made using a Cs-137 source.

3.6 Survey Evaluations

Acceptable contamination limits and gamma exposure rates for releasing a facility for unrestricted use are described in Table 3. The lowest (most conservative) applicable limits were chosen from these guidelines and incorporated into the Final Status Survey criteria for the Mass Spectroscopy Laboratory.

Table 3: Allowable Residual Surface Contamination (dpm/100cm^2)

Radionuclides[1]	Average	Maximum	Removable
Separated or enriched Sr-90, Th-natural, Th-232	<1,000	<3,000	<200
U-natural, U-235, U-238, and associated decay products	<5,000α	<15,000α	<1,000α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission), including Sr-90 intrinsic to the mixture. [This category of radionuclides includes mixed fission products, including Cs-137 and Sr-90. It does not apply to Sr-90, which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.]	<5,000β-γ	<15,000β-γ	<1,000β-γ
Gamma Exposure Rate	≤ 5 μR/hr above background at one meter		

Note: Where surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides apply independently. Measurements of average contamination should not be averaged over an area of more than one square meter. For objects of less surface area, dose rate averages should be derived for each such object. The maximum and removable contamination level applies to an area of not more than 100 cm^2.

[1]From References 7.0, Item 2: DOE Order 5400.5, Figure IV-1.

Table 4 provides guidelines for alpha and beta-gamma emitters whose specific isotopic content had not been determined.

Table 4: Contamination Limits for Unidentified Isotopes

Radionuclides[1]	Average (dpm/100 cm2)	Removable (dpm/100 cm2)	Maximum (dpm/100 cm2)	Max Count Rate Meter Response
Unidentified Alpha emitters	< 100	< 20	< 300	No detectable activity when measured on a ZnS portable survey meter. (< 2 cpm on "slow" response)
Unidentified Beta-Gamma emitters	< 5,000	< 100	< 15,000	< 100 net counts per minute above ambient background on a pancake frisker

The average surface levels of contamination were taken over an area of one square meter. For objects of less surface area, the average was derived for each surface. The maximum contamination level applied to an area of not more than 100 cm^2. The amount of removable material per 100 cm^2 of surface area was determined by wiping an area with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wiping with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm^2 was determined, the activity per unit area was based on the actual area and the entire surface was wiped.

[1]From References 7.0, Item 2: DOE Order 5400.5, Figure IV-1.

4.0 DATA ANALYSES

The Final Status Survey had to confirm that the De Soto building 104 Mass Spectroscopy Laboratory and adjoining offices were acceptable for unrestricted use. Therefore, the results of the survey must be validated using statistical analysis. A distribution analysis was performed in which the activity was plotted against the cumulative probability using CUM-Plot 2.20[1].

A statistical procedure was used to validate the applicability of the raw survey data for selected sample lot areas. The statistical method known as "sampling inspection by variables" was used. This method is widely applied in the industry and military[2].

In sampling inspection by variables, the data is assumed to be *normally* (i.e., Gaussian)[3] distributed. The mean of the distribution $\bar{x}$, and its standard deviation s, are then related to a "test statistic," TS, as follows:

$$TS = \bar{x} + k \cdot s$$

where $\bar{x}$ = average (arithmetic mean of measured values)

s = observed sample standard deviation

k = tolerance factor calculated from the number of samples to achieve the desired sensitivity for the test

TS and $\bar{x}$ are then compared with an acceptance limit, U, to determine acceptance or other plans of action, including rejection of the area as contaminated and requiring further remediation.

The sample mean and standard deviation are easily calculable quantities; the value of **k**, the tolerance factor, is examined. Of the various criteria for selecting plans for acceptance sampling by variables[4], the most appropriate is the method of *Lot Tolerance Percent Defective* (LTPD, also referred to as the *Reject-able Quality Level* (RQL). The LTPD is defined as the poorest quality that should be accepted in an individual lot. Associated with the LTPD is a parameter referred to as "consumer's risk" (β), the risk of accepting a lot of quality equal to or poorer than the LTPD.

[1]References 7.0, Item 7: CUM-Plot 2.20, Proprietary Statistical Program .

[2]From References 7.0, Item 4: MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective", June 11, 1957.

[3]Ref. 7.0, Item 4.

[4]Ref. 7.0, Item 4.

Assigning values for LTPD and β, and given the sample size ***n***, a value for ***k*** can be calculated as follows:

$$k = \frac{K_2 + \sqrt{K_2^2 - ab}}{a};\ a = 1 - \frac{K_\beta}{2(n-1)};\ b = K_2^2 - \frac{K_\beta^2}{n}$$

where k = tolerance factor,

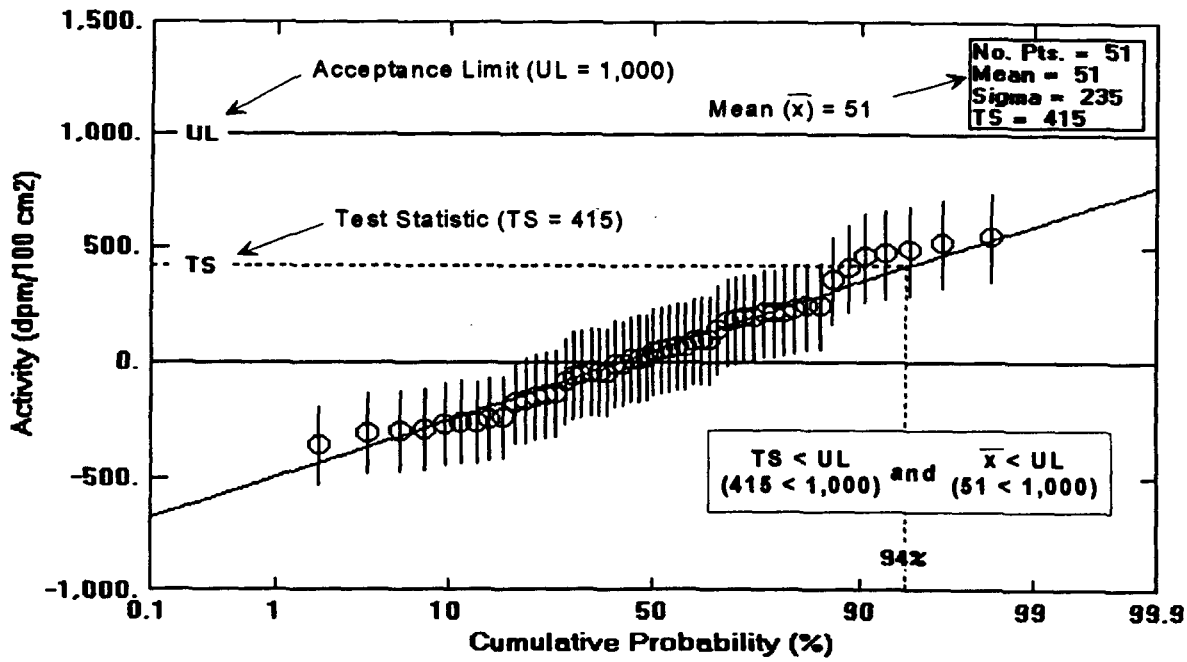
K_2 = the normal deviate exceeded with probability equal to the LTPD,

K_β = the normal deviate exceeded with probability of β,

n = number of samples.

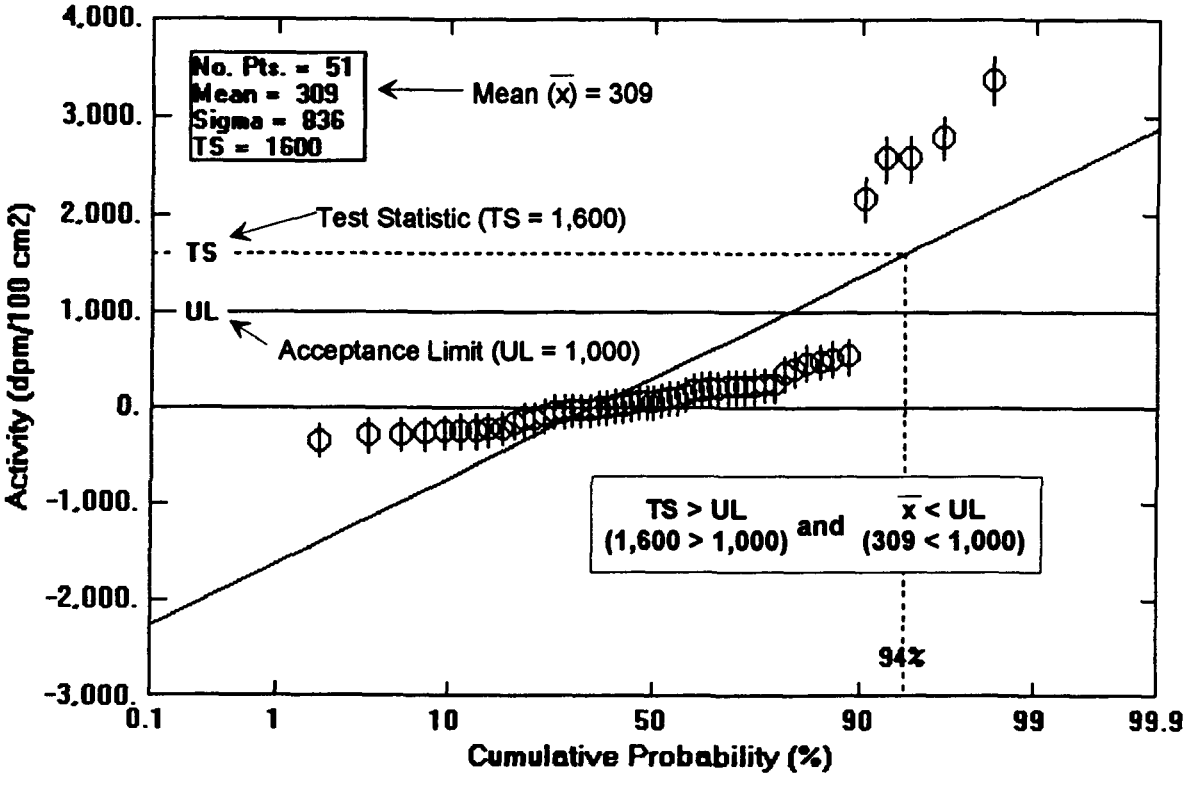
Depending on the data collected, the statistical test may result in one of three conclusions illustrated below:

1. **Acceptance**: If the test statistic ($\bar{x} + k \cdot s$) is less than or equal to the limit (U); accept the region as clean. If any single measured value exceeds 80% of the limit; decontaminate that location to as near background as is possible, but do not change the value in the analysis. Graph A is an example of the sample lot acceptance by the test.



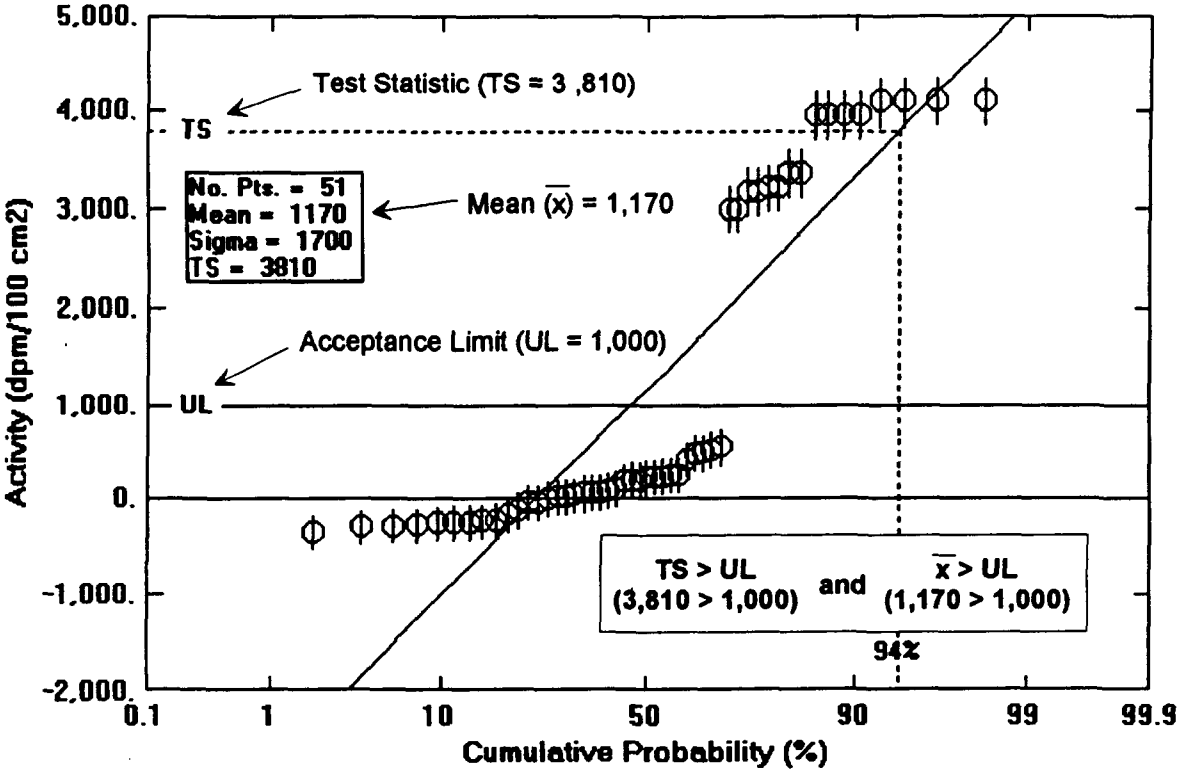
Graph A. Example of Sample Lot Acceptance, where TS ($=\bar{x} + k \cdot s$) ≤ UL and $\bar{x} \leq$ UL

2. **Collect additional measurements**: If the test statistic ($\bar{x} + k \cdot s$) is greater that the limit (U), but $\bar{x}$ itself is less than U, and if independently re-sampling and combining all measured values to determine if $\bar{x} + k \cdot s \leq U$ for the combined set occurs; then accept the region as clean. If not, the region is contaminated and must be remediated. Graph B gives an example of additional measurements that must be taken in the sample lot to accept or reject it.



Graph B. Example of Sample Lot Requiring Additional Measurements, where TS (= $\bar{x} + k \cdot s$) > UL and $\bar{x}$ < UL

3. **Rejection:** If the test statistic ($\bar{x} + k \cdot s$) is greater than the limit (U) and $\bar{x} \geq$ U; the region is contaminated and must be remediated. **Graph** C gives an example of sample lot rejection by the test.



Graph C. Example of Sample Lot Rejection, where TS (= $\bar{x} + k \cdot s$) > UL and $\bar{x}$ > UL

The Mass Spectroscopy Laboratory survey was analyzed using a Lot Tolerance Percent Defect of β = LTPD = 5%, for the choices $K_\beta = K_2 = 1.645$ for a region of rejection, one-tailed test. The 5% value used was more conservative than the 10% LTPD Consumer Risk Value[1] used by the USNRC [Regulatory Guide 6.6], and State of California.[2] If the statistical tests meet the acceptance criteria above, we are willing to accept the hypothesis that the probability of accepting a Sample Lot as not being contaminated, which is in fact 5% or more contaminated is 5%. In other words, if the test statistic is less than the release criteria, we are 95% confident that over 95% of the Sample Lot has residual contamination below 100% of the release criteria of Section 3.6. This is referred to as the (95/95/100) test.[3]

[1]From References 7.0, item 3: USNRC Regulatory Guide 6.6,"Acceptance Sampling Procedures for Exempted and Generally Licensed Containing By-Product Material"

[2]From References 7.0, item 6: DECON-1, "State of California for Decontaminating Facilities and Equipment Prior to Release for Unrestricted Use", June 1977.

[3]From References 7.0, item 4: MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective", June 11, 1957.

5.0 SAMPLE LOT ANALYSES AND RESULTS

Survey measurements were tested against the acceptance criteria for each particular type of radiation. Sample lots 1 and 2 were tested for the total and removable contamination and ambient gamma.

Measurements for the survey were taken over the period from 6/6/98 through 9/15/98, based on entries from the D&D logbook from the De Soto Building 104. Raw data measurements were adjusted for daily instrument background and statistically tested using the CUM Plot[1] method. Data was plotted on cumulative probability graphs to demonstrate a visual characterization. The more linear the data, the closer it approached normal distribution. When applicable, plots are shown in two scales; a condensed scale to show all the data relative to the acceptance limit, and when there is a wide separation between the data and the acceptance limit.

The test statistic ($TS = \bar{x} + k \cdot s$) for both sample lots combined was calculated and applicable contamination acceptance limits were compared. Individual calculated sample results data, used to generate the graphs, are provided in the following attachments.

5.1 Sample Lot Results (Mass Spec Lab)

The survey data results, Table 5 below, demonstrates for each applicable acceptance limit (U), the corresponding test statistic (TS) value is less than U, ($TS < U$). Therefore, the combined Sample Lots pass the "sampling inspection by variables" test and are "Accepted" as radiologically clean. The De Soto Building 104 Mass Spectroscopy Laboratory surveys correspond to assuring with a 95% confidence that 95% of the Sample Lots have residual contamination below 100% (a 95/95/100 test) of the applicable NRC, DOE, EPA, and State of California limits[2].

Table 5: Survey Results Comparison

	Total (dpm/100 cm²)		Removable (dpm/100 cm²)		Ambient Gamma
Criteria	**Alpha**	**Beta**	**Alpha**	**Beta**	**Exposure Rate (μR/h)**
Acceptance Limit (UL)	5,000	5,000	1,000	1,000	5
Actual Results (TS)	16.7	951	2.81	12.8	2.6

[1] References 7.0, item 7: CUM-Plot 22.0, Proprietary Statistical Program

[2] References 7.0, item 6: DECON-1, "State of California for Decontaminating Facilities and Equipment Prior to Release for Unrestricted Use", June 1977.

5.2 Trench Sampling

This section summarizes the results from a radiation survey performed on soil samples from the Mass Spectroscopy Laboratory piping trench area and western extension into the graphics room following excavation. In order to ascertain the levels of radioactivity in soil, a series of soil samples were taken and counted on a GeLi gamma spectrometer detector. Soil samples were obtained from the trench area after the piping was sampled and removed. Each soil sample was placed in a plastic bag, uniquely numbered, and subsequently placed in a "B"-box in numerical order. Each sample was transferred to a marinelli beaker, weighed, and analyzed in the counting lab using a Ge(Li) gamma spectrometer.

