Rocky Flats Environmental Technology Site

PRE-DEMOLITION SURVEY REPORT (PDSR)

Building 771 Area AE

REVISION 1

August 31, 2004

CLASSIFICATION REVIEW NOT REQUIRED PER
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Building 771 Area AE

REVISION 1

August 31, 2004

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ABBREVIATIONS/ACRONYMS

ACM	Asbestos Containing Material
Be	Beryllium
CDPHE	Colorado Department of Public Health and the Environment
$DCGL_{EMC}$	Derived Concentration Guideline Level – elevated measurement comparison
$DCGL_W$	Derived Concentration Guideline Level – Wilcoxon Rank Sum Test
D&D	Decontamination and Decommissioning
DDCP	Decontamination and Decommissioning Characterization Protocol
DOE	U.S. Department of Energy
DPP	Decommissioning Program Plan
DQA	Data quality assessment
DQOs	Data quality objectives
EPA	U.S. Environmental Protection Agency
FDPM	Facility Disposition Program Manual
HVAC	Heating, ventilation, air conditioning
HSAR	Historical Site Assessment Report
HEUN	Highly Enriched Uranyl Nitrate
IHSS	Individual Hazardous Substance Site
IWCP	Integrated Work Control Package
K-H	Kaiser-Hill
LBP	Lead-based paint
LLW	Low-level waste
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum detectable activity
MDC	Minimum detectable concentration
NORM	Naturally occurring radioactive material
NRA	Non-Rad-Added Verification
OSHA	Occupational Safety and Health Administration
PARCC	Precision, accuracy, representativeness, comparability and completeness
PCBs	Polychlorinated Biphenyls
PDS	Pre-demolition survey
PDSR	Pre-demolition survey report
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RLC	Reconnaissance Level Characterization
RLCR	Reconnaissance Level Characterization Report
RSA	Removable Surface Activity
RSOP	RFCA Standard Operating Protocol
RSP	Radiological Safety Practices
SVOCs	Semi-volatile organic compounds
TCLP	Toxicity Characteristic Leaching Procedure
TSA	Total surface activity

VOCs	Volatile organic compounds
WSRIC	Waste Stream and Residue Identification and Characterization

EXECUTIVE SUMMARY

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the west side of the Building 771 First Floor (Area AE), for structural surfaces that exist within six feet of the final grade. This report also provides the radiological status of areas that exist greater than six feet below the final grade.

Because this area will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). Building surfaces characterized as part of this PDS include the interior surfaces of Area AE (within six feet of the final grade).

The PDS encompassed both chemical and radiological characterization. The characterization was built upon physical, chemical and radiological hazards identified in the facility-specific *B771 and B774 Hazards Characterization Report for the 771 Closure Project.*

Based upon the results of this PDSR, major portions of Area AE meet the unrestricted release limits specified in the site Pre-Demolition Survey Plan. After multiple hydrolazing passes (with 35,000 to 50,000 psi high pressure water) which removed ¼" to ½" of surface concrete, and extensive dry decontamination efforts, several areas of the structure do not meet unrestricted release limits. The areas of the structure that do not meet unrestricted release limits and exist within six feet of final grade will be covered with fixative and packaged as radiological waste during building demolition.

No removable contamination in excess of the unrestricted release limits (20 dpm/100 cm^2) exists in Area AE. No beryllium contamination has been detected above the action level in Area AE. In addition, radiological controls shall be in place during demolition to assure there is no release of contamination. These controls shall include the use of water and fixative for dust suppression, air sampling, and continuous RCT coverage. Air sampling shall include localized low-volume air monitors within the demolition zone and lapel air samplers for appropriate operators and support personnel.

The contaminated surfaces (i.e., painted surfaces within 6' of final grade) will be carefully removed during demolition activities. A bright-colored fixative will be used to allow for visible detection of these areas by operators and waste personnel. In the event painted debris becomes mixed with the areas of concrete that have been free-released, these portions will be dispositioned as radiological waste to the extent practicable (i.e., all debris where paint is visible and any areas where contaminated concrete may have mixed with areas of concrete that have been free-released). All attempts will be made to minimize mixing of clean and contaminated concrete during demolition.

The remainder of the structure can be demolished and the concrete can be used for backfill on-site per the RFCA RSOP for Recycling Concrete. The structural surfaces that exist greater than six feet below final grade that meet the established limits (less than 100 nCi/g surface and less than 7 nCi/g over the volume of concrete) will remain in place. All metal items (equipment, piping, and rebar) removed during demolition shall be

packaged as radiological waste. To ensure that the facility remains free of contamination and PDS data remain valid, Level 1 isolation controls are established.

1 INTRODUCTION

A Pre-Demolition Survey was performed to enable compliant disposition and waste management of the west side of Building 771 First Floor (Area AE). Because this Type 3 building will be demolished, the characterization was performed in accordance with the Pre-Demolition Survey Plan (MAN-127-PDSP). The results of this survey shall demonstrate that the structural concrete to be used for fill material meets the unrestricted release limits specified in the site Pre-Demolition Survey Plan. The results of this survey also demonstrate that major portions of Area AE do not meet the unrestricted release limits. These areas shall be segregated and packaged as radiological waste during building demolition. Building surfaces characterized as part of this PDS include the interior surfaces of the west half of the Building 771 first floor (within six feet of the final grade).

Data is also provided for structural surfaces that exist greater than 6' below final grade to demonstrate compliance with the established limits (less than 100 nCi/g surface and less than 7 nCi/g over the volume of concrete). These areas were characterized per the *Building 771/774 Closure Project Characterization Plan for Areas Greater than Six Feet Below Final Grade*, dated November 24, 2003 (refer to Attachment G). This portion of the structure shall remain in place.

As part of the Rocky Flats Environmental Technology Site (RFETS) Closure Project, numerous facilities will be removed. Among these is Area AE. This facility no longer supports the RFETS mission and will be removed to reduce Site infrastructure, risks and/or operating costs.

Before this Type 3 facility can be demolished, the Data Quality Objectives (DQOs) for a Pre-Demolition Survey (PDS) must be satisfied; this document presents the PDS results for Area AE. The PDS was conducted pursuant to the Decontamination and Decommissioning Characterization Protocol (MAN-077-DDCP) and the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). The PDS is built upon physical, chemical and radiological hazards identified in the facility-specific *B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0.

1.1 PURPOSE

The purpose of this report is to communicate and document the results of Area AE. A PDS is performed prior to building demolition to define the pre-demolition radiological and chemical conditions of a facility. The pre-demolition conditions are compared with the release limits for radiological and non-radiological contaminants. PDS results will enable project personnel to make final disposition decisions, develop related worker health and safety controls, and estimate waste volumes by waste types.

1.2 SCOPE

This report presents the pre-demolition radiological and chemical conditions of the Area AE surfaces that will be free-released and used as backfill per the requirements of the *RFETS, RFCA RSOP for Recycling Concrete*. The results of this report also demonstrate

that major portions of Area AE do not meet the unrestricted release limits. These areas shall be segregated and packaged as radiological waste during building demolition.

Also included in the scope of this report is the characterization of the structural surfaces that exist greater than six feet below final grade that were surveyed in accordance with the *Building 771/774 Closure Project Characterization Plan for Areas Greater than Six Feet Below Final Grade*, dated November 24, 2003 (refer to Attachment G).

1.3 DATA QUALITY OBJECTIVES (FOR FREE RELEASE)

The Data Quality Objectives (DQOs) used in designing this PDS meet the minimum requirements specified in Section 2.0 of the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to section 2.0 of MAN-127-PDSP for these DQOs.

The DQOs for the areas that exist greater than 6' below final grade are discussed in the *Building 771/774 Closure Project Characterization Plan for Areas Greater than Six Feet Below Final Grade*, dated November 24, 2003 (refer to Attachment G).

1.3.1 The Problem

The problem involves determining whether or not the survey unit is suitable for unrestricted release in accordance with this plan.

1.3.2 The Decision

The decision is verification that objectives specified in the decommissioning decision document have been met (e.g., certain materials meet unrestricted release criteria for radiological and non-radiological constituents).

1.3.3 Inputs to the Decision

Inputs to the decision include the magnitude and location of data from preceding characterizations, including RLC and In-Process Characterization (IPC), PDS results, decision document action levels, and unrestricted release criteria.

1.3.4 Decision Boundaries

The decision boundaries are the spatial confines of the facility, including rooms and sets of rooms, in two and three dimensions. Interior surfaces are included, including those below grade. Boundaries may be further defined in RFCA decision documents.

1.3.5 Decision Rules

The following are decision rules to be used during PDS:

1.3.5.1 Radionuclides

If all radiological survey and scan measurements are below the surface contamination guidelines specified in the Site PDSP, then the related areas and/or volume are considered not radiologically contaminated.

If any radiological survey or scan measurement exceeds the surface contamination guidelines provided in the Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP), the related survey unit must be evaluated per the statistical tests described in section 7.0, Data Analysis and Quality Assessment, of this plan.

1.3.5.2 Hazardous Waste

If decommissioning waste is mixed with or contains a listed hazardous waste, or if the waste exhibits a characteristic of a hazardous waste, then the waste is considered RCRA-regulated hazardous waste in accordance with 6 CCR 1007-3, Parts 261 and 268.

1.3.5.3 Hazardous Substances

If material contains a listed hazardous substance above a decision document action level (e.g., RFCA) and/or the CERCLA reportable quantity (40 CFR 302.4), the material is subject to CERCLA regulation (i.e., remediation and/or notification requirements).

1.3.5.4 Beryllium

If surface concentrations of beryllium are equal to or greater than 0.2 $\mu g/100\ cm^2$, the material is considered beryllium contaminated per 10 CFR 850.

1.3.5.5 PCBs

If material contains PCBs, in a non-liquid state, from the manufacturing process at concentrations ≥50 ppm, the material is considered PCB Bulk Product Waste and subject to the requirements of 40 CFR 761.

If PCB contamination from a past spill/release is suspected, or if a PCB spill is discovered that has not been cleaned up, the associated material is considered PCB Remediation Waste and subject to the requirements of 40 CFR 761. PCB remediation waste includes: materials disposed of prior to April 18, 1978, that are currently at concentrations ≥50 ppm PCBs, regardless of the concentration of the original spill; materials which are currently at any volume or concentration where the original source was ≥500 ppm PCBs beginning on April 18, 1978, or ≥50 ppm PCBs beginning on July 2, 1979; and materials which are currently at any concentration if the PCBs are spilled or released from a source not authorized for use under 40 CFR 761.

If a waste or item contains PCBs in regulated concentrations, the waste or item is classified as PCB-regulated material and subject to the requirements of 40 CFR 761.

1.3.5.6 Asbestos

If any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., >1% by volume), then material is considered ACM (40 CFR 763 and 5 CCR 1001-10).

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1.3.6 Tolerable Limits on Decision Error

Acceptable false negative *(a)* errors for calculating the number of samples generally range from 1% to 10%. The default value specified by the Site PDSP is 5%, which was assumed for the survey design in this report.

1.3.7 Optimization of Plan Design

Statistically based radiological surveying and sampling will be conducted per the guidance in Appendix B of the RFETS Pre-Demolition Survey Plan for D&D Facilities (MAN-127-PDSP). Refer to Section 4.0 of the PDSP for direction of characterization of non-radiological, chemical constituents. For this report, the minimum number of measurement locations is fifteen per 100 square meters of floor area for Class 1 survey units, as calculated based on the guidance in MAN-127-PDSP. For survey unit 771073, the minimum number of measurement locations is 15 per 100 m^2 based on total surface area (for conservatism, because a large percentage of the floor area exists more than 6' below final grade, and does not fall within the boundaries of the survey unit).

The $DCGL_W$ is 100 dpm/100 cm^2 for TSA and media measurements/samples, and 20 dpm/100 cm^2 for RSA measurements. The LBGR was adjusted to obtain a relative shift of two. The estimated standard deviation for each measurement type was calculated based on an assumed coefficient of variation of 30%.

The scan requirements for specific survey unit classifications are as follows:

Class 1: 100% of accessible surfaces

No Class 2 or 3 survey units are included in the scope of this report.

2 HISTORICAL SITE ASSESSMENT

A facility-specific Hazards Characterization Report was conducted to understand the facility history and related hazards. The Building 771 Hazards Characterization was performed in June 2001 (Refer *B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0). Based on the characterization results, radiological contamination is suspect on the structural surfaces of the 1st Floor of Building 771 (including Area AE). Media sample results indicated radiological contamination in excess of the unrestricted release limits in or under the paint in all areas except Room 283. Therefore, all paint was removed from Area AE (areas within 6' of final grade).

The area included in the scope of this PDSR is referred to herein Area AE. This area was part of the original building 771 construction, and included the Room 164 Analytical Laboratory Area, the Room 158 Lab Area, the Room 153 Process Area, the Rooms 180A-F, 180K, 187 and 188 Process Area, the Room 174 Process Area, and the Room 179 Maintenance Area. These areas were used to support various R&D activities, laboratory operations, and plutonium production processes, and housed gloveboxes, hot cells, and tanks. Highly contaminated solutions were likely spilled in these areas during

operations. The 180 Process Area is the origin of the 1957 fire, resulting in widespread contamination in that area. A detailed description of these areas is provided in Revision 0 of the B771 and B774 Hazards Characterization Report (dated 06/12/01).

Approximately 2500 linear feet of embedded unistrut exists in Area AE. Several attempts were made to decontaminate the unistrut to unrestricted release limits. However, due to the geometry of the unistrut, the decontamination and follow-up survey efforts were hindered. Removing the unistrut prior to demolition would be unusually difficult and would result in a considerable risk to the workers. Removing the contaminated unistrut post-demolition could be attempted either manually or mechanically. However, both methods result in a relatively dangerous working environment. Therefore, per agreement with the DOE and CDPHE (refer to Contact Record dated October 2, 2003), the unistrut was decontaminated to the extent practicable and will remain in-place provided the unistrut does not adversely impact the ability to meet the compaction requirements. Remaining contamination levels on the unistrut is typically less than 1000 dpm/100 cm^2 (fixed alpha), with limited areas up to 20,000 dpm/100 cm^2 (fixed alpha). Fixative has been applied to the unistrut for contamination control during demolition.

Area AE consists of two Class 1 survey units (771072 and 771073) based on the contamination potential, per Section 3.0 of the PDSP.

The hazards characterization results and historical review (refer to Attachment F) were used to identify PDS data gaps and needs, and to develop radiological and chemical PDS characterization packages. Characterization documentation is located in the Building 771 Characterization Project files.

3 RADIOLOGICAL CHARACTERIZATION AND HAZARDS

Area AE was characterized for radiological hazards per the PDSP. Radiological characterization was performed to define the nature and extent of radioactive materials that may be present on the facility surfaces. Measurements were performed to evaluate the contaminants of concern (weapons-grade plutonium isotopes). Based upon a review of the characterization data, historical and process knowledge, in-process survey data, building walk-downs, and the Site Pre-Demolition Survey Plan (MAN-127-PDSP), a Radiological Characterization Plan was developed during the planning phase that describes the minimum survey requirements (refer to survey packages 771072 and 771073). A Survey Unit Overview Map is presented in Attachment A. Based on hazard characterization data and historical and process knowledge, transuranic isotopes are the primary contaminants of concern in Buildings 771/774. Therefore, the PDS was performed to the transuranic PDS unrestricted release criteria. Individual radiological survey unit packages are maintained in the Building 771 Characterization Project files.

The Area AE survey unit packages were developed in accordance with Radiological Safety Practices (RSP) 16.01, *Radiological Survey/Sampling Package Design, Preparation, Control, Implementation and Closure.* Total surface activity (TSA) and removable surface activity (RSA) measurements were collected in accordance with RSP

16.02 *Radiological Surveys of Surfaces and Structures*. Radiological survey data were verified, validated and evaluated in accordance with RSP 16.04, *Radiological Survey/Sample Data Analysis*. Quality control measures were implemented relative to the survey process in accordance with RSP 16.05, *Radiological Survey/Sample Quality Control*.

For this report, the minimum number of measurement locations is fifteen per 100 square meters of floor area for Class 1 survey units, as calculated based on the guidance in MAN-127-PDSP. For survey unit 771073, the minimum number of measurement locations is 15 per 100 m^2 based on total surface area (for conservatism, because a large percentage of the floor area exists more than 6' below final grade, and does not fall within the boundaries of the survey unit).

Random survey locations that landed on previously identified "hot-spots" (i.e., areas shaded in red on survey unit overview maps) were relocated as close to the original location as possible within the contiguous square-meter. When this was not possible, a new random location was selected from a random-number generator.

The contamination levels for areas beneath fixative (annotated in yellow on survey unit maps) and beneath the spots that do not meet unrestricted release limits (annotated in red on survey unit maps) range from 120 dpm/100 cm^2 to 6000 dpm/100 cm^2, with one spot of 120,000 dpm/100 cm^2 (located in the bay between columns F4-F5 and E4-E5).

Radiological survey data, statistical analysis results, survey locations, and radiological scan maps are presented in Attachments B and C, *Radiological Data Summary and Survey Maps*.

Area AE North – (Survey Unit 771072)

The north side of Area AE is classified as a Class 1 survey unit. This area includes Rooms 151 to 160, and Room 166A. A total of 128 random TSA and RSA measurements were collected. Surface scans of 1439 m^2 (100% of accessible surfaces within 6' of final grade) were performed. All paint was removed from the structural surfaces; therefore no media samples were collected for this survey unit.

Surfaces that exist greater than 6' below final grade were characterized per the requirements of the *Building 771/774 Closure Project Characterization Plan for Areas Greater than Six Feet Below Final Grade*, dated November 24, 2003 (refer to Attachment G). The structural surfaces that exist greater than six feet below final grade that meet the established limits (less than 100 nCi/g surface and less than 7 nCi/g over the volume of concrete) will remain in place (refer to Attachment G). Surfaces that did not meet the established surface limits (100 nCi/g) were removed with a scabbling tool or grinder. Areas that did not meet the established volumetric limits (7 nCi/g) were removed with a concrete saw. All areas that were removed are delineated in Attachment G.

An estimate of the total remaining weapons-grade plutonium activity (WGP) for the AE structural surfaces that exist greater than 6' below the final grade and will remain in

place, is provided in Attachment G. This value was calculated based on the results of the random in-situ gamma-spectroscopy measurements.

All scans and surveys in survey unit 771072 were less than the applicable PDS transuranic DCGL values, with the exception of the areas marked in red on the survey unit map. Radiological survey data, statistical analysis results, survey locations, and radiological scan maps for survey unit 771072 are presented in Attachment B, *Survey Unit 771072 Radiological Data Summary and Survey Map.*

Area AE South – (Survey Unit 771073)

The south side of Area AE is classified as a Class 1 survey unit. This area includes Rooms 161 to 169, 174, 180, and 186 to 188. A total of 65 random TSA and RSA measurements were collected. Surface scans of 433 m^2 (100% of accessible surfaces within 6' of final grade/areas not covered with fixative) were performed. All paint was removed from the structural surfaces; therefore no media samples were collected for this survey unit. Fixative has been applied to several ceiling bays that did not meet unrestricted release limits, and this concrete will be packaged as radiological waste during demolition.

The structural surfaces that exist greater than six feet below final grade that meet the established limits (less than 100 nCi/g surface and less than 7 nCi/g over the volume of concrete) will remain in place (refer to Attachment G). Surfaces that did not meet the established surface limits (100 nCi/g) were removed with a scabbling tool or grinder. Areas that did not meet the established volumetric limits (7 nCi/g) were removed with a concrete saw. All areas that were removed are delineated in Attachment G.

All scans and surveys in survey unit 771073 were less than the applicable PDS transuranic DCGL values, with the exception of the areas marked in red on the survey unit map. Radiological survey data, statistical analysis results, survey locations, and radiological scan maps for survey unit 771073 are presented in Attachment C, *Survey Unit 771073 Radiological Data Summary and Survey Map.*

4 CHEMICAL CHARACTERIZATION AND HAZARDS

Based on a thorough review of historical and process knowledge, visual inspections, and personnel interviews, no additional chemical hazard sampling requirements were identified.

4.1 Asbestos

Asbestos containing building material is not present in or on Area AE (previously removed).

4.2 Beryllium (Be)

Area AE is not and has never been a beryllium-controlled area. However, Beryllium was detected in a limited number of gloveboxes in Building 771. Per the Beryllium Sampling

Decision Tree in the PDSP, 53 biased beryllium smear samples were collected in Area AE, in accordance with the PDSP and the *Beryllium Characterization Procedure,* PRO-536-BCPR, Revision 0, September 9, 1999.

All beryllium smear sample results were less than the investigative limit of 0.1 $\mu g/100cm^2$. PDS beryllium laboratory sample data and location maps are contained in Attachment D, *Chemical Data Summaries and Sample Maps.*

4.3 RCRA/CERCLA Constituents [including metals and volatile organic compounds (VOCs)]

Based upon the *B771 and B774 Hazards Characterization Report, 771 Closure Project,* Revision 0, dated June 12, 2001, personnel interviews, facility walk-downs, and historical process knowledge (WSRIC/WEMS), several portions of Area AE previously managed hazardous wastes. Specifically, Rooms 172, 182, 183, 186 and 188 were permitted hazardous waste container storage units. Each unit has been decontaminated (e.g., hydrolazed) in accordance with the 771 Decommissioning Operations Plan and has met the "clean closure" decontamination criteria. A visual inspection of the building by 771/774 Industrial Hygiene personnel verified the absence of hazardous waste residuals and/or stains on the floor/concrete slab, walls, or ceiling. As a result of these observances, it has been determined that no sampling for RCRA/CERCLA constituents is required. The concrete generated from the demolition of the areas included in the scope of this report can be used for onsite recycling in accordance with the Concrete Recycling RSOP.

4.4 Polychlorinated Biphenyls (PCBs)

Based on historical knowledge, personnel interviews, and 771/774 Environmental Compliance Personnel walk-downs, Area AE never used/transferred free flowing/exposed PCB's. At one time the facility may have used PCB ballasts in its fluorescent light fixtures, however, all of these have been removed, and compliantly disposed of, resulting in no impact on demolition activities in this area.

