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Closeout Radiological Survey Report For Buildings 727, 782, and 783

ORIGINAL

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**CLOSEOUT RADIOLOGICAL SURVEY REPORT
FOR BUILDINGS 727, 782, AND 783**

REVISION 0

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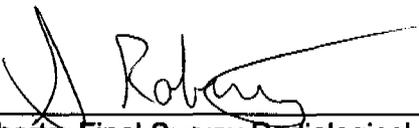
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Table of Contents

Acronyms	2
Abstract	3
1.0 Introduction	3
2.0 Final Survey Details	3
3.0 Survey Unit Descriptions	4
4.0 Overview Maps	6
5.0 Scope of Work	8
5.1 Paint/Surface Media Samples	8
5.2 Removable Surface Contamination Surveys	9
5.3 Total Surface Activity Surveys	9
5.4 Scan Surveys	10
5.4.1 SCM/SIMS Scan Surveys	10
5.4.2 NE Electra Scan Surveys	11
6.0 DCGLs	11
7.0 Background	11
8.0 Quality Assurance/Quality Control	12
8.1 Paint/Surface Media Samples	12
8.2 Removable Surface Contamination Surveys	12
8.3 Total Surface Activity Surveys	12
8.4 Scan Surveys	13
8.4.1 SCM/SIMS Scan Surveys	13
8.4.2 NE Electra Scan Surveys	13
9.0 Investigation Methodology	13
10.0 Survey Results	14
10.1 Paint/Surface Media Samples	14
10.2 Removable Surface Contamination Surveys	15
10.3 Total Surface Activity Surveys	16
10.4 Scan Surveys	16
11.0 Conclusion	17
Attachments	
Attachment A	Scan Data Summaries
Attachment B	Survey Unit 72701 Data Summary
Attachment C	Survey Unit 72702 Data Summary
Attachment D	Survey Unit 78201 Data Summary
Attachment E	Survey Unit 78203 Data Summary
Attachment F	Survey Unit Overlay Maps
Attachment G	SCM/SIMS Quality Control Charts
Attachment H	Data Quality Assessment
Attachment I	Sample/Survey Measurement Location Maps

Acronyms

cpm	counts per minute
CRSP	Closeout Radiological Survey Plan
D&D	Decontamination and Decommissioning
DCGL _W	Derived Concentration Guideline Level – Wilcoxon Rank Sum test
DCGL _{EMC}	Derived Concentration Guideline Level – Elevated Measurement Comparison
DOE	U.S. Department of Energy
dpm	disintegrations per minute
DQA	Data Quality Assessment
DQO	Data Quality Objectives
FSS	Final Status Survey
FSSP	Final Status Survey Plan
FSSR	Final Status Survey Report
HSA	Historical Site Assessment
LBGR	Lower Bound of the Gray Region
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
NIST	National Institute of Standards & Technology
NORM	Naturally Occurring Radioactive Material
PRE	Project Radiological Engineer
PSPC	Position Sensitive Proportional Counter
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RCT	Radiological Control Technician
RE	Radiological Engineer
REFS	Radiological Engineering Field Services
RESS	Radiological Engineering Support Services
RFETS	Rocky Flats Environmental Technology Site
SAC-4	Scintillation Alpha Counter
SCM/SIMS	Surface Contamination Monitor/Survey Information Management System
SRA	Shonka Research Associates
TSA (TSC)	Total Surface Activity (or Total Surface Contamination)
V&V	Verification and Validation

Abstract

This report contains final survey data for the interior and exterior surfaces of buildings 727, 782, and 783. Total and removable surface contamination surveys and scan surveys were performed in each survey unit. Paint/surface media samples were collected in survey units 78201 and 78203. The number/frequency of surveys/samples collected in each survey unit was based on the guidance provided in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM).

All survey/sample results presented in this report meet the DCGLs as defined by the Closeout Radiological Survey Plan for the 779 Cluster.