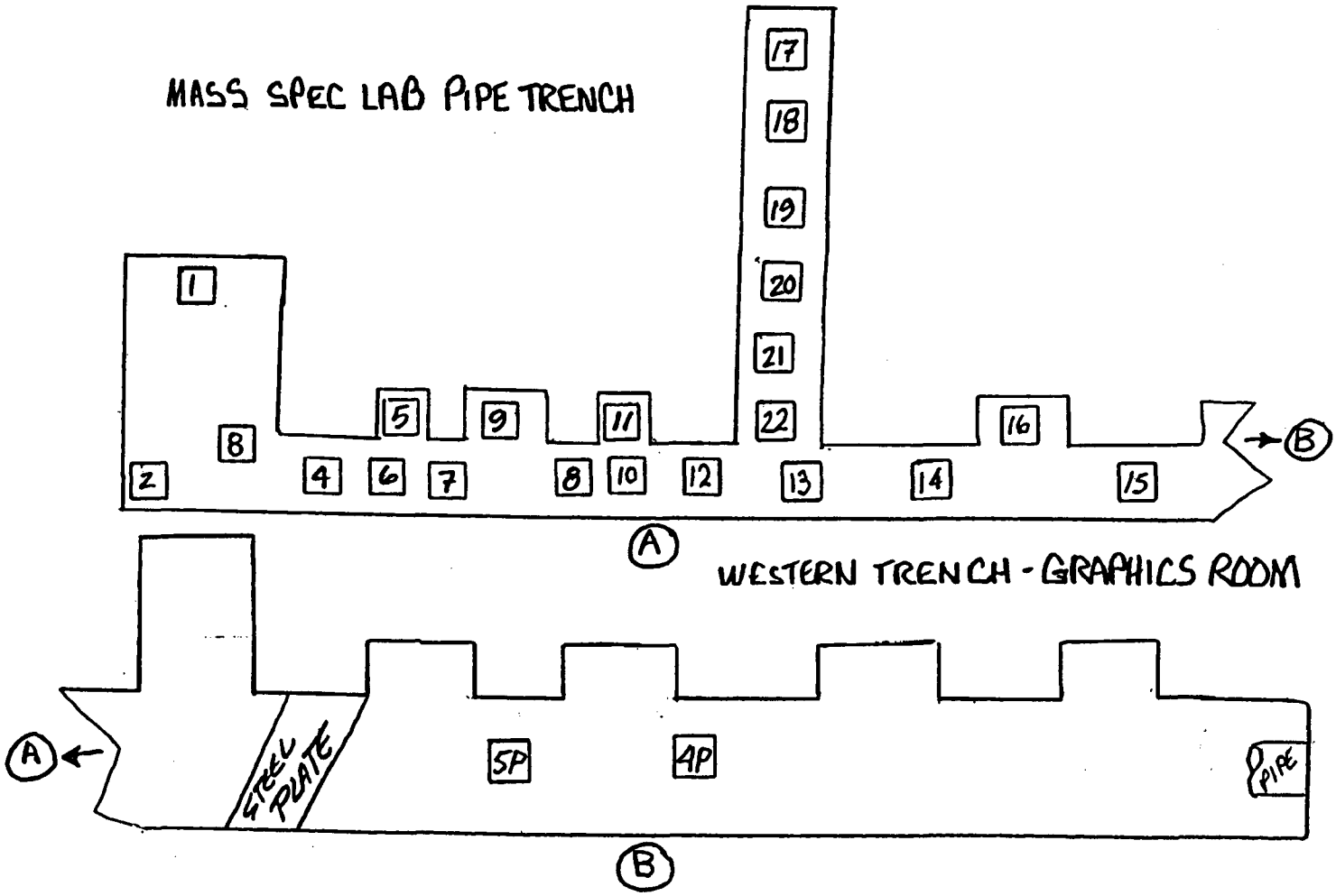


Figure 3: Mass Spec Lab and Western Pipe Trench

Table 6a and 6b summarizes the radionuclide concentrations after excavation and piping removal from the trench. The results were found to contain a maximum of 0.13 pCi/g of Cs-137 within normal background and approximately 1% of the clean-up standard of 9.2 pCi/gm (the location of the highest counts/minute).

Table 6a: Gamma Spectrometer Analysis of Soil Samples from Mass Spec Lab Pipe Trench

SAMPLE NUMBER*	DATE	LOCATION	NUCLIDE	DETECTED pCi/gm	MDA pCi/gm	LIMIT pCi/gm
ENV98176	7/6/98	TL-10	Cs-137	0.13	0.022	9.2
ENV98177	7/6/98	TL-11	Co-60	0.04	0.025	1.94

NOTE: MDA means minimum detectable activity * taken from 1998 Environmental Sample Logbook, SSFL, Bldg T100 Laboratory

In the west end of the pipe trench (that ran under the graphics room), remediated debris such as sludge, water, and piping sections were disposed of as radwaste. The debris contained trace levels of activation products below the limits described in Table 7. Soil samples were taken from the west trench after the soil was excavated and placed into shipping boxes. Soil samples from the boxes were analyzed and found to be below the guideline limits.

Samples ENV98155 and 156, taken directly from the west trench, were removed simultaneously with the soil samples removed by the Department of Health Services for the State of California. The results of those soil samples are shown in Table 6b.

Table 6b: Gamma Spectrometer Analysis of Soil Samples from Graphics Area Pipe Trench

Sample Number*	Date	Location	Isotopes Detected	C-137	Co-60
ENV98155	6/3/98	4P	No Unnatural Activity	NDA	NDA
ENV98156	6/3/98	5P	No Unnatural Activity	NDA	NDA

NOTE: NDA means no detectable activity. * taken from 1998 Environmental Sample Logbook, SSFL, Bldg T100 Laboratory

Table 7 below, lists the soil release limits to compare the radionuclides in Tables 6a and 6b, verifying the pipe trench radionuclides well below the release limits.

Table 7. Soil Guideline Release Limits

Radionuclide	Soil Guidelines[1] (pCi/g)
Am-241	5.44
Co-60	1.94
Cs-134	3.33
Cs-137	9.20
Eu-152	4.51
Eu-154	4.11
Fe-55	629,000
H-3	31,900
K-40	27.6
Mn-54	6.11
Na-22	2.31
Ni-59	151,000
Ni-63	55,300
Pu-238	37.2
Pu-239	33.9
Pu-240	33.9
Pu-241	230
Pu-242	35.5
Ra-226	5 and 15[a]
Sr-90	36.0
Th-228	5 and 15[a]
Th-232	5 and 15[a]
U-234	30[b]
U-235	30[b]
U-238	35[b]

NOTES: (a) DOE Order 5400.5 limits are 5 pCi/g averaged over first 15 cm of soil depth and 15 pCi/g averaged over 15-cm layers below the top 15 cm. (b) Generally, more conservative NRC limits for Uranium isotopes are proposed.

[1]From References 7.0, item 1, N001SRR140127, Proposed Sitewide Release Criteria for Remediation of Facilities at the Santa Susana Field Lab", revision A, 8/22/96.

6.0 SUMMARY

In all areas, affected and unaffected, the highest total alpha measurement found was 31.3 dpm/100cm^2. The highest removable alpha measurement found was 5.4 dpm/100cm^2. In all areas, the highest total beta measurement found was 1185 dpm/100cm^2. The highest removable beta found was 27.2 dpm/100cm^2. The highest level for Cs-137 was 0.13 pCi/gm, and Co-60 was 0.04 pCi/gm in the piping trench area.

All tests for surface contamination and soil concentration confirmed the De Soto building 104 Mass Spectroscopy laboratory is suitable for release for "unrestricted use".

7.0 REFERENCES

1. N001SRR140127, Proposed Sitewide Release Criteria for Remediation of Facilities at the Santa Susana Field Lab", revision A, 8/22/96.

2. DOE Order 5400.5 "Radiation Protection of the Public and Environment", Department of Energy, 1/7/92, (Figure IV-1).

3. USNRC Regulatory Guide 6.6,"Acceptance Sampling Procedures for Exempted and Generally Licensed Items Containing By-Product Material"

4. MIL-STD-414, "Sampling Procedures and Tables for Inspection by Variables for Percent Defective", June 11, 1957.

5. Rocketdyne System of Procedures, N001SRR140129, De Soto Mass Spectroscopy Laboratory Final Survey Plan, 1998.

6. DECON-1, "State of California for Decontaminating Facilities and Equipment Prior to Release for Unrestricted Use", June 1977.

7. CUM-Plot, Proprietary Statistical Program.

8. 10CFR32.110, "Acceptance Sampling Procedures under Specific Licenses".

9. 1998 Environmental Sample Logbook, SSFL, Bldg T100 Laboratory.

Appendix A

Direct Alpha Frisk

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
AFFECTED AREA					
GIF FOYER					
CEILING GRID C039	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C040	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C041	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C042	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C043	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C044	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C045	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C046	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C047	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C048	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C049	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C059	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C060	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C061	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C062	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C063	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C064	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C065	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C066	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C067	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C068	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C069	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C070	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C071	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C072	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C073	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C074	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C075	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C076	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C077	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C078	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C079	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C080	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID C081	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F028	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F029	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F030	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F031	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F032	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F033	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F034	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F035	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F036	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F037	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F038	06/23/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ASS SPECTROSCOPY LAB					
FLOOR GRID F120	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F122	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F123	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F124	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F125	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F126	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F127	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F128	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F129	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F130	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F131	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F144	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F157	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F170	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F171	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F172	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F173	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F174	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F175	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F176	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F177	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F178	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F179	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F180	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F181	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F182	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F183	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F184	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F185	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F186	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F187	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F188	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F189	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F190	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F191	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F192	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F193	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F194	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F195	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F196	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F197	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F198	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F199	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F200	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F201	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F202	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F203	06/08/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
LOOR GRID F204	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F205	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F206	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F207	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F208	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F209	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F210	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F211	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F212	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F213	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F214	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F215	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F216	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F217	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F218	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F219	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F220	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F221	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F222	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F223	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F224	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F225	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F226	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F227	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F228	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F229	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F230	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F231	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F232	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F233	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F234	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F235	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F236	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F237	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F238	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F239	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F240	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F241	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F242	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F243	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F244	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F245	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F246	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F247	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F248	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F249	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F250	06/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F251	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F252	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F253	06/05/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
FLOOR GRID F254	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F255	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F256	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F257	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F258	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F259	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F260	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F261	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F262	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F263	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F264	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F265	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F266	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F267	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F268	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F269	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F270	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F271	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F272	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F273	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F274	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F275	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F276	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F277	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F278	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F279	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F280	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F281	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F282	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F283	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F284	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F285	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F286	06/05/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F287	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F288	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F289	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F290	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F291	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F292	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F293	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F294	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F295	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F296	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F297	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F298	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F299	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F300	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F301	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F302	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F303	07/09/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
AFFECTED AREA					
CIF FOYER					
CEILING GRID C039	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C040	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C041	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C042	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C043	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C044	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C045	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C046	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C047	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C048	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C049	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C059	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C060	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C061	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C062	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C063	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C064	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C065	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C066	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C067	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C068	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C069	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C070	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
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CEILING GRID C072	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C073	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C074	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C075	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C076	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C077	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C078	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
CEILING GRID C079	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C080	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
EILING GRID C081	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F028	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F029	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F030	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F031	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F032	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F033	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F034	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F035	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F036	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F037	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F038	06/23/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
LOOR GRID F304	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F305	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F306	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F307	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F308	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F309	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F310	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F311	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F312	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F313	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F314	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F315	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F316	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F317	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F318	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F319	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F321	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F322	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F323	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F326	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F327	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F328	07/07/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F329	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F330	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F331	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F332	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F333	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F334	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F335	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F336	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F337	07/08/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F338	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F339	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID F340	07/09/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F372	07/11/1998	< MDA	35.7	5000	dpm/100 cm2
LOOR GRID F393	07/11/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W001	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W002	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W003	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W004	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W005	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W006	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W007	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W008	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W009	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W010	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W011	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W012	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W013	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W014	06/16/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ALL GRID W015	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W016	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W017	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W018	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W019	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W020	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W021	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W022	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W023	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W023N	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W024	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W025	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W026	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W027	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W028	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W029	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W030	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W031	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W032	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W033	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W034	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W035	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W036	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W037	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W038	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W039	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W040	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W041	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W042	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W043	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W044	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W045	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W046	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W047	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W048	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W049	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W050	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W051	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W052	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W053	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W054	06/16/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W066	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W067	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W068	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W069	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W070	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W071	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W072	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W073	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W074	06/28/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
WALL GRID W075	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W076	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W077	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W078	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W079	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W080	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W081	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W082	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W083	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W084	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W085	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W086	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W087	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W088	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W089	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W090	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W091	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W092	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W093	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W094	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W095	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W096	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W097	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W098	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W099	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W100	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W101	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W102	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W103	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W104	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W105	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W106	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W107	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W108	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W109	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W110	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W111	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W112	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W113	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W114	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W115	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W116	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W117	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W118	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W119	06/28/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W132	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W133	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W134	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W135	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W136	06/19/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ALL GRID W137	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W138	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W139	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W140	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W141	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W142	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W143	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W145	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W146	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W147	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W148	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W149	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W150	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W151	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W152	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W153	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W154	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W155	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W156	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W158	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W159	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W160	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W161	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W162	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W163	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W164	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W165	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W166	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID W167	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W168	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID W169	06/19/1998	< MDA	35.7	5000	dpm/100 cm2
SOUTH HALLWAY					
CEILING GRID S019	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID S020	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID S021	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID S022	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID S023	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
CEILING GRID S024	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S013	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S014	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S015	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S016	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S017	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
FLOOR GRID S018	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S001	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S002	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S003	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S004	07/18/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
WALL GRID S005	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID S006	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S007	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S008	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID S009	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S010	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
WALL GRID S011	07/18/1998	< MDA	35.7	5000	dpm/100 cm2
ALL GRID S012	07/18/1998	< MDA	35.7	5000	dpm/100 cm2

DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
NAFFECTED AREA					
HALLWAY AREAS					
ALLWAY AREAS (UNSPE	06/23/1998	< MDA	35.7	5000	dpm/100 cm2
FFICE AREAS					
ROOM 104-1-AB-35	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
ROOM 104-1-AB-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
OOM 104-1-AC-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
ROOM 104-1-BB-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
ROOM 104-1-BC-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
OOM 104-1-BD-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
OOM 104-1-CB-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
ROOM 104-1-CC-39	06/24/1998	< MDA	35.7	5000	dpm/100 cm2
OOF AREA					
ROOF LOCATION 01	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 02	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 03	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 04	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 05	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 06	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 07	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 08	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 09	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 10	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 11	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 12	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 13	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 14	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 15	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 16	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 17	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 18	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 19	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 20	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 21	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 22	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 23	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 24	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 25	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 26	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 27	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 28	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
OOF LOCATION 29	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 30	08/20/1998	< MDA	35.7	5000	dpm/100 cm2

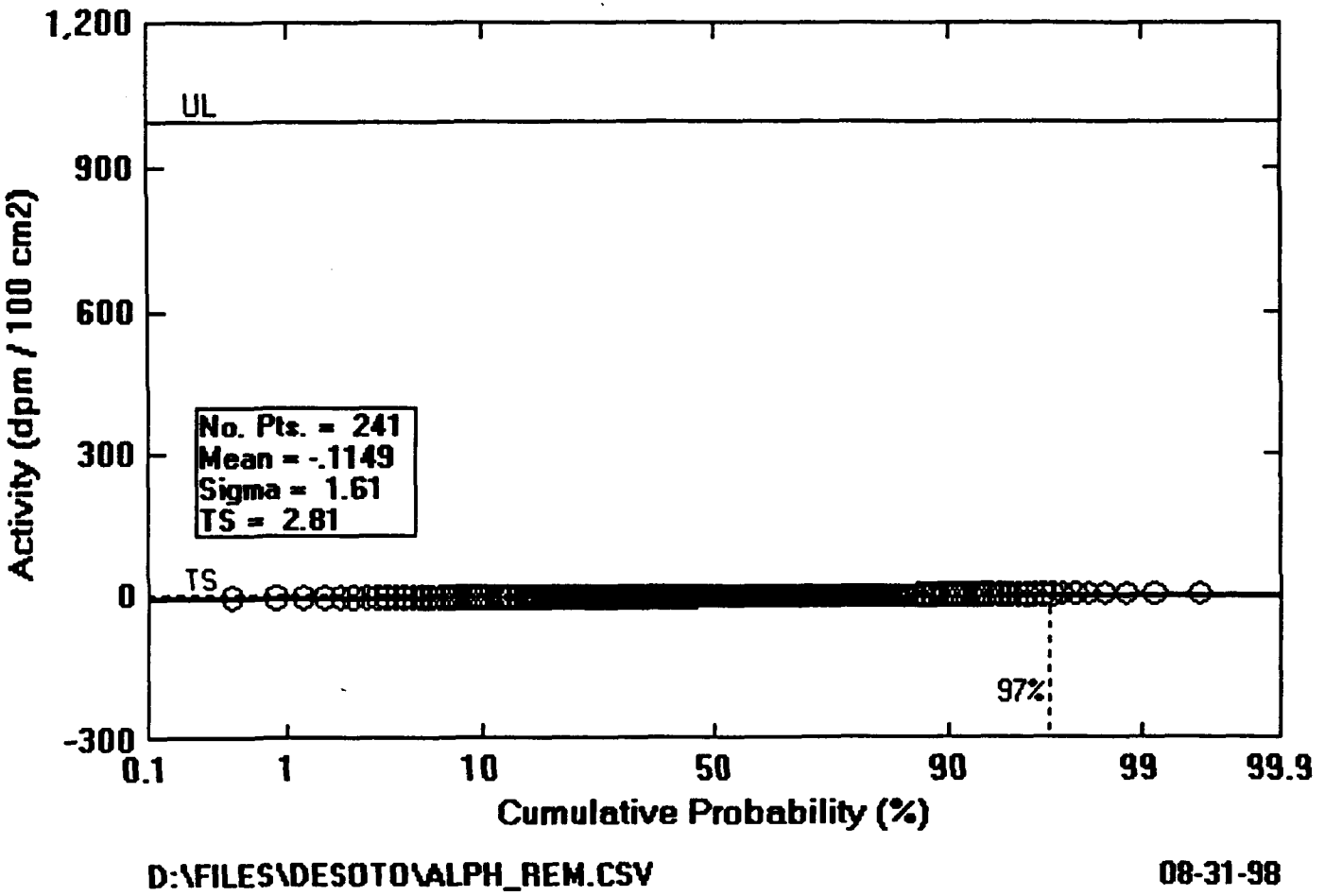
DIRECT ALPHA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ROOF LOCATION 31	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 32	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 33	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 34	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 35	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 36	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 37	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 38	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 39	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 40	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 41	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 42	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 43	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 44	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 45	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 46	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 47	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 48	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 49	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 50	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 51	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 52	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 53	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 54	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 55	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 56	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 57	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 58	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 59	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 60	08/20/1998	< MDA	35.7	5000	dpm/100 cm2
ROOF LOCATION 61	08/20/1998	< MDA	35.7	5000	dpm/100 cm2