5 PHYSICAL HAZARDS

Physical hazards associated with Area AE are common to standard industrial environments. Several large floor penetrations exist that have been filled with grout or fill material (following survey) to avoid fall hazards. In addition, auxiliary lighting is required for access to the area.

Physical hazards are controlled by the Site Occupational Safety and Industrial Hygiene Program, which is based on OSHA regulations, DOE orders, and standard industry practices.

6 DATA QUALITY ASSESSMENT

Data used in making management decisions for decommissioning of Area AE, and consequent waste management, is of adequate quality to support the decisions

documented in this report. The data presented in this report (Attachments B, C, and D) were verified and validated relative to MAN-127-PDSP, Pre-Demolition Survey Plan for D&D Facilities, and original project DQOs.

In summary, the Verification and Validation (V&V) process corroborates that the following elements of the characterization process are adequate:

- the *number* of samples and surveys;
- the *types* of samples and surveys;
- the sampling/survey process as implemented "in the field"; and
- the laboratory analytical process, relative to accuracy and precision considerations.

Details of the DQA are presented in Attachment E. The DQA Checklists are provided in the individual survey unit packages (located in the Building 771 Characterization Files).

The Minimum Detectable Activity (MDA) for each PDS instrument was determined *a priori* based on typical parameters (background, efficiency, and count time). A list of radiological field instrumentation and associated sensitivities is presented in Table 1.

Table 1
PDS Radiological Field Instrumentation and Minimum Detectable Activities

Model	Measurement Type	MDA (dpm/100 cm^2)
NE Electra DP6	TSA	48
Eberline SAC-4	Removable (Smears)	10
NE Electra AP6	Scans	300

7 DECOMMISSIONING WASTE TYPES

The demolition and disposal of Area AE will generate a variety of wastes. Structural surfaces that exist within 6' of final grade that do not meet unrestricted release limits shall be packaged as radiological waste. These areas shall be delineated with blue paint and yellow fixative, such that they can be easily identified during demolition for segregation and packaging.

The remaining concrete within 6' of final grade can be used as backfill onsite in accordance with the RFCA RSOP for Recycling Concrete. The portions of the structure that exist beneath the 6' grade line can remain in place because they meet the established limits (less than 100 nCi/g at the surface and less than 7 nCi/g over the volume of concrete) (refer to Attachment G). The estimated grams of weapons-grade plutonium (WGP) remaining in Area AE is 0.4 grams (refer to Attachment G).

Any equipment items removed (rebar) will be packaged as radiological waste. Any area that does not meet unrestricted release limits shall be covered with fixative to prevent the release of contamination during demolition activities.

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The estimated volume of radiological waste to be generated for this area is 2400 cubic yards. This includes any remaining equipment items, concrete that does not meet the unrestricted release limits, and rebar.

8 FACILITY CLASSIFICATION AND CONCLUSIONS

Based on the analysis of radiological, chemical and physical hazards, Area AE is classified as an RFCA Type 3 facility pursuant to the RFETS Decommissioning Program Plan (DPP; K-H, 1999). Based upon the results of this PDSR, portions of the Area AE structure meet the unrestricted release limits specified in the site Pre-Demolition Survey Plan and are ready for demolition. Areas that are marked in red in Attachments B and C do not meet unrestricted release limits and will be packaged as radiological waste during demolition. The structural surfaces in Area AE that exist beneath the 6' grade line meet the established limits (less than 100 nCi/g at the surface and less than 7 nCi/g over the volume of concrete) therefore can remain in place (refer to Attachment G). The PDS for Area AE was performed in accordance with the DDCP and PDSP, all PDSP DQOs were met, and all data satisfied the PDSP DQA criteria.

A facility walkdown and historical review indicates that no RCRA/CERCLA constituents exist in Area AE (refer to Attachment F, Historical Review). Any painted (paint or fixative) debris generated during demolition will be disposed of as radiological waste.

Radiological contamination in excess of the PDSP Table 7-1 limits was not detected in Area AE (with the exception of the areas in red on maps in Attachments B and C). The applicable limits are as follows:

Table 2
PDSP Table 7-1 Surface Contamination Limits

Radionuclides	Total Average (dpm/100 cm^2) (1) ($DCGL_W$)	Total Maximum (dpm/100 cm^2) (2) ($DCGL_{EMC}$)	Removable (dpm/100 cm^2) ($DCGL_W$)
Transuranics	100	300	20

(1) Measurements of average contamination should not be averaged over an area of more than 1 m^2.
(2) The maximum contamination level applies to an area of not more than 100 cm^2.

Based upon this PDSR, portions of Area AE can be demolished and concrete can be used for backfill on-site per the RFCA RSOP for Recycling Concrete. The areas shaded in red in Attachments B and C do not meet unrestricted release limits and shall be covered with fixative and packaged as radiological waste during demolition. The portions of the structure that exist beneath the 6' grade line can remain in place because they meet the established limits (less than 100 nCi/g at the surface and less than 7 nCi/g over the volume of concrete). These areas have also been covered with fixative to prevent the release of contamination during demolition activities. No removable contamination in excess of the unrestricted release limits (20 dpm/100 cm^2) exists in Area AE. No beryllium contamination has been detected above the action level in Area AE. In addition, radiological controls shall be in place during demolition to assure there is no release of contamination. These controls shall include the use of water and fixative for dust suppression, air sampling, and continuous RCT coverage. Air sampling shall

include localized low-volume air monitors within the demolition zone and lapel air samplers for appropriate operators and support personnel.

The contaminated surfaces (i.e., painted surfaces within 6' of final grade) will be carefully removed during demolition activities. A bright-colored fixative will be used to allow for visible detection of these areas by operators and waste personnel. In the event painted debris becomes mixed with the areas of concrete that have been free-released, these portions will be dispositioned as radiological waste to the extent practicable (i.e., all debris where paint is visible and any areas where contaminated concrete may have mixed with areas of concrete that have been free-released). All attempts will be made to minimize mixing of clean and contaminated concrete during demolition

To ensure that the facility remains free of contamination and that PDS data remain valid, Level 1 isolation controls have been established.

9 REFERENCES

B771 and B774 Hazards Characterization Report for the 771 Closure Project, dated June 12, 2001, Revision 0.

DOE/RFFO, CDPHE, EPA, 1996. *Rocky Flats Cleanup Agreement (RFCA)*, July 19, 1996.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*

DOE Order 414.1A, *Quality Assurance*

EPA, 1994. *The Data Quality Objective Process*, EPA QA/G-4.

K-H, 1999. *Decommissioning Program Plan*, June 21, 1999.

MAN-131-QAPM, *Kaiser-Hill Team Quality Assurance Program*, Rev. 1, November 1, 2001.

MAN-076-FDPM, *Facility Disposition Program Manual*, Rev. 3, January 1, 2002.

MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol*, Rev. 4, July 15, 2002.

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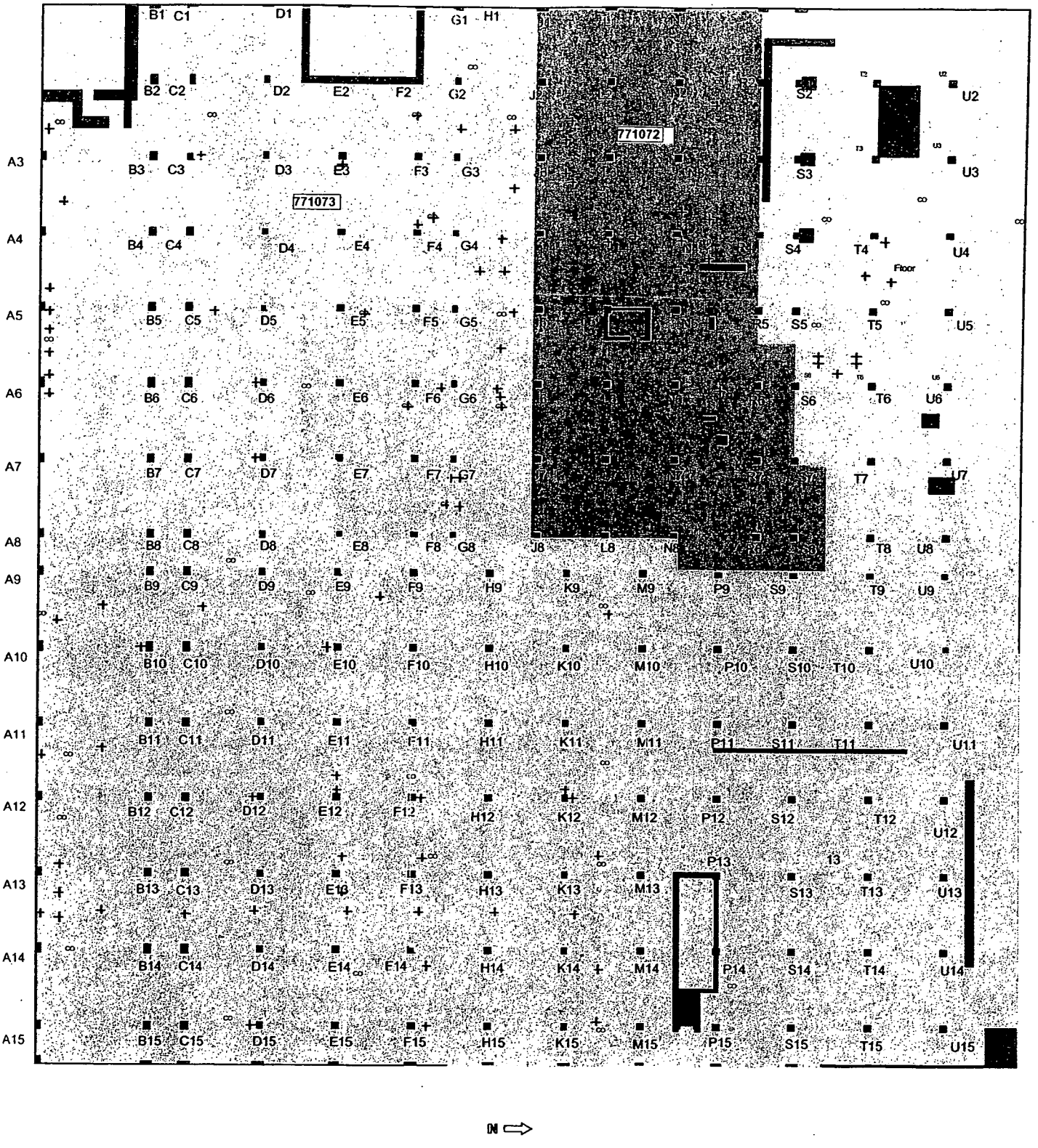
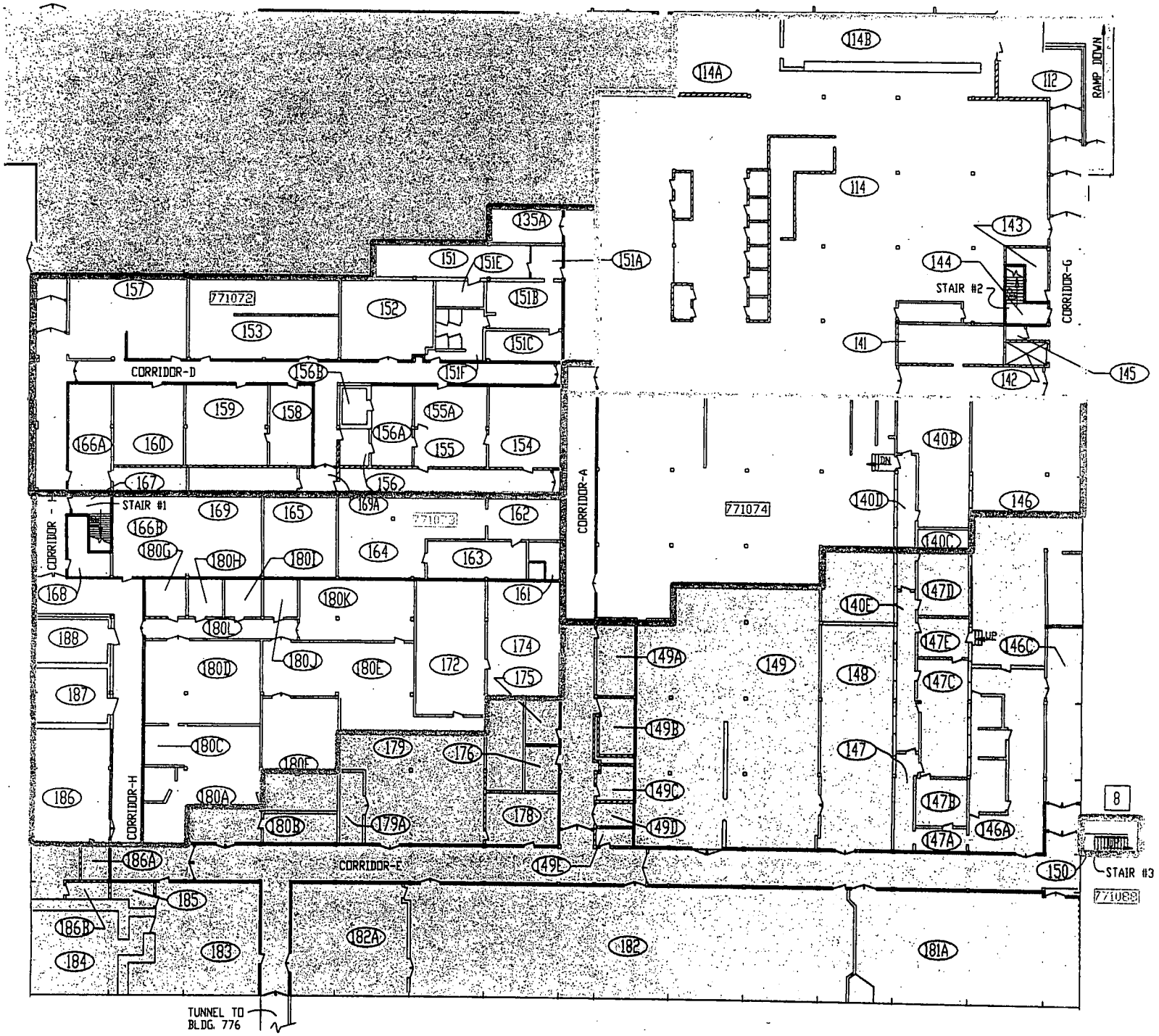
ATTACHMENT A

Survey Unit Overview Map

Area AE Overview





BLDG 771-FIRST FLOOR ROOMS

ATTACHMENT B

Survey Unit 771072
Radiological Data Summary and Survey Map

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Rocky Flats Environmental Technology Site
Final Radiological Survey Summary Results

Total Surface Activity Measurements

Nbr Random Measurements Required: 125 | Nbr Biased Measurements Required: 0 | Nbr QC Required: 7

Nbr Random Measurements Performed: 128 | Nbr Biased Measurements Performed: 0 | Nbr QC Performed: 7

Alpha

Maximum:	89.8 dpm/100cm²
Minimum:	-1.9 dpm/100cm²
Mean:	33.3 dpm/100cm²
Standard Deviation:	21.8
QC Maximum:	51.9 dpm/100cm²
QC Minimum:	22.3 dpm/100cm²
QC Mean:	38.9 dpm/100cm²
Transuranic DCGL$_W$:	100.0 dpm/100cm²
Transuranic DCGL$_{EMC}$:	300.0 dpm/100cm²

Removable Surface Activity Measurements

Nbr Random Measurements Required: 125 | Nbr Biased Measurements Required: 0

Nbr Random Measurements Performed: 128 | Nbr Biased Measurements Performed: 0

Alpha

Maximum:	7.5 dpm/100cm²
Minimum:	-1.5 dpm/100cm²
Mean:	0.5 dpm/100cm²
Standard Deviation:	1.6
Transuranic DCGL$_W$:	20.0 dpm/100cm²

Media Sample Results

Nbr Random Required: 0 | Nbr Biased Required: 0

Nbr Random Collected: 0 | Nbr Biased Collected: 0

Conclusion - A comparison of the random, biased and QC measurement results against the PDSP Table 7-1 Surface Contamination Guideline limits was conducted; the comparison demonstrates that this survey unit passes the criterion specified in the PDSP.

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Instrument Data Sheet

Inst/RCT Number	RCT ID	Analysis Date	Instr Model	Instru S/N	Probe Type	Calibration Due Dt	Instru Efficiency		A-Priori MDA (dpm/100cm²)		Survey Type
							Alpha	Beta	Alpha	Beta	
23	514979	08/02/04	Electra	1536	DP-6	12/22/04	0.218	NA	48.0	NA	T
24	514979	08/03/04	Electra	1536	DP-6	12/22/04	0.218	NA	48.0	NA	T
25	516635	08/03/04	Electra	2380	DP-6	01/24/05	0.223	NA	48.0	NA	Q
26	516635	08/03/04	SAC-4	1178	NA	09/17/04	0.333	NA	10.0	10.0	R
27	516635	08/03/04	SAC-4	1410	NA	10/13/04	0.333	NA	10.0	10.0	R
28	516635	08/03/04	SAC-4	1491	NA	09/17/04	0.333	NA	10.0	10.0	R
29	516635	08/03/04	SAC-4	1354	NA	09/18/04	0.333	NA	10.0	10.0	R
30	513185	08/04/04	Electra	1551	DP-6	12/21/04	0.214	NA	48.0	NA	T
31	514510	08/04/04	SAC-4	1410	NA	10/13/04	0.333	NA	10.0	10.0	R

Survey Types: T = Total Surface Activity, Q = TSA QC, S = Scan, R = Removable Surface Activity, I = Investigation

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N001	31	0.0	N/A	
771072PRP-N002	26	0.0	N/A	
771072PRP-N003	27	0.0	N/A	
771072PRP-N004	31	-1.5	N/A	
771072PRP-N005	28	1.5	N/A	
771072PRP-N006	31	-1.5	N/A	
771072PRP-N007	31	-1.5	N/A	
771072PRP-N008	29	-0.9	N/A	
771072PRP-N009	26	0.0	N/A	
771072PRP-N010	27	7.5	N/A	
771072PRP-N011	28	0.0	N/A	
771072PRP-N012	29	-0.9	N/A	
771072PRP-N013	26	3.0	N/A	
771072PRP-N014	27	0.0	N/A	
771072PRP-N015	31	-1.5	N/A	
771072PRP-N016	31	-1.5	N/A	
771072PRP-N017	31	-1.5	N/A	
771072PRP-N018	31	0.0	N/A	
771072PRP-N019	31	0.0	N/A	
771072PRP-N020	31	-1.5	N/A	
771072PRP-N021	31	4.5	N/A	
771072PRP-N022	31	0.0	N/A	
771072PRP-N023	31	0.0	N/A	
771072PRP-N024	31	0.0	N/A	
771072PRP-N025	31	0.0	N/A	
771072PRP-N026	31	0.0	N/A	
771072PRP-N027	31	-1.5	N/A	
771072PRP-N028	31	-1.5	N/A	
771072PRP-N029	31	-1.5	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N030	31	-1.5	N/A	
771072PRP-N031	31	0.0	N/A	
771072PRP-N032	31	-1.5	N/A	
771072PRP-N033	31	-1.5	N/A	
771072PRP-N034	31	-1.5	N/A	
771072PRP-N035	28	0.0	N/A	
771072PRP-N036	29	2.1	N/A	
771072PRP-N037	26	1.5	N/A	
771072PRP-N038	27	0.0	N/A	
771072PRP-N039	28	1.5	N/A	
771072PRP-N040	29	0.6	N/A	
771072PRP-N041	26	1.5	N/A	
771072PRP-N042	27	0.0	N/A	
771072PRP-N043	28	0.0	N/A	
771072PRP-N044	29	-0.9	N/A	
771072PRP-N045	26	1.5	N/A	
771072PRP-N046	27	1.5	N/A	
771072PRP-N047	28	1.5	N/A	
771072PRP-N048	29	0.6	N/A	
771072PRP-N049	26	1.5	N/A	
771072PRP-N050	27	3.0	N/A	
771072PRP-N051	28	3.0	N/A	
771072PRP-N052	29	-0.9	N/A	
771072PRP-N053	26	3.0	N/A	
771072PRP-N054	27	0.0	N/A	
771072PRP-N055	28	1.5	N/A	
771072PRP-N056	29	-0.9	N/A	
771072PRP-N057	26	0.0	N/A	
771072PRP-N058	27	0.0	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N059	28	6.0	N/A	
771072PRP-N060	29	-0.9	N/A	
771072PRP-N061	26	0.0	N/A	
771072PRP-N062	27	1.5	N/A	
771072PRP-N063	28	3.0	N/A	
771072PRP-N064	29	2.1	N/A	
771072PRP-N065	26	0.0	N/A	
771072PRP-N066	27	1.5	N/A	
771072PRP-N067	28	0.0	N/A	
771072PRP-N068	29	-0.9	N/A	
771072PRP-N069	26	0.0	N/A	
771072PRP-N070	27	1.5	N/A	
771072PRP-N071	28	1.5	N/A	
771072PRP-N072	29	-0.9	N/A	
771072PRP-N073	26	1.5	N/A	
771072PRP-N074	27	1.5	N/A	
771072PRP-N075	31	-1.5	N/A	
771072PRP-N076	31	-1.5	N/A	
771072PRP-N077	28	0.0	N/A	
771072PRP-N078	29	-0.9	N/A	
771072PRP-N079	26	0.0	N/A	
771072PRP-N080	27	1.5	N/A	
771072PRP-N081	28	0.0	N/A	
771072PRP-N082	29	0.6	N/A	
771072PRP-N083	26	0.0	N/A	
771072PRP-N084	27	0.0	N/A	
771072PRP-N085	28	0.0	N/A	
771072PRP-N086	29	-0.9	N/A	
771072PRP-N087	26	0.0	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N088	31	1.5	N/A	
771072PRP-N089	31	0.0	N/A	
771072PRP-N090	27	1.5	N/A	
771072PRP-N091	28	0.0	N/A	
771072PRP-N092	29	-0.9	N/A	
771072PRP-N093	26	0.0	N/A	
771072PRP-N094	27	3.0	N/A	
771072PRP-N095	28	0.0	N/A	
771072PRP-N096	29	-0.9	N/A	
771072PRP-N097	26	0.0	N/A	
771072PRP-N098	27	0.0	N/A	
771072PRP-N099	28	0.0	N/A	
771072PRP-N100	29	-0.9	N/A	
771072PRP-N101	26	0.0	N/A	
771072PRP-N102	27	0.0	N/A	
771072PRP-N103	28	0.0	N/A	
771072PRP-N104	29	-0.9	N/A	
771072PRP-N105	26	1.5	N/A	
771072PRP-N106	27	1.5	N/A	
771072PRP-N107	28	0.0	N/A	
771072PRP-N108	29	-0.9	N/A	
771072PRP-N109	26	0.0	N/A	
771072PRP-N110	27	0.0	N/A	
771072PRP-N111	28	3.0	N/A	
771072PRP-N112	29	-0.9	N/A	
771072PRP-N113	26	1.5	N/A	
771072PRP-N114	27	3.0	N/A	
771072PRP-N115	28	0.0	N/A	
771072PRP-N116	29	2.1	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N117	26	4.5	N/A	
771072PRP-N118	27	3.0	N/A	
771072PRP-N119	28	1.5	N/A	
771072PRP-N120	29	-0.9	N/A	
771072PRP-N121	26	1.5	N/A	
771072PRP-N122	27	1.5	N/A	
771072PRP-N123	28	0.0	N/A	
771072PRP-N124	29	0.6	N/A	
771072PRP-N125	26	1.5	N/A	
771072PRP-N126	27	3.0	N/A	
771072PRP-N127	28	0.0	N/A	
771072PRP-N128	29	-0.9	N/A	