1.0 Introduction

Building 782 was constructed in 1973 and served as the 2nd plenum building for Building 779. Building 727 was constructed in 1973 and housed the emergency diesel generator which supported Building 782. Building 783 was constructed in 1973 and housed motor control centers for the B779 cooling towers and circulating pumps as well as the circulating pumps themselves. As stated in the abstract above, this report contains final survey data for the interior and exterior surfaces of buildings 727, 782, and 783. The final surveys for Building 779 and the remaining structures in the Building 779 cluster are documented in separate, stand-alone reports. The basement and tunnel of building 782 was removed from final survey requirements because it is below grade, and considered out of scope. In addition, continuous ground water leakage indicates contamination exists up to 400 pCi/L in the basement sump. Characterization data to date for the basement and tunnel revealed no contamination greater than the applicable DCGLs.

Buildings 727, 782, and 783 are single story structures. The walls of building 782 are prefabricated concrete panels and concrete support columns. The building 782 roof was constructed of fiberboard and tar with rock ballast material and supported by Tee beams. The walls and roof of building 783 are galvanized steel. The walls of building 727 are cinderblock and the roof was constructed of fiberboard and tar with rock ballast material supported by beams.

2.0 Final Survey Details

Final surveys were limited to alpha contamination surveys. Beta-gamma characterization surveys in the exhaust plenums did not indicate the presence of any beta-gamma contamination in excess of the applicable DCGLs. Therefore, no beta-gamma final surveys were required for these survey units. The beta surveys consisted of the following:

- removable beta-gamma contamination measurements counted on Eberline BC-4 systems
- total beta-gamma activity and beta-gamma scans as measured with the NE Electras and DP-6 scintillation detectors

Final alpha contamination surveys consisted of the following:

- removable alpha contamination measurements counted on Eberline SAC-4 systems
- total alpha activity and alpha scans as measured with the Shonka SCM system
- total alpha activity and alpha scans as measured with the NE Electra/DP-6 or DP-8 scintillation detectors

The areas were stripped of radiologically contaminated process piping, plenums and ducting prior to the performance of final surveys. All contaminated and non-contaminated penetrations in the slab were surveyed, grouted and will remain until environmental restoration is accomplished.

Characterization data of the 401 and 402 plenum concrete pads in building 782 revealed fixed alpha contamination up to 15,000 dpm/100 cm². The 401 and 402 plenum pads were scabbled to remove the contamination.

Building 782's roof surface had contaminated media samples up to 1422 dpm/100 cm² transuranic alpha. It is suspected that the distributed contamination was transported from the solar ponds. The rock, tar/fiberboard, and fiberglass insulation beneath the fiberboard were removed and disposed of as radioactive waste. TSA and Smear measurements were repeated at all initial roof locations after all remediation work was completed. The results are included as final survey data. A 10% scan was performed after all remediation work was completed. No survey unit reclassification was required for the following reasons: 1) During remediation a full time RCT covered the job and took frequent surveys of tools and personnel and no spread of contamination was detected. 2) Due to the nature of the contamination (e.g., likely a plume from solar ponds) a 10% scan would be just as likely to identify any remaining contamination as would a higher percentage scan. 3) The contaminated roof media was not in direct contact with the Tee beams and the likelihood of contamination spreading from the roof media through two layers of insulation and onto the Tee beams was deemed highly unlikely. Building 727's roof was disposed of as radioactive waste as well based on a similar contamination potential. Surveys performed after the B727 roof media was removed met the unrestricted release criteria. The roof of building 783 was constructed of galvanized steel and remained free of contamination.