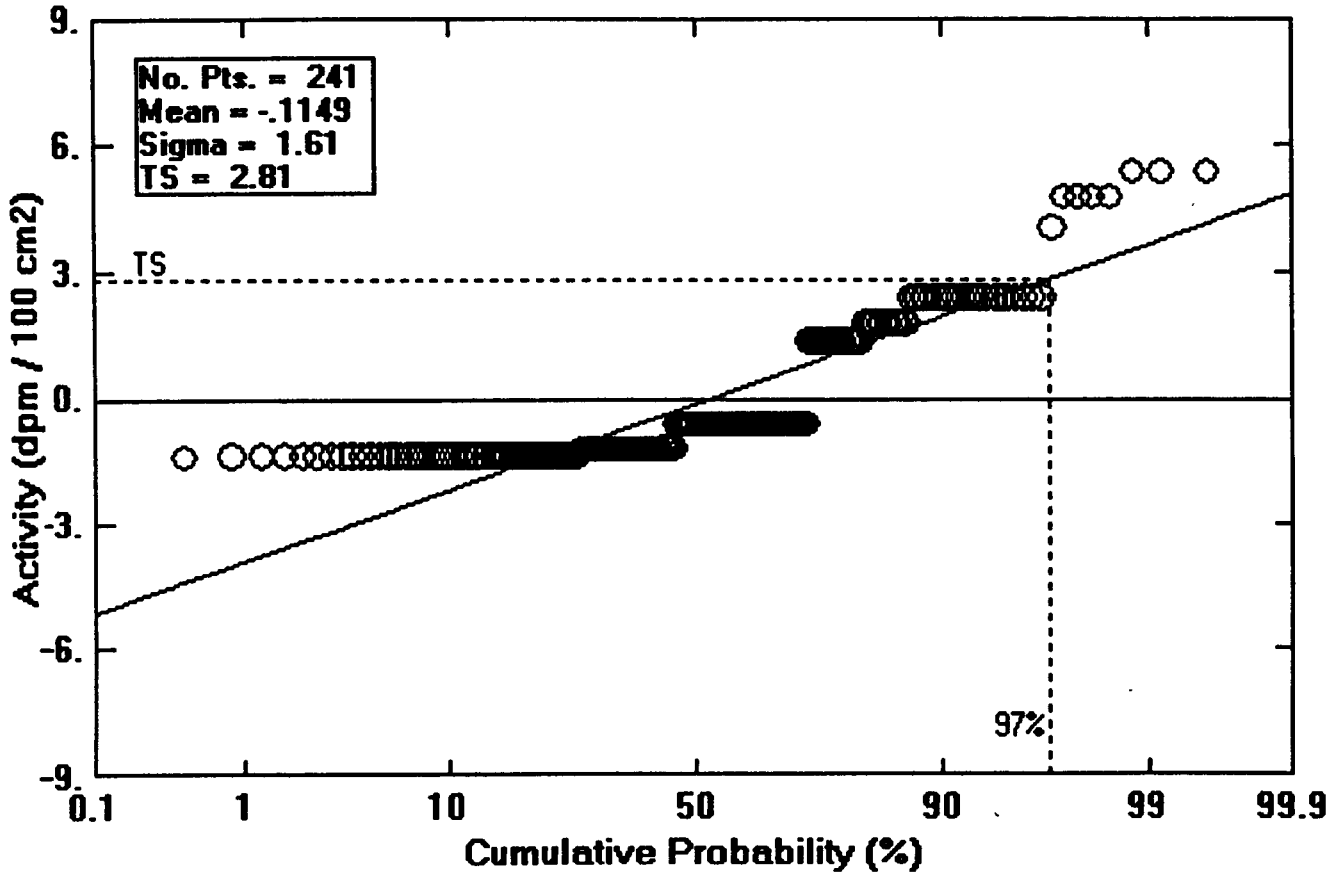
APPENDIX B

Removable Alpha Contamination

Removable Alpha Contamination (Mass Spec Lab)



Removable Alpha Contamination (Mass Spec Lab)



REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
AFFECTED AREAS					
GIF FOYER					
EILING GRID C04	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C04	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
CEILING GRID C06	07/23/1998	2.4	3.10	1000.0	dpm/100 cm2
EILING GRID C06	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C07	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
FLOOR GRID F031	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F037	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F040	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F046	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F056	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ASS SPECTROSCOPY LAB					
EILING GRID C41	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C42	07/21/1998	2.4	1.60	1000.0	dpm/100 cm2
CEILING GRID C43	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C44	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C44	07/21/1998	-0.6	1.60	1000.0	dpm/100 cm2
CEILING GRID C45	07/23/1998	2.4	3.10	1000.0	dpm/100 cm2
CEILING GRID C46	07/21/1998	-0.6	1.60	1000.0	dpm/100 cm2
EILING GRID C46	07/21/1998	-0.6	1.60	1000.0	dpm/100 cm2
EILING GRID C46	07/21/1998	-0.6	1.60	1000.0	dpm/100 cm2
CEILING GRID C47	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C47	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C48	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
CEILING GRID C53	07/16/1998	-0.6	2.30	1000.0	dpm/100 cm2
EILING GRID C54	07/17/1998	-0.6	2.60	1000.0	dpm/100 cm2
EILING GRID C54	07/23/1998	2.4	3.10	1000.0	dpm/100 cm2
CEILING GRID C55	07/23/1998	2.4	3.10	1000.0	dpm/100 cm2
CEILING GRID C55	07/17/1998	2.4	2.60	1000.0	dpm/100 cm2
EILING GRID C56	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
EILING GRID C57	07/16/1998	-0.6	2.30	1000.0	dpm/100 cm2
CEILING GRID C59	07/17/1998	-0.6	2.60	1000.0	dpm/100 cm2
EILING GRID C59	07/17/1998	-0.6	2.60	1000.0	dpm/100 cm2
EILING GRID C60	07/23/1998	-0.6	3.10	1000.0	dpm/100 cm2
CEILING GRID C61	07/17/1998	-0.6	2.60	1000.0	dpm/100 cm2
CEILING GRID C62	07/23/1998	2.4	3.10	1000.0	dpm/100 cm2
EILING GRID C62	07/16/1998	-0.6	2.30	1000.0	dpm/100 cm2
CEILING GRID C63	07/17/1998	-0.6	2.60	1000.0	dpm/100 cm2
FLOOR GRID F185	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F199	07/24/1998	5.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F207	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F214	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F219	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F227	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F234	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F237	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2

REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
FLOOR GRID F239	07/24/1998	5.4	2.30	1000.0	dpm/100 cm2
LOOR GRID F244	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F246	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F250	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F306	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F311	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
LOOR GRID F319	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F322	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
LOOR GRID F328	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
LOOR GRID F333	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F341	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F364	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F368	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
FLOOR GRID F372	07/24/1998	-1.3	2.30	1000.0	dpm/100 cm2
LOOR GRID F384	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
LOOR GRID F392	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
LOOR GRID F395	07/24/1998	5.4	2.30	1000.0	dpm/100 cm2
FLOOR GRID F402	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W004	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W008	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W009	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W010	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W015	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W023E	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W023N	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
ALL GRID W023S	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W025	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W027	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W034	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W036	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W037	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W051	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W059	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W063	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W076	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W088	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W092	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W096	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
ALL GRID W104	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
ALL GRID W117	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W123	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W130	07/24/1998	2.4	2.30	1000.0	dpm/100 cm2
WALL GRID W134	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W154	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W161	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W166	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W170	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2
WALL GRID W174	07/24/1998	-0.6	2.30	1000.0	dpm/100 cm2

REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

UNAFFECTED AREAS

HALLWAY AREAS

		Result	MDA	Limit	Units
HALLWAY CEILING	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2

OFFICE AREAS

ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2

REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
ROOM 104-1-AB-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-AB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-AB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/09/1998	4.1	3.40	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	-1.4	3.40	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	1.4	3.40	1000.0	dpm/100 cm2
OOF AREA					
ROOF LOCATION 01	08/20/1998	4.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 02	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 03	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 04	08/20/1998	4.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 05	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2

ppendix B
rage 5
08/31/1998
ALPH_REM]

REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
ROOF LOCATION 06	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 07	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 08	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 09	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 10	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 11	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 12	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 13	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 14	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 15	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 16	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 17	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 18	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 19	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 20	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 21	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 22	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 23	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 24	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 25	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 26	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 27	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 28	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 29	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 30	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 31	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 32	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 33	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 34	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 35	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 36	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 37	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 38	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 39	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 40	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 41	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 42	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 43	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 44	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 45	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 46	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 47	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 48	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 49	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 50	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 51	08/20/1998	4.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 52	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 53	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
OOF LOCATION 54	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
OOF LOCATION 55	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 56	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 57	08/20/1998	4.8	3.10	1000.0	dpm/100 cm2

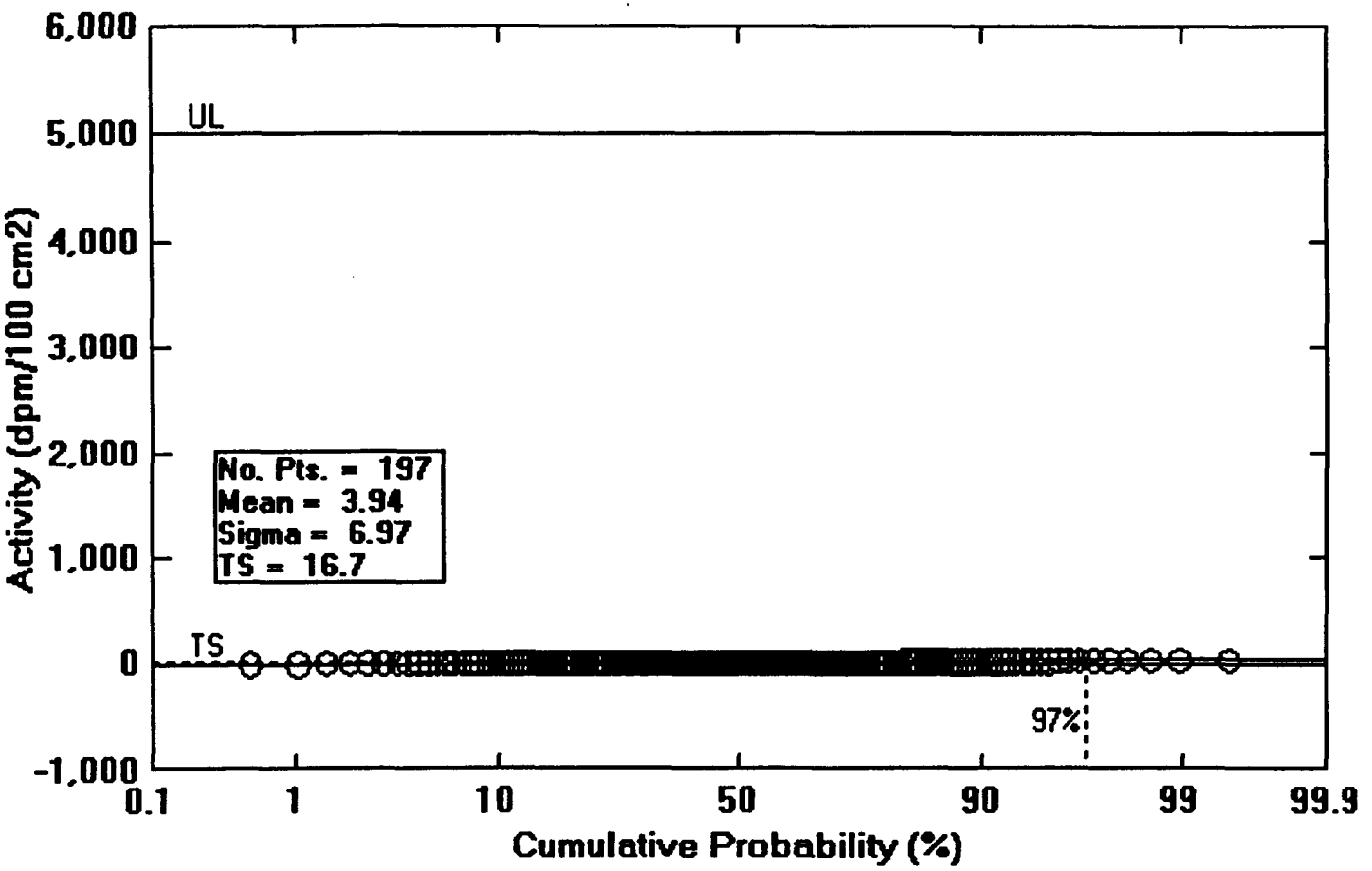
REMOVABLE ALPHA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
ROOF LOCATION 58	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 59	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 60	08/20/1998	-1.2	3.10	1000.0	dpm/100 cm2
ROOF LOCATION 61	08/20/1998	1.8	3.10	1000.0	dpm/100 cm2

APPENDIX C

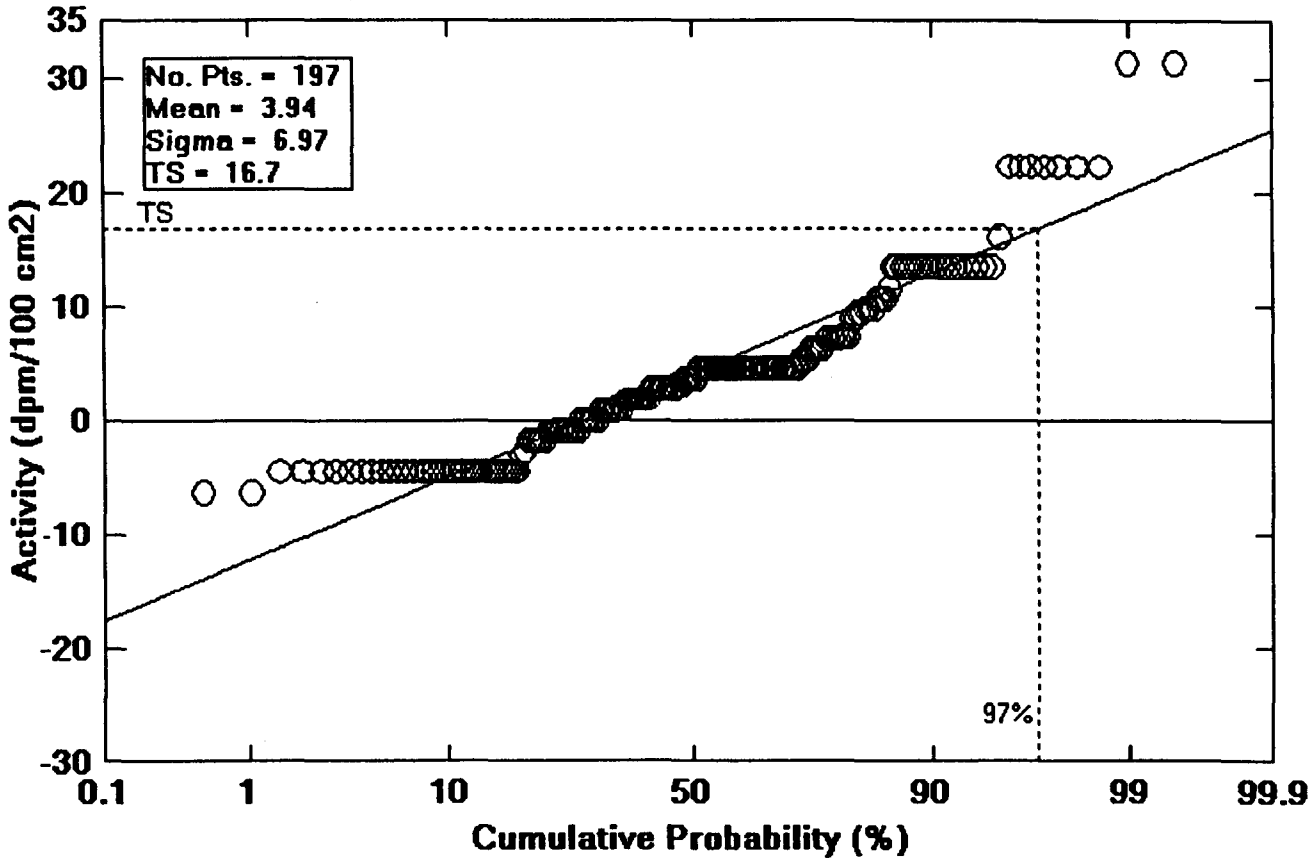
Quantitative Total Alpha Measurement

Quantitative Total Alpha Measurements (Mass Spec Lab)



D:\FILES\DESOTO\ALPHQAN2.CMP 08-31-98

Quantitative Total Alpha Measurements (Mass Spec Lab)



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Appendix C
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[ALPH_QAN]