Comments:

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N001	30	45.0	N/A	
771072PRP-N002	24	22.4	N/A	
771072QRP-N002	25	37.1	N/A	
771072PRP-N003	24	53.1	N/A	
771072PRP-N004	30	29.6	N/A	
771072PRP-N005	24	71.5	N/A	
771072PRP-N006	30	35.6	N/A	
771072PRP-N007	30	63.7	N/A	
771072PRP-N008	24	19.6	N/A	
771072PRP-N009	24	38.0	N/A	
771072PRP-N010	24	43.9	N/A	
771072PRP-N011	24	13.2	N/A	
771072PRP-N012	24	16.4	N/A	
771072PRP-N013	24	10.5	N/A	
771072PRP-N014	24	43.9	N/A	
771072PRP-N015	30	79.1	N/A	
771072PRP-N016	30	29.6	N/A	
771072PRP-N017	30	82.4	N/A	
771072PRP-N018	30	45.0	N/A	
771072PRP-N019	30	66.9	N/A	
771072PRP-N020	30	45.0	N/A	
771072PRP-N021	30	81.0	N/A	
771072PRP-N022	30	45.0	N/A	
771072PRP-N023	30	60.4	N/A	
771072PRP-N024	30	82.4	N/A	
771072PRP-N025	30	65.1	N/A	
771072PRP-N026	30	54.3	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N027	30	57.6	N/A	
771072PRP-N028	30	48.2	N/A	
771072PRP-N029	30	38.9	N/A	
771072PRP-N030	30	45.0	N/A	
771072PRP-N031	30	29.6	N/A	
771072PRP-N032	30	45.0	N/A	
771072PRP-N033	30	60.4	N/A	
771072PRP-N034	30	35.6	N/A	
771072PRP-N035	24	25.6	N/A	
771072PRP-N036	24	22.4	N/A	
771072PRP-N037	24	10.5	N/A	
771072PRP-N038	24	38.0	N/A	
771072PRP-N039	24	16.4	N/A	
771072PRP-N040	24	22.4	N/A	
771072PRP-N041	24	19.6	N/A	
771072PRP-N042	24	4.0	N/A	
771072QRP-N042	25	22.3	N/A	
771072PRP-N043	24	56.3	N/A	
771072PRP-N044	24	49.9	N/A	
771072PRP-N045	24	59.1	N/A	
771072PRP-N046	24	74.7	N/A	
771072PRP-N047	24	49.9	N/A	
771072PRP-N048	24	68.3	N/A	
771072PRP-N049	24	56.3	N/A	
771072QRP-N049	25	49.3	N/A	
771072PRP-N050	24	13.2	N/A	
771072PRP-N051	24	22.4	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N052	24	19.6	N/A	
771072PRP-N053	24	25.6	N/A	
771072PRP-N054	24	10.5	N/A	
771072PRP-N055	24	59.1	N/A	
771072PRP-N056	24	38.0	N/A	
771072PRP-N057	24	34.8	N/A	
771072PRP-N058	24	1.3	N/A	
771072PRP-N059	24	22.4	N/A	
771072QRP-N059	25	46.1	N/A	
771072PRP-N060	24	31.6	N/A	
771072PRP-N061	24	25.6	N/A	
771072PRP-N062	24	4.0	N/A	
771072PRP-N063	24	47.2	N/A	
771072PRP-N064	24	38.0	N/A	
771072PRP-N065	24	43.9	N/A	
771072PRP-N066	24	86.6	N/A	
771072PRP-N067	24	22.4	N/A	
771072PRP-N068	24	16.4	N/A	
771072PRP-N069	24	-1.9	N/A	
771072PRP-N070	24	40.7	N/A	
771072PRP-N071	24	47.2	N/A	
771072PRP-N072	24	13.2	N/A	
771072PRP-N073	24	40.7	N/A	
771072QRP-N073	25	51.9	N/A	
771072PRP-N074	24	34.8	N/A	
771072QRP-N074	25	31.3	N/A	
771072PRP-N075	30	51.0	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N076	30	57.6	N/A	
771072PRP-N077	23	16.4	N/A	
771072QRP-N077	25	34.0	N/A	
771072PRP-N078	23	22.4	N/A	
771072PRP-N079	23	28.8	N/A	
771072PRP-N080	23	13.2	N/A	
771072PRP-N081	23	19.6	N/A	
771072PRP-N082	23	10.5	N/A	
771072PRP-N083	23	13.2	N/A	
771072PRP-N084	23	7.2	N/A	
771072PRP-N085	23	47.2	N/A	
771072PRP-N086	23	16.4	N/A	
771072PRP-N087	23	31.6	N/A	
771072PRP-N088	30	35.6	N/A	
771072PRP-N089	30	51.0	N/A	
771072PRP-N090	23	7.2	N/A	
771072PRP-N091	23	62.3	N/A	
771072PRP-N092	23	77.4	N/A	
771072PRP-N093	23	19.6	N/A	
771072PRP-N094	23	16.4	N/A	
771072PRP-N095	23	10.5	N/A	
771072PRP-N096	23	22.4	N/A	
771072PRP-N097	23	13.2	N/A	
771072PRP-N098	23	7.2	N/A	
771072PRP-N099	23	10.5	N/A	
771072PRP-N100	23	19.6	N/A	
771072PRP-N101	23	89.8	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771072PRP-N102	23	34.8	N/A	
771072PRP-N103	23	38.0	N/A	
771072PRP-N104	23	28.8	N/A	
771072PRP-N105	23	22.4	N/A	
771072PRP-N106	23	10.5	N/A	
771072PRP-N107	23	19.6	N/A	
771072PRP-N108	23	16.4	N/A	
771072PRP-N109	23	7.2	N/A	
771072PRP-N110	23	4.0	N/A	
771072PRP-N111	23	38.0	N/A	
771072PRP-N112	23	47.2	N/A	
771072PRP-N113	23	16.4	N/A	
771072PRP-N114	23	7.2	N/A	
771072PRP-N115	23	4.0	N/A	
771072PRP-N116	23	28.8	N/A	
771072PRP-N117	23	31.6	N/A	
771072PRP-N118	23	22.4	N/A	
771072PRP-N119	23	71.5	N/A	
771072PRP-N120	23	10.5	N/A	
771072PRP-N121	23	13.2	N/A	
771072PRP-N122	23	13.2	N/A	
771072PRP-N123	23	4.0	N/A	
771072PRP-N124	23	16.4	N/A	
771072PRP-N125	23	13.2	N/A	
771072PRP-N126	23	16.4	N/A	
771072PRP-N127	23	22.4	N/A	
771072PRP-N128	23	13.2	N/A	

Survey Area: AE	Survey Unit: 771072	Building: 771

Description: First Floor (northwest side)

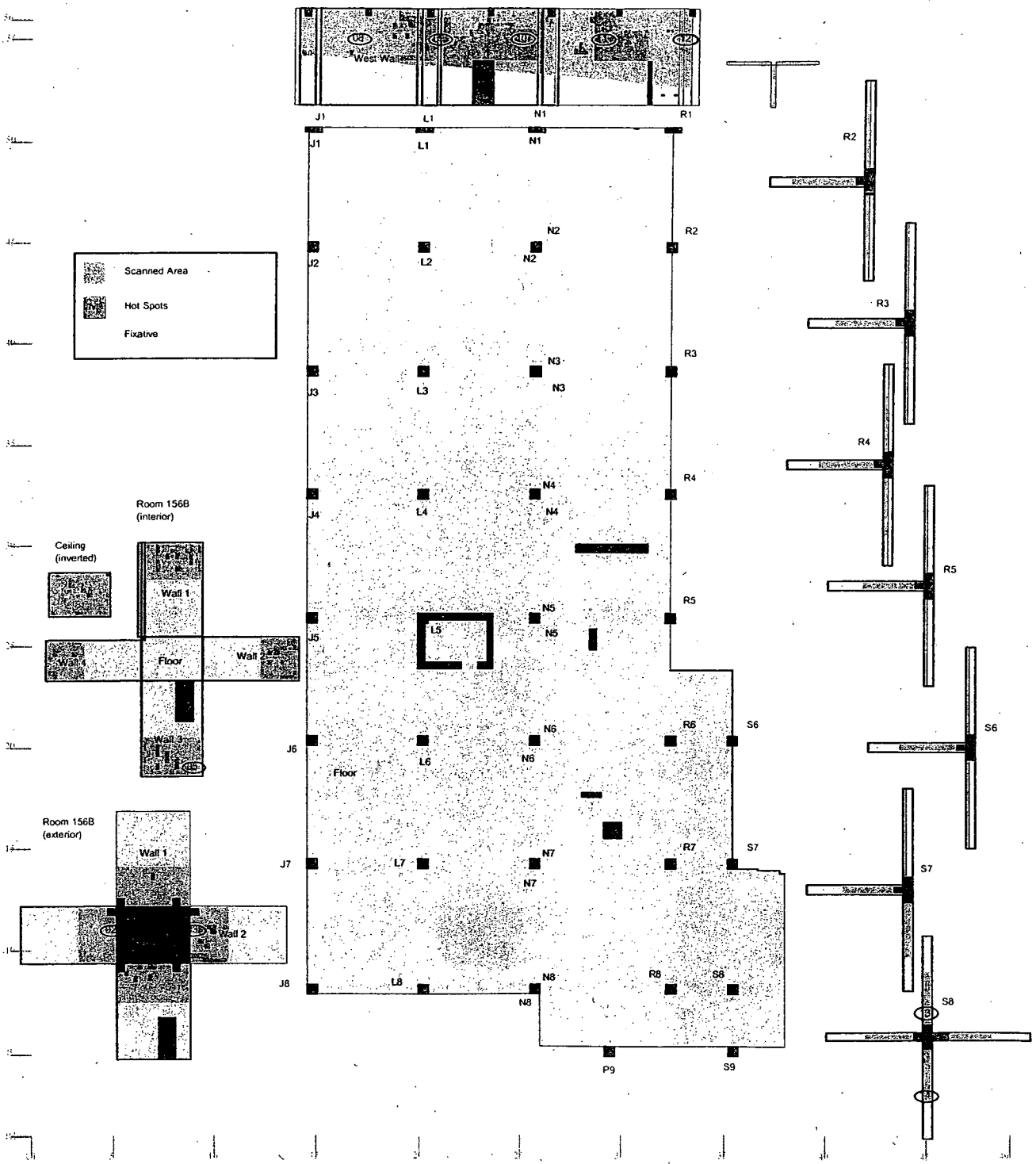
Comments:

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771072 Classification: 1
Building: 771
Survey Unit Description: First floor (northwest side)

Total Floor Area: 848 sq. m Total Area: 2571 sq. m Grid Size: 4m x 4m

SURVEY UNIT 771072 - MAP 1 OF 3



0 Feet 30
0 Meters 10

N

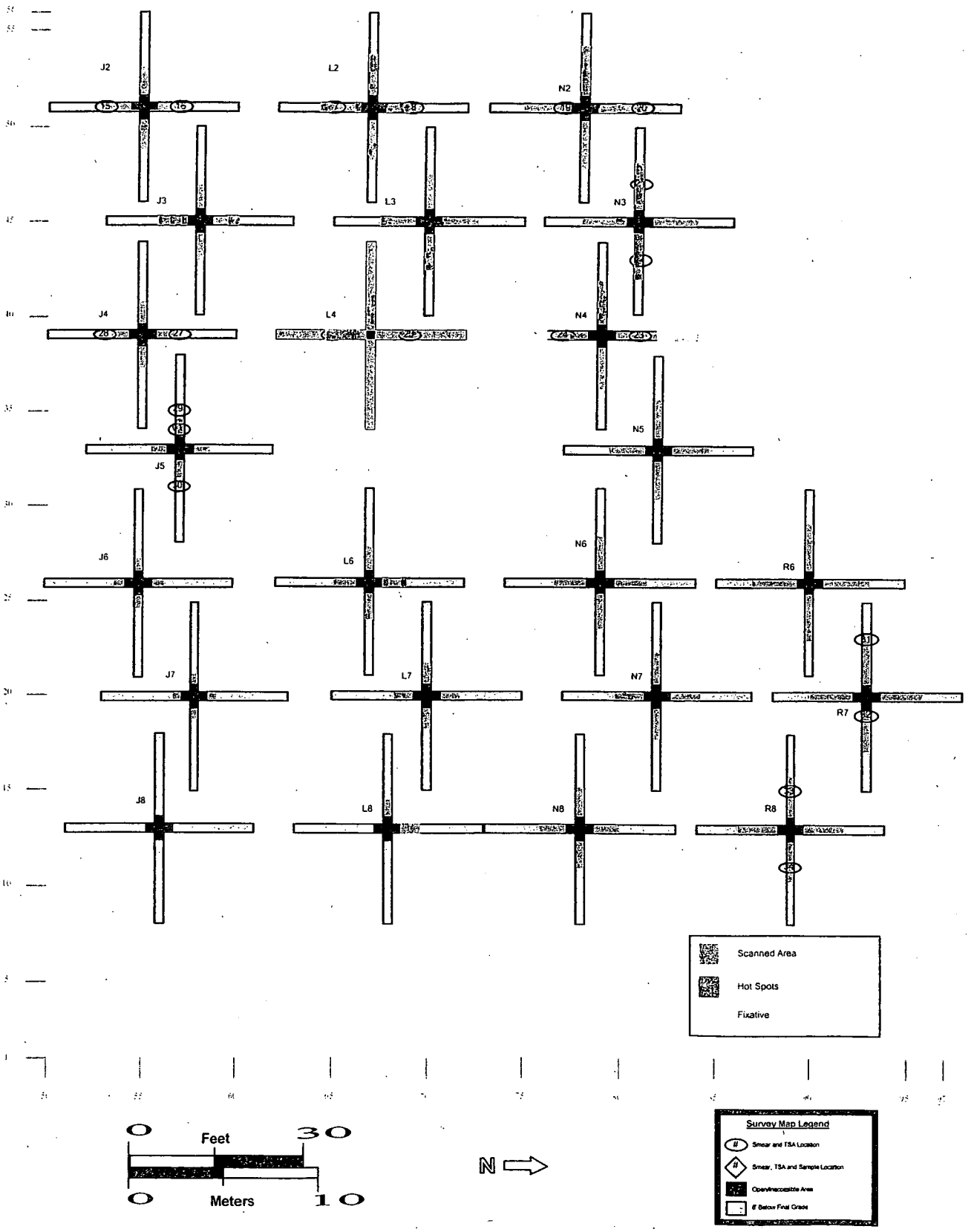
Survey Map Legend
Smear and TSA Location
Smear, TSA and Sample Location
Openthaccessible Area
6' Below First Grade

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771072 Classification: 1
Building: 771
Survey Unit Description: First floor (northwest side)

Total Floor Area: 848 sq. m Total Area: 2571 sq. m Grid Size: 4m x 4m

SURVEY UNIT 771072 - MAP 2 OF 3

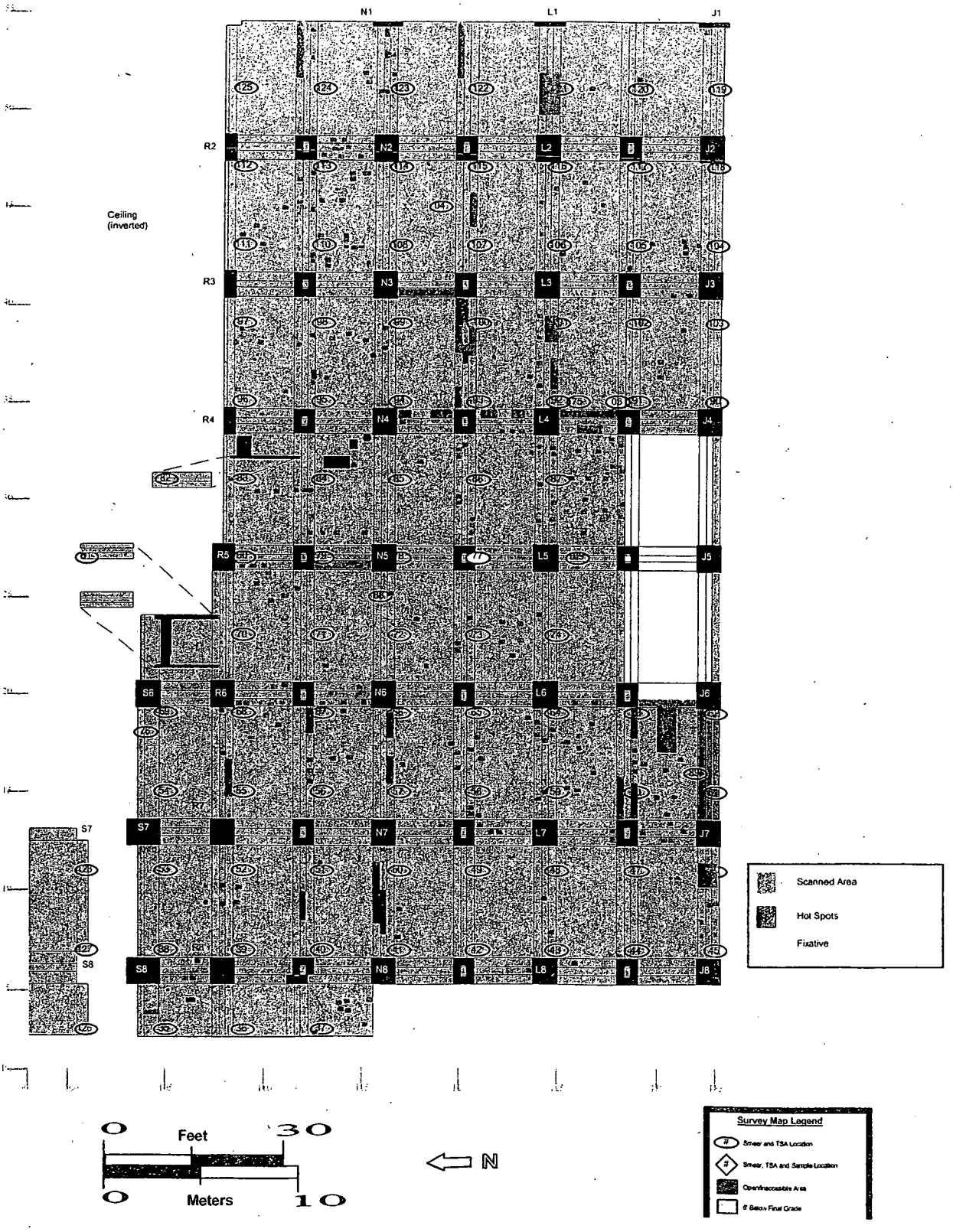


RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771072 Classification: 1
Building: 771
Survey Unit Description: First floor (northwest side)

Total Floor Area: 848 sq. m Total Area: 2571 sq. m Grid Size: 4m x 4m

SURVEY UNIT 771072 - MAP 3 OF 3



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ATTACHMENT C

Survey Unit 771073
Radiological Data Summary and Survey Map

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Rocky Flats Environmental Technology Site
Final Radiological Survey Summary Results

Total Surface Activity Measurements

Nbr Random Measurements Required: 65 | Nbr Biased Measurements Required: 0 | Nbr QC Required: 4

Nbr Random Measurements Performed: 65 | Nbr Biased Measurements Performed: 0 | Nbr QC Performed: 4

Alpha

Maximum:	85.1 dpm/100cm²
Minimum:	1.7 dpm/100cm²
Mean:	40.2 dpm/100cm²
Standard Deviation:	19.4
QC Maximum:	49.1 dpm/100cm²
QC Minimum:	15.1 dpm/100cm²
QC Mean:	36.7 dpm/100cm²
Transuranic DCGL$_W$:	100.0 dpm/100cm²
Transuranic DCGL$_{EMC}$:	300.0 dpm/100cm²

Removable Surface Activity Measurements

Nbr Random Measurements Required: 65 | Nbr Biased Measurements Required: 0

Nbr Random Measurements Performed: 65 | Nbr Biased Measurements Performed: 0

Alpha

Maximum:	4.2 dpm/100cm²
Minimum:	-0.6 dpm/100cm²
Mean:	0.6 dpm/100cm²
Standard Deviation:	1.3
Transuranic DCGL$_W$:	20.0 dpm/100cm²

Media Sample Results

Nbr Random Required: 0 | Nbr Biased Required: 0

Nbr Random Collected: 0 | Nbr Biased Collected: 0

Conclusion - A comparison of the random, biased and QC measurement results against the PDSP Table 7-1 Surface Contamination Guideline limits was conducted; the comparison demonstrates that this survey unit passes the criterion specified in the PDSP.