After demolition, a large plate will be placed over the entrance to the basement of building 782. The plate will be sealed to prevent water from entering the basement and tunnel from above. The basement and tunnel will not be included in this final report. In the Closeout Radiological Report, Main Building, it was stated that the 779 Basement (001), survey unit 77943 would be included in this report. Since that time, it was agreed that the 779 basement would not be included in this Closeout Radiological Report and is exempted from final survey as agreed to by the CDPHE, EPA, DOE and B779 project. Building 783 has two sumps, which were exempted from final survey as well. The basement was exempted because it is below grade, and has a high potential of becoming contaminated from highly contaminated soil adjacent to the area. Characterization contamination levels of the two sumps were verified to be less than the applicable DCGLs. Prior to demolition, a protective plate will be placed over a penetration on the 402 plenum pad to ensure the grout in the penetrations is not disturbed.

Elevated results were detected on the roof of Building 783 and on the roof flashing of Building 782 (ranging from ~90 to 130 dpm/100 cm²). Both surfaces were constructed of galvanized steel, which led to the conclusion that Po-210 (a radon progeny) was the source of the elevated activity. This phenomenon has been exhibited on other similar type surfaces (galvanized steel or oxidized metal) at RFETS. Coupon samples were collected from each surface and analyzed for DOE-added contamination. Results indicated that Pu-239 and Am-241 were not present.; Po-210, however, was detected. In addition, elevated activity (in excess of 75 dpm/100 cm²) was not detected on adjacent surfaces, indicating that airborne dispersion of a contamination source was unlikely. Therefore, based on lab confirmation of the existence of Po-210 and the absence of DOE-added radionuclides, elevated (total surface) activity on the roof of B783 and on the flashing of B782 was attributed to Po-210.

3.0 Survey Unit Descriptions

This report consists of survey data for the interior and exterior surfaces of buildings 727, 782, and 783. Total and removable surface contamination surveys and scan surveys were performed in each survey unit. Total surface contamination and removable contamination surveys were performed in the following survey units: 72701 (interior surfaces of building 727 & 783); 72702 (exterior surfaces of building 727 & 783); 78201 (exterior surfaces of building 782) and 78203 (interior surfaces of building 782) Paint/surface media samples were collected in survey units 78201, and 78203.

Utilizing process history, characterization surveys and in-process surveys, the survey units were classified in accordance with MARSSIM and the Building 779 Cluster Closeout Radiological Survey Plan (CRSP).

This report consists of two survey areas that were further broken down into four survey units (refer to Table 3.1 below). More detailed survey unit justifications are delineated in each survey unit package located in the project files.

**Table 3.1
 Survey Unit Classifications**

Survey Unit	Description	Justification for Classification	Remediation Required	Class
72701	Interior surfaces of bldg. 727 & 783	Low contamination potential	N/A	3
72702	Exterior surfaces of bldg. 727 & 783	No expected contamination > than applicable DCGL after roof removal	Roof removed from bldg. 727	2
78201	Exterior surfaces of bldg. 782	No expected contamination > than applicable DCGL after roof removal	Roof removed from bldg. 782	2
78203	Interior surfaces of bldg. 782	No expected contamination > than applicable DCGL	Plenum pads were scabbled	2

4.0 Overview Maps

Figures 4.1 and 4.2 depict exterior and interior views of Building 782, Building 783, and Building 727, respectively.