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

AFFECTED AREA		COUNT DATA Counts Gross	Bkgd	Time (Min)	Eff.	RESULT DATA Result	MDA	Limit	Result Units
GIF FOYER									
CEILING GRID C063	07/23/1998	5.0	3.0	5.0	0.28	3.6	7.0	5000	dpm/100 cm2
CEILING GRID C069	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
CEILING GRID C079	07/23/1998	3.0	3.0	5.0	0.28	0.0	7.0	5000	dpm/100 cm2
FLOOR GRID F031	07/23/1998	7.0	3.0	5.0	0.28	7.1	7.0	5000	dpm/100 cm2
FLOOR GRID F037	07/23/1998	3.0	3.0	5.0	0.28	0.0	7.0	5000	dpm/100 cm2
FLOOR GRID F040	07/23/1998	2.0	3.0	5.0	0.28	-1.8	7.0	5000	dpm/100 cm2
FLOOR GRID F046	07/23/1998	3.0	3.0	5.0	0.28	0.0	7.0	5000	dpm/100 cm2
FLOOR GRID F056	07/23/1998	2.0	3.0	5.0	0.28	-1.8	7.0	5000	dpm/100 cm2
MASS SPECTROSCOPY LAB									
CEILING GRID C415	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
CEILING GRID C429	07/21/1998	3.0	3.5	5.0	0.28	-0.9	7.8	5000	dpm/100 cm2
CEILING GRID C437	07/23/1998	5.0	3.0	5.0	0.28	3.6	7.0	5000	dpm/100 cm2
CEILING GRID C444	07/23/1998	3.0	3.0	5.0	0.28	0.0	7.0	5000	dpm/100 cm2
CEILING GRID C449	07/21/1998	3.0	3.5	5.0	0.28	-0.9	7.8	5000	dpm/100 cm2
CEILING GRID C457	07/23/1998	7.0	3.0	5.0	0.28	7.1	7.0	5000	dpm/100 cm2
CEILING GRID C464	07/21/1998	6.0	3.5	5.0	0.28	4.5	7.8	5000	dpm/100 cm2
CEILING GRID C467	07/21/1998	4.0	3.5	5.0	0.28	0.9	7.8	5000	dpm/100 cm2
CEILING GRID C469	07/21/1998	2.0	3.5	5.0	0.28	-2.7	7.8	5000	dpm/100 cm2
CEILING GRID C474	07/23/1998	5.0	3.0	5.0	0.28	3.6	7.0	5000	dpm/100 cm2
CEILING GRID C476	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
CEILING GRID C480	07/23/1998	5.0	3.0	5.0	0.28	3.6	7.0	5000	dpm/100 cm2
CEILING GRID C536	07/16/1998	6.0	3.5	5.0	0.28	4.5	7.5	5000	dpm/100 cm2
CEILING GRID C541	07/17/1998	7.0	3.5	5.0	0.28	6.3	8.0	5000	dpm/100 cm2
CEILING GRID C549	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
CEILING GRID C552	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
CEILING GRID C558	07/17/1998	3.0	3.5	5.0	0.28	-0.9	8.0	5000	dpm/100 cm2
CEILING GRID C563	07/23/1998	3.0	3.0	5.0	0.28	0.0	7.0	5000	dpm/100 cm2
CEILING GRID C571	07/16/1998	6.0	3.5	5.0	0.28	4.5	7.5	5000	dpm/100 cm2
CEILING GRID C594	07/17/1998	3.0	3.5	5.0	0.28	-0.9	8.0	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
CEILING GRID C598	07/17/1998	7.0	3.5	5.0	0.28	6.3	8.0	5000	dpm/100 cm2
CEILING GRID C602	07/23/1998	8.0	3.0	5.0	0.28	8.9	7.0	5000	dpm/100 cm2
CEILING GRID C614	07/17/1998	6.0	3.5	5.0	0.28	4.5	8.0	5000	dpm/100 cm2
CEILING GRID C622	07/23/1998	8.0	3.0	5.0	0.28	8.9	7.0	5000	dpm/100 cm2
CEILING GRID C625	07/16/1998	5.0	3.5	5.0	0.28	2.7	7.5	5000	dpm/100 cm2
CEILING GRID C632	07/17/1998	7.0	3.5	5.0	0.28	6.3	8.0	5000	dpm/100 cm2
FLOOR GRID F185	07/21/1998	5.0	3.5	5.0	0.28	2.7	7.8	5000	dpm/100 cm2
FLOOR GRID F199	07/21/1998	9.0	3.5	5.0	0.28	9.8	7.8	5000	dpm/100 cm2
FLOOR GRID F207	07/21/1998	7.0	3.5	5.0	0.28	6.3	7.8	5000	dpm/100 cm2
FLOOR GRID F214	07/22/1998	6.0	5.0	5.0	0.28	1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F219	07/21/1998	3.0	3.5	5.0	0.28	-0.9	7.8	5000	dpm/100 cm2
FLOOR GRID F227	07/22/1998	5.0	5.0	5.0	0.28	0.0	9.3	5000	dpm/100 cm2
FLOOR GRID F234	07/21/1998	9.0	3.5	5.0	0.28	9.8	7.8	5000	dpm/100 cm2
FLOOR GRID F237	07/21/1998	9.0	3.5	5.0	0.28	9.8	7.8	5000	dpm/100 cm2
FLOOR GRID F239	07/21/1998	5.0	3.5	5.0	0.28	2.7	7.8	5000	dpm/100 cm2
FLOOR GRID F244	07/22/1998	4.0	5.0	5.0	0.28	-1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F246	07/22/1998	4.0	5.0	5.0	0.28	-1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F250	07/22/1998	4.0	5.0	5.0	0.28	-1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F306	07/22/1998	6.0	5.0	5.0	0.28	1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F311	07/22/1998	6.0	5.0	5.0	0.28	1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F319	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
FLOOR GRID F322	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
FLOOR GRID F328	07/22/1998	4.0	5.0	5.0	0.28	-1.8	9.3	5000	dpm/100 cm2
FLOOR GRID F333	07/23/1998	5.0	3.0	5.0	0.28	3.6	7.0	5000	dpm/100 cm2
FLOOR GRID F341	07/22/1998	9.0	5.0	5.0	0.28	7.1	9.3	5000	dpm/100 cm2
FLOOR GRID F364	07/22/1998	5.0	5.0	5.0	0.28	0.0	9.3	5000	dpm/100 cm2
FLOOR GRID F368	07/22/1998	9.0	5.0	5.0	0.28	7.1	9.3	5000	dpm/100 cm2
FLOOR GRID F372	07/23/1998	4.0	3.0	5.0	0.28	1.8	7.0	5000	dpm/100 cm2
FLOOR GRID F384	07/22/1998	7.0	5.0	5.0	0.28	3.6	9.3	5000	dpm/100 cm2
FLOOR GRID F392	07/23/1998	9.0	3.0	5.0	0.28	10.7	7.0	5000	dpm/100 cm2
FLOOR GRID F395	07/16/1998	4.0	3.5	5.0	0.28	0.9	7.5	5000	dpm/100 cm2
FLOOR GRID F402	07/17/1998	7.0	3.5	5.0	0.28	6.3	8.0	5000	dpm/100 cm2
WALL GRID W004	07/10/1998	4.0	2.5	5.0	0.24	3.1	7.4	5000	dpm/100 cm2
WALL GRID W008	07/10/1998	3.0	2.5	5.0	0.24	1.0	7.4	5000	dpm/100 cm2
WALL GRID W009	07/10/1998	8.0	2.5	5.0	0.24	11.5	7.4	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
WALL GRID W010	07/10/1998	5.0	2.5	5.0	0.24	5.2	7.4	5000	dpm/100 cm2
WALL GRID W015	07/10/1998	6.0	2.5	5.0	0.24	7.3	7.4	5000	dpm/100 cm2
WALL GRID W023E	07/10/1998	1.0	2.5	5.0	0.24	-3.1	7.4	5000	dpm/100 cm2
WALL GRID W023N	07/10/1998	3.0	2.5	5.0	0.24	1.0	7.4	5000	dpm/100 cm2
WALL GRID W023S	07/10/1998	7.0	2.5	5.0	0.24	9.4	7.4	5000	dpm/100 cm2
WALL GRID W025	07/10/1998	5.0	2.5	5.0	0.24	5.2	7.4	5000	dpm/100 cm2
WALL GRID W027	07/10/1998	2.0	2.5	5.0	0.24	-1.0	7.4	5000	dpm/100 cm2
WALL GRID W034	07/10/1998	2.0	2.5	5.0	0.24	-1.0	7.4	5000	dpm/100 cm2
WALL GRID W036	07/10/1998	2.0	2.5	5.0	0.24	-1.0	7.4	5000	dpm/100 cm2
WALL GRID W076	07/10/1998	6.0	2.5	5.0	0.24	7.3	7.4	5000	dpm/100 cm2
WALL GRID W088	07/10/1998	3.0	2.5	5.0	0.24	1.0	7.4	5000	dpm/100 cm2
WALL GRID W092	07/10/1998	4.0	2.5	5.0	0.24	3.1	7.4	5000	dpm/100 cm2
WALL GRID W096	07/10/1998	5.0	2.5	5.0	0.24	5.2	7.4	5000	dpm/100 cm2
WALL GRID W117	07/10/1998	4.0	2.5	5.0	0.24	3.1	7.4	5000	dpm/100 cm2
WALL GRID W130	07/16/1998	6.0	3.5	5.0	0.28	4.5	7.5	5000	dpm/100 cm2
WALL GRID W134	07/10/1998	7.0	2.5	5.0	0.24	9.4	7.4	5000	dpm/100 cm2
WALL GRID W154	07/10/1998	6.0	2.5	5.0	0.24	7.3	7.4	5000	dpm/100 cm2
SOUTH HALLWAY									
CEILING GRID S019	07/18/1998	7.0	6.5	5.0	0.28	0.9	10.8	5000	dpm/100 cm2
CEILING GRID S020	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
CEILING GRID S021	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
CEILING GRID S022	07/18/1998	7.0	6.5	5.0	0.28	0.9	10.8	5000	dpm/100 cm2
CEILING GRID S023	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
CEILING GRID S024	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
FLOOR GRID S013	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
FLOOR GRID S014	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
FLOOR GRID S015	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
FLOOR GRID S016	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
FLOOR GRID S017	07/18/1998	9.0	6.5	5.0	0.28	4.5	10.8	5000	dpm/100 cm2
FLOOR GRID S018	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
WALL GRID S001	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
WALL GRID S002	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
WALL GRID S003	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
WALL GRID S004	07/18/1998	8.0	6.5	5.0	0.28	2.7	10.8	5000	dpm/100 cm2
WALL GRID S005	07/18/1998	6.0	6.5	5.0	0.28	-0.9	10.8	5000	dpm/100 cm2
WALL GRID S006	07/18/1998	7.0	6.5	5.0	0.28	0.9	10.8	5000	dpm/100 cm2
WALL GRID S007	07/18/1998	4.0	6.5	5.0	0.28	-4.5	10.8	5000	dpm/100 cm2
WALL GRID S008	07/18/1998	6.0	6.5	5.0	0.28	-0.9	10.8	5000	dpm/100 cm2
WALL GRID S009	07/18/1998	3.0	6.5	5.0	0.28	-6.3	10.8	5000	dpm/100 cm2
WALL GRID S010	07/18/1998	3.0	6.5	5.0	0.28	-6.3	10.8	5000	dpm/100 cm2
WALL GRID S011	07/18/1998	6.0	6.5	5.0	0.28	-0.9	10.8	5000	dpm/100 cm2
WALL GRID S012	07/18/1998	7.0	6.5	5.0	0.28	0.9	10.8	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

UNAFFECTED AREA

HALLWAY AREAS

		COUNT DATA Counts Gross	Bkgd	Time (Min)	Eff.	RESULT DATA Result	MDA	Limit	Result Units
HALLWAY CEILING	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY CEILING	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY CEILING	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY CEILING	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY CEILING	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY DOOR	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY EAST WALL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
HALLWAY SOUTH WAL	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
HALLWAY WEST WALL	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
OFFICE AREAS									
ROOM 104-1-AB-35	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-35	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AB-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-AC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BB-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2

QUANTITATIVE TOTAL ALPHA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
ROOM 104-1-BC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	4.0	0.5	1.0	0.28	31.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	4.0	0.5	1.0	0.28	31.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	0.0	0.5	1.0	0.28	-4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	2.0	0.5	1.0	0.28	13.4	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	3.0	0.5	1.0	0.28	22.3	11.8	5000	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	1.0	0.5	1.0	0.28	4.5	11.8	5000	dpm/100 cm2
ROOF AREA									
ROOF LOCATION R1	08/20/1998	10.0	7.0	5.0	0.28	5.4	11.1	5000	dpm/100 cm2
ROOF LOCATION R2	08/20/1998	13.0	7.0	5.0	0.28	10.7	11.1	5000	dpm/100 cm2
ROOF LOCATION R3	08/20/1998	11.0	7.0	5.0	0.28	7.1	11.1	5000	dpm/100 cm2
ROOF LOCATION R4	08/20/1998	13.0	7.0	5.0	0.28	10.7	11.1	5000	dpm/100 cm2
ROOF LOCATION R5	08/20/1998	16.0	7.0	5.0	0.28	16.1	11.1	5000	dpm/100 cm2

APPENDIX D

Direct Beta Frisk

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ASS SPECTROSCOPY LAB					
FLOOR GRID F120	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F122	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F123	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F124	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F125	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F126	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F127	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F128	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F129	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F130	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F131	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F144	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F157	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F170	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F171	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F172	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F173	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F174	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F175	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F176	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F177	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F178	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F179	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F180	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F181	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F182	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F183	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F184	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F185	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F186	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F187	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F188	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F189	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F190	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F191	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F192	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F193	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F194	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F195	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F196	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F197	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F198	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F199	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F200	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F201	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F202	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F203	06/08/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
FLOOR GRID F204	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F205	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F206	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F207	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F208	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F209	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F210	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F211	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F212	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F213	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F214	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F215	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F216	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F217	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F218	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F219	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F220	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F221	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F222	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F223	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F224	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F225	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F226	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F227	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F228	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F229	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F230	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F231	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F232	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F233	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F234	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F235	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F236	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F237	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F238	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F239	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F240	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F241	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F242	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F243	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F244	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F245	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F246	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F247	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F248	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F249	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F250	06/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F251	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F252	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F253	06/05/1998	< MDA	725.2	5000	dpm/100 cm2

ppendix D
rage No. 4
08/31/1998
BETA_DIR]

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
LOOR GRID F254	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F255	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F256	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F257	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F258	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F259	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F260	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F261	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F262	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F263	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F264	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F265	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F266	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F267	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F268	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F269	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F270	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F271	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F272	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F273	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F274	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F275	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F276	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F277	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F278	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F279	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F280	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F281	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F282	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F283	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F284	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F285	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F286	06/05/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F287	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F288	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F289	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F290	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F291	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F292	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F293	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F294	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F295	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F296	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F297	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F298	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F299	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F300	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F301	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
LOOR GRID F302	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F303	07/09/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
FLOOR GRID F304	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F305	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F306	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F307	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F308	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F309	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F310	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F311	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F312	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F313	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F314	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F315	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F316	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F317	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F318	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F319	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F321	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F322	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F323	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F326	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F327	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F328	07/07/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F329	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F330	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F331	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F332	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F333	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F334	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F335	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F336	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F337	07/08/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F338	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F339	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F340	07/09/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F372	07/11/1998	< MDA	725.2	5000	dpm/100 cm2
FLOOR GRID F393	07/11/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W001	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W002	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W003	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W004	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W005	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W006	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W007	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W008	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W009	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W010	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W011	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W012	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W013	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W014	06/16/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
WALL GRID W015	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W016	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W017	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W018	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W019	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W020	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W021	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W022	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W023	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W023N	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W024	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W025	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W026	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W027	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W028	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W029	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W030	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W031	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W032	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W033	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W034	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W035	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W036	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W037	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W038	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W039	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W040	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W041	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W042	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W043	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W044	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W045	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W046	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W047	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W048	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W049	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W050	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W051	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W052	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W053	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W054	06/16/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W066	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W067	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W068	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W069	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W070	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W071	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W072	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W073	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W074	06/28/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ALL GRID W075	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W076	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W077	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W078	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W079	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W080	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W081	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W082	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W083	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W084	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W085	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W086	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W087	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W088	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W089	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W090	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W091	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W092	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W093	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W094	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W095	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W096	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W097	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W098	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W099	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W100	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W101	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W102	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W103	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W104	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W105	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W106	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W107	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W108	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W109	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W110	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W111	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W112	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W113	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W114	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W115	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W116	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W117	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W118	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W119	06/28/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W132	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W133	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W134	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W135	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W136	06/19/1998	< MDA	725.2	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
WALL GRID W137	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W138	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W139	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W140	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W141	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W142	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W143	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W145	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W146	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W147	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W148	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W149	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W150	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W151	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W152	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W153	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W154	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W155	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W156	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W158	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W159	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W160	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W161	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W162	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W163	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W164	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W165	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W166	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
ALL GRID W167	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W168	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
WALL GRID W169	06/19/1998	< MDA	725.2	5000	dpm/100 cm2
SOUTH HALLWAY					
CEILING GRID S019	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
CEILING GRID S020	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
CEILING GRID S021	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
CEILING GRID S022	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
CEILING GRID S023	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
CEILING GRID S024	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S013	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S014	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S015	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S016	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S017	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
FLOOR GRID S018	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S001	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S002	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S003	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S004	07/18/1998	< MDA	839.7	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
WALL GRID S005	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S006	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S007	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S008	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S009	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S010	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S011	07/18/1998	< MDA	839.7	5000	dpm/100 cm2
WALL GRID S012	07/18/1998	< MDA	839.7	5000	dpm/100 cm2

DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
NAFFECTED AREA					
HALLWAY AREAS					
HALLWAY AREAS (UNSPE	06/23/1998	< MDA	725.2	5000	dpm/100 cm2
FFICE AREAS					
ROOM 104-1-AB-35	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-AB-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-AC-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-BB-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-BC-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-BD-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-CB-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
ROOM 104-1-CC-39	06/24/1998	< MDA	725.2	5000	dpm/100 cm2
OOF AREA					
ROOF LOCATION 01	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 02	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 03	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 04	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 05	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 06	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 07	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 08	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 09	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 10	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 11	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 12	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 13	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 14	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 15	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 16	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 17	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 18	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 19	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 20	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 21	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 22	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 23	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 24	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 25	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 26	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 27	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 28	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 29	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 30	08/20/1998	< MDA	725.2	5000	dpm/100 cm2

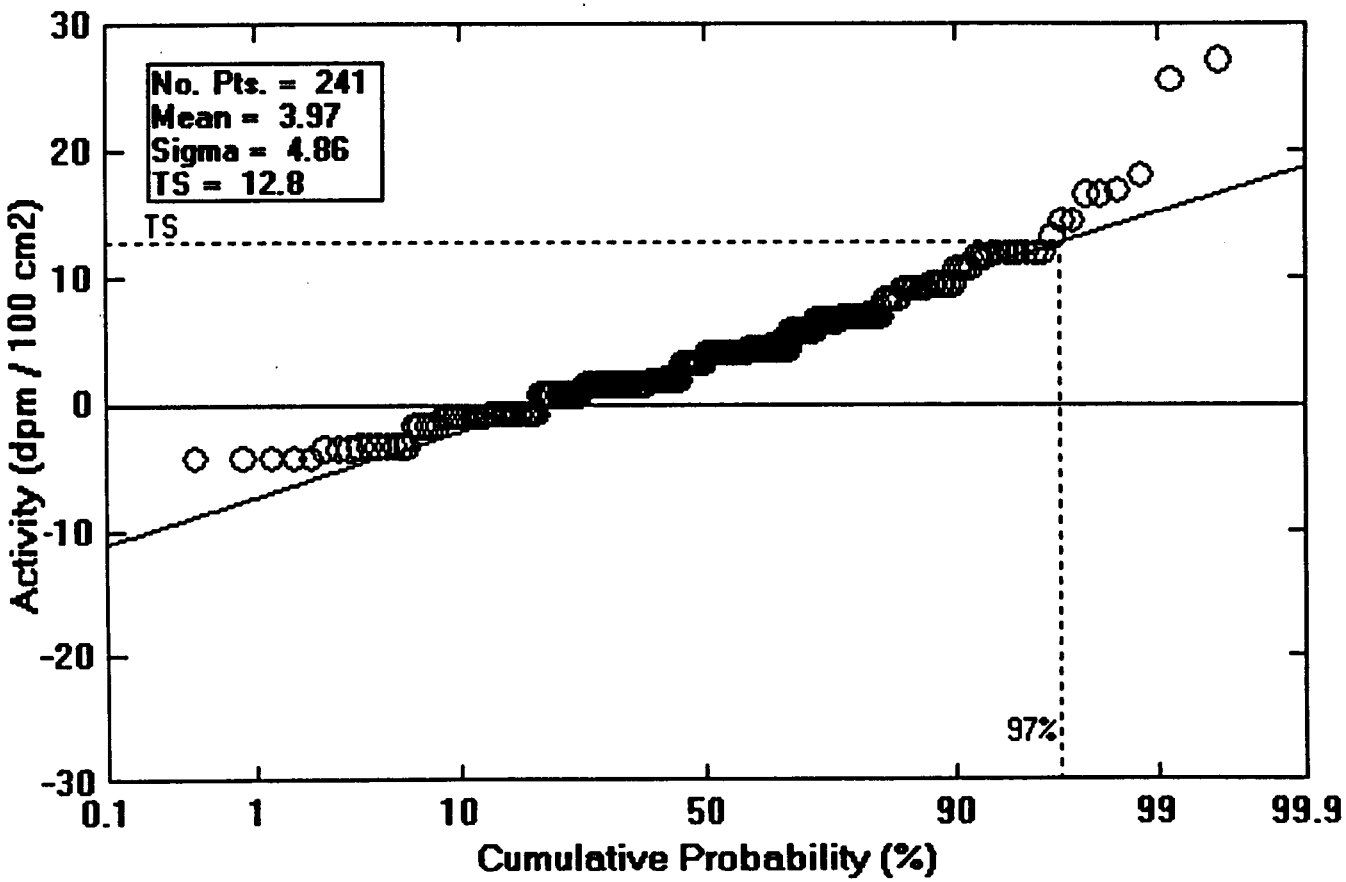
DIRECT BETA FRISK
SUMMARY OF RESULTS
DeSoto Building 104 Mass Spec Laboratory