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Instrument Data Sheet

Inst/RCT Number	RCT ID	Analysis Date	Instr Model	Instru S/N	Probe Type	Calibration Due Dt	Instru Efficiency		A-Priori MDA (dpm/100cm²)		Survey Type
							Alpha	Beta	Alpha	Beta	
1	516635	08/05/04	Electra	2380	DP-6	01/24/05	0.223	NA	48.0	NA	T
2	516635	08/05/04	SAC-4	1178	NA	09/17/04	0.330	NA	NA	10.0	R
3	516635	08/05/04	SAC-4	1410	NA	10/13/04	0.330	NA	NA	10.0	R
4	516635	08/05/04	SAC-4	1491	NA	09/17/04	0.330	NA	NA	10.0	R
5	511760	08/05/04	Electra	1536	DP-6	12/22/04	0.218	NA	48.0	NA	Q

Survey Types: T = Total Surface Activity, Q = TSA QC, S = Scan, R = Removable Surface Activity, I = Investigation

Printed On: 09/07/04 13:09

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Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N001	4	-0.6	N/A	
771073PRP-N002	2	1.2	N/A	
771073PRP-N003	3	-0.3	N/A	
771073PRP-N004	2	4.2	N/A	
771073PRP-N005	3	-0.3	N/A	
771073PRP-N006	4	3.9	N/A	
771073PRP-N007	2	1.2	N/A	
771073PRP-N008	3	4.2	N/A	
771073PRP-N009	4	-0.6	N/A	
771073PRP-N010	2	1.2	N/A	
771073PRP-N011	3	-0.3	N/A	
771073PRP-N012	4	0.9	N/A	
771073PRP-N013	2	-0.3	N/A	
771073PRP-N014	3	-0.3	N/A	
771073PRP-N015	4	2.4	N/A	
771073PRP-N016	2	-0.3	N/A	
771073PRP-N017	3	1.2	N/A	
771073PRP-N018	4	2.4	N/A	
771073PRP-N019	2	-0.3	N/A	
771073PRP-N020	3	-0.3	N/A	
771073PRP-N021	4	0.9	N/A	
771073PRP-N022	2	1.2	N/A	
771073PRP-N023	3	2.7	N/A	
771073PRP-N024	4	-0.6	N/A	
771073PRP-N025	2	-0.3	N/A	
771073PRP-N026	3	2.7	N/A	
771073PRP-N027	4	0.9	N/A	
771073PRP-N028	2	1.2	N/A	
771073PRP-N029	3	-0.3	N/A	

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N030	4	0.9	N/A	
771073PRP-N031	2	1.2	N/A	
771073PRP-N032	3	-0.3	N/A	
771073PRP-N033	4	-0.6	N/A	
771073PRP-N034	2	1.2	N/A	
771073PRP-N035	3	1.2	N/A	
771073PRP-N036	4	-0.6	N/A	
771073PRP-N037	2	-0.3	N/A	
771073PRP-N038	3	-0.3	N/A	
771073PRP-N039	4	-0.6	N/A	
771073PRP-N040	2	-0.3	N/A	
771073PRP-N041	3	2.7	N/A	
771073PRP-N042	4	-0.6	N/A	
771073PRP-N043	2	1.2	N/A	
771073PRP-N044	3	-0.3	N/A	
771073PRP-N045	4	2.4	N/A	
771073PRP-N046	2	-0.3	N/A	
771073PRP-N047	3	-0.3	N/A	
771073PRP-N048	4	0.9	N/A	
771073PRP-N049	2	-0.3	N/A	
771073PRP-N050	3	-0.3	N/A	
771073PRP-N051	4	2.4	N/A	
771073PRP-N052	2	1.2	N/A	
771073PRP-N053	3	-0.3	N/A	
771073PRP-N054	4	-0.6	N/A	
771073PRP-N055	2	1.2	N/A	
771073PRP-N056	3	-0.3	N/A	
771073PRP-N057	4	-0.6	N/A	
771073PRP-N058	2	1.2	N/A	

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random Removable Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N059	3	-0.3	N/A	
771073PRP-N060	4	-0.6	N/A	
771073PRP-N061	2	-0.3	N/A	
771073PRP-N062	3	-0.3	N/A	
771073PRP-N063	4	0.9	N/A	
771073PRP-N064	2	-0.3	N/A	
771073PRP-N065	3	-0.3	N/A	

Comments: None

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N001	1	64.5	N/A	
771073QRP-N001	5	49.1	N/A	
771073PRP-N002	1	37.6	N/A	
771073PRP-N003	1	40.3	N/A	
771073PRP-N004	1	76.1	N/A	
771073PRP-N005	1	79.3	N/A	
771073PRP-N006	1	67.2	N/A	
771073PRP-N007	1	37.6	N/A	
771073PRP-N008	1	40.3	N/A	
771073PRP-N009	1	22.3	N/A	
771073PRP-N010	1	64.5	N/A	
771073PRP-N011	1	28.6	N/A	
771073PRP-N012	1	28.6	N/A	
771073PRP-N013	1	22.3	N/A	
771073QRP-N013	5	15.1	N/A	
771073PRP-N014	1	28.6	N/A	
771073PRP-N015	1	49.2	N/A	
771073PRP-N016	1	16.5	N/A	
771073PRP-N017	1	46.6	N/A	
771073PRP-N018	1	4.4	N/A	
771073PRP-N019	1	19.6	N/A	
771073PRP-N020	1	37.6	N/A	
771073PRP-N021	1	58.2	N/A	
771073PRP-N022	1	19.6	N/A	
771073PRP-N023	1	49.2	N/A	
771073PRP-N024	1	28.6	N/A	
771073PRP-N025	1	16.5	N/A	

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N026	1	25.5	N/A	
771073QRP-N026	5	39.9	N/A	
771073PRP-N027	1	46.6	N/A	
771073PRP-N028	1	58.2	N/A	
771073PRP-N029	1	31.3	N/A	
771073PRP-N030	1	52.4	N/A	
771073QRP-N030	5	42.6	N/A	
771073PRP-N031	1	46.6	N/A	
771073PRP-N032	1	52.4	N/A	
771073PRP-N033	1	67.2	N/A	
771073PRP-N034	1	55.5	N/A	
771073PRP-N035	1	46.6	N/A	
771073PRP-N036	1	13.4	N/A	
771073PRP-N037	1	34.4	N/A	
771073PRP-N038	1	1.7	N/A	
771073PRP-N039	1	28.6	N/A	
771073PRP-N040	1	31.3	N/A	
771073PRP-N041	1	22.3	N/A	
771073PRP-N042	1	28.6	N/A	
771073PRP-N043	1	1.7	N/A	
771073PRP-N044	1	37.6	N/A	
771073PRP-N045	1	85.1	N/A	
771073PRP-N046	1	85.1	N/A	
771073PRP-N047	1	31.3	N/A	
771073PRP-N048	1	34.4	N/A	
771073PRP-N049	1	25.5	N/A	
771073PRP-N050	1	31.3	N/A	

Survey Area: AE	Survey Unit: 771073	Building: 771

Description: First Floor (west side,south end)

Random/QC Total Surface Activity Data Sheet

Random Measurement Location	Inst / RCT Nbr	Net Alpha (dpm/100cm²)	Net Beta (dpm/100cm²)	
771073PRP-N051	1	55.5	N/A	
771073PRP-N052	1	28.6	N/A	
771073PRP-N053	1	34.4	N/A	
771073PRP-N054	1	31.3	N/A	
771073PRP-N055	1	40.3	N/A	
771073PRP-N056	1	25.5	N/A	
771073PRP-N057	1	79.3	N/A	
771073PRP-N058	1	40.3	N/A	
771073PRP-N059	1	31.3	N/A	
771073PRP-N060	1	58.2	N/A	
771073PRP-N061	1	64.5	N/A	
771073PRP-N062	1	34.4	N/A	
771073PRP-N063	1	28.6	N/A	
771073PRP-N064	1	46.6	N/A	
771073PRP-N065	1	55.5	N/A	

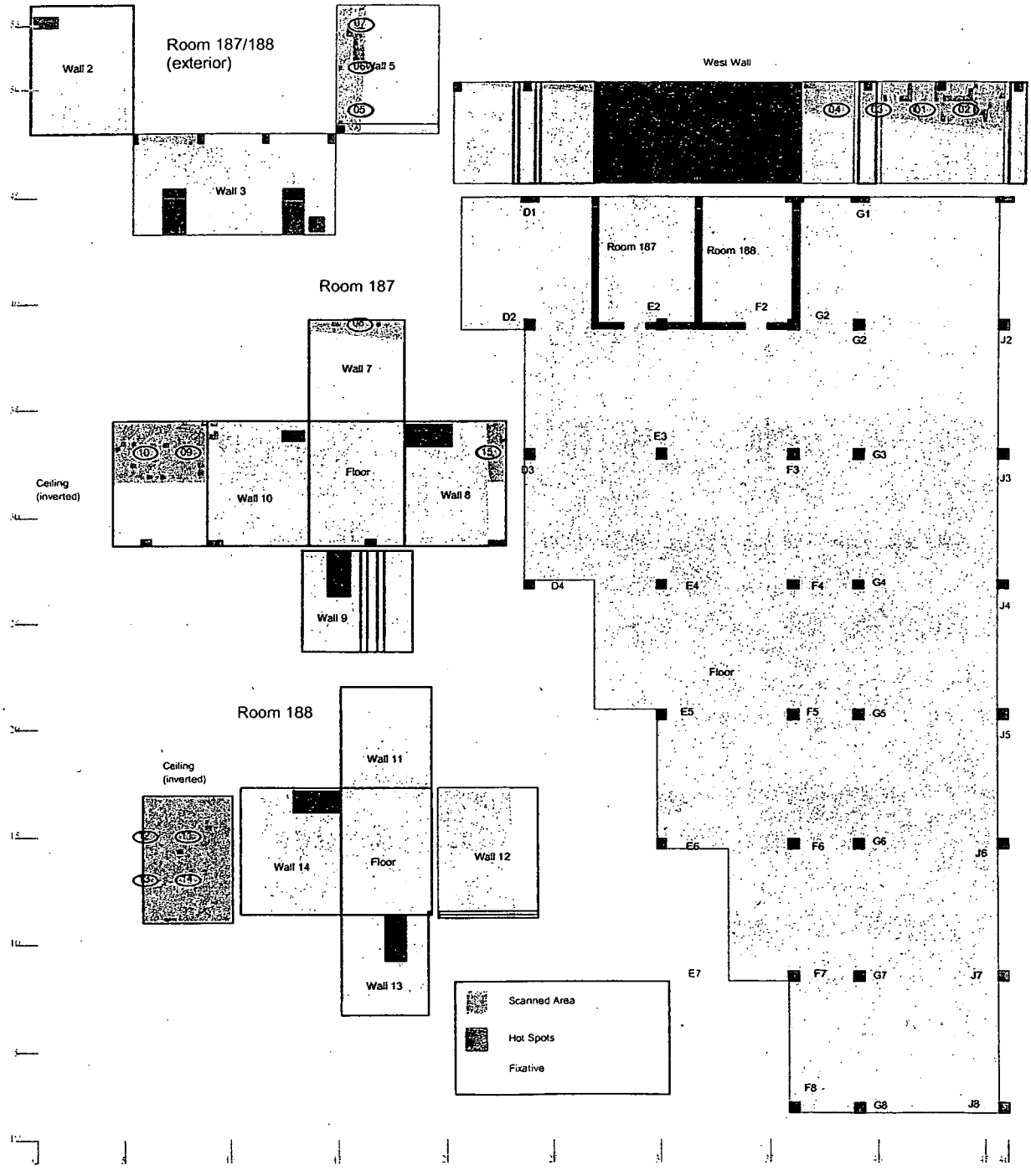
Comments: None

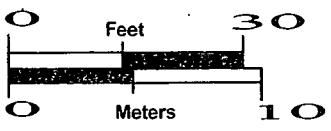
RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771073 Classification: 1
Building: 771
Survey Unit Description: First floor (west side,south end)

Total Floor Area: N/A Total Area: 433 sq. m Grid Size: 2m x 2m

SURVEY UNIT 771073 - MAP 1 OF 3





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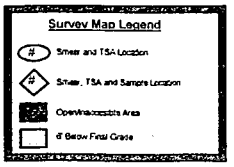

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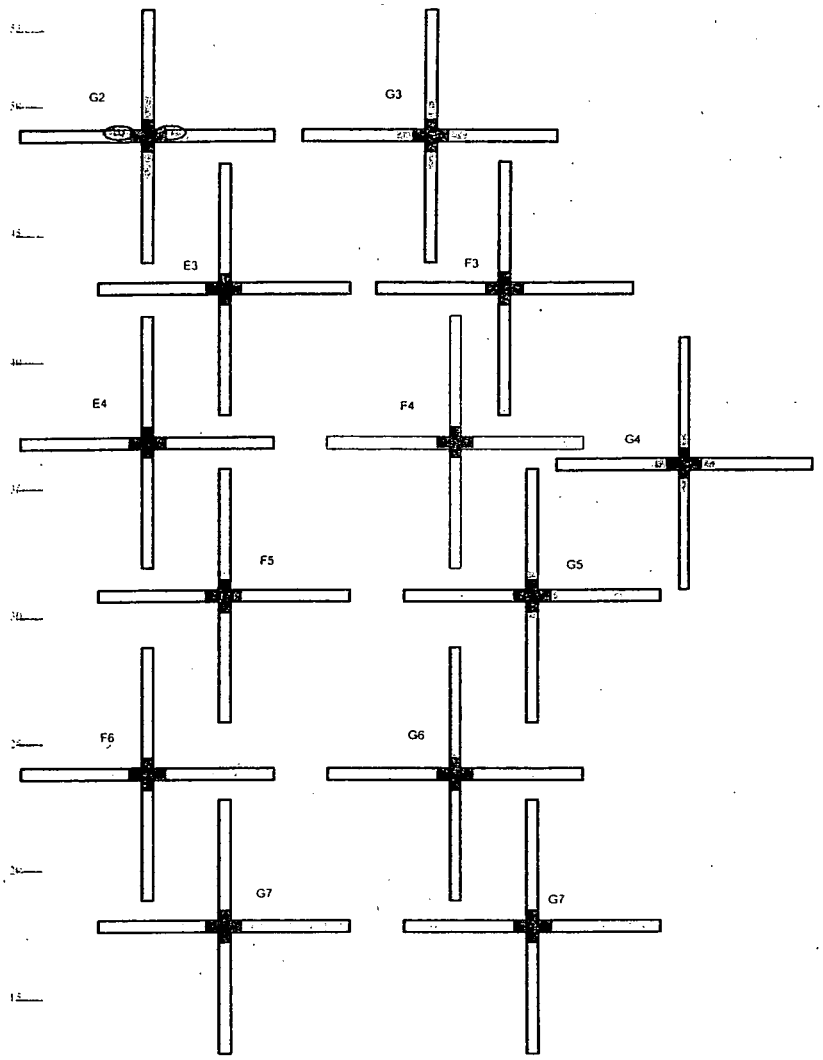
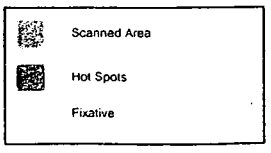
RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

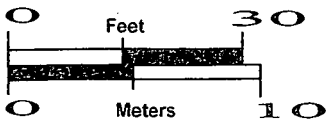
Survey Area: AE Survey Unit: 771073 Classification: 1
Building: 771
Survey Unit Description: First floor (west side, south end)

Total Floor Area: N/A Total Area: 433 sq. m Grid Size: 2m x 2m

SURVEY UNIT 771073 - MAP 2 OF 3







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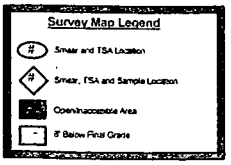
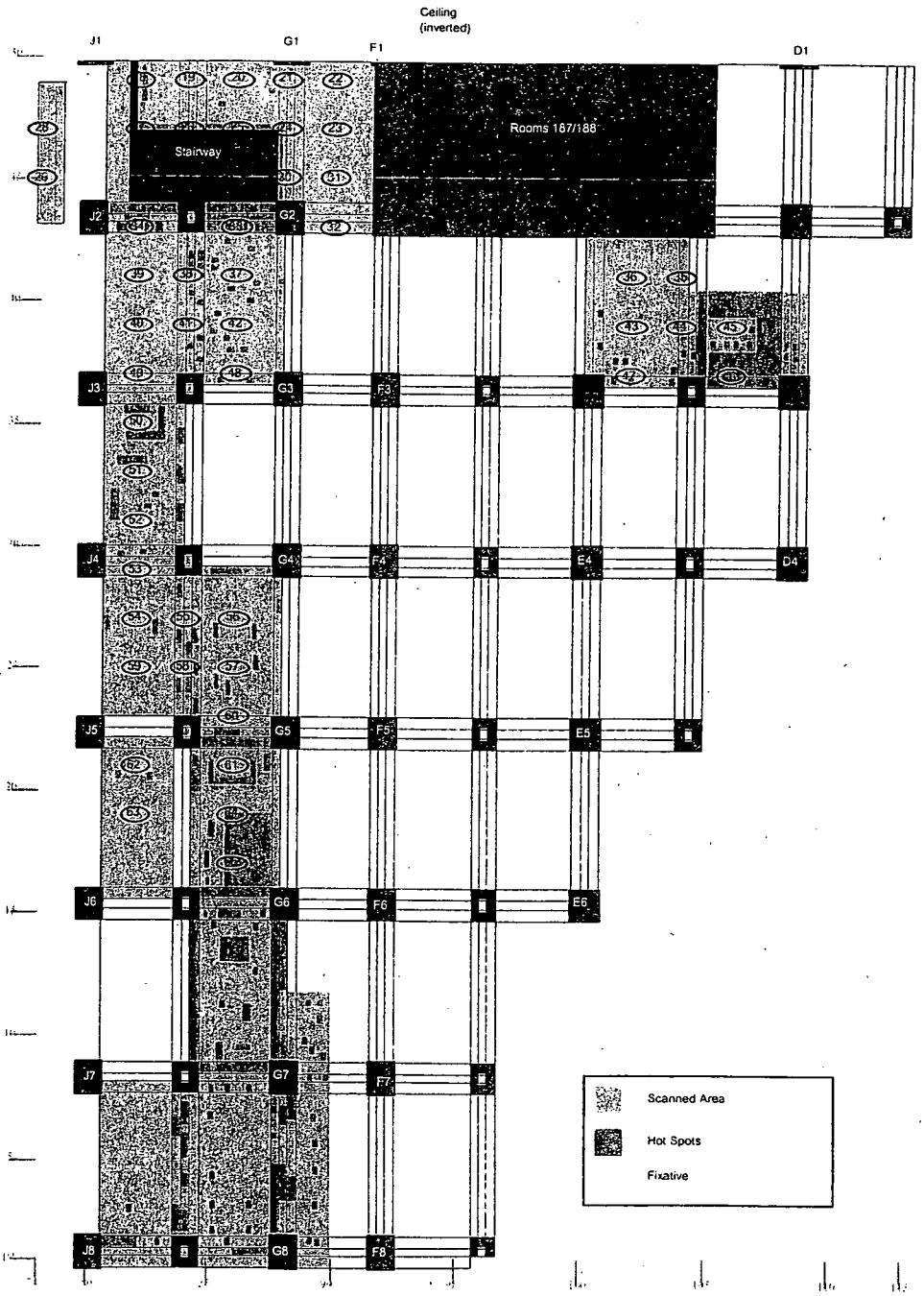


RADIOLOGICAL CLOSEOUT SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771073 Classification: 1
Building: 771
Survey Unit Description: First floor (west side, south end)

Total Floor Area: N/A Total Area: 433 sq. m Grid Size: 2m x 2m

SURVEY UNIT 771073 - MAP 3 OF 3



0 Feet 30

0 Meters 10

N

Survey Map Legend
Smear and TSA Location
Smear, TSA and Sample Location
Open/Inaccessible Area
Below Final Grade

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ATTACHMENT D

Chemical Data Summaries and Sample Maps

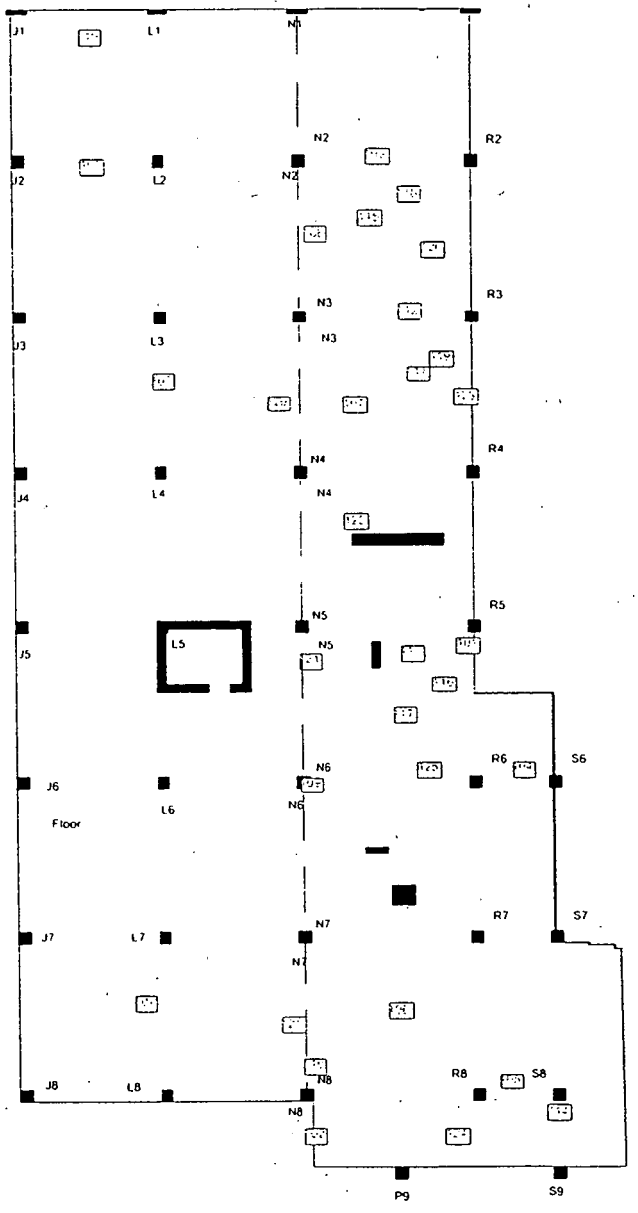
BERYLLIUM CHARACTERIZATION SURVEY FOR THE 771 CLUSTER

Survey Area: AE Survey Unit: 771072 Be Classification: NA
Building: 771
Survey Unit Description: First floor (North end west side)