Figure 4.1
B782, B783 & B727 Exterior Overview Map

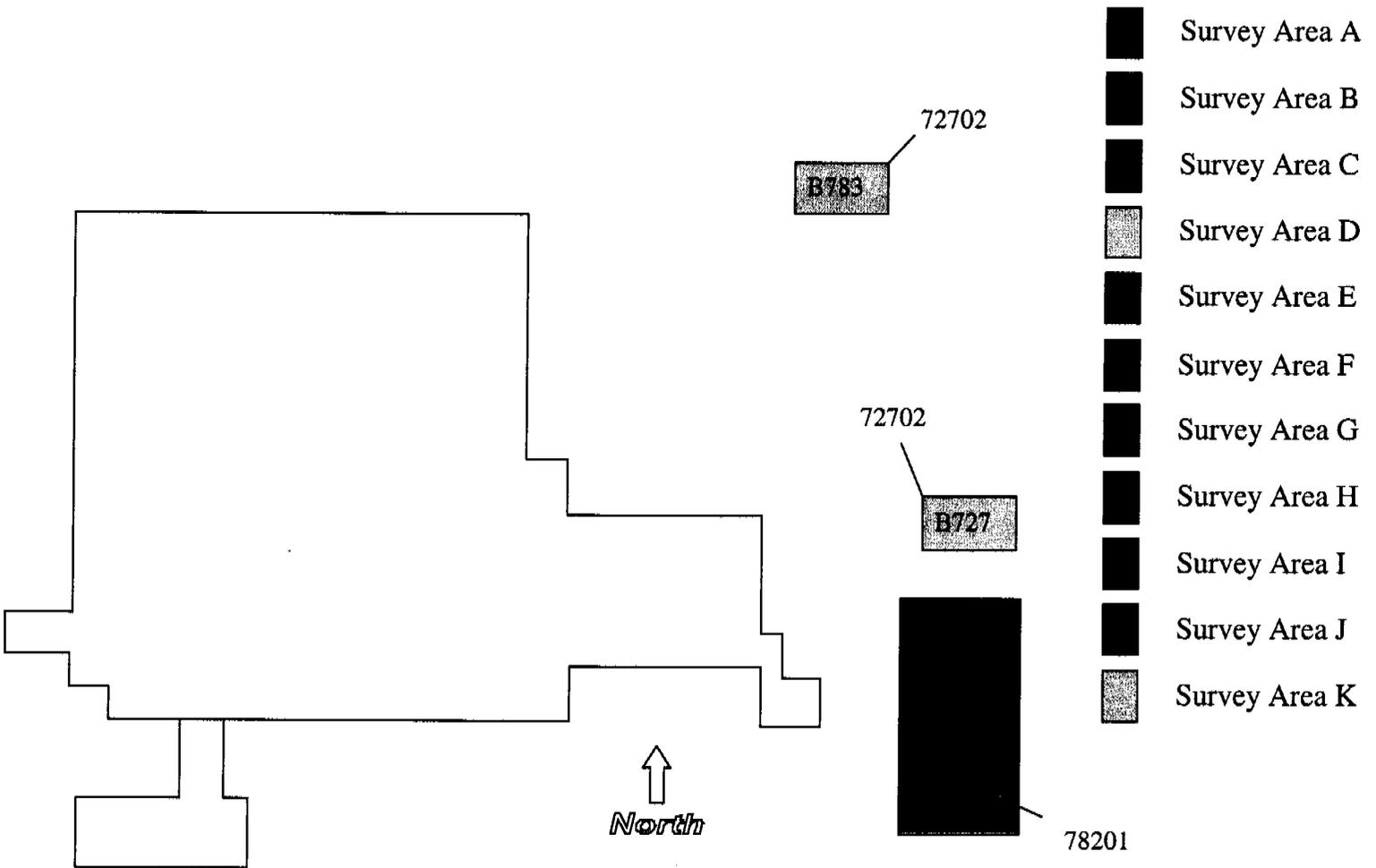
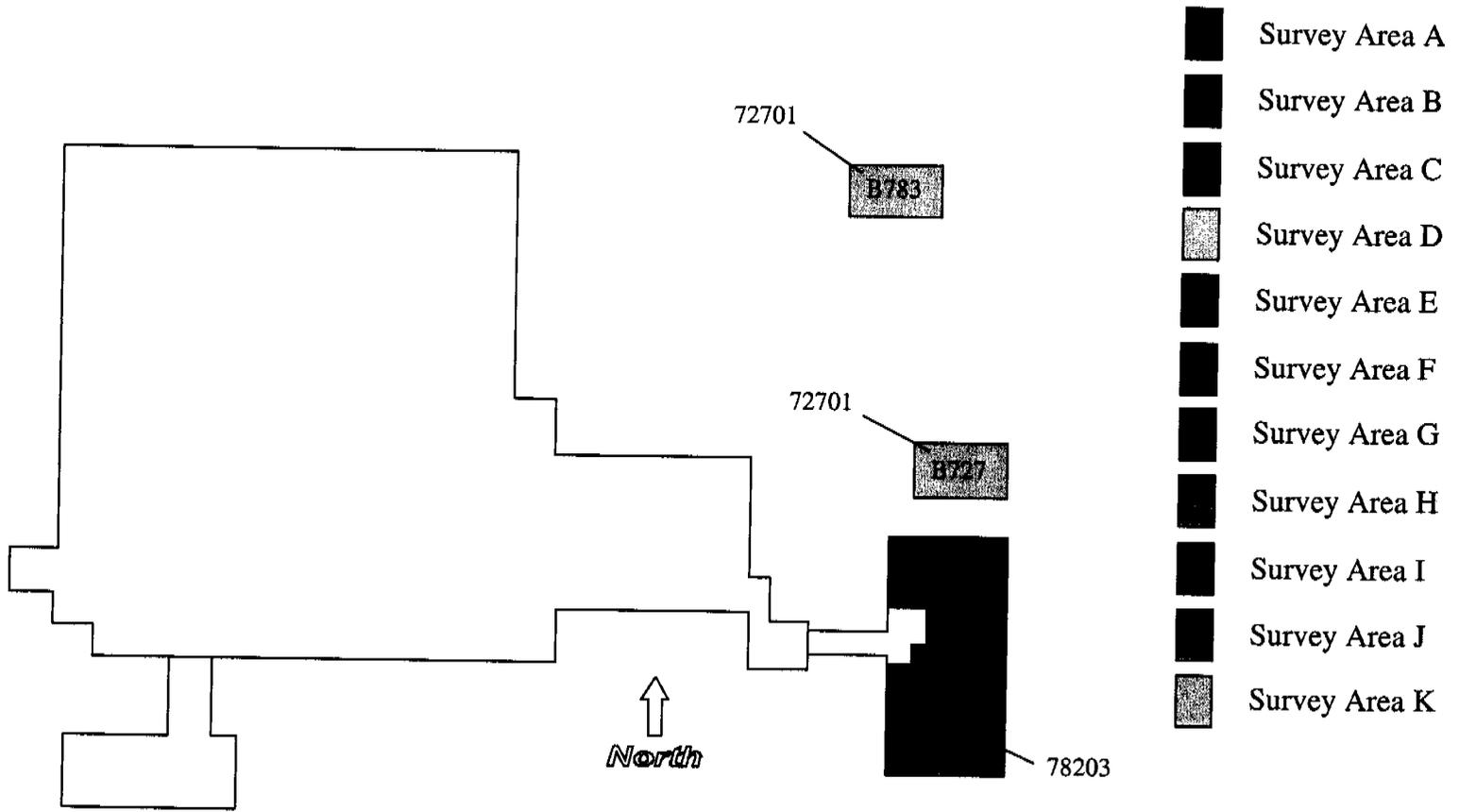