LOCATION	DATE	RESULTS	MDA	LIMIT	
ROOF LOCATION 31	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 32	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 33	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 34	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 35	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 36	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 37	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 38	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 39	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 40	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 41	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 42	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 43	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 44	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 45	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 46	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 47	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 48	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 49	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 50	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 51	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 52	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 53	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 54	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 55	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 56	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 57	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 58	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
OOF LOCATION 59	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 60	08/20/1998	< MDA	725.2	5000	dpm/100 cm2
ROOF LOCATION 61	08/20/1998	< MDA	725.2	5000	dpm/100 cm2

APPENDIX E

Removable Beta Contamination

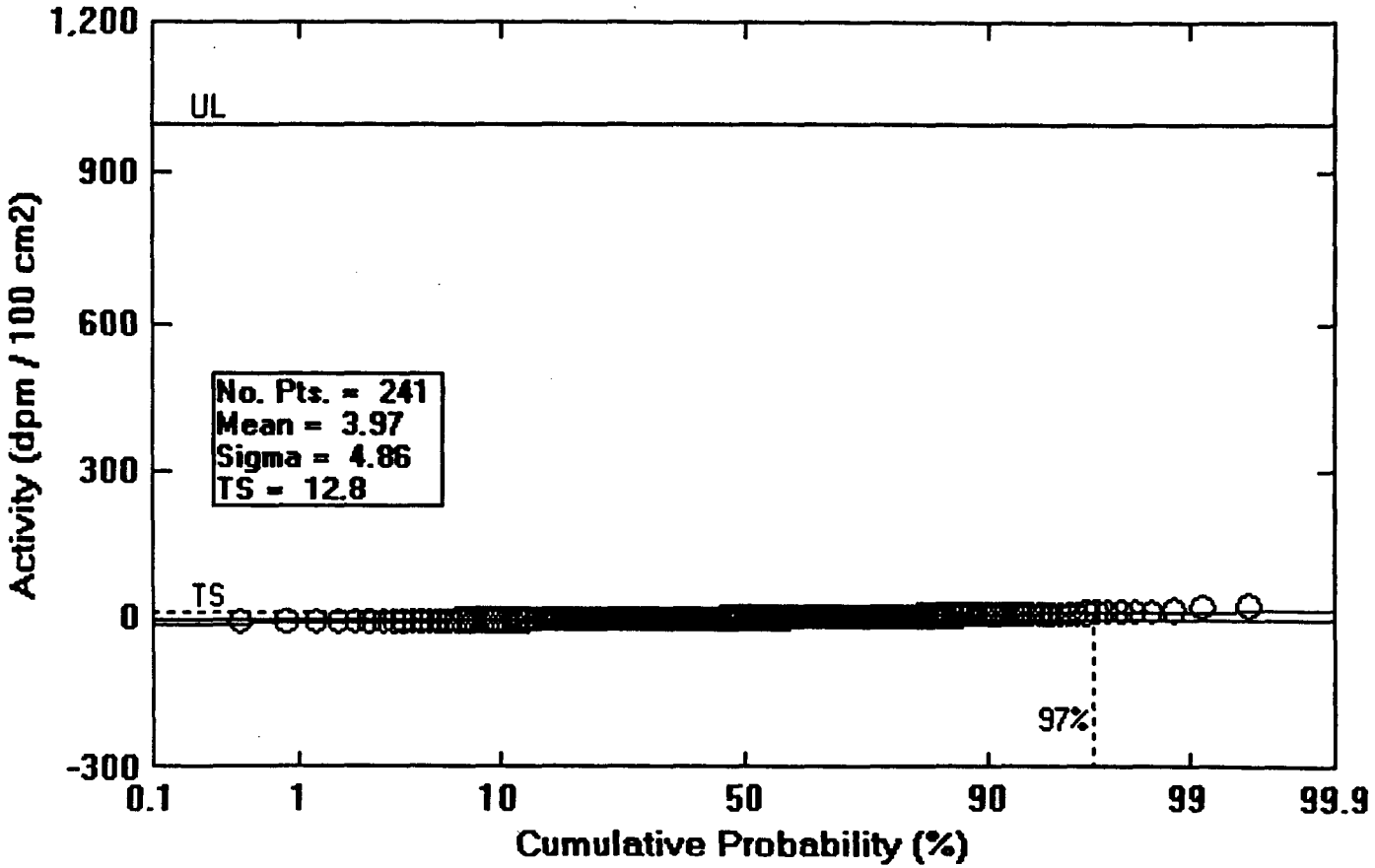
Removable Beta Contamination (Mass Spec Lab)



D:\FILES\DESOTO\BETAREM1.CMP

08-31-98

Removable Beta Contamination (Mass Spec Lab)



D:\FILES\DESOTO\BETAREM2.CMP 08-31-98

REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
AFFECTED AREAS					
GIF FOYER					
EILING GRID C04	07/23/1998	4.3	5.30	1000.0	dpm/100 cm2
EILING GRID C04	07/23/1998	17.0	5.30	1000.0	dpm/100 cm2
CEILING GRID C06	07/23/1998	1.8	5.30	1000.0	dpm/100 cm2
EILING GRID C06	07/23/1998	-0.8	5.30	1000.0	dpm/100 cm2
EILING GRID C07	07/23/1998	-3.3	5.30	1000.0	dpm/100 cm2
FLOOR GRID F031	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
LOOR GRID F037	07/24/1998	-3.3	5.00	1000.0	dpm/100 cm2
LOOR GRID F040	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F046	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
FLOOR GRID F056	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
ASS SPECTROSCOPY LAB					
EILING GRID C41	07/23/1998	1.8	5.30	1000.0	dpm/100 cm2
EILING GRID C42	07/21/1998	4.3	6.40	1000.0	dpm/100 cm2
CEILING GRID C43	07/23/1998	1.8	5.30	1000.0	dpm/100 cm2
EILING GRID C44	07/23/1998	4.3	5.30	1000.0	dpm/100 cm2
EILING GRID C44	07/21/1998	6.9	6.40	1000.0	dpm/100 cm2
CEILING GRID C45	07/23/1998	12.0	5.30	1000.0	dpm/100 cm2
CEILING GRID C46	07/21/1998	4.3	6.40	1000.0	dpm/100 cm2
EILING GRID C46	07/21/1998	4.3	6.40	1000.0	dpm/100 cm2
EILING GRID C46	07/21/1998	1.8	6.40	1000.0	dpm/100 cm2
CEILING GRID C47	07/23/1998	1.8	5.30	1000.0	dpm/100 cm2
EILING GRID C47	07/23/1998	4.3	5.30	1000.0	dpm/100 cm2
EILING GRID C48	07/23/1998	12.0	5.30	1000.0	dpm/100 cm2
CEILING GRID C53	07/16/1998	4.3	5.80	1000.0	dpm/100 cm2
EILING GRID C54	07/17/1998	1.8	5.40	1000.0	dpm/100 cm2
EILING GRID C54	07/23/1998	9.4	5.30	1000.0	dpm/100 cm2
CEILING GRID C55	07/23/1998	-0.8	5.30	1000.0	dpm/100 cm2
CEILING GRID C55	07/17/1998	6.8	5.40	1000.0	dpm/100 cm2
EILING GRID C56	07/23/1998	27.2	5.30	1000.0	dpm/100 cm2
EILING GRID C57	07/16/1998	-0.8	5.80	1000.0	dpm/100 cm2
CEILING GRID C59	07/17/1998	-3.3	5.40	1000.0	dpm/100 cm2
EILING GRID C59	07/17/1998	4.3	5.40	1000.0	dpm/100 cm2
EILING GRID C60	07/23/1998	14.5	5.30	1000.0	dpm/100 cm2
CEILING GRID C61	07/17/1998	4.3	5.40	1000.0	dpm/100 cm2
EILING GRID C62	07/23/1998	1.8	5.30	1000.0	dpm/100 cm2
EILING GRID C62	07/16/1998	11.9	5.80	1000.0	dpm/100 cm2
CEILING GRID C63	07/17/1998	-3.3	5.40	1000.0	dpm/100 cm2
FLOOR GRID F185	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
LOOR GRID F199	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
LOOR GRID F207	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
FLOOR GRID F214	07/24/1998	11.9	5.00	1000.0	dpm/100 cm2
LOOR GRID F219	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
LOOR GRID F227	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F234	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
LOOR GRID F237	07/24/1998	9.4	5.00	1000.0	dpm/100 cm2

Appendix E
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08/31/1998
[BETA_REM]

REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
FLOOR GRID F239	07/24/1998	-3.3	5.00	1000.0	dpm/100 cm2
FLOOR GRID F244	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F246	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F250	07/24/1998	11.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F306	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
FLOOR GRID F311	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F319	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F322	07/24/1998	12.0	5.00	1000.0	dpm/100 cm2
FLOOR GRID F328	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F333	07/24/1998	6.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F341	07/24/1998	9.4	5.00	1000.0	dpm/100 cm2
FLOOR GRID F364	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F368	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
FLOOR GRID F372	07/24/1998	-3.3	5.00	1000.0	dpm/100 cm2
FLOOR GRID F384	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
FLOOR GRID F392	07/24/1998	9.4	5.00	1000.0	dpm/100 cm2
FLOOR GRID F395	07/24/1998	14.5	5.00	1000.0	dpm/100 cm2
FLOOR GRID F402	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W004	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W008	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W009	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W010	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W015	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
WALL GRID W023E	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W023N	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W023S	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W025	07/24/1998	9.4	5.00	1000.0	dpm/100 cm2
WALL GRID W027	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W034	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W036	07/24/1998	11.9	5.00	1000.0	dpm/100 cm2
WALL GRID W037	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
WALL GRID W051	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
WALL GRID W059	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W063	07/24/1998	9.4	5.00	1000.0	dpm/100 cm2
WALL GRID W076	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W088	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W092	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W096	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W104	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W117	07/24/1998	11.9	5.00	1000.0	dpm/100 cm2
WALL GRID W123	07/24/1998	-3.3	5.00	1000.0	dpm/100 cm2
WALL GRID W130	07/24/1998	1.8	5.00	1000.0	dpm/100 cm2
WALL GRID W134	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W154	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W161	07/24/1998	6.9	5.00	1000.0	dpm/100 cm2
WALL GRID W166	07/24/1998	-0.8	5.00	1000.0	dpm/100 cm2
WALL GRID W170	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2
WALL GRID W174	07/24/1998	4.3	5.00	1000.0	dpm/100 cm2

REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
UNAFFECTED AREAS					
HALLWAY AREAS					
HALLWAY CEILING	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY CEILING	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	4.0	5.10	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY FLOORS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-3.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	11.6	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	-3.5	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
HALLWAY WALLS	07/09/1998	16.7	5.10	1000.0	dpm/100 cm2
OFFICE AREAS					
ROOM 104-1-AB-35	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	-3.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-35	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2

REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
ROOF LOCATION 06	08/20/1998	8.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 07	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 08	08/20/1998	-1.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 09	08/20/1998	-1.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 10	08/20/1998	8.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 11	08/20/1998	-4.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 12	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 13	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 14	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 15	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 16	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 17	08/20/1998	8.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 18	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 19	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 20	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 21	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 22	08/20/1998	-4.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 23	08/20/1998	-1.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 24	08/20/1998	-1.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 25	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 26	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 27	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 28	08/20/1998	8.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 29	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 30	08/20/1998	10.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 31	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 32	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 33	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 34	08/20/1998	-4.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 35	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 36	08/20/1998	25.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 37	08/20/1998	-4.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 38	08/20/1998	-4.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 39	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 40	08/20/1998	8.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 41	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 42	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 43	08/20/1998	10.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 44	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 45	08/20/1998	13.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 46	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 47	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 48	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 49	08/20/1998	10.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 50	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 51	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 52	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 53	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 54	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 55	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 56	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 57	08/20/1998	18.2	5.50	1000.0	dpm/100 cm2

REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
ROOM 104-1-AB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AB-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-AB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AC-39	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-AC-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-AC-39	07/09/1998	16.7	5.10	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	1.4	5.10	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-BB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	11.6	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-BC-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/09/1998	-1.0	5.10	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-BD-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-CB-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	4.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	6.6	5.10	1000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/09/1998	1.5	5.10	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	9.1	5.10	1000.0	dpm/100 cm2
OOM 104-1-CC-39	07/09/1998	11.6	5.10	1000.0	dpm/100 cm2
OOF AREA					
ROOF LOCATION 01	08/20/1998	3.2	5.50	1000.0	dpm/100 cm2
OOF LOCATION 02	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2
OOF LOCATION 03	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 04	08/20/1998	10.7	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 05	08/20/1998	-1.7	5.50	1000.0	dpm/100 cm2

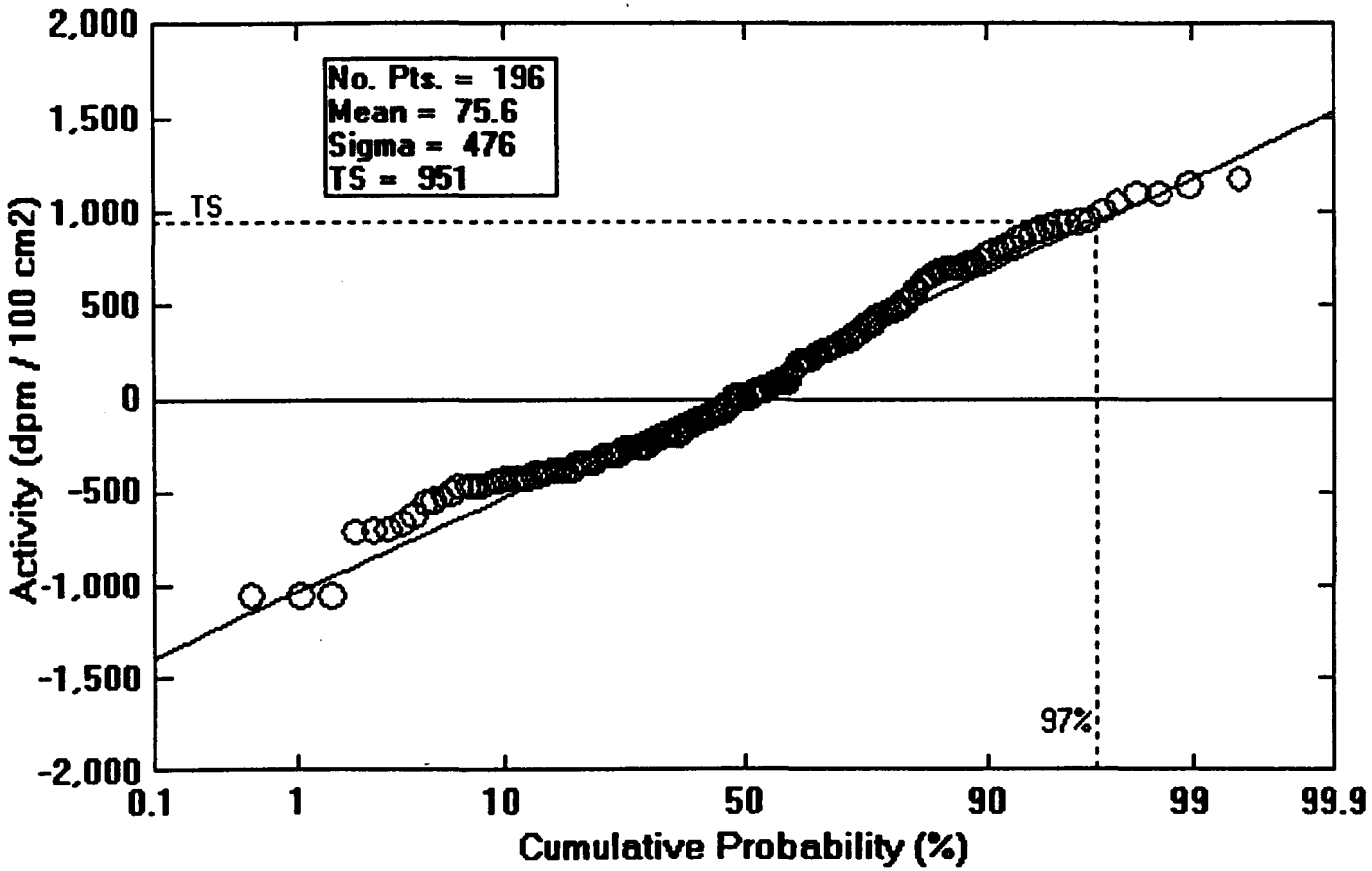
REMOVABLE BETA CONTAMINATION
SUMMARY OF RESULTS
DESOTO BUILDING 104

		Result	MDA	Limit	Units
KOOF LOCATION 58	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
ROOF LOCATION 59	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
OOF LOCATION 60	08/20/1998	0.8	5.50	1000.0	dpm/100 cm2
..OOF LOCATION 61	08/20/1998	5.7	5.50	1000.0	dpm/100 cm2