Total Floor Area: 9250 sq. ft. Total Area: NA Grid Size: NA

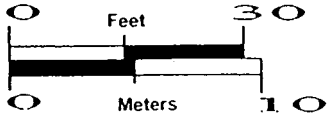
SURVEY UNIT 771072 Be - MAP 1 OF 1

Sample location	Sample Number	Sample Result
101, 103, 107	771-07-20-2004-76-101,103,107	<0.1 ug/100 sq cm
	771-07-20-2004-76-143B thru 144B	Blanks



Sample location	Sample Number	Sample Result
119 thru 121	771-07-20-2004-76-119 thru 121	<0.1 ug/100 sq cm
	771-07-20-2004-76-143B thru 144B	Blanks

Sample location	Sample Number	Sample Result
101 thru 125	771-12-01-2003-76-101 thru 125	<0.1 ug/100 sq. cm
	771-12-01-2003-76-126B thru 127B	Blanks



N

Survey Map Legend

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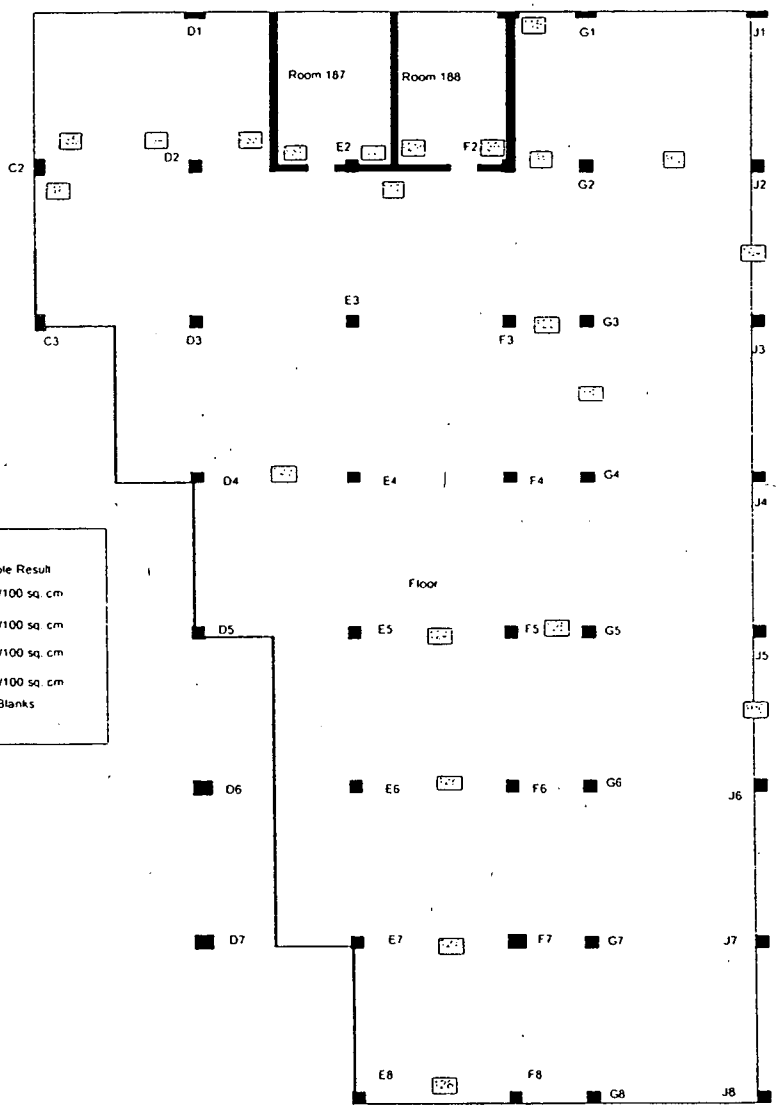
BERYLLIUM CHARACTERIZATION SURVEY FOR THE 771 CLUSTER

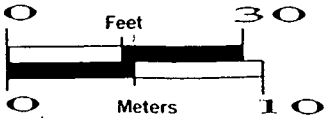
Survey Area: AE Survey Unit: 771073 Be Classification: NA
Building: 771
Survey Unit Description: First floor (Consolidated Labs north end)

Total Floor Area: 6652 sq. ft. Total Area: NA Grid Size: NA

SURVEY UNIT 771073 Be - MAP 1 OF 1



Sample location	Sample Number	Sample Result
102, 104 thru 106	771-07-20-2004-76-102, 104 thru 106	<0.1 ug/100 sq. cm
115 thru 118	771-07-20-2004-76-115 thru 118	<0.1 ug/100 sq. cm
122 thru 128	771-07-20-2004-76-122 thru 128	<0.1 ug/100 sq. cm
129 thru 135	771-07-20-2004-76-129 thru 135	<0.1 ug/100 sq. cm
	771-07-20-2004-76-143B thru 144B	Blanks



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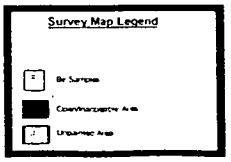

771	180	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS J2 & L2	SURFACE	771-07202004-76-101	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	180	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS G3 & J3	SURFACE	771-07202004-76-102	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	180	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS L3 & L4	SURFACE	771-07202004-76-103	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	180	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS J4 & J5	SURFACE	771-07202004-76-104	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	164	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS G5 & G6	SURFACE	771-07202004-76-105	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	164	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS J6 & J7	SURFACE	771-07202004-76-106	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	164	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS L7 & L8	SURFACE	771-07202004-76-107	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	D CORRIDOR	7/20/2004	BE SWIPE TAKEN SOUTH OF COLUMN G1	SURFACE	771-07202004-76-115	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2
771	D CORRIDOR	7/20/2004	BE SWIPE TAKEN SOUTH OF COLUMN G2	SURFACE	771-07202004-76-116	BERYLLIUM AND BE COMPOUND S (AS BE)	< 0.1000 _ UG/100CM2

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771	D CORRIDOR	7/20/2004	BE SWIPE TAKEN WEST BETWEEN COLUMNS E2 & F2	SURFACE	771-07202004-76-117	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	D CORRIDOR	7/20/2004	BE SWIPE TAKEN NORTH OF COLUMN C2	SURFACE	771-07202004-76-118	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	D CORRIDOR	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS J1 & L1	SURFACE	771-07202004-76-119	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	H CORRIDOR	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS N3 & N4	SURFACE	771-07202004-76-120	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	H CORRIDOR	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS N7 & N8	SURFACE	771-07202004-76-121	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS F3 & G3	SURFACE	771-07202004-76-122	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS D4 & E4	SURFACE	771-07202004-76-123	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS E5 & F5	SURFACE	771-07202004-76-124	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS F5 & G5	SURFACE	771-07202004-76-125	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2

771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS E6 & F6	SURFACE	771-07202004-76-126	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS E7 & F7	SURFACE	771-07202004-76-127	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	180D	7/20/2004	BE SWIPE TAKEN BETWEEN COLUMNS E8 & F8	SURFACE	771-07202004-76-128	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	188	7/20/2004	BE SWIPE TAKEN SOUTH EAST CORNER	SURFACE	771-07202004-76-129	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	188	7/20/2004	BE SWIPE TAKEN NORTH EAST CORNER	SURFACE	771-07202004-76-130	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	187	7/20/2004	BE SWIPE TAKEN SOUTH EAST CORNER	SURFACE	771-07202004-76-131	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	187	7/20/2004	BE SWIPE TAKEN NORTH EAST CORNER	SURFACE	771-07202004-76-132	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	186	7/20/2004	BE SWIPE TAKEN WEST WALL BETWEEN COLUMNS D2&D1	SURFACE	771-07202004-76-133	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	186	7/20/2004	BE SWIPE TAKEN SOUTH/BEWTEEN COLUMNS D2&D1	SURFACE	771-07202004-76-134	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2

771	186	7/20/2004	BE SWIPE TAKEN EST OF COLUMN C2	SURFACE	771-07202004-76-135	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-101	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-102	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-103	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-104	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-105	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-106	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-107	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-108	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2

771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-109	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-110	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-111	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-112	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-113	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-114	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-115	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-116	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-117	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2

771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-118	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-119	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-120	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-121	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-122	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-123	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-124	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2
771	157	12/1/2003	FINAL SURVEY BE WIPES ON FLOOR	SURFACE	771-12012003-76-125	BERYLLIUM AND BE COMPOUNDS (AS BE)	< 0.1000 _ UG/100CM2

ATTACHMENT E

Data Quality Assessment

DATA QUALITY ASSESSMENT (DQA)

VERIFICATION & VALIDATION OF RESULTS

V&V of the data confirm that appropriate quality controls are implemented throughout the sampling and analysis process, and that any substandard controls result in qualification or rejection of the data in question. The required quality controls and their implementation are summarized in a tabular, checklist format for each category of data – radiological surveys and chemical analyses (specifically beryllium).

DQA criteria and results are provided in a tabular format for each suite of surveys or chemical analyses performed; the radiological survey assessment is provided in Table E-1, and beryllium in E-2. A data completeness summary for all results is given in Table E-3. A data completeness summary for the radiological data representing areas greater than 6' below final grade is provided in Table E-4. These areas were characterized per the *Building 771/774 Closure Project Characterization Plan for Areas Greater than Six Feet Below Final Grade*, dated November 24, 2003 (refer to Attachment G).

All relevant Quality records supporting this report are maintained in the B771 Characterization Project Files. This report will be submitted to the CERCLA Administrative Record for permanent storage within 30 days of approval by the Regulators. All radiological data are organized into Survey Packages, which correlate to unique Survey Units. Chemical data are organized by RIN (Report Identification Number) and are traceable to the sample number and corresponding sample location.

Survey designs were implemented based on the transuranic limits used as DCGLs in the unrestricted release decision process. All survey results were evaluated against, and were less than the Transuranic $DCGL_w$ (100 dpm/100cm^2).

SUMMARY

In summary, the data presented in this report have been verified and validated relative to the quality requirements and project decisions as stated in the original DQOs. All data are useable based on qualifications stated herein and are considered satisfactory without qualification.

Based upon an independent review of the radiological data, it is determined that the original project DQOs satisfied site PDSP guidance. However, it should be noted that because portions of the facility exceed the DCGLs and shall be dispositioned as radiological waste, the original survey design was modified. When a randomly selected TSA/RSA location landed on a previously identified "hot-spot", the location was moved as close as possible to the original location within the square meter. When this was not

possible, a new random location was selected. All facility contamination levels were below applicable unrestricted release levels, except as noted in Tables E-3 and E-4. Minimum survey requirements were met, sampling/survey protocol was performed in accordance with applicable procedures, survey units were properly designed and bounded, and instrument performance and calibration were within acceptable limits.

Level 1 Isolation Controls have been implemented to prevent the inadvertent introduction of further contamination into the facility. On this basis, the B771 AE (1st Floor West Side) meets the RLCP and PDSP DQO criteria with the confidences stated herein.

Table E-1 V&V of Radiological Surveys – B771 AE (1st Floor West Side)

V&V CRITERIA, RADIOLGICAL SURVEYS		K-H RSP 16.00 Series MARSSIM (NUREG-1575)		
QUALITY REQUIREMENTS				
Parameters		Measure	Frequency	COMMENTS
ACCURACY	initial calibrations	80%<x<120 %	≥1	Calibration using Alpha Group procedure and approved technicians.
	daily source checks	80%<x<120 %	≥1/day	Performed daily/within range.
	local area background: Field	typically < 10 dpm	≥1/day	All local area backgrounds were within expected Ranges <10 cpm
PRECISION	field duplicate measurements for TSA	≥5% of real survey points	≥100% packages	N/A
REPRESENTATIVENESS	MARSSIM methodology: Survey Unit 771072, 771073	statistical	NA	Random w/ statistical confidence. Some measurement locations were moved within the contiguous square meter when they landed on a previously identified "hot-spot". When this was not possible, a new random location was generated to replace the original location.
	Survey Maps	NA	NA	Random measurement locations controlled/mapped to ±1m. When this was not possible, a new random location was generated to replace the original location.

	Controlling Documents (Characterization Pkg; RSPs)	qualitative	NA	Refer to the Characterization Package (planning document) for field/sampling procedures (located in Project files); thorough documentation of the planning, sampling/analysis process, and data reduction into formats.
COMPARABILITY	units of measure	dpm/100cm^2	NA	Use of standardized engineering units in the reporting of measurement results.
COMPLETENESS	Plan vs. Actual surveys usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	detection limits	TSA: ≤50 dpm/100cm^2 RA: ≤10 dpm/100cm^2	all measures	MDAs ≤ ½ DCGL$_w$ per MARSSIM guidelines.

Table E-2 V&V of Beryllium Results – B771 AE (1st Floor West Side)

V&V CRITERIA, CHEMICAL ANALYSES		DATA PACKAGE		
BERYLLIUM	Prep: NMAM 7300 METHOD: OSHA ID-125G	LAB ---->	Johns Manville Corp. Denver, Co.	
QUALITY REQUIREMENTS		RIN ---->	RIN 771-07-20-2004-76-101 to 107, 115 to 135; 771-12-01-2003-76-101 to 125	
		Measure	Frequency	COMMENTS
ACCURACY	Calibrations Initial	linear calibration	≥1	No qualifications significant enough to change project decisions, i.e., classification of Type 3 facilities confirmed for radiological contamination. No Beryllium results above action level (0.2ug/100cm^2) or investigative level (0.1ug/100cm^2).
	Continuing	80%<%R<120%	≥1	
	LCS/MS	80%<%R<120%	≥1	
	Blanks - lab & field	<MDL	≥1	
	interference check std (ICP)	NA	NA	
PRECISION	Laboratory Control Sample Duplicate	80%<%R<120% (RPD<20%)	≥1	
	field duplicate	all results < RL	≥1	
REPRESENTATIVENESS	COC	Qualitative	NA	
	hold times/preservation	Qualitative	NA	
	Controlling Documents (Plans, Procedures, maps, etc.)	Qualitative	NA	
COMPARABILITY	measurement units	ug/100cm^2	NA	
COMPLETENESS	Plan vs. Actual samples usable results vs. unusable	>95% >95%	NA	
SENSITIVITY	detection limits	MDL of 0.10ug/100cm^2	all measures	

Table E-3 Data Completeness Summary (Areas within 6' of Final Grade) – B771 AE (1st Floor West Side)

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Beryllium	B771 AE 771072 (1st Floor North West)	31 biased (interior)	31 biased (interior)	No beryllium contamination found at any location, all results below the regulatory limit	OSHA ID-125G RIN 771-07-20-2004-76-101, 103, 107, 119 to 121 RIN 771-12-01-2003-76-101 to 125 No results above action level (0.2ug/100cm^2) or investigative level (0.1ug/100cm^2).
Beryllium	B771 AE 771073 (1st Floor South West)	22 biased (interior)	22 biased (interior)	No beryllium contamination found at any location, all results below the regulatory limit	OSHA ID-125G RIN 771-07-20-2004-76-102, 104, 105, 106, 115 to 118, 122 to 135 No results above action level (0.2ug/100cm^2) or investigative level (0.1ug/100cm^2).
Radiological	Survey Area: B771 AE 771072 (1st Floor North West)	128 α TSA (128 – Random/Systematic) and 128 α Smears (128 - Random/Systematic) 7 QC TSA	128 α TSA (128 – Random/Systematic) and 128 α Smears (128 - Random/Systematic) 7 QC TSA	No elevated contamination at any **random** location; all values below PDS unrestricted release levels No result above action level	Transuranic DCGLs Random survey locations that landed on previously identified "hot-spots" (i.e., areas shaded in red on survey unit overview maps) were relocated as close to the original location as possible within the continguous square-meter. When this was not possible, a new random location was selected from a random-number generator. No results above DCGLw identified at random locations.

Table E-3 Data Completeness Summary (Areas within 6' of Final Grade) – B771 AE (1st Floor West Side)

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
		100 % scanned	100 % scanned	All results less than DCGLs, except as noted in red on survey unit scan map (Att. B)	
Radiological	Survey Area: B771 AE 771073 (1st Floor South West)	65 α TSA (65 – Random/Systematic) and 65 α Smears (65 - Random/Systematic) 4 QC TSA 100% scanned	65 α TSA (65 – Random/Systematic) and 65 α Smears (65 - Random/Systematic) 4 QC TSA 100% scanned	No elevated contamination at any random location; all values below PDS unrestricted release levels No result above action level All results less than DCGLs, except as noted in red on survey unit scan map (Att. C)	Transuranic DCGLs Random survey locations that landed on previously identified "hot-spots" (i.e., areas shaded in red on survey unit overview maps) were relocated as close to the original location as possible within the continguous square-meter. When this was not possible, a new random location was selected from a random-number generator. No results above DCGLw identified at random locations.

Table E-4 Data Completeness Summary (Areas Greater than 6' Below Final Grade) – B771 AE (1st Floor West Side)

ANALYTE	Building/Area /Unit	Sample Number Planned (Real & QC)[A]	Sample Number Taken (Real & QC)	Project Decisions (Conclusions) & Uncertainty	Comments (RIN, Analytical Method, Qualifications, etc.)
Radiological	B771 AE (Greater than 6' Below Final Grade)	15 Random In-Situ Gamma-Spectroscopy 100% Scan with Bicron Fidler (NaI)	15 Random In-Situ Gamma-Spectroscopy	No radiological contamination found at any location in excess of action levels	No results above action level of 7 nCi/g (volumetric) or 100 nCi/g (surficial) for Am-241 and Pu-239 No results above action level of 250,000 cpm
Beryllium	B771 AE (Greater than 6' Below Final Grade)	See Table E-3	See Table E-3	No beryllium contamination found at any location, all results below the regulatory limit	The beryllium swipes presented for survey units 771072 and 771073 were all collected on the floor (horizontal) surfaces. The floors are greater than 6' below final grade. Therefore, the beryllium data collected for the respective survey units were collected in areas greater than 6' below final grade.

ATTACHMENT F

Historical Review

Area AE (B771 Laboratories Area)
Historical Review
August 10, 2004

Facility ID: Building 771 1st Floor Area (Survey Area AE)

Anticipated Facility Type (1, 2, or 3):

Survey area AE is part of a Type 3 Facility.

Physical Description:

Building 771 is located in the north-central section of RFETS Industrial Area. The building is predominantly constructed of reinforced concrete, with some non-production portions of the building constructed of concrete block and fabricated metal. The original building was a two-story structure built into the side of a hill with most of the three sides covered by earth. The fourth side, facing the north, provides the main entrance to the building. The original building measures 263 feet (north to south) by 282 feet (east to west) on the ground floor, and 202 feet by 282 feet on the second floor. The building is 31 feet tall, and there are no outside windows in the main building. The Building 771 Area AE was part of the original building.

Historical Operations:

Room 151 Radiation Control Area: The Room 151 Radiation Control Area includes of Rooms 135A, 135B, 151, 151A, 151B, 151C, 151E, 151F and 152. This included the RCT areas, the selective alpha air monitor (SAAM) alarm panel, the Radcon Support Lab, doffing area, and decontamination showers.

Room 153 Process Area: Room 153 was an R&D area that included Gloveboxes 153A, 153B, 153C, 153D and 153E; "Hot Cells" (HC) HC1, HC2, HC3, HC4, HC5 and HC6; and Tanks T-3, T-4, T-86, T-87 and T-88. The area also had test equipment, piping, remote manipulators, and water-walls. Gamma and high neutron emitting materials were processed, handled and packaged in this area. Various type of shielding, including Benelex, lead, and Plexiglas, were present. Various other chemicals were used, including acids, bases, oils, and solvents.

Room 158 Lab Area. The Room 158 Lab Area includes Rooms 157, 158, 159, 160, 165, 166A, 166B, 168 and 169. The area contains gloveboxes and B-Boxes used for laboratory analysis of Pu, Am and U, including Gloveboxes 158 North, 158 South, BX1, BX2, BX3, BX4, BX5, BX8 and BX9; and Hoods 2, 663A, 663B, 663C and 664. The area also contains the calorimeters and the Standards Laboratory where standards for counting equipment were prepared. Rooms 158 and 159 were the radiochemistry labs. Room 160 was the Calorimeter Lab, which contained cooling systems. Room 165 was the smear counting room that also has cooling systems. Room 166A was the Electronics Maintenance Shop. Solvents have been used and stored in this room. Lead solder was also commonly used in the instrument shop. Room 166B was used as an R&D metal-casting laboratory. Room 168 was a janitor's closet and storage area. Room 169 was the standards fabrication and calorimeter analysis lab. The calorimeter includes a cooling system. Many lead bricks are also stored here.

Room 180 Office Area: The Room 180 Office Area includes Room 180G, 180H, 180I, 180J and 180L. These are offices and corridor (L). This area contains cabinets and office furniture. Various RCRA-listed chemicals were formerly stored in these rooms.

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Rooms 180A-F, 180K, 187 and 188 Process Area: This process area includes Rooms 180A, 180B, 180C, 180D, 180E, 180F, 180K, 187 and 188. This process area has always been a Process Chemistry R&D area, with many process gloveboxes, process tanks, and associated process piping. Room 180A was a process simulation lab used for R&D work to define process-operating parameters. Lead shielding was used through the glovebox systems, as well as water-wall shielding. Room 180B was a vault that has been cleaned out and RCRA closed. Room 180C was an extension of 180A. Room 180D included a glovebox used for hydroxide precipitation and neutralization of lab wastes. Room 180E contains furnace casting metal storage within gloveboxes for R&D operations. Multiple kilograms of SNM hold-up were present in the 180E gloveboxes and process lines. Room 180F was an R&D analytical lab for radionuclide bearing acid and basic solutions. Room 180K was an R&D processing and storage facility for aqueous radioactive solutions. Lead plate, lead-lined glovebox gloves, and leaded glass windows exist in each of the 180 Process Area Rooms. The 180 Process Area was the origin of the 1957 fire, resulting was wide spread radioactive contamination.

Room 174 Process Area: The Room 174 Process Area includes Rooms 172, 174, 175 and 176. Gloveboxes A1and A4 contained nitric acid spray leaching processes to strip Pu contamination off of U components and parts. SNM hold-up for these boxes was expected to be several grams. Lead in the form of plate shielding, leaded glass windows and lead-lined gloves are on the gloveboxes. There are also six storage cabinets and a refrigeration unit. Gloveboxes A2 and A3 are evaporators for concentrating the spray leach solutions from A1 and A4. A caustic scrubber was connected to the gloveboxes, which was used to neutralize the acidic fumes. Glovebox A-1097 contains a HR Nash vacuum pump that provided the primary negative pressure to transfer solutions to the storage tanks. A heat exchanger cooled the pump.

Current Operational Status

The Building 771 1st Floor (Area AE) is no longer operational. All major equipment/piping and non-load-bearing walls have been removed. The structure surfaces have been decontaminated.

Contaminants of Concern

Asbestos

The Building 771 1st Floor Area AE was part of the original construction, therefore the presence of ACM was suspected. A Certified Building Inspector performed a complete inspection of the area and sampled the suspect materials. Asbestos-Containing Material (ACM) was identified in the following materials:

- silver-painted flashing (to be removed per the demolition plan)
- drywall joint compound (removed)
- mudded fittings on domestic water and steam condensate piping (removed)

Beryllium (Be)

Area AE is not and has never been a beryllium-controlled area. Based on extensive Be surveys throughout B771 and B774, no beryllium contamination is present on building surfaces in Building 771 (refer to B771 and B774 Hazards Characterization Report, 771 Closure Project). However, beryllium contamination was identified in some process equipment (gloveboxes and tanks).

Lead

The remaining paint in the AE area will not be removed from the substrate.

Although the AE Area paint was not specifically sampled and evaluated for lead, the samples collected from other areas of Building 771 are considered representative of the expected lead levels in Area AE. Analysis of 61 paint samples from the process areas of the 771/774 complex indicates that lead levels are below regulatory limits in paint.

Area AE (B771 Laboratories Area)
Historical Review
August 10, 2004

RCRA/CERCLA Constituents

Several portions of Area AE previously managed hazardous wastes. Specifically, Rooms 172, 182, 183, 186 and 188 were permitted hazardous waste container storage units. Each unit has been decontaminated (e.g., hydrolased) in accordance with the 771 Decommissioning Operations Plan and has met the "clean closure" decontamination criteria.

PCBs

Free-flowing or exposed PCBs have never been used or transferred in Area AE. PCB ballasts in fluorescent light fixtures were present throughout the area, and have been removed and disposed of. PCBs may be present in some applied paints. Because additional paint sampling was not performed in Area AE, and because painted surfaces remain in the area (cinderblock and concrete walls), any painted debris generated during demolition that is not recycled on-site will be disposed of a PCB bulk product waste.

Radiological Contaminants

The contaminants of concern for the 771 project, including all areas of Buildings 771 and 774, are transuranic alpha-emitting radioisotopes (including Pu-238, Pu-239/240, Pu-242, and Am-241). Based on findings documented in Radiological Engineering TBD-00161, Rev. 0, alpha-only surveys assure that the unrestricted-release limits for any other isotopes that may exist in Building 771/774 will not be exceeded.

Environmental Restoration Concerns

UBC sampling performed inside the B771 footprint has been performed. Based on the preliminary results, no remedial action is anticipated.

Additional Information

None

References

(1) *B771 and B774 Hazards Characterization Report for the 771 Closure Project*, dated June 12, 2001, Revision 0.

(2) *Building 771/774 Cluster Closure Project Reconnaissance Level Characterization Report*, dated August 8, 1998, Revision 2.

Further Actions

Complete the PDS process.

ATTACHMENT G

SAP for Areas Greater than 6' Below Final Grade and Final Results

Building 771/774 Closure Project
Characterization Plan For
Areas Greater than Six
Feet Below Final Grade

Final
11/14/03

TABLE OF CONTENTS

ATTACHMENTS

1.0 INTRODUCTION

This Characterization Plan identifies the characterization and verification approach for portions of Building 771/774 that contain fixed areas of contamination. As stated in the 771 Closure Project Decommissioning Operations Plan Modification 5 (DOP), the objective of this characterization plan is to ensure that the nature and extent of contamination is adequately defined and that the material that will be left in place is consistent with the framework for contaminated soil. The areas that have not been decontaminated to the unrestricted release criteria and will remain in place after backfilling will be characterized in accordance with this project-specific characterization package prepared in accordance with the Decontamination and Decommissioning Characterization Protocol and the Industrial Area Sampling and Analysis Plan. The slab and structure within 0 to 6 feet of the final proposed grade will be decontaminated to the unrestricted release criteria and 0 to 3.5 feet will be removed during demolition. The Building 771/774 slab and structure below 6 feet of the final proposed grade will be decontaminated to ensure that it will not exceed 7 nCi/g (over depth of volume) and/or 100 nCi/g (surface). The described characterization methods are based on the Data Quality Objectives of the Industrial Area Sampling and Analysis Plan (IASAP)(DOE 2001a).

2.0 EXISTING CHARACTERIZATION INFORMATION

The contaminant of concern in Building 771/774 is weapons-grade plutonium, which consists primarily of Pu-239/240 and Am-241 (which is present as a result of ingrowth from the decay of Pu-241). These three isotopes represent over 98% of the total activity per gram of WGP. Other incidental radionuclides were utilized for various processes in Building 771 and 774, including enriched and depleted uranium, and mixed fission products (MFP). However, a review of the *in-situ* gamma-spectroscopy data did not indicate the presence of the associated radioisotopes on structural surfaces (refer to Attachment A).

The locations of the existing random *in-situ* data were selected per the requirements of RSP-09.09, Radiological Characterization of Low Specific Activity Waste by Field Sampling and Analysis. This procedure describes a method to calculate conservative estimates of material activity concentration based on random sampling and calculation of the upper confidence limit (UCL_{95}) of the mean concentration. The statistical evaluation also assumes a lognormal distribution with the intention of biasing results high to provide a high degree of confidence that no transportation or waste acceptance criteria is exceeded. However, because many areas exceeding the specified limits have been identified through this sampling effort, no statistical evaluations of the existing data set will be performed. However, a statistical evaluation will be performed for verification sample data, as described in Section 5.0.

Each characterization unit represented one room or area with similar process histories and contamination potential. Building 771 was divided into seven areas and fifteen random measurements were collected in each unit (with the exception of the Room 182, from which five samples were collected due to previously-existing work interferences). Additional biased *in-situ* measurements were collected in Room 148 and in Building 774.

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estimates derived from existing data, and verified to be adequate based on actual standard deviations.

5.0 NON-RADIOLOGICAL CONTAMINANTS

The non-radiological contaminants of concern, including beryllium (Be), asbestos (ACM), poly-chlorinated bi-phenyls (PCBs), RCRA contaminants, including lead (Pb), will be evaluated per existing site requirements for demolition. A discussion of each contaminant and path forward is provided below.

Beryllium will be evaluated per the requirements of the PDSP. Asbestos shall be removed and controlled per the requirements of Colorado Department of Public Health and Environment Regulation No. 8, Part B, and OSHA 29 CFR 1926.1101. PCB-based paints shall remain in place and the control measures outlined in the Risk-Based Approach memorandum (8EPR-F) shall be implemented during demolition. RCRA contaminants, including any RCRA closures, shall be evaluated per the requirements of the B771 DOP. Lead analysis of paint from the process areas of the 771/774 complex has revealed lead levels above regulatory limits in only one out of 61 samples taken, and the elevated level was only found in the stack exhaust tunnel (on an orange-colored sealant). Additional sampling will be performed in the exhaust tunnel in order to determine the path forward.

6.0 REPORTS

Upon completion of verification sampling, a final report shall be generated that includes the information described below.

- An overview map delineating decontaminated areas and post-remediation sample results
- The individual verification sample results and statistical evaluation (by survey unit)
- The average remaining activity (by survey unit)
- The conclusion for each survey unit

7.0 MAPS

The final grade maps are presented in Figure 2.

8.0 REFERENCES

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

MAN-127-PDSP, Pre-Demolition Survey Plan for D&D Facilities, Revision 0, Golden, Colorado, April 23, 2001.

PRO-1564-RSP-09.09, Radiological Characterization of Low Specific Activity Waste by Field Sampling and Analysis, Revision 0, Golden, Colorado, 9/26/02.

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Table 1
Number and Type of Existing Characterization Data

Location	No. of Samples	Media	Depth Interval	Analyte	Method
Building 771	16	Paint	Surface	Gross α	Alpha Spec.
	32	Concrete	1 in.	Gross α	ZnS Detector [1]
	100	Concrete	7 in. [2]	Pu-239/240 [3] Am-241	*In-Situ* Gamma Spec.
B771/B776 Tunnel	17	Paint	Surface	Pu-239/240 [3] Am-241	Gamma-Spec.
	6	Concrete	7 in. [2]	Pu-239/240 [3] Am-241	*In-Situ* Gamma Spec.
B771, Second Floor	90	Paint	Surface	Pu-239/240 Am-241	Alpha Spec.
Building 774	11	Concrete	1 in.	Gross α	ZnS Detector [1]
	15 [4]	Paint	Surface	Pu-239/240 [3] Am-241	Alpha Spec.
	10	Concrete	7 in. [2]	Pu-239/240 [3] Am-241	*In-Situ* Gamma Spec.

(1) Field survey of concrete core at 1" depth
(2) Assumed conservative slab depth (actual ranges from 7 to 12 in.)
(3) When Pu-239 gamma line not detected, determined by multiplying detected Am-241 concentration by 6.95 (assumes 34-year WGP)
(4) Collected in Room 241 (all results less than 0.1 nCi/g)

Table 2
Characterization Data Summary and Identified Data Gaps

Areas	Areas Evaluated	# Random Samples [1]	# Biased Samples [2]	Remediation Required?	# Locations > 100 nCi/g (surface)	# Locations > 7 nCi/g (volumetric)	Data Gaps Identified?	Additional Characterization Samples Required [3]
Rooms 183 through 187	Slab/Wall/Ceiling	15	9	No	0	0	No	0
Rooms 181A, 182, 182A	Slab/Wall/Ceiling	5	6	No	0	0	YES	10
Former Room 170s, 180s (South end former Labs)	Slab/Wall/Ceiling	15	5	YES	1	1	No	0
Former Room 150s, 160s (North end former Labs)	Slab/Wall/Ceiling	15	9	YES	0	0	No	0
Room 114, 114A, 114B, 112, and Corridor G Floors	Slab	15	8	YES	2	1	No	0
Room 149, 149A, and 148 Floors	Slab	15	3	YES	1	1	No	0
Room 146, 146A, 146C, 140s and 147s	Slab	15	0	YES	1	1	No	0
B771 Room 148	Slab	0	5	YES	3	0	No [5]	0
B771/B776 Tunnel	Slab	15	8	YES	2	2	No	0
B771, Second Floor	Slab/Wall/Ceiling	90	0	No	0	0	No	0
B774	Slab/Wall	15 [4]	21	YES	8	5	No [5]	0
B771 Non-Process Areas	Slab	0	5	No	0	0	No	0

(1) *In-situ* gamma spectroscopy performed for all random locations
(2) Biased locations surveyed via *in-situ* gamma spectroscopy, ZnS field surveys, and paint sample analysis.
(3) Does not include post-remediation confirmation samples, or verification samples.
(4) Collected in Room 241.
(5) Only biased samples were collected in Rooms 148, and Building 774 Rooms 102, 103 and Old Tank 40. Due to extensive remediation required, no additional random samples will be collected as part of the characterization effort. Post-remediation samples and verification samples shall be collected.

Table 3
Verification Survey Units (Slab Surfaces > 6' Final Grade)

Verification Survey Unit ID	Building	Description	Estimated Surface Area (m^2)
A	771	West Side Process Area	1970
B	771	East Side Process Area	2815
C	771	Second Floor	1260
D	774	Rooms 102, 103, 241, Old Tank 40	1130

Attachment A

EBERLINE SERVICES
RFETS
SUMMARY REPORT

Spectroscopy Date: August 2002 through April, 2003

Location: RFETS Building 771, 774.

Customer: Chris Lee

Description: Uranium-235(^{235}U) concentrations for floors and walls in B771 and B774

Summary: **There is no indication in any of the wall, floor or ceiling assays of either B771 or B774 of enriched uranium.** In the initial evaluation of these spectra all peaks that were observed were identified. No gamma rays for mixed fission products or activation products were detected in any of the assays, Tank 40 included.

^{235}U concentrations in the B771 sample locations were not high enough to indicate anything but natural isotopic abundance. All radium-226(^{226}Ra) peaks were consistent with background levels observed throughout Building 771 and Building 776.

Previously modeled data indicated that ^{235}U concentrations in B774 were not high enough to indicate anything but natural isotopic abundance, with the exception of old Tank 40. It is the only assay location in either building where the relationship between the ^{226}Ra and the uranium isotopes indicates some form of uranium purification. Because the uranium's depth distribution in the concrete is not known, a conclusive evaluation of this sample point is not possible with in-situ measurements. Because the ^{226}Ra levels seem to be similar to the natural levels, and the ^{238}U appears to be elevated, it is possible that some depleted uranium exists in the bottom of Tank 40. No other locations in B774 have detectable amounts of ^{238}U. Any ^{235}U present cannot be distinguished from the naturally occurring ^{226}Ra.

Detail

At the request of Building 771 radiological engineering, the spectra collected in B771 were re-evaluated for the potential presence of ^{235}U. Because it is a naturally occurring isotope, its presence could not be ruled out, but because of interference from other naturally occurring isotopes, it could not always be detected. Minimum detectable activities (MDA's) were calculated for ^{235}U.

Values for ^{235}U in this report are higher than those actually present. It's most abundant gamma line could not be resolved from the gamma line for naturally occurring ^{226}Ra. The most abundant peak for ^{235}U at 185.74 keV was used because it still provided a lower MDA than the second most abundant peak, which did not have interference from nearby peaks. In most cases, radium's daughter product, lead-214, was used to indicate the samples in which interference from ^{226}Ra caused estimates of ^{235}U to be affected by more than 50%. A separate column in the report was added to indicate when ^{226}Ra dominated the region of interest used to calculate the ^{235}U MDA. No attempt was made to adjust the estimate in an effort to minimize the number of assumptions used in these calculations. The high values were still reported for conservatism.

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Assumptions/Deviations: All contamination was modeled as existing in a thin layer just under the paint to provide a worst-case scenario. If the contaminant had been modeled as existing throughout the concrete slab, the MDA's would have been significantly lower.

Analyst: _____ Date: _____

Reviewer: _____ Date: _____

CC: ES files

Attachment B
Verification Sampling Statistical Design

Characterization Unit:	1 to 4	Building:	B771/B774

Characterization Unit Description:
Building 771/774 Slab Surfaces > 6" Final Grade

Step 1: Calculate the relative shift Δ/σ_s.

Δ/σ_s = (DCGL-LBGR)/σ_s

where:

Δ/σ_s is the relative shift or the resolution of measurements in units of measurement uncertainty (MARSSIM recommends a value between 1 and 3)

DCGL is the derived concentration guideline value (7 nCi/g volumetric and 100 nCi/g surficial)

LBGR is the lower bound of the gray region - the lower bound of the range of values of the parameter of interest in a survey unit where the consequences of making a decision error is relatively minor. The LBGR is typically adjusted to obtain a relative shift between 1 and 3

σ_s is the estimated standard deviation of the total surface activity measurements (MARSSIM recommends assuming a 30% coefficient of variation if scoping or characterization data is not available)

Step 2: Determine Sign P using the calculated relative shift and Table 4. Sign p is the estimated probability that a random measurement from the survey unit will be less than the DCGL$_w$ when the survey unit median is actually at the LBGR.

Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.

Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:

$$N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(Sign\ p - 0.5)^2}$$

where:

1.645 is the alpha and beta decision error value (95% confidence) per the PDSP

Sign P equals 0.977250 for a relative shift of 2.0

Step 4: Increase N by 20% to allow for missing or invalid data points per MARSSIM, Section 5.5.2.3.

Figure 1
Characterization Data Summary
Page 1 of 2

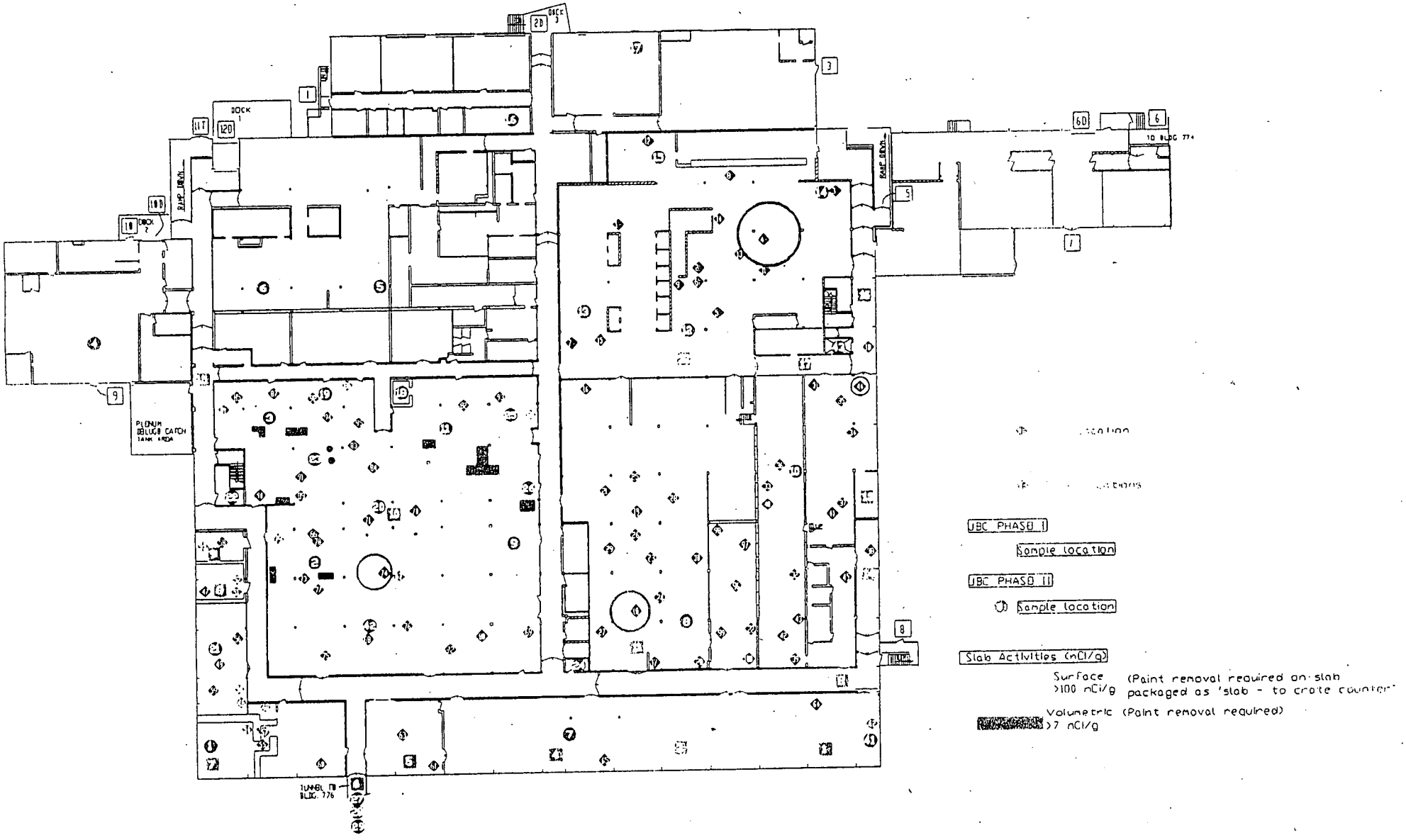
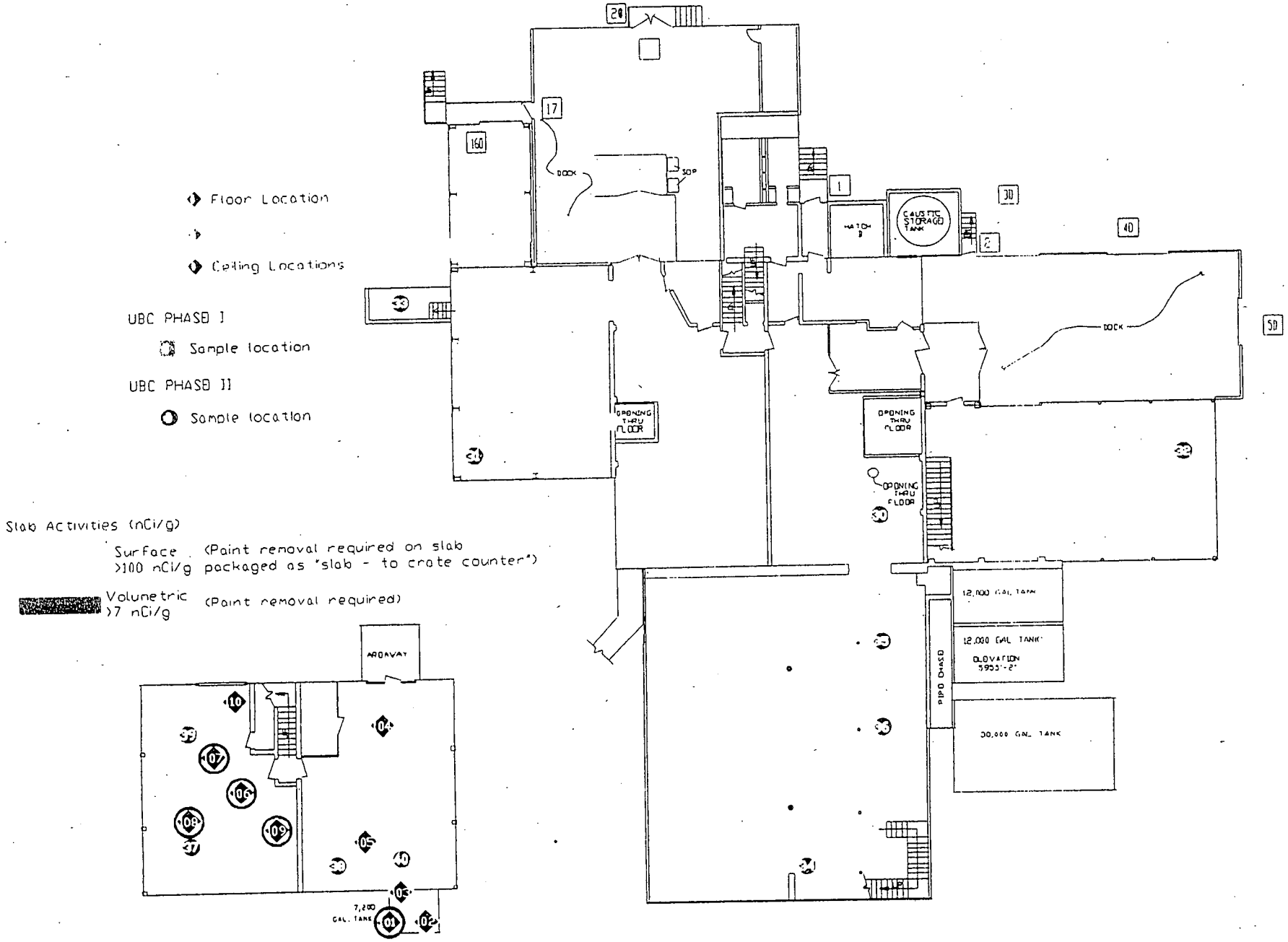
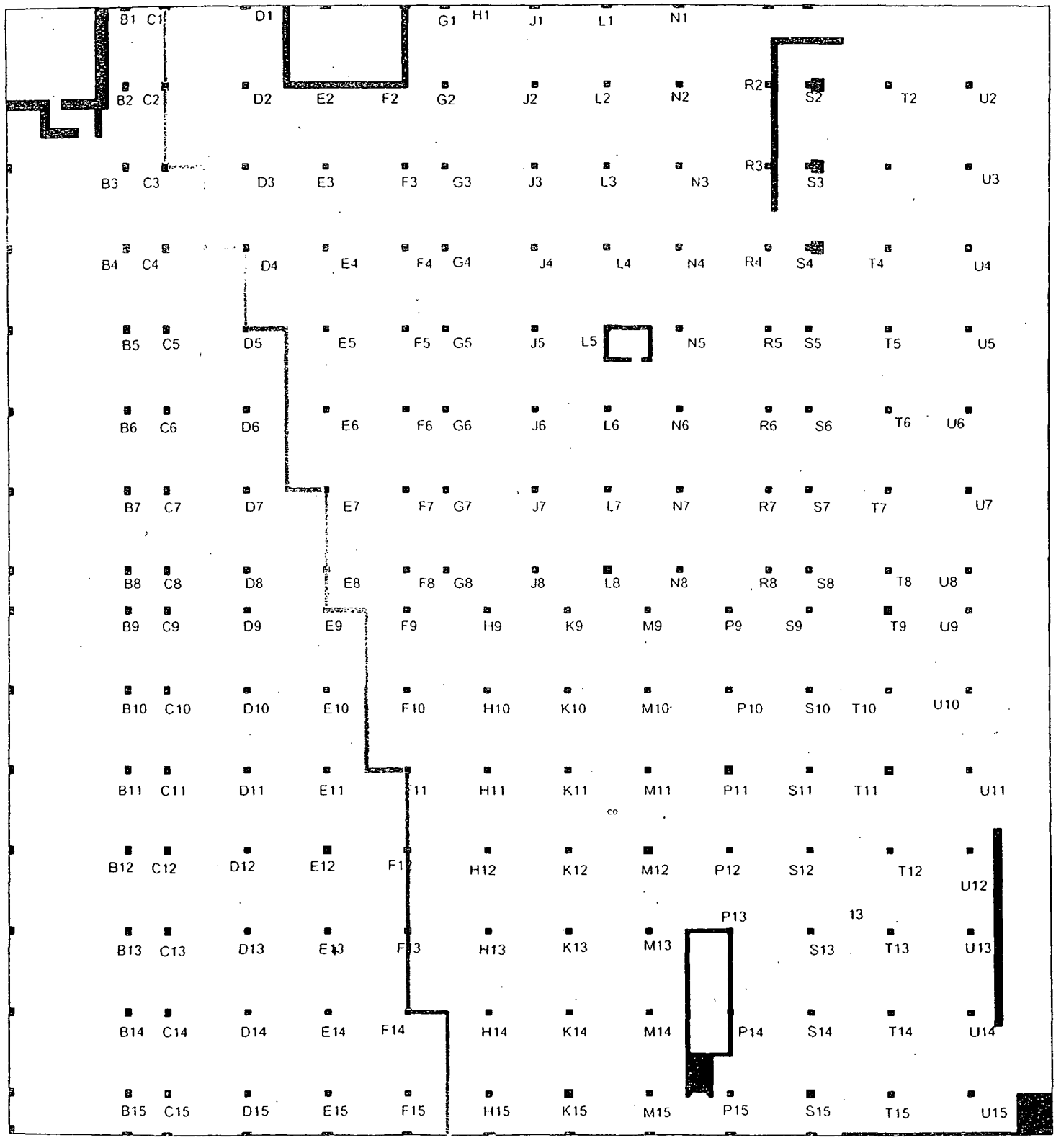