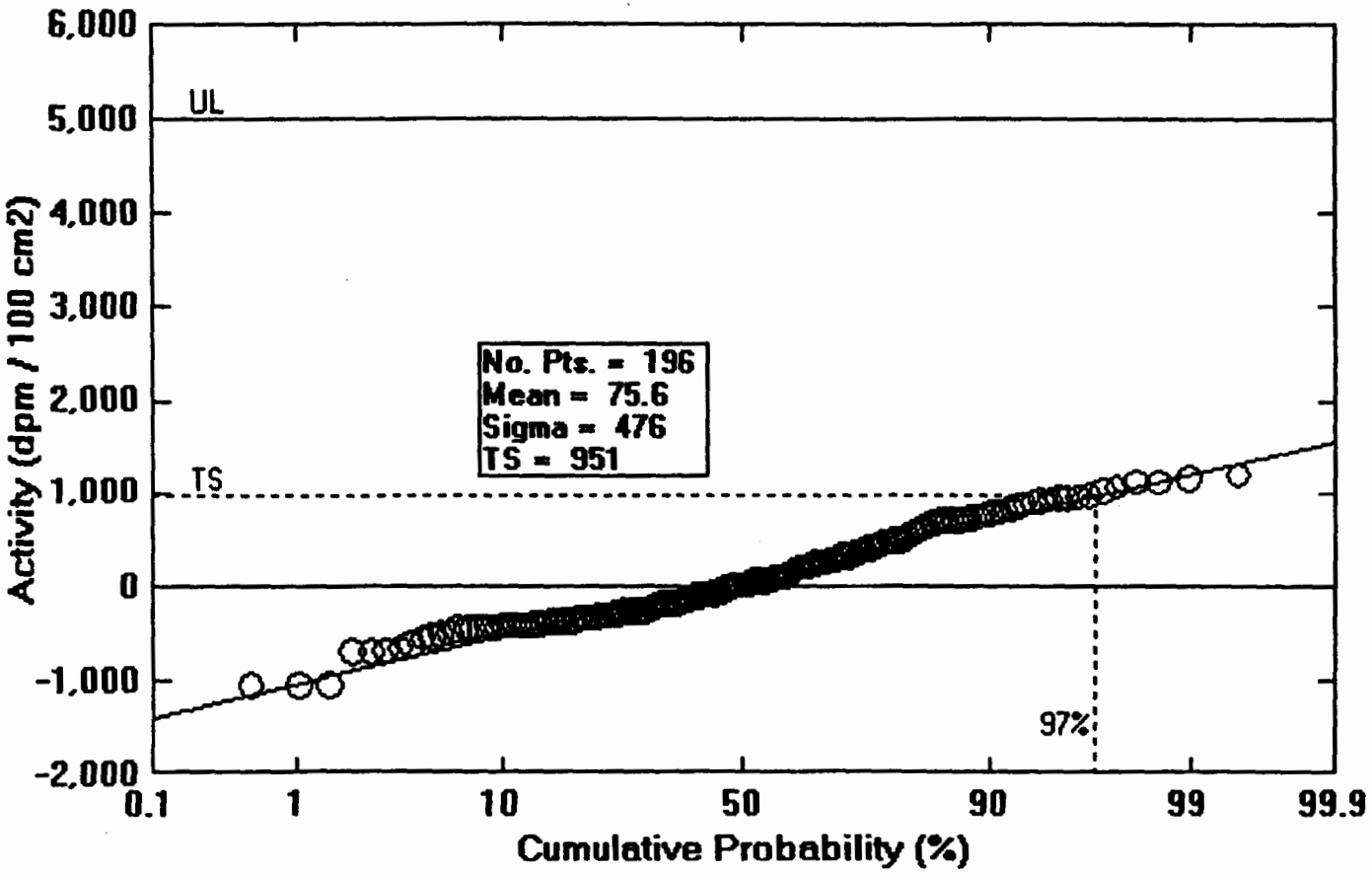
APPENDIX F

Quantitative Total Beta Measurements

Quantitative Total Beta Measurements (Mass Spec Lab)



Quantitative Total Beta Measurements (Mass Spec Lab)



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Appendix F
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[BETA_QAN]

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

AFFECTED AREA		COUNT DATA Counts Gross	Bkgd	Time (Min)	Eff.	RESULT DATA Result	MDA	Limit	Result Units
GIF FOYER									
CEILING GRID C063	07/23/1998	329.0	284.5	5.0	0.13	350.4	308.90	5000.0	dpm/100 cm2
CEILING GRID C069	07/23/1998	346.0	284.5	5.0	0.13	484.3	308.90	5000.0	dpm/100 cm2
CEILING GRID C079	07/23/1998	306.0	284.5	5.0	0.13	169.3	308.90	5000.0	dpm/100 cm2
FLOOR GRID F031	07/23/1998	374.0	284.5	5.0	0.13	704.7	308.90	5000.0	dpm/100 cm2
FLOOR GRID F037	07/23/1998	359.0	284.5	5.0	0.13	586.6	308.90	5000.0	dpm/100 cm2
FLOOR GRID F040	07/23/1998	373.0	284.5	5.0	0.13	696.9	308.90	5000.0	dpm/100 cm2
FLOOR GRID F046	07/23/1998	376.0	284.5	5.0	0.13	720.5	308.90	5000.0	dpm/100 cm2
FLOOR GRID F056	07/23/1998	383.0	284.5	5.0	0.13	775.6	308.90	5000.0	dpm/100 cm2
MASS SPECTROSCOPY LAB									
CEILING GRID C415	07/23/1998	294.0	284.5	5.0	0.13	74.8	308.90	5000.0	dpm/100 cm2
CEILING GRID C429	07/21/1998	312.0	279.5	5.0	0.13	255.9	306.20	5000.0	dpm/100 cm2
CEILING GRID C437	07/23/1998	287.0	284.5	5.0	0.13	19.7	308.90	5000.0	dpm/100 cm2
CEILING GRID C444	07/23/1998	311.0	284.5	5.0	0.13	208.7	308.90	5000.0	dpm/100 cm2
CEILING GRID C449	07/21/1998	323.0	279.5	5.0	0.13	342.5	306.20	5000.0	dpm/100 cm2
CEILING GRID C457	07/23/1998	310.0	284.5	5.0	0.13	200.8	308.90	5000.0	dpm/100 cm2
CEILING GRID C464	07/21/1998	322.0	279.5	5.0	0.13	334.6	306.20	5000.0	dpm/100 cm2
CEILING GRID C467	07/21/1998	338.0	279.5	5.0	0.13	460.6	306.20	5000.0	dpm/100 cm2
CEILING GRID C469	07/21/1998	312.0	279.5	5.0	0.13	255.9	306.20	5000.0	dpm/100 cm2
CEILING GRID C474	07/23/1998	293.0	284.5	5.0	0.13	66.9	308.90	5000.0	dpm/100 cm2
CEILING GRID C476	07/23/1998	324.0	284.5	5.0	0.13	311.0	308.90	5000.0	dpm/100 cm2
CEILING GRID C480	07/23/1998	320.0	284.5	5.0	0.13	279.5	308.90	5000.0	dpm/100 cm2
CEILING GRID C536	07/16/1998	312.0	267.5	5.0	0.13	350.4	299.50	5000.0	dpm/100 cm2
CEILING GRID C541	07/17/1998	334.0	278.5	5.0	0.13	437.0	305.80	5000.0	dpm/100 cm2
CEILING GRID C549	07/23/1998	363.0	284.5	5.0	0.13	618.1	308.90	5000.0	dpm/100 cm2
CEILING GRID C552	07/23/1998	319.0	284.5	5.0	0.13	271.7	308.90	5000.0	dpm/100 cm2
CEILING GRID C558	07/17/1998	335.0	278.5	5.0	0.13	444.9	305.80	5000.0	dpm/100 cm2
CEILING GRID C563	07/23/1998	373.0	284.5	5.0	0.13	696.9	308.90	5000.0	dpm/100 cm2
CEILING GRID C571	07/16/1998	329.0	267.5	5.0	0.13	484.3	299.50	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
CEILING GRID C594	07/17/1998	329.0	278.5	5.0	0.13	397.6	305.80	5000.0	dpm/100 cm2
CEILING GRID C598	07/17/1998	311.0	278.5	5.0	0.13	255.9	305.80	5000.0	dpm/100 cm2
CEILING GRID C602	07/23/1998	303.0	284.5	5.0	0.13	145.7	308.90	5000.0	dpm/100 cm2
CEILING GRID C614	07/17/1998	318.0	278.5	5.0	0.13	311.0	305.80	5000.0	dpm/100 cm2
CEILING GRID C622	07/23/1998	310.0	284.5	5.0	0.13	200.8	308.90	5000.0	dpm/100 cm2
CEILING GRID C625	07/16/1998	304.0	267.5	5.0	0.13	287.4	299.50	5000.0	dpm/100 cm2
CEILING GRID C632	07/17/1998	308.0	278.5	5.0	0.13	232.3	305.80	5000.0	dpm/100 cm2
FLOOR GRID F185	07/21/1998	383.0	279.5	5.0	0.13	815.0	306.20	5000.0	dpm/100 cm2
FLOOR GRID F199	07/21/1998	388.0	279.5	5.0	0.13	854.3	306.20	5000.0	dpm/100 cm2
FLOOR GRID F207	07/21/1998	426.0	279.5	5.0	0.13	1153.5	306.20	5000.0	dpm/100 cm2
FLOOR GRID F214	07/22/1998	339.0	279.0	5.0	0.13	472.4	306.00	5000.0	dpm/100 cm2
FLOOR GRID F219	07/21/1998	408.0	279.5	5.0	0.13	1011.8	306.20	5000.0	dpm/100 cm2
FLOOR GRID F227	07/22/1998	375.0	279.0	5.0	0.13	755.9	306.00	5000.0	dpm/100 cm2
FLOOR GRID F234	07/21/1998	390.0	279.5	5.0	0.13	870.1	306.20	5000.0	dpm/100 cm2
FLOOR GRID F237	07/21/1998	384.0	279.5	5.0	0.13	.3E+7	306.20	5000.0	dpm/100 cm2
FLOOR GRID F239	07/21/1998	397.0	279.5	5.0	0.13	925.2	306.20	5000.0	dpm/100 cm2
FLOOR GRID F244	07/22/1998	363.0	279.0	5.0	0.13	661.4	306.00	5000.0	dpm/100 cm2
FLOOR GRID F246	07/22/1998	401.0	279.0	5.0	0.13	960.6	306.00	5000.0	dpm/100 cm2
FLOOR GRID F250	07/22/1998	413.0	279.0	5.0	0.13	1055.1	306.00	5000.0	dpm/100 cm2
FLOOR GRID F306	07/22/1998	364.0	279.0	5.0	0.13	669.3	306.00	5000.0	dpm/100 cm2
FLOOR GRID F311	07/22/1998	360.0	279.0	5.0	0.13	637.8	306.00	5000.0	dpm/100 cm2
FLOOR GRID F319	07/23/1998	388.0	284.5	5.0	0.13	815.0	308.90	5000.0	dpm/100 cm2
FLOOR GRID F322	07/23/1998	404.0	284.5	5.0	0.13	940.9	308.90	5000.0	dpm/100 cm2
FLOOR GRID F328	07/22/1998	371.0	279.0	5.0	0.13	724.4	306.00	5000.0	dpm/100 cm2
FLOOR GRID F333	07/23/1998	372.0	284.5	5.0	0.13	689.0	308.90	5000.0	dpm/100 cm2
FLOOR GRID F341	07/22/1998	367.0	279.0	5.0	0.13	692.9	306.00	5000.0	dpm/100 cm2
FLOOR GRID F364	07/22/1998	379.0	279.0	5.0	0.13	787.4	306.00	5000.0	dpm/100 cm2
FLOOR GRID F368	07/22/1998	398.0	279.0	5.0	0.13	937.0	306.00	5000.0	dpm/100 cm2
FLOOR GRID F372	07/23/1998	377.0	284.5	5.0	0.13	728.3	308.90	5000.0	dpm/100 cm2
FLOOR GRID F384	07/22/1998	392.0	279.0	5.0	0.13	889.8	306.00	5000.0	dpm/100 cm2
FLOOR GRID F392	07/23/1998	333.0	284.5	5.0	0.13	381.9	308.90	5000.0	dpm/100 cm2
FLOOR GRID F395	07/16/1998	340.0	267.5	5.0	0.13	570.9	299.50	5000.0	dpm/100 cm2
FLOOR GRID F402	07/17/1998	313.0	278.5	5.0	0.13	271.7	305.80	5000.0	dpm/100 cm2
WALL GRID W004	07/10/1998	245.0	296.5	5.0	0.13	-402.3	313.10	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
WALL GRID W008	07/10/1998	261.0	296.5	5.0	0.13	-277.3	313.10	5000.0	dpm/100 cm2
WALL GRID W009	07/10/1998	294.0	296.5	5.0	0.13	-19.5	313.10	5000.0	dpm/100 cm2
WALL GRID W010	07/10/1998	259.0	296.5	5.0	0.13	-293.0	313.10	5000.0	dpm/100 cm2
WALL GRID W015	07/10/1998	244.0	296.5	5.0	0.13	-410.2	313.10	5000.0	dpm/100 cm2
WALL GRID W023E	07/10/1998	282.0	296.5	5.0	0.13	-113.3	313.10	5000.0	dpm/100 cm2
WALL GRID W023N	07/10/1998	286.0	296.5	5.0	0.13	-82.0	313.10	5000.0	dpm/100 cm2
WALL GRID W023S	07/10/1998	285.0	296.5	5.0	0.13	-89.8	313.10	5000.0	dpm/100 cm2
WALL GRID W025	07/10/1998	257.0	296.5	5.0	0.13	-308.6	313.10	5000.0	dpm/100 cm2
WALL GRID W027	07/10/1998	244.0	296.5	5.0	0.13	-410.2	313.10	5000.0	dpm/100 cm2
WALL GRID W034	07/10/1998	225.0	296.5	5.0	0.13	-558.6	313.10	5000.0	dpm/100 cm2
WALL GRID W036	07/10/1998	268.0	296.5	5.0	0.13	-222.7	313.10	5000.0	dpm/100 cm2
WALL GRID W076	07/10/1998	242.0	296.5	5.0	0.13	-425.8	313.10	5000.0	dpm/100 cm2
WALL GRID W088	07/10/1998	238.0	296.5	5.0	0.13	-457.0	313.10	5000.0	dpm/100 cm2
WALL GRID W092	07/10/1998	271.0	296.5	5.0	0.13	-199.2	313.10	5000.0	dpm/100 cm2
WALL GRID W096	07/10/1998	256.0	296.5	5.0	0.13	-316.4	313.10	5000.0	dpm/100 cm2
WALL GRID W117	07/10/1998	275.0	296.5	5.0	0.13	-168.0	313.10	5000.0	dpm/100 cm2
WALL GRID W130	07/16/1998	277.0	267.5	5.0	0.13	74.8	299.50	5000.0	dpm/100 cm2
WALL GRID W134	07/10/1998	288.0	296.5	5.0	0.13	-66.4	313.10	5000.0	dpm/100 cm2
WALL GRID W154	07/10/1998	282.0	296.5	5.0	0.13	-113.3	313.10	5000.0	dpm/100 cm2
SOUTH HALLWAY									
CEILING GRID S019	07/18/1998	285.0	295.5	5.0	0.13	-82.7	315.00	5000.0	dpm/100 cm2
CEILING GRID S020	07/18/1998	321.0	295.5	5.0	0.13	200.8	315.00	5000.0	dpm/100 cm2
CEILING GRID S021	07/18/1998	307.0	295.5	5.0	0.13	90.6	315.00	5000.0	dpm/100 cm2
CEILING GRID S022	07/18/1998	354.0	295.5	5.0	0.13	460.6	315.00	5000.0	dpm/100 cm2
CEILING GRID S023	07/18/1998	282.0	295.5	5.0	0.13	-106.3	315.00	5000.0	dpm/100 cm2
CEILING GRID S024	07/18/1998	325.0	295.5	5.0	0.13	232.3	315.00	5000.0	dpm/100 cm2
FLOOR GRID S013	07/18/1998	283.0	295.5	5.0	0.13	-98.4	315.00	5000.0	dpm/100 cm2
FLOOR GRID S014	07/18/1998	322.0	295.5	5.0	0.13	208.7	315.00	5000.0	dpm/100 cm2
FLOOR GRID S015	07/18/1998	304.0	295.5	5.0	0.13	66.9	315.00	5000.0	dpm/100 cm2
FLOOR GRID S016	07/18/1998	384.0	295.5	5.0	0.13	696.9	315.00	5000.0	dpm/100 cm2
FLOOR GRID S017	07/18/1998	383.0	295.5	5.0	0.13	689.0	315.00	5000.0	dpm/100 cm2
FLOOR GRID S018	07/18/1998	270.0	295.5	5.0	0.13	-200.8	315.00	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
WALL GRID S001	07/18/1998	236.0	295.5	5.0	0.13	-468.5	315.00	5000.0	dpm/100 cm2
WALL GRID S002	07/18/1998	277.0	295.5	5.0	0.13	-145.7	315.00	5000.0	dpm/100 cm2
WALL GRID S003	07/18/1998	236.0	295.5	5.0	0.13	-468.5	315.00	5000.0	dpm/100 cm2
WALL GRID S004	07/18/1998	239.0	295.5	5.0	0.13	-444.9	315.00	5000.0	dpm/100 cm2
WALL GRID S005	07/18/1998	244.0	295.5	5.0	0.13	-405.5	315.00	5000.0	dpm/100 cm2
WALL GRID S006	07/18/1998	216.0	295.5	5.0	0.13	-626.0	315.00	5000.0	dpm/100 cm2
WALL GRID S007	07/18/1998	247.0	295.5	5.0	0.13	-381.9	315.00	5000.0	dpm/100 cm2
WALL GRID S008	07/18/1998	257.0	295.5	5.0	0.13	-303.1	315.00	5000.0	dpm/100 cm2
WALL GRID S009	07/18/1998	239.0	295.5	5.0	0.13	-444.9	315.00	5000.0	dpm/100 cm2
WALL GRID S010	07/18/1998	253.0	295.5	5.0	0.13	-334.6	315.00	5000.0	dpm/100 cm2
WALL GRID S011	07/18/1998	247.0	295.5	5.0	0.13	-381.9	315.00	5000.0	dpm/100 cm2
WALL GRID S012	07/18/1998	283.0	295.5	5.0	0.13	-98.4	315.00	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
UNAFFECTED AREA									
HALLWAY AREAS									
HALLWAY CEILING	07/15/1998	68.0	56.9	1.0	0.13	437.0	535.20	5000.0	dpm/100 cm2
HALLWAY CEILING	07/15/1998	48.0	56.9	1.0	0.13	-350.4	535.20	5000.0	dpm/100 cm2
HALLWAY CEILING	07/15/1998	87.0	56.9	1.0	0.13	1185.0	535.20	5000.0	dpm/100 cm2
HALLWAY CEILING	07/15/1998	80.0	56.9	1.0	0.13	909.4	535.20	5000.0	dpm/100 cm2
HALLWAY CEILING	07/15/1998	70.0	56.9	1.0	0.13	515.7	535.20	5000.0	dpm/100 cm2
HALLWAY DOOR	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
HALLWAY EAST WALL	07/15/1998	39.0	56.9	1.0	0.13	-704.7	535.20	5000.0	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	59.0	56.9	1.0	0.13	82.7	535.20	5000.0	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	59.0	56.9	1.0	0.13	82.7	535.20	5000.0	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	62.0	56.9	1.0	0.13	200.8	535.20	5000.0	dpm/100 cm2
HALLWAY FLOOR	07/15/1998	65.0	56.9	1.0	0.13	318.9	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	46.0	56.9	1.0	0.13	-429.1	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	53.0	56.9	1.0	0.13	-153.5	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	47.0	56.9	1.0	0.13	-389.8	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	56.0	56.9	1.0	0.13	-35.4	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	30.0	56.9	1.0	0.13	-1059	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
HALLWAY NORTH WAL	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	55.0	56.9	1.0	0.13	-74.8	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	47.0	56.9	1.0	0.13	-389.8	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	49.0	56.9	1.0	0.13	-311.0	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	49.0	56.9	1.0	0.13	-311.0	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	46.0	56.9	1.0	0.13	-429.1	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
HALLWAY SOUTH WAL	07/15/1998	40.0	56.9	1.0	0.13	-665.4	535.20	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
IALLWAY SOUTH WAL	07/15/1998	47.0	56.9	1.0	0.13	-389.8	535.20	5000.0	dpm/100 cm2
IALLWAY SOUTH WAL	07/15/1998	47.0	56.9	1.0	0.13	-389.8	535.20	5000.0	dpm/100 cm2
IALLWAY SOUTH WAL	07/15/1998	54.0	56.9	1.0	0.13	-114.2	535.20	5000.0	dpm/100 cm2
IALLWAY WEST WALL	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
)FFICE AREAS									
?OOM 104-1-AB-35	07/15/1998	67.0	56.9	1.0	0.13	397.6	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	56.0	56.9	1.0	0.13	-35.4	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	51.0	56.9	1.0	0.13	-232.3	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	48.0	56.9	1.0	0.13	-350.4	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	49.0	56.9	1.0	0.13	-311.0	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	30.0	56.9	1.0	0.13	-1059	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-35	07/15/1998	30.0	56.9	1.0	0.13	-1059	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	59.0	56.9	1.0	0.13	82.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	70.0	56.9	1.0	0.13	515.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	53.0	56.9	1.0	0.13	-153.5	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AB-39	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	47.0	56.9	1.0	0.13	-389.8	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	67.0	56.9	1.0	0.13	397.6	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	59.0	56.9	1.0	0.13	82.7	535.20	5000.0	dpm/100 cm2
?OOM 104-1-AC-39	07/15/1998	44.0	56.9	1.0	0.13	-507.9	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	81.0	56.9	1.0	0.13	948.8	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	48.0	56.9	1.0	0.13	-350.4	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	46.0	56.9	1.0	0.13	-429.1	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	71.0	56.9	1.0	0.13	555.1	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	65.0	56.9	1.0	0.13	318.9	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	48.0	56.9	1.0	0.13	-350.4	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BB-39	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
?OOM 104-1-BC-39	07/15/1998	85.0	56.9	1.0	0.13	1106.3	535.20	5000.0	dpm/100 cm2

QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
ROOM 104-1-BC-39	07/15/1998	51.0	56.9	1.0	0.13	-232.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	51.0	56.9	1.0	0.13	-232.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	43.0	56.9	1.0	0.13	-547.2	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	46.0	56.9	1.0	0.13	-429.1	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BC-39	07/15/1998	53.0	56.9	1.0	0.13	-153.5	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	45.0	56.9	1.0	0.13	-468.5	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	63.0	56.9	1.0	0.13	240.2	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	52.0	56.9	1.0	0.13	-192.9	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	69.0	56.9	1.0	0.13	476.4	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	60.0	56.9	1.0	0.13	122.0	535.20	5000.0	dpm/100 cm2
ROOM 104-1-BD-39	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	85.0	56.9	1.0	0.13	1106.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	55.0	56.9	1.0	0.13	-74.8	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	48.0	56.9	1.0	0.13	-350.4	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	45.0	56.9	1.0	0.13	-468.5	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CB-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	77.0	56.9	1.0	0.13	791.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	46.0	56.9	1.0	0.13	-429.1	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	57.0	56.9	1.0	0.13	3.9	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	50.0	56.9	1.0	0.13	-271.7	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	58.0	56.9	1.0	0.13	43.3	535.20	5000.0	dpm/100 cm2
ROOM 104-1-CC-39	07/15/1998	54.0	56.9	1.0	0.13	-114.2	535.20	5000.0	dpm/100 cm2
ROOF AREA									
ROOF LOCATION R1	08/20/1998	224.0	290.5	5.0	0.13	-523.6	312.20	5000.0	dpm/100 cm2
ROOF LOCATION R2	08/20/1998	246.0	290.5	5.0	0.13	-350.4	312.20	5000.0	dpm/100 cm2
ROOF LOCATION R3	08/20/1998	252.0	290.5	5.0	0.13	-303.1	312.20	5000.0	dpm/100 cm2
ROOF LOCATION R4	08/20/1998	200.0	290.5	5.0	0.13	-712.6	312.20	5000.0	dpm/100 cm2

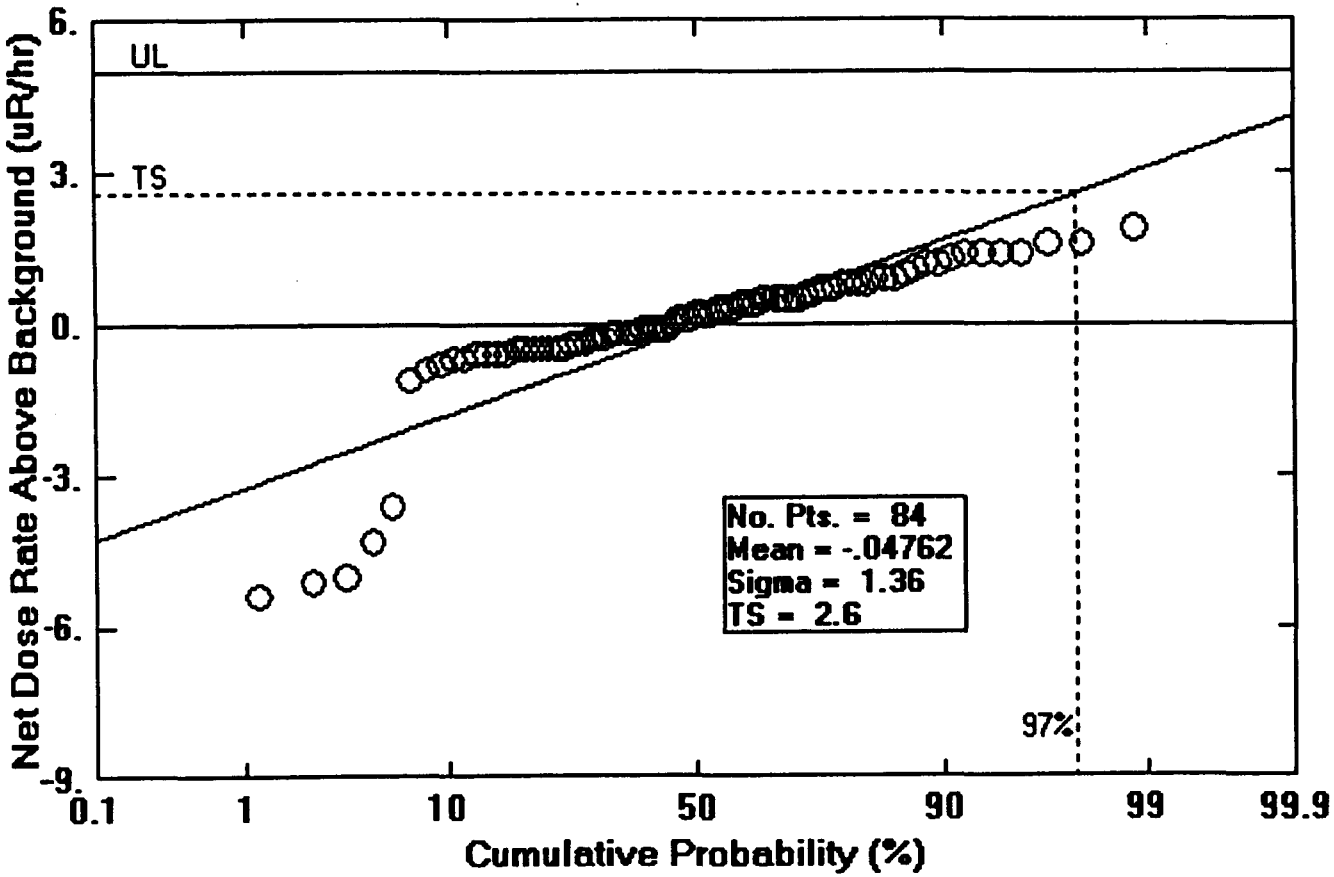
QUANTITATIVE TOTAL BETA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA				RESULT DATA			
		Counts		Time					
		Gross	Bkgd	(Min)	Eff.	Result	MDA	Limit	Result Units
ROOF LOCATION R5	08/20/1998	202.0	290.5	5.0	0.13	-696.9	312.20	5000.0	dpm/100 cm2

APPENDIX G

Quantitative Gamma Measurements

Quantitative Gamma Measurements (Mass Spec Lab)



D:\FILES\DESOTO\GAMQAN2.CMP

08-31-98

QUANTITATIVE GAMMA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

AFFECTED AREA		COUNT DATA Counts Gross	Bkgd	Time (Min)	RESULT DATA Result	MDA	Limit	Result Units
:IF FOYER								
:EILING GRID C023	07/07/1998	2695.0	2584.3	1.0	0.5	0.40	5.0	uR/hr [net]
:EILING GRID C027	07/07/1998	2708.0	2584.3	1.0	0.6	0.40	5.0	uR/hr [net]
:EILING GRID C042	07/07/1998	2617.0	2584.3	1.0	0.2	0.40	5.0	uR/hr [net]
:EILING GRID C048	07/07/1998	2695.0	2584.3	1.0	0.5	0.40	5.0	uR/hr [net]
:EILING GRID C063	07/07/1998	2636.0	2584.3	1.0	0.2	0.40	5.0	uR/hr [net]
:EILING GRID C069	07/07/1998	2651.0	2584.3	1.0	0.3	0.40	5.0	uR/hr [net]
:EILING GRID C079	07/07/1998	2429.0	2584.3	1.0	-0.7	0.40	5.0	uR/hr [net]
'LOOR GRID F037	07/07/1998	2777.0	2584.3	1.0	0.9	0.40	5.0	uR/hr [net]
'LOOR GRID F040	07/07/1998	2772.0	2584.3	1.0	0.9	0.40	5.0	uR/hr [net]
'LOOR GRID F046	07/07/1998	2822.0	2584.3	1.0	1.1	0.40	5.0	uR/hr [net]
'LOOR GRID F056	07/07/1998	2619.0	2584.3	1.0	0.2	0.40	5.0	uR/hr [net]
IASS SPECTROSCOPY LAB								
'LOOR GRID F031	07/07/1998	2877.0	2584.3	1.0	1.4	0.40	5.0	uR/hr [net]
'LOOR GRID F185	07/06/1998	2597.0	2608.7	1.0	-0.1	0.40	5.0	uR/hr [net]
'LOOR GRID F199	07/06/1998	2711.0	2608.7	1.0	0.5	0.40	5.0	uR/hr [net]
'LOOR GRID F207	07/06/1998	2660.0	2608.7	1.0	0.2	0.40	5.0	uR/hr [net]
'LOOR GRID F214	07/06/1998	2764.0	2608.7	1.0	0.7	0.40	5.0	uR/hr [net]
'LOOR GRID F219	07/06/1998	2790.0	2608.7	1.0	0.8	0.40	5.0	uR/hr [net]
'LOOR GRID F227	07/06/1998	2752.0	2608.7	1.0	0.7	0.40	5.0	uR/hr [net]
'LOOR GRID F234	07/06/1998	2692.0	2608.7	1.0	0.4	0.40	5.0	uR/hr [net]
'LOOR GRID F237	07/06/1998	2942.0	2608.7	1.0	1.6	0.40	5.0	uR/hr [net]
'LOOR GRID F239	07/06/1998	2796.0	2608.7	1.0	0.9	0.40	5.0	uR/hr [net]
'LOOR GRID F244	07/06/1998	2871.0	2608.7	1.0	1.2	0.40	5.0	uR/hr [net]
'LOOR GRID F246	07/06/1998	3008.0	2608.7	1.0	1.9	0.40	5.0	uR/hr [net]
'LOOR GRID F250	07/06/1998	2905.0	2608.7	1.0	1.4	0.40	5.0	uR/hr [net]
'LOOR GRID F306	07/06/1998	2730.0	2608.7	1.0	0.6	0.40	5.0	uR/hr [net]
'LOOR GRID F311	07/06/1998	2881.0	2608.7	1.0	1.3	0.40	5.0	uR/hr [net]
'LOOR GRID F319	07/06/1998	2752.0	2608.7	1.0	0.7	0.40	5.0	uR/hr [net]
'LOOR GRID F322	07/06/1998	2781.0	2608.7	1.0	0.8	0.40	5.0	uR/hr [net]

QUANTITATIVE GAMMA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA			RESULT DATA			
		Counts		Time				
		Gross	Bkgd	(Min)	Result	MDA	Limit	Result Units
FLOOR GRID F328	07/06/1998	2918.0	2608.7	1.0	1.4	0.40	5.0	uR/hr [net]
FLOOR GRID F333	07/06/1998	2714.0	2608.7	1.0	0.5	0.40	5.0	uR/hr [net]
FLOOR GRID F341	07/06/1998	2677.0	2608.7	1.0	0.3	0.40	5.0	uR/hr [net]
FLOOR GRID F364	07/06/1998	2781.0	2608.7	1.0	0.8	0.40	5.0	uR/hr [net]
FLOOR GRID F368	07/06/1998	2827.0	2608.7	1.0	1.0	0.40	5.0	uR/hr [net]
FLOOR GRID F372	07/06/1998	2725.0	2608.7	1.0	0.5	0.40	5.0	uR/hr [net]
FLOOR GRID F384	07/06/1998	2685.0	2608.7	1.0	0.4	0.40	5.0	uR/hr [net]
FLOOR GRID F392	07/06/1998	2668.0	2608.7	1.0	0.3	0.40	5.0	uR/hr [net]
FLOOR GRID F395	07/06/1998	2420.0	2608.7	1.0	-0.9	0.40	5.0	uR/hr [net]
FLOOR GRID F402	07/06/1998	2491.0	2608.7	1.0	-0.5	0.40	5.0	uR/hr [net]
WALL GRID W004	07/07/1998	2764.0	2584.3	1.0	0.8	0.40	5.0	uR/hr [net]
WALL GRID W008	07/06/1998	2466.0	2608.7	1.0	-0.7	0.40	5.0	uR/hr [net]
WALL GRID W009	07/07/1998	2937.0	2584.3	1.0	1.6	0.40	5.0	uR/hr [net]
WALL GRID W010	07/06/1998	2364.0	2608.7	1.0	-1.1	0.40	5.0	uR/hr [net]
WALL GRID W015	07/06/1998	2536.0	2608.7	1.0	-0.3	0.40	5.0	uR/hr [net]
WALL GRID W023E	07/06/1998	2589.0	2608.7	1.0	-0.1	0.40	5.0	uR/hr [net]
WALL GRID W023N	07/06/1998	2707.0	2608.7	1.0	0.5	0.40	5.0	uR/hr [net]
WALL GRID W025	07/06/1998	2529.0	2608.7	1.0	-0.4	0.40	5.0	uR/hr [net]
WALL GRID W034	07/06/1998	2474.0	2608.7	1.0	-0.6	0.40	5.0	uR/hr [net]
WALL GRID W036	07/06/1998	2489.0	2608.7	1.0	-0.6	0.40	5.0	uR/hr [net]
WALL GRID W037	07/06/1998	2564.0	2608.7	1.0	-0.2	0.40	5.0	uR/hr [net]
WALL GRID W051	07/06/1998	2712.0	2608.7	1.0	0.5	0.40	5.0	uR/hr [net]
WALL GRID W059	07/06/1998	2435.0	2608.7	1.0	-0.8	0.40	5.0	uR/hr [net]
WALL GRID W063	07/06/1998	2621.0	2608.7	1.0	0.1	0.40	5.0	uR/hr [net]
WALL GRID W076	07/06/1998	2687.0	2608.7	1.0	0.4	0.40	5.0	uR/hr [net]
WALL GRID W088	07/06/1998	2519.0	2608.7	1.0	-0.4	0.40	5.0	uR/hr [net]
WALL GRID W092	07/06/1998	2555.0	2608.7	1.0	-0.2	0.40	5.0	uR/hr [net]
WALL GRID W096	07/06/1998	2577.0	2608.7	1.0	-0.1	0.40	5.0	uR/hr [net]
WALL GRID W104	07/06/1998	2509.0	2608.7	1.0	-0.5	0.40	5.0	uR/hr [net]
WALL GRID W117	07/06/1998	2568.0	2608.7	1.0	-0.2	0.40	5.0	uR/hr [net]
WALL GRID W123	07/06/1998	2536.0	2608.7	1.0	-0.3	0.40	5.0	uR/hr [net]
WALL GRID W130	07/06/1998	2478.0	2608.7	1.0	-0.6	0.40	5.0	uR/hr [net]
WALL GRID W134	07/06/1998	2560.0	2608.7	1.0	-0.2	0.40	5.0	uR/hr [net]
WALL GRID W154	07/06/1998	2630.0	2608.7	1.0	0.1	0.40	5.0	uR/hr [net]
WALL GRID W161	07/06/1998	2505.0	2608.7	1.0	-0.5	0.40	5.0	uR/hr [net]

QUANTITATIVE GAMMA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA			RESULT DATA			
		Counts		Time				
		Gross	Bkgd	(Min)	Result	MDA	Limit	Result Units
WALL GRID W166	07/06/1998	2673.0	2608.7	1.0	0.3	0.40	5.0	uR/hr [net]
WALL GRID W170	07/06/1998	2564.0	2608.7	1.0	-0.2	0.40	5.0	uR/hr [net]
WALL GRID W174	07/06/1998	2506.0	2608.7	1.0	-0.5	0.40	5.0	uR/hr [net]