Figure 1
Characterization Data Summary



Building 771 First Floor Ceiling Final Grade



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771 Second Floor Final Grade Line

Surface Scan (Fidler) Maps for Area AE (Survey Unit A)

Summary: Flagged results (> 250,000 cpm were assessed with in-situ gamma spectroscopy and/or removed (via floor saw)

MACTEC, Inc. COPY

Radiological Survey Record

INSTRUMENT DATA

Bicron	Mfg: N/A	Mfg: N/A
l: Fidler	Model:	Model:
l #: B5088	Serial #:	Serial #:
)ue: 3-31-05	Cal Due:	Cal Due:
2000 cpm	Bkg:	Bkg:
iency: 23%	Efficiency:	Efficiency:
: 1053 DPM	MDA: N/A	MDA: N/A
N/A	Mfg: N/A	Mfg: N/A
el:	Model:	Model:
l #:	Serial #:	Serial #:
Due:	Cal Due:	Cal Due:
:	Bkg:	Bkg:
iency:	Efficiency:	Efficiency:
A: N/A	MDA: N/A	MDA: N/A

Building: 771

Location: AE AREA COLC2-G2
C2-F6
Locate AREAS > 250 KCPM

Purpose: After saw cutting

RWP #: 0001

Date: 7-22-04 Time: 1600

[redacted]

ıments: *Large area wipes are 1 m² unless otherwise noted. Dose rate survey results are recorded directly on maps or drawings on rse side. All dose rate readings are in urem/hr unless otherwise noted.*

vey Tracking #: 771M-04- 2400

Air Sample Tracking #: 771-04-A- N/A

	Location	swipe dpm/100cm²	direct dpm/100cm²	wipe dpm/wipe
	COL G-6 & F-6 IN Between	N/A	300K	N/A
2	COLE-4 At Base		375K	
3	COLE-5 7 Feet North		400K	
4	Col E5B+ Shortcut Hole		260K	
5	COLE-5 At Base		400K	
6	COL D3-D4 Middle of Bay		250K	
7	COL D3-D4 Near Center of Bay		250K	
8	COL D-4 Base		260K	
9	E-5 Base of Column		260K	
10	Trench 7' North of Col C-5		250K	
11	E3 & E4 Between Beams		400K	
12	N/A	N/A	N/A	N/A
13				
14				
15				
16				
17				
18				
19				
20	N/A	N/A	N/A	N/A

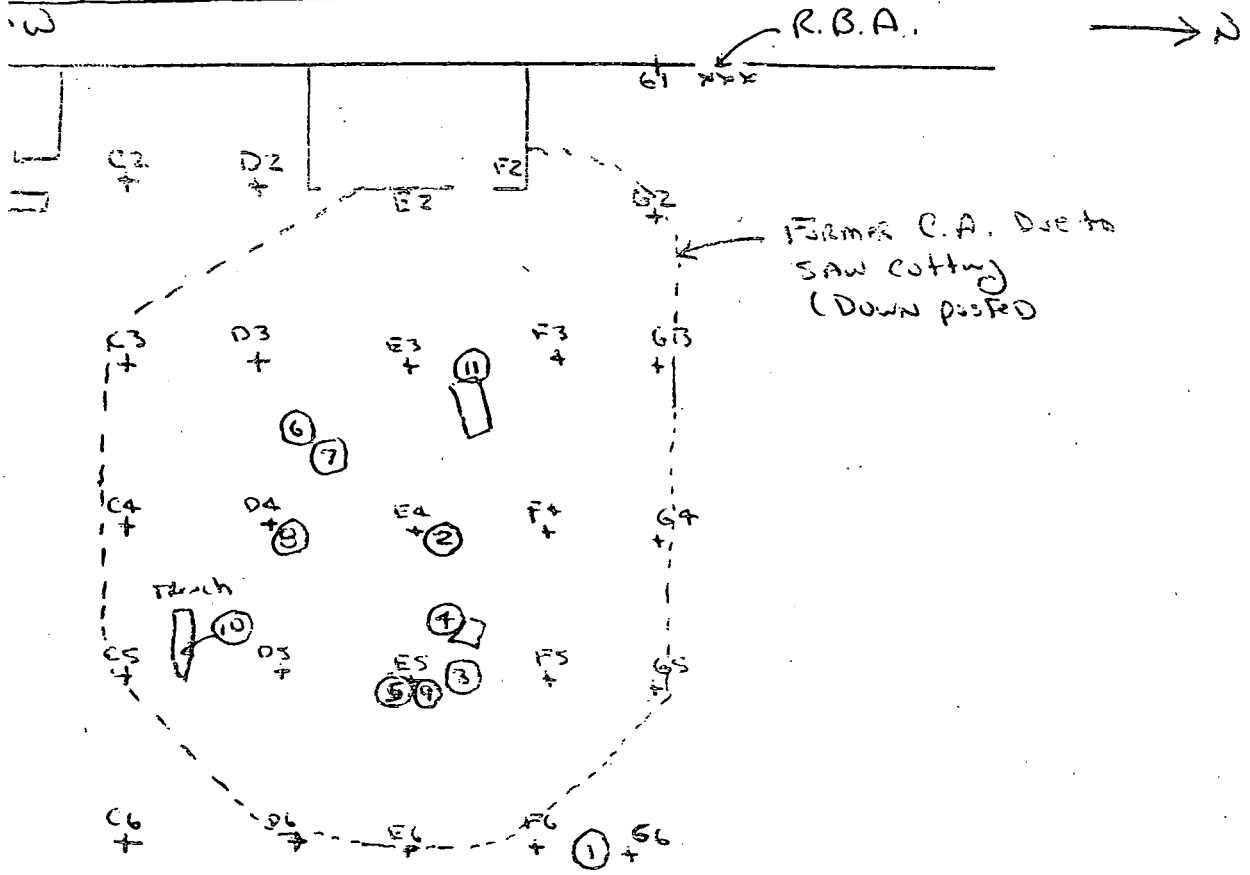
ID	Location	swipe dpm/100cm²	direct dpm/100cm²	wipe dpm/wipe
21	N/A	N/A	N/A	N/A
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40	N/A	N/A	N/A	N/A

ate Reviewed: 7/23/04 RCT Supervisor: [redacted] / [redacted] / [redacted]
Print Name Signature

MACTEC, Inc.

Survey Record

Drawing(s) Showing Survey Points



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MACTEC, Inc

Radiological Survey Record

INSTRUMENT DATA

Bicron	Mfg: Bicron	Mfg: N/A
l: Fidler	Model: Fidler	Model:
l #: B508E	Serial #: 9536 BP	Serial #:
Due: 3-31-05	Cal Due: 4-12-05	Cal Due:
2000 cpm	Bkg: 2500 cpm	Bkg:
iency: 24%	Efficiency: 24%	Efficiency:
: 1083 dpm	MDA: 1051 dpm	MDA: N/A
N/A	Mfg: N/A	Mfg: N/A
el:	Model:	Model:
l #:	Serial #:	Serial #:
Due:	Cal Due:	Cal Due:
	Bkg:	Bkg:
iency:	Efficiency:	Efficiency:
A: N/A	MDA: N/A	MDA: N/A

Building: 771 1st Floor

Location: "AE" Area excluding C.A. (saw cutting concrete) Indent. by areas > 250Kcpm

Purpose:

RWP #: 40001

Date: 7-21-04 Time: 1820

[redacted]

Comments: *Large area wipes are 1 m² unless otherwise noted. Dose rate survey results are recorded directly on maps or drawings on reverse side. All dose rate readings are in µrem/hr unless otherwise noted.* SURVEY OF FLOOR U.A Fidler Indent. Areas >250Kcpm at 1/2" above Detector. All readings in Kcpm. All areas >250K marked with RED PAINT. Surveyed areas R1–R8, A1→A8

Survey Tracking #: 771M-04-2393

Air Sample Tracking #: 771-04-A- N/A

ID	Location	swipe dpm/100cm²	direct dpm/100cm² (Kcpm)	wipe dpm/wipe
	Col L-3 Around column	N/A	260K	N/A
	↓		400K	
	Col S2 4' East of column		>500K	
	Col S3 6' East of column		300K	
	Between Col G2 & G3		300K	
	Col G4 North of col 3'		>500K	
	Col G-8 All Around column		>500K	
	Col G-8 3' west of column		>500K	
	Col E-9 At column		300K	
	Col B-5 7' west of column		300K	
	N/A			
	N/A	N/A		N/A

ID	Location	swipe dpm/100cm²	direct dpm/100cm²	wipe dpm/wipe
21	N/A	N/A	N/A	N/A
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40	N/A	N/A	N/A	N/A

Date Reviewed: [illegible]

RCT Supervisor: [illegible] [illegible] [redacted]
Print Name Signature

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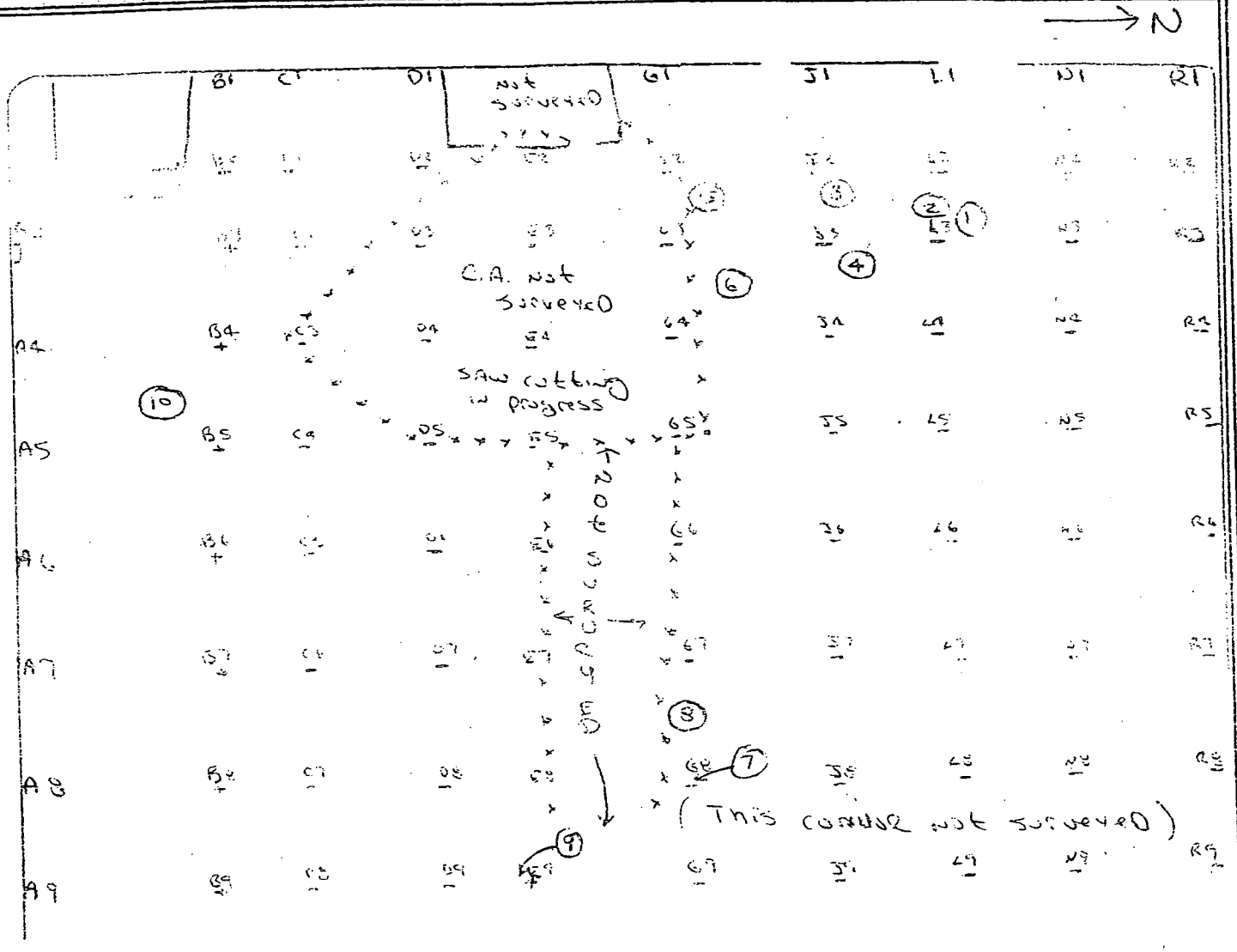
Survey Record

Drawing(s) Showing Survey Points



All areas in AE area survey with Fidler except those one

1) Saw cutting
2) Equipment transfer path
3) Corridor Between G9 → R9

"Hot-Spot" *In-Situ* Measurements for Area AE (Survey Unit A)

Summary: 23 of 27 results > 100 nCi/g surface and/or 7 nCi/g volumetric
Hot-spots removed via floor cutting

EBERLINE SERVICES
RFETS
SUMMARY REPORT

Spectroscopy Date(s):7/2/04, 7/6/04, 7/7/04. 7/12/04

Location: RFETS B771, 1st Floor

Customer: Sarah Roberts

Description: Assay of 1st Floor Hot Spots

Notes: The purpose of the measurements is to identify and quantify the gamma-emitting radionuclides present in the surfaces. All spectra are visually reviewed and the final radionuclide peak identifications are performed using the *Table of Radioactive Isotopes* by Browne and Firestone.

In the initial evaluation of these spectra, all peaks that were observed were identified. No gamma rays for mixed fission products or activation products were detected in any of the assays. Uranium-235 concentrations in the B771 sample locations were not high enough to indicate anything but natural isotopic abundance. All radium-226 peaks were consistent with background levels observed throughout Building 771.

Analyst: [signature] Date: 7/15/04

Reviewer: Randy Lucero Date: 7/15/04

CC: ES files

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Building 771 Floor Hot Spot Gamma Spec Survey Results