QUANTITATIVE GAMMA MEASUREMENT
SUMMARY OF RESULTS
DESOTO BUILDING 104

		COUNT DATA			RESULT DATA			
		Counts		Time				
		Gross	Bkgd	(Min)	Result	MDA	Limit	Result Units
UNAFFECTED AREA								
HALLWAY AREAS								
HALLWAY	07/13/1998	2501.0	2611.4	1.0	-0.5	0.40	5.0	uR/hr [net]
HALLWAY	07/13/1998	2542.0	2611.4	1.0	-0.3	0.40	5.0	uR/hr [net]
HALLWAY	07/13/1998	2534.0	2611.4	1.0	-0.4	0.40	5.0	uR/hr [net]
HALLWAY	07/13/1998	2688.0	2611.4	1.0	0.4	0.40	5.0	uR/hr [net]
HALLWAY	07/13/1998	2504.0	2611.4	1.0	-0.5	0.40	5.0	uR/hr [net]
OFFICE AREAS								
ROOM 104-1-AB-35	07/13/1998	2903.0	2611.4	1.0	1.4	0.40	5.0	uR/hr [net]
ROOM 104-1-AB-39	07/13/1998	2864.0	2611.4	1.0	1.2	0.40	5.0	uR/hr [net]
ROOM 104-1-AC-39	07/13/1998	2512.0	2611.4	1.0	-0.5	0.40	5.0	uR/hr [net]
ROOM 104-1-BB-39	07/13/1998	2478.0	2611.4	1.0	-0.6	0.40	5.0	uR/hr [net]
ROOM 104-1-BC-39	07/13/1998	2598.0	2611.4	1.0	-0.1	0.40	5.0	uR/hr [net]
ROOM 104-1-BD-39	07/13/1998	2624.0	2611.4	1.0	0.1	0.40	5.0	uR/hr [net]
ROOM 104-1-CB-39	07/13/1998	2583.0	2611.4	1.0	-0.1	0.40	5.0	uR/hr [net]
ROOM 104-1-CC-39	07/13/1998	2619.0	2611.4	1.0	0.0	0.40	5.0	uR/hr [net]
ROOF AREA								
ROOF LOCATION R1	08/20/1998	1634.0	2569.0	1.0	-4.3	0.40	5.0	uR/hr [net]
ROOF LOCATION R2	08/20/1998	1786.0	2569.0	1.0	-3.6	0.40	5.0	uR/hr [net]
ROOF LOCATION R3	08/20/1998	1492.0	2569.0	1.0	-5.0	0.40	5.0	uR/hr [net]
ROOF LOCATION R4	08/20/1998	1480.0	2569.0	1.0	-5.1	0.40	5.0	uR/hr [net]
ROOF LOCATION R5	08/20/1998	1410.0	2569.0	1.0	-5.4	0.40	5.0	uR/hr [net]

APPENDIX H

Quantitative Gamma Measurements of Pipe Trenches

QUANTITATIVE GAMMA MEASUREMENT OF PIPING TRENCHES
SUMMARY OF RESULTS
DESOTO BUILDING 104

AFFECTED AREA

MASS SPECTROSCOPY LAB

		Counts	Time(min)
RENCH LOCATION T001	07/03/1998	7617.0	2.0
TRENCH LOCATION T002	07/03/1998	7498.0	2.0
RENCH LOCATION T003	07/03/1998	7494.0	2.0
RENCH LOCATION T004	07/03/1998	7891.0	2.0
TRENCH LOCATION T005	07/03/1998	7637.0	2.0
RENCH LOCATION T006	07/03/1998	8074.0	2.0
RENCH LOCATION T007	07/03/1998	7751.0	2.0
TRENCH LOCATION T008	07/03/1998	7773.0	2.0
TRENCH LOCATION T009	07/03/1998	7533.0	2.0
RENCH LOCATION T010	07/03/1998	8261.0	2.0
RENCH LOCATION T011	07/03/1998	7665.0	2.0
TRENCH LOCATION T012	07/03/1998	7875.0	2.0
RENCH LOCATION T013	07/03/1998	7921.0	2.0
RENCH LOCATION T014	07/03/1998	7872.0	2.0
TRENCH LOCATION T015	07/03/1998	8593.0	2.0
RENCH LOCATION T016	07/03/1998	8062.0	2.0
RENCH LOCATION T017	07/03/1998	8810.0	2.0
RENCH LOCATION T018	07/03/1998	8172.0	2.0
TRENCH LOCATION T019	07/03/1998	8111.0	2.0
RENCH LOCATION T020	07/03/1998	8317.0	2.0
RENCH LOCATION T021	07/03/1998	8224.0	2.0
TRENCH LOCATION T022	07/03/1998	8182.0	2.0
	Average:	7969.7	
	1-sigma:	341.9	
	2-sigma:	562.4	

APPENDIX I

Quantitative Soil Measurements of Pipe Trenches

QUANTITATIVE SOIL MEASUREMENTS OF PIPING TRENCHES
SUMMARY OF RESULTS
DESOTO BUILDING 104

Appendix I
Page 1
09/03/1998
[TREN_SOIL]

AFFECTED AREA MASS SPECTROSCOPY LAB

SAMPLE	LOCATION	DATE	RESULTS	MDA	LIMIT
ENV167	001	07/06/1998	0.01 pCi/g; Cs-137	0.022	9.20
ENV168	002	07/06/1998	NO ACTIVITY DETECTED		
ENV169	003	07/06/1998	NO ACTIVITY DETECTED		
ENV170	004	07/06/1998	NO ACTIVITY DETECTED		
ENV171	005	07/06/1998	0.01 pCi/g; Cs-137	0.022	9.20
ENV172	006	07/06/1998	7.10 pCi/g; U-234	15.900	30.0
ENV173	007	07/06/1998	NO ACTIVITY DETECTED		
ENV174	008	07/06/1998	NO ACTIVITY DETECTED		
ENV175	009	07/06/1998	NO ACTIVITY DETECTED		
ENV176	010	07/06/1998	0.013 pCi/g Cs-137	0.022	9.20
ENV177	011	07/06/1998	0.04 pCi/g Co-60	0.025	1.94
ENV178	012	07/06/1998	NO ACTIVITY DETECTED		
ENV179	013	07/06/1998	NO ACTIVITY DETECTED		
ENV180	014	07/06/1998	NO ACTIVITY DETECTED		
ENV181	015	07/06/1998	NO ACTIVITY DETECTED		
ENV182	016	07/06/1998	NO ACTIVITY DETECTED		
ENV183	017	07/06/1998	NO ACTIVITY DETECTED		
ENV184	018	07/06/1998	NO ACTIVITY DETECTED		
ENV185	019	07/06/1998	NO ACTIVITY DETECTED		
ENV186	020	07/06/1998	NO ACTIVITY DETECTED		
ENV187	021	07/06/1998	NO ACTIVITY DETECTED		
ENV188	022	07/06/1998	0.03 pCi/g; Am-241	0.061	5.44

BOEING

Space Systems
Rocketdyne Propulsion & Power
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, CA 91309-7922

SHEA
Radiation Safety Department

RADIOMETRIC ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Sample Number	Sample Type	Collection Date	Gross α	Gross β	γ Spec	^3H	^{90}Sr	Isotopic U	Isotopic Th	Isotopic Pu	Other
ENV-98-155	SOIL	6/3/98	☐	☐	☒	☐	☐	☐	☐	☐	ENV-98-1
ENV-98-156	SOIL	6/3/98	☐	☐	☒	☐	☐	☐	☐	☐	ENV-98-1
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	☐	

Description of Item Sampled, Location, and Purpose of Sample:
Soil from TRENCH DESOTO 104

Sample Collector: Richard S. Garrett [signature]
(Print and Sign)

Date: 6/3/98

RECORD OF SAMPLE CUSTODY

Names of Custodians (Print and Sign)	Received Date	Received Time	Transferred Date	Transferred Time
BARNES & Robin Duncan [signature]	6/3/98	1:00		

Results Reported (To and How):

Sample Disposition (Describe):

SAMPO 90, 1990 PA,MN,JR. 4-Jun-1998 14:5

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR ENV98155

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: DESOTO- SOIL Fm TREN(W/STATE), ENV980155, 6/3/98
Spectrum file name: ENV98155
Sample identifier : GARRETT
Sample size : 7.000E+02 g
Measured by : FCD

Date of Activity Calculation : 4-Jun-1998 at 8:13:46
Collect started on : 4-Jun-1998 at 8:13:46
Collect ended on : 4-Jun-1998 at 10:10:32

Decay time : 0 years 0 days 0 hours 0 minut
Live time: 7.000E+03 s real time: 7.006E+03 s dead time: .09 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 28-May-1998 15:26:23

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 6/4/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: ENV98155 Date: 4-Jun-1998 Time: 10:10:32

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
	1	K-40	.9977	1.774E+01	+- 4.76%	1.774E+01	0.000E+00
	2	Tl-208T	.9987	2.188E-01	+- 5.24%	2.188E-01	0.000E+00
	3	Pb-210U	.9999	7.921E-01	+- 19.43%	7.921E-01	0.000E+00
	4	Pb-212T	.9998	7.549E-01	+- 5.11%	7.549E-01	0.000E+00
	5	Pb-214U	.9022	9.884E-01	+- 3.21%	9.884E-01	0.000E+00
	6	Bi-212T	.9846	5.805E-01	+- 35.26%	5.805E-01	0.000E+00
	7	Bi-214U	.9289	8.641E-01	+- 3.23%	8.641E-01	0.000E+00
	8	Ra-223A	.9881	8.310E-02	+- 37.74%	8.310E-02	0.000E+00
	9	Ra-224T	1.0000	7.901E-01	+- 10.91%	7.901E-01	0.000E+00
C	10	Ra-226U	.9993	1.746E+00	+- 7.58%	1.746E+00	0.000E+00
	11	Ac-228T	.9679	6.060E-01	+- 3.30%	6.060E-01	0.000E+00
	12	Th-234U	.9993	8.566E-01	+- 11.15%	8.566E-01	0.000E+00
C	13	U-235	.9746	1.060E-01	+- 7.58%	1.060E-01	0.000E+00
				2.612E+01		2.612E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 4-Jun-1998 15: 2

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR ENV98156

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: DESOTO- SOIL SPLIT W/STATE, ENV980156, 6/3/98
Spectrum file name: ENV98156
Sample identifier : BARNES
Sample size : 6.820E+02 g
Measured by : FCD

Date of Activity Calculation : 3-Jun-1998 at 14: 4:42
Collect started on : 3-Jun-1998 at 14: 4:42
Collect ended on : 3-Jun-1998 at 16: 1:28

Decay time : 0 years 0 days 0 hours 0 minute
Live time: 7.000E+03 s real time: 7.006E+03 s dead time: .09 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 28-May-1998 15:26:23

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 38 isotopes and 191 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 6/4/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Spectrum file: ENV98156 Date: 3-Jun-1998 Time: 16: 1:28

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured			decay corrected	saturation
	1	K-40	.9905	2.145E+01	+-	4.47%	2.145E+01	0.000E+00
	2	Tl-208T	.9853	2.408E-01	+-	5.26%	2.408E-01	0.000E+00
	3	Pb-212T	.9994	7.215E-01	+-	5.12%	7.215E-01	0.000E+00
	4	Pb-214U	.8953	9.926E-01	+-	3.34%	9.926E-01	0.000E+00
	5	Bi-212T	.9753	7.377E-01	+-	27.78%	7.377E-01	0.000E+00
	6	Bi-214U	.8316	9.258E-01	+-	3.34%	9.258E-01	0.000E+00
	7	Ra-224T	.9995	8.114E-01	+-	10.99%	8.114E-01	0.000E+00
C	8	Ra-226U	1.0000	2.211E+00	+-	6.47%	2.211E+00	0.000E+00
	9	Ac-228T	.9870	6.410E-01	+-	3.64%	6.410E-01	0.000E+00
	10	Th-227A	1.0000	1.103E-01	+-	14.25%	1.103E-01	0.000E+00
	11	Th-234U	.9998	7.965E-01	+-	11.06%	7.965E-01	0.000E+00
C	12	U-235	.9815	1.343E-01	+-	6.47%	1.343E-01	0.000E+00
				2.978E+01			2.978E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

BOEING

Space Systems
Rocketdyne Propulsion & Power
6633 Canoga Avenue
P.O. Box 7922
Canoga Park, CA 91309-7922

SHEA

Radiation Safety Department

RADIOMETRIC ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

Sample Number	Sample Type	Collection Date	Analysis Requested: Gross α	Gross β	γ Spec	^{3}H	^{90}Sr	Isotopic U	Isotopic Th	Isotopic Pu	Other
ENV-98-0167	Soil	7/3/98	☐	☐	☒	☐	☐	☐	☐	☐	
-0168			☐	☐	☒	☐	☐	☐	☐	☐	
-0169			☐	☐	☒	☐	☐	☐	☐	☐	
-0170			☐	☐	☒	☐	☐	☐	☐	☐	
-0171			☐	☐	☒	☐	☐	☐	☐	☐	
-0172			☐	☐	☒	☐	☐	☐	☐	☐	
-0173			☐	☐	☒	☐	☐	☐	☐	☐	
-0174			☐	☐	☒	☐	☐	☐	☐	☐	
-0175			☐	☐	☒	☐	☐	☐	☐	☐	
-0176			☐	☐	☒	☐	☐	☐	☐	☐	
-0177			☐	☐	☒	☐	☐	☐	☐	☐	

Description of Item Sampled, Location, and Purpose of Sample: Soil From MASS SPEC LAB TRENCH 104 DESOTO PART of FINAL Survey Requirements

Sample Collector: R.R.O Richard S. GARRETT

(Print and Sign)

Date: 7/3/98

RECORD OF SAMPLE CUSTODY

Names of Custodians (Print and Sign)	Received: Date	Received: Time	Transferred: Date	Transferred: Time
E.C. Dahl	7/6/98	1100		

Results Reported (To and How):

Sample Disposition (Describe):

SAMPO 90, 1990 PA,MN,JR. 11-Aug-1998 13:13:59

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR ENV98176

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: DS104- FS TERNCH SOIL, ENV980176, 7.6.98
Spectrum file name: ENV98176
Sample identifier : GARRETT
Sample size : 7.960E+02 g
Measured by : FCD

Date of Activity Calculation : 14-Jul-1998 at 18:47:10
Collect started on : 14-Jul-1998 at 18:47:10
Collect ended on : 14-Jul-1998 at 20:43:56

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.006E+03 s dead time: .09 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 22-Jul-1998 11:20:21

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 39 isotopes and 192 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Threshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 8/11/98
RP&HPS

Acceptable for Non-radioactive Disposal
(See Rocketdyne N001OP000034)

Cs-137 0.13 pCi/g

Spectrum file: ENV98176 Date: 14-Jul-1998 Time: 20:43:56

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
	1	K-40	.9979	2.056E+01	+- 4.68%	2.056E+01	0.000E+00
	2	CS-137	.9986	1.291E-02	+- 23.90%	1.291E-02	0.000E+00
	3	Tl-208T	.9932	1.966E-01	+- 5.80%	1.966E-01	0.000E+00
	4	Pb-210U	.9979	9.323E-01	+- 15.37%	9.323E-01	0.000E+00
	5	Pb-212T	.9982	6.556E-01	+- 5.19%	6.556E-01	0.000E+00
	6	Pb-214U	.9123	9.217E-01	+- 3.31%	9.217E-01	0.000E+00
	7	Bi-214U	.9434	8.930E-01	+- 3.29%	8.930E-01	0.000E+00
	8	Ra-224T	.9989	6.745E-01	+- 13.26%	6.745E-01	0.000E+00
C	9	Ra-226U	.9996	2.030E+00	+- 6.61%	2.030E+00	0.000E+00
	10	Ac-228T	.9933	4.940E-01	+- 3.55%	4.940E-01	0.000E+00
	11	Th-234U	.9999	9.110E-01	+- 9.32%	9.110E-01	0.000E+00
C	12	U-235	.9766	1.233E-01	+- 6.61%	1.233E-01	0.000E+00
				2.840E+01		2.840E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution

SAMPO 90, 1990 PA,MN,JR. 11-Aug-1998 13:16:11

G A M M A S P E C T R U M A N A L Y S I S R E P O R T

FOR ENV98177

Boeing North American / Rocketdyne - SHEA Env Lab
Sample description: DS104- FS TRENCH SOIL, ENV980177, 7/6/98
Spectrum file name: ENV98177
Sample identifier : GARRETT
Sample size : 7.500E+02 g
Measured by : FCD

Date of Activity Calculation : 15-Jul-1998 at 14:40: 0
Collect started on : 15-Jul-1998 at 14:40: 0
Collect ended on : 15-Jul-1998 at 16:36:46

Decay time : 0 years 0 days 0 hours 0 minutes
Live time: 7.000E+03 s real time: 7.006E+03 s dead time: .09 %

Calibration Files

Shape calibration requested : ZM051198
Shape calibration used : ZM051198
Created : 5-Jan-1995 9:39:36
Modified : 28-May-1998 15:21:41

Energy calibration requested : ZM051198
Energy calibration used : ZM051198
Created : 5-Jan-1995 9:39: 3
Modified : 22-Jul-1998 11:20:21

Efficiency calibration requested : ZM051198
Efficiency calibration used : ZM051198
Created : 2-Feb-1996 10: 6:29
Modified : 28-May-1998 15:29:49

Last search discrimination level: 3.00
Last search FROM channel 12 TO channel 8180
Last fitting discrimination level: 1.64
Last fit FROM channel 1 TO channel 8192
Identification energy tolerance : .70
Minimum intensity conv. factor : 10.00
Gamma reference library : C:\SAMPO\LIBRARY\LIBRARY.ILF
with 39 isotopes and 192 gamma lines.

MDA library name: C:\SAMPO\LIBRARY\MDALIB1A.ILF 3
MDA energy tolerance: .70 keV
MDA decision limit 1-alpha: 95.00 %
MDA detection limit 1-beta: 95.00 %

Peaked backround file: C:\SAMPO\SPECTRA\BX051198.PTF
Energy tolerance for peaked backround subtraction: .70 keV
Thréshold factor for peak areas: 1.00

Report Reviewed and
Conforms to N001OP000028 By: _____ Date: 8/11/98
RP&HPS

Co-60 0.038 pCi/g
Cs-137 0.13 pCi/g

Spectrum file: ENV98177 Date: 15-Jul-1998 Time: 16:36:46

********** R A D I O N U C L I D E A N A L Y S I S R E P O R T *******

	number	nuclide	conf.value	Activity (pCi/g) measured		decay corrected	saturation
	1	K-40	.9991	2.042E+01	+- 4.70%	2.042E+01	0.000E+00
	2	CO-60	.9979	3.796E-02	+- 7.53%	3.796E-02	0.000E+00
	3	CS-137	.9998	1.300E-01	+- 5.73%	1.300E-01	0.000E+00
	4	Tl-208T	.9918	1.928E-01	+- 5.54%	1.928E-01	0.000E+00
	5	Pb-210U	.9967	1.001E+00	+- 13.30%	1.001E+00	0.000E+00
	6	Pb-212T	.9988	6.952E-01	+- 5.06%	6.952E-01	0.000E+00
	7	Pb-214U	.9109	8.734E-01	+- 3.31%	8.734E-01	0.000E+00
	8	Bi-214U	.9242	8.923E-01	+- 3.12%	8.923E-01	0.000E+00
	9	Ra-223A	.9755	6.701E-02	+- 45.33%	6.701E-02	0.000E+00
	10	Ra-224T	.9976	8.909E-01	+- 9.34%	8.909E-01	0.000E+00
C	11	Ra-226U	1.0000	2.250E+00	+- 6.33%	2.250E+00	0.000E+00
	12	Ac-228T	.9533	5.971E-01	+- 3.51%	5.971E-01	0.000E+00
	13	Th-234U	1.0000	8.725E-01	+- 10.56%	8.725E-01	0.000E+00
C	14	U-235	.9832	1.367E-01	+- 6.33%	1.367E-01	0.000E+00
				2.905E+01		2.905E+01	0.000E+00

Flags: C = check; nuclide is a part of an underdetermined solution