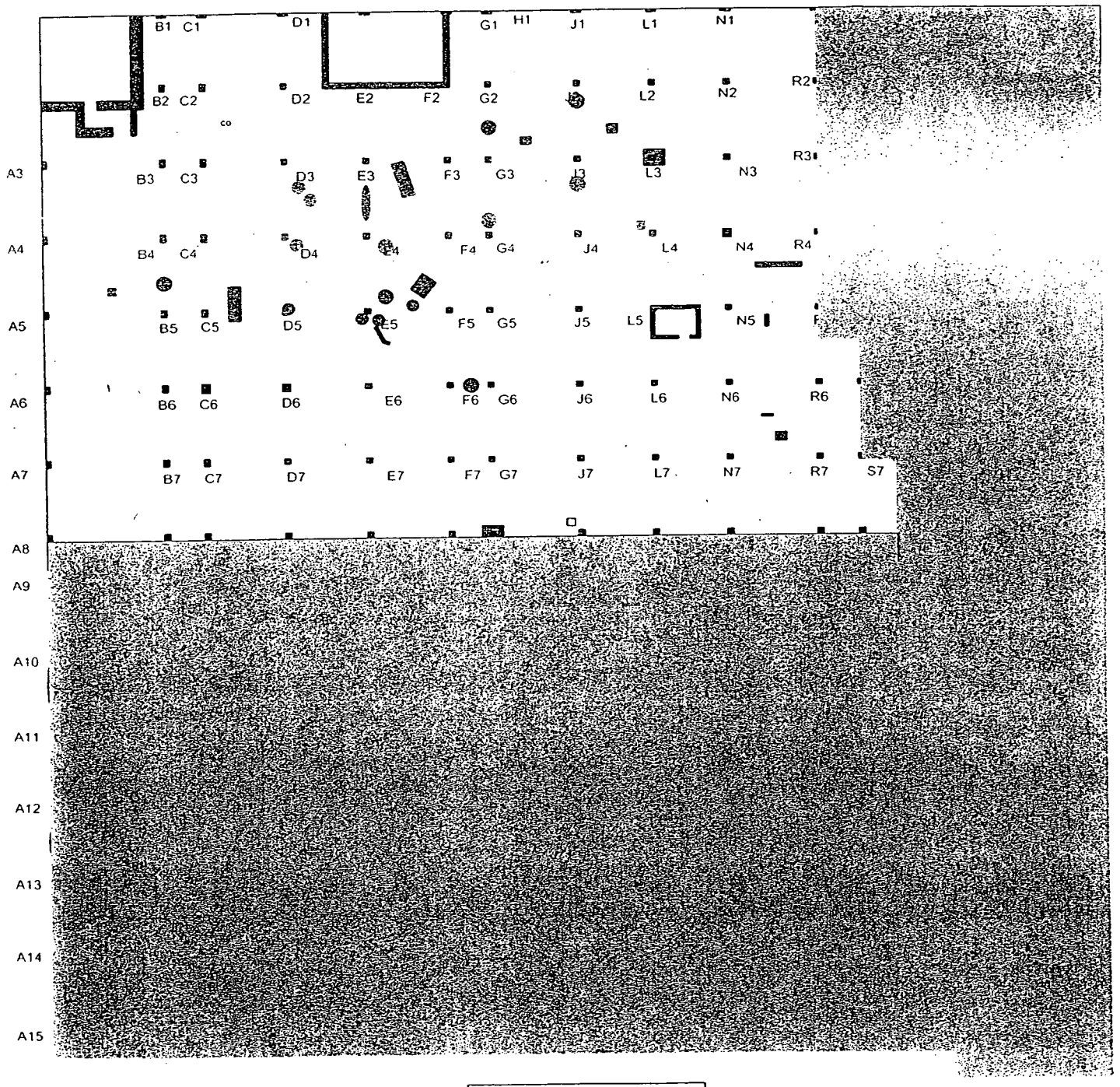
Area ID	Detect?	Detector	Spectrum File ID	SNAP Am241 Activity Concentration (nCi/g)	SNAP Am241 Activity Concentration MDA (nCi/g)	Pu-239/240 Activity Concentration (nCi/g)	Total Alpha Concentration (Am-241 + Pu-239/240) (nCi/g)	Assumed Contamination Depth (inches)	Assumed Slab Thickness (inches)	Estmated Average Pu-239/240 Slab Activity Concentration (nCi/g)	Estmated Average Pu-239/240+Am-241 Slab Activity Concentration (nCi/g)	Calculation Case
66" west of H11	Y	31-TN30637A	07020401	1.02E+02	2.68E-01	6.40E+02	7.42E+02	0.060	7.0	5.49E+00	6.36E+00	2
80" east of F11	Y	31-TN30637A	07020402	4.54E+01	1.65E-01	9.36E+02	9.81E+02	0.060	7.0	8.02E+00	8.41E+00	2
38" south of K12	Y	33-TN40488A	07060401	1.14E+01	1.17E-01	2.82E+02	2.93E+02	0.060	7.0	2.42E+00	2.51E+00	2
36" west, 44" north of E5	Y	33-TN40488A	07060402	7.58E+02	7.38E+02	7.95E+03	8.71E+03	0.060	7.0	6.81E+01	7.46E+01	2
Floor hot spot at NE corner of D5	Y	33-TN40488A	07060403	1.32E+01	7.72E-02	9.18E+01	1.05E+02	0.060	7.0	7.86E-01	9.00E-01	1
120" west of E4	Y	33-TN40488A	07060404	3.51E+01	1.66E-01	2.50E+02	2.85E+02	0.060	7.0	2.14E+00	2.44E+00	2
85" north of K10	Y	33-TN40488A	07060405	6.20E+00	8.92E-02	4.31E+01	4.93E+01	0.060	7.0	3.69E-01	4.23E-01	1
51" west of P11	Y	33-TN40488A	07060406	1.35E+01	1.06E-01	9.38E+01	1.07E+02	0.060	7.0	8.04E-01	9.20E-01	1
30" north, 36" east of P11	Y	33-TN40488A	07060407	9.56E+03	7.71E+02	1.78E+03	1.13E+04	0.060	7.0	1.52E+01	9.72E+01	2
36" east of P11	Y	33-TN40488A	07060408	4.05E+03	6.15E+02	7.18E+02	4.77E+03	0.060	7.0	6.15E+00	4.09E+01	2
28" north, 30" east of M13	Y	33-TN40488A	07060409	1.23E+02	2.99E-01	6.65E+02	7.88E+02	0.060	7.0	5.70E+00	6.75E+00	2
28" north, 132" east of M13	Y	33-TN40488A	07070401	2.46E+02	1.05E+01	1.11E+03	1.36E+03	0.060	7.0	9.55E+00	1.17E+01	2
East 1/4 ,40" north, 96" west of P14	Y	33-TN40488A	07070402	1.85E+02	4.02E+00	5.58E+02	7.43E+02	0.060	7.0	4.79E+00	6.37E+00	2
East mid 1/4, 132" west, 40" north of P1	Y	31-TN30637A	07070403	1.33E+03	5.98E+02	9.43E+03	1.08E+04	0.060	7.0	8.08E+01	9.22E+01	2
West mid 1/4, 64" east, 40" north of P1	Y	31-TN30637A	07070404	1.13E+03	6.90E+02	8.58E+03	9.71E+03	0.060	7.0	7.36E+01	8.33E+01	2
West 1/4, 26" east, 40" north of P13	Y	31-TN30637A	07070405	1.05E+03	6.18E+02	4.53E+03	5.58E+03	0.060	7.0	3.88E+01	4.78E+01	2
108" east of T9	Y	31-TN30637A	07070406	1.10E+01	1.00E-01	7.65E+01	8.75E+01	0.060	7.0	6.55E-01	7.50E-01	1
36" east, 108" south of T11	Y	31-TN30637A	07070407	2.10E+02	4.45E+00	1.51E+03	1.72E+03	0.060	7.0	1.29E+01	1.47E+01	2
Hot spot 27" north, 16" west of T12	Y	31-TN30637A	07120401	5.43E+01	1.94E-01	3.77E+02	4.32E+02	0.060	7.0	3.24E+00	3.70E+00	1
Hot spot 58" east of U13	Y	31-TN30637A	07120402	1.32E+01	1.28E-01	9.18E+01	1.05E+02	0.060	7.0	7.86E-01	9.00E-01	1
Hot spot 16" south of U15	Y	31-TN30637A	07120403	1.71E+02	3.74E-01	1.31E+03	1.48E+03	0.060	7.0	1.12E+01	1.27E+01	2
Hot spot 90" west, 16" south of U15	Y	31-TN30637A	07120404	1.90E+02	3.94E-01	1.13E+03	1.32E+03	0.060	7.0	9.66E+00	1.13E+01	2
Hot spot 35" south of H12	Y	31-TN30637A	07120405	6.83E+01	2.59E-01	2.16E+03	2.22E+03	0.060	7.0	1.85E+01	1.91E+01	2
Hot spot 36" east, 32" north of F11	Y	31-TN30637A	07120406	4.35E+00	5.99E-02	3.02E+01	3.46E+01	0.060	7.0	2.59E-01	2.96E-01	1
Hot spot 64" east, 12" north of E12	Y	31-TN30637A	07120407	7.86E-01	4.88E-02	5.46E+00	6.25E+00	0.060	7.0	4.68E-02	5.36E-02	1
Hot spot 84" east of A12 along wall	Y	31-TN30637A	07120408	8.77E+01	3.25E-01	4.70E+02	5.58E+02	0.060	7.0	4.03E+00	4.78E+00	2
Hot spot 24" west of A11 along wall	Y	31-TN30637A	07120409	1.89E+02	4.69E-01	1.95E+03	2.14E+03	0.060	7.0	1.67E+01	1.83E+01	2

1. < sign indicates number is an MDA for that measurement.

2. Activity per gram values for each isotope taken from TBD-00076, Activities for Isotopes of Concern in Weapons Plutonium as a Function of Time, for 34 year old plutonium.

3. Total activity calculation based on one of four cases listed in Assumptions and Calculations sheet.

4. Thickness of contaminated layers was assumed to be twice the average thickness of paint determined from earlier sampling unless otherwise noted in column O.



771 First Floor (west side)
Updated 8/06/2004

Decon Required ●
Fiddler Scans

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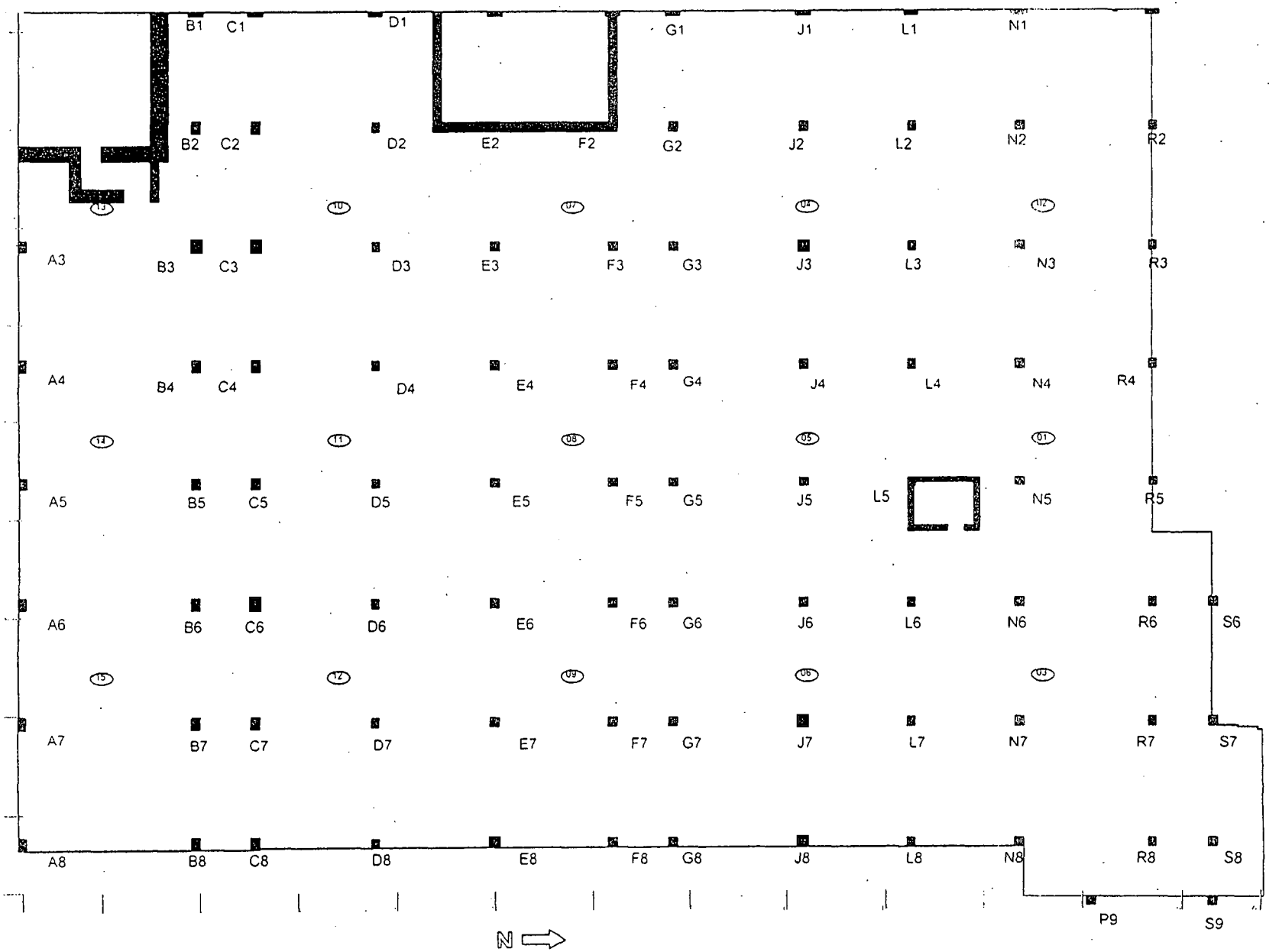
Random *In-Situ* Measurements for Area AE (Survey Unit A)

Summary: all results < 100 nCi/g (surface) and 7 nCi/g (volumetric)

771 1st Floor
Area AE



Folder

EBERLINE SERVICES
RFETS
SUMMARY REPORT

Spectroscopy Date(s): 4/28/04 - 5/4/04

Location: RFETS B771 First and Second Floors

Customer: Sarah Roberts

Description: Floor Surveys

Notes: The purpose of the measurements is to identify and quantify the gamma-emitting radionuclides present within the concrete floor of building 771. All spectra are visually reviewed and the final radionuclide peak identifications are performed using the *Table of Radioactive Isotopes* by Browne and Firestone.

Assumptions/Deviations: Alpha concentration calculation is based on Am-241 59 keV photopeak unless indicated otherwise. Contamination was assumed to be evenly distributed within the material to the depth indicated. When surface contamination within the detector FOV was identified, modeling parameters were adjusted accordingly. Total alpha values reported were calculated from assay values for Am-241 using a obtained multiplication factor of 8.23 from TBD-00076 (34 year old wgPu), unless otherwise indicated. Pu239/240 values were empirically derived based upon RFETS WgPu ratios.

Final results are provided within the attached report.

Analyst: _____ Date: 5/31/04

Reviewer: _____ Date: 5/31/04

CC: ES files

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*Amended

Building 771 Floor Surveys

Map/Room	Area Type / #	Detect?	Detector	Spectrum File ID	SNAP Am241 Activity Concentration (nCi/g)	SNAP Am241 Activity Concentration MDA (nCi/g)	Pu-239/240 Activity Concentration (nCi/g)	Total Alpha Concentration (Am-241/Pu-239/240) (nCi/g)	Total Alpha MDA (nCi/g)	Assumed Contamination Depth (inches)	Assumed Total Thickness (inches)	Estmated Average Pu-239/240 Slab Activity Concentration (nCi/g)	Estmated Average Pu-239/240+Am-241 Slab Activity Concentration (nCi/g)	
771 Second Floor	1	N	33-TN40488A	04280401	< 2.37E-02	2.37E-02	< 1.65E-01	1.88E-01	1.95E-01	0.06	7.00	1.41E-03	1.62E-03	
771 Second Floor	11	Y	33-TN40488A	04280403	3.90E-02	2.33E-02	2.71E-01	5.10E-01	1.92E-01	0.06	7.00	2.32E-03	2.66E-03	
771 Second Floor	14	Y	33-TN40488A	04290401	6.39E-02	2.24E-02	4.44E-01	5.08E-01	1.84E-01	0.06	7.00	3.81E-03	4.35E-03	
771 Second Floor	12	Y	33-TN40488A	04290403	4.33E-02	2.26E-02	3.01E-01	3.44E-01	1.86E-01	0.06	7.00	2.58E-03	2.95E-03	
771 Second Floor	5	Y	33-TN40488A	04290404	4.60E-02	1.38E-02	3.20E-01	3.66E-01	1.14E-01	0.06	7.00	2.74E-03	3.13E-03	
771 Second Floor	2	Y	33-TN40488A	04290405	4.46E-02	1.53E-02	3.10E-01	3.55E-01	1.26E-01	0.06	7.00	2.66E-03	3.04E-03	
771 First Floor	AE / 2	Y	33-TN40488A	04300401	1.84E-01	1.90E-02	1.28E+00	1.46E+00	1.56E-01	0.06	7.00	1.10E-02	1.25E-02	
771 First Floor	AE / 4	Y	33-TN40488A	04300402	4.07E-01	2.10E-02	2.83E+00	3.24E+00	1.73E-01	0.06	7.00	2.42E-02	2.77E-02	
771 First Floor	AE / 7	Y	33-TN40488A	04300403	4.01E-01	1.61E-02	2.79E+00	3.19E+00	1.49E-01	0.06	7.00	2.39E-02	2.73E-02	
771 First Floor	AE / 15	Y	33-TN40488A	04300407	4.67E-02	1.54E-02	3.25E-01	3.71E-01	1.27E-01	0.06	7.00	2.78E-03	3.18E-03	
771 First Floor	AE / 5	Y	33-TN40488A	04300408	7.09E-02	1.85E-02	4.93E-01	5.64E-01	1.52E-01	0.06	7.00	4.22E-03	4.83E-03	
771 First Floor	AE / 13	Y	33-TN40488A	05030401	5.71E-02	4.07E-02	3.97E-01	4.54E-01	3.35E-01	0.06	7.00	3.40E-03	3.89E-03	*
771 First Floor	AE / 14	Y	33-TN40488A	05030402	4.27E-01	4.07E-02	2.97E+00	3.40E+00	3.35E-01	0.06	7.00	2.54E-02	2.91E-02	*
771 First Floor	AE / 6	Y	33-TN40488A	05030403	3.69E-01	2.36E-02	2.56E+00	2.93E+00	1.94E-01	0.06	7.00	2.20E-02	2.51E-02	
771 First Floor	AE / 1	Y	33-TN40488A	05030405	8.93E-02	1.53E-02	6.21E-01	7.10E-01	1.26E-01	0.06	7.00	5.32E-03	6.09E-03	
771 First Floor	AE / 11	Y	33-TN40488A	05030406	5.74E+01	2.76E+01	3.42E+02	3.99E+02	2.27E+02	3.00	7.00	1.47E+02	1.71E+02	(2)
771 First Floor	AE / 12	Y	33-TN40488A	05040402	2.04E-01	1.92E-02	1.42E+00	1.62E+00	1.58E-01	0.06	7.00	1.22E-02	1.39E-02	
771 First Floor	AE / 9	Y	33-TN40488A	05040403	1.00E+00	1.54E-02	6.95E+00	7.95E+00	1.27E-01	0.06	7.00	5.96E-02	6.82E-02	
771 First Floor	AE / 10	Y	33-TN40488A	05040404	1.07E+00	1.76E-02	7.44E+00	8.51E+00	1.45E-01	0.06	7.00	6.38E-02	7.29E-02	
771 First Floor	AF / 3	Y	33-TN40488A	05040407	2.77E-01	1.83E-02	1.93E+00	2.20E+00	1.51E-01	0.06	7.00	1.65E-02	1.89E-02	
771 First Floor	AF / 2	Y	33-TN40488A	05040408	1.44E-01	1.60E-02	1.00E+00	1.14E+00	1.32E-01	0.06	7.00	8.58E-03	9.81E-03	
771 First Floor	AF / 1	Y	33-TN40488A	05040409	3.30E+00	1.89E-02	2.29E+01	2.62E+01	1.56E-01	0.06	7.00	1.97E-01	2.25E-01	

NOTES

1. Specific activity values for each isotope are taken from TED-00076, "Activities for Isotopes of Concern in Weapons Plutonium as a Function of Time", for 34 year old plutonium.

2. Differential peak analysis indicated contamination could be as deep as 3 inches. Survey point modeled accordingly.

EBERLINE SERVICES
RFETS
SUMMARY REPORT

Spectroscopy Date(s): 7/21/04

Location: RFETS B771, 1st Floor Area AE

Customer: Sarah Roberts

Description: B771 1st Floor Areas AE Surveys

Notes: The purpose of the measurements is to identify and quantify the gamma-emitting radionuclides present in the surfaces. All spectra are visually reviewed and the final radionuclide peak identifications are performed using the *Table of Radioactive Isotopes* by Browne and Firestone.

In the initial evaluation of these spectra, all peaks that were observed were identified. No gamma rays for mixed fission products or activation products were detected in any of the assays. Contamination was assumed to be in the top 0.06" of surface material. All activity detected was assumed to be from weapons grade plutonium.

Analyst: _____ Date: 7/22/04

Reviewer: _____ Date: 7/22/04

CC: ES files

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Building 771 1st Floor Surveys Area AE

Area ID	Detect?	Detector	Spectrum File ID	SNAP Am241 Activity Concentration (nCi/g)	SNAP Am241 Activity Concentration MDA (nCi/g)	Pu-239/240 Activity Concentration (nCi/g)	Total Alpha Concentration (Am-241 + Pu-239/240) (nCi/g)	Assumed Contamination Depth (inches)	Assumed Slab Thickness (inches)	Estmated Average Pu-239/240 Slab Activity Concentration (nCi/g)	Estmated Average Pu-239/240+Am-241 Slab Activity Concentration (nCi/g)	Calculation Case
Area AE-10 (South of 106" D3 x 188" D2)	Y	31-TN30637A	07210401	5.89E+00	1.16E-01	4.09E+01	4.68E+01	0.060	7.0	3.51E-01	4.01E-01	1
Area AE-9 (South of 169" F6 x 117" F7)	N	31-TN30637A	07210402	< 8.78E-02	8.78E-02	< 6.10E-01	< 6.98E-01	0.060	7.0	5.23E-03	5.98E-03	3
Area AE-3 (North of 123" N6 x 113" N7)	N	31-TN30637A	07210403	< 8.93E-02	8.93E-02	< 6.21E-01	< 7.10E-01	0.060	7.0	5.32E-03	6.09E-03	4

1 " sign indicates number is an MDA for that measurement.

2 Activity per gram values for each isotope taken from TBD-00076, Activities for Isotopes of Concern in Weapons Plutonium as a Function of Time, for 34 year old plutonium.

3 Total activity calculation based on one of four cases listed in Assumptions and Calculations sheet.

Building 771 1st Floor Area Surveys

Area ID	Detect?	Detector	Spectrum File ID	SNAP Am241 Activity Concentration (nCi/g)	SNAP Am241 Activity Concentration MDA (nCi/g)	Pu-239/240 Activity Concentration (nCi/g)	Total Alpha Concentration (Am-241 + Pu-239/240) (nCi/g)	Assumed Contamination Depth (Inches)	Assumed Slab Thickness (Inches)	Estmated Average Pu-239/240 Slab Activity Concentration (nCi/g)	Estmated Average Pu-239/240+Am-241 Slab Activity Concentration (nCi/g)	Calculation Case
Area AE-11 (South of 160" D4 x 110" D5)	Y	31-TN30637A	07220401	1.15E+00	9.50E-02	7.99E+00	9.14E+00	0.060	7.0	6.85E-02	7.84E-02	1

1 < sign indicates number is an MDA for that measurement.

2 Activity per gram values for each isotope taken from TBD-00076, Activities for Isotopes of Concern in Weapons Plutonium as a Function of Time, for 34 year old plutonium.

3 Total activity calculation based on one of four cases listed in Assumptions and Calculations sheet.

5/5/05

Estimated Grams WGP Remaining
Area AE

Area AE Random In-Situ Gamma Spectroscopy Results	
Location	Volumetric Result for Pu-239/240 and Am-241 (nCi/g)
1	0.01
2	0.01
3	0.01
4	0.03
5	0.00
6	0.03
7	0.03
8	0.07
9	0.01
10	0.40
11	0.08
12	0.01
13	0.00
14	0.03
15	0.00
mean =	0.05
max =	0.40
stdev =	0.10

	Remaining Surface Area (ft^2)	Remaining Surface Area (m^2)	Remaining Surface Area (cm^2)	Assumed slab/wall thickness (in)	Assumed slab/wall thickness (cm)	Remaining Volume Concrete (cm^3)	Density Concrete (g/cm^3)	Total Remaining Activity (nCi)	SA 35-yr WGP (Ci/g)	Grams WGP (Alpha)
AE Floor	17244	1603	16028405.7	7	17.78	284985054	2.35	3.18E+07	8.24E-02	0.39
									Total Remaining Grams WGP =	0.39

NOTE: Potential hold-up in walls/ceilings is negligible compared to floor activity.