Figure 4.2
B782, B783 & B727 Interior Overview Map



5.0 Scope of Work

5.1 Paint/Surface Media Samples

Paint/surface media samples were obtained in survey units 78201 and 78203 to ensure contamination did not exist below painted surfaces or other forms of surface media such as roofing material, floor adhesive, or within the paint or roofing/adhesive material itself.

An exception to the Closeout radiological survey plan is that no samples were collected from Class 2 survey unit 72702. This decision was made because no potential for painted over contamination exists as is explained below:

- The material on the exterior of B727 was original stucco (No paint) as validated by the removal of exterior components such as conduit.
- The surface media on the exterior of B783 consisted of an original factory coating on galvanized metal.

No volumetric samples were collected due to the fact that there was no evidence (as discovered during the historical site assessment, characterization, and final status surveys) that contamination had migrated into cinder block, concrete, or any other base material and disappeared from the surface. Total surface activity measurements and surface media sampling were utilized as the detection methods for any contamination that occurred on building surfaces.

The sample collection method for coated surfaces (paint or adhesive) involved the collection of cover material to a depth where the underlying base material was exposed.

The quantity of samples was determined based on MARSSIM statistical calculations to satisfy Impacted Class 2 survey requirements. The calculation methodology for the number of media samples is presented in the Closeout Radiological Survey Plan for the 779 Cluster (Section 5.2.6.2). Based on the pre-survey calculations included in each survey package, the following were required for each survey unit:

- A minimum of 15 surface media samples per 1000 m² floor area for Class 2 survey units

Refer to Building 779 project files for raw survey data and additional final survey details.

Initial media sample results for the roof of building 782 revealed total activity in excess of the alpha DCGL_{EMC}. It is believed that the contamination migrated from the solar ponds based on previous site history (e.g., Building 980 final survey). The decision was made to remove the contaminated portion of the roof (rock ballast, tar, fiberboard, and underlying insulation) and dispose of the material as radioactive waste. Prior to obtaining media samples on the roof of building 727, the decision was made to treat the building 727 roof in a similar fashion, and it was disposed of as radioactive waste as well. Verification surveys were performed after the radioactive roofing material was removed to ensure contamination was not introduced onto underlying surfaces. No removable or total activity was detected above the applicable DCGLs.

The results of the media samples from the building 782 roof were discarded. This resulted in only four media samples remaining in survey unit 78201. Because of the special circumstances regarding the data removal, these four samples were considered adequate.

Instrument calibration, maintenance, source check requirements, data reduction and MDC equations are controlled per applicable Kaiser Hill Analytical Services Division procedures (refer to Attachment H, Data Quality Assessment, for additional references).

5.2 Removable Surface Contamination Surveys

Removable surface contamination surveys were obtained in each survey unit to ensure that removable contamination did not exist above the Building 779 Cluster applicable DCGL. The quantity of removable contamination measurements was determined based on MARSSIM statistical calculations as presented in the Closeout Radiological Survey Plan for the 779 Cluster, RF/RMRS-97-123.UN (Section 5.2.6.2). Based on the pre-survey calculations included in each survey package, the following were required for each survey unit:

- A minimum of 15 removable contamination measurements per 1000 m² floor area for Class 2 survey units
- A minimum of 15 removable contamination measurements for Class 3 survey units

Refer to Building 779 project files for raw survey data and additional final survey details.

Smears were counted on a SAC-4. Instrument calibration, maintenance, source check requirements, data reduction and MDC equations are provided in 3-PRO-112-RSP-02.01, Revision 1, "Radiological Instrumentation".

All smears that were obtained following the collection of media samples were less than 20 dpm/100 cm².

5.3 Total Surface Activity Surveys

Total surface activity surveys were obtained in each survey unit to ensure the average total activity levels did not exist above the Building 779 Cluster DCGL_{ws}. The number of total surface activity surveys was determined based on MARSSIM statistical calculations as presented in the Closeout Radiological Survey Plan for the 779 Cluster (Section 5.2.6.2). Based on the pre-survey calculations included in each survey package, the following were required for each survey unit:

- A minimum of 15 total surface contamination measurements per 1000 m² floor area for Class 2 survey units
- A minimum of 15 total contamination measurements for Class 3 survey units

Refer to Building 779 project files for raw survey data and additional final survey details.

All post-sampling total surface activity measurements that were obtained following the collection of media samples were less than 100 dpm/100 cm².

The Total Surface Activity measurements were performed with an NE Electra with the 100-cm² DP6 detector. The survey count time was ninety seconds. Local area background determinations are discussed in Section 7.0. Instrument calibration, maintenance, source check requirements, as well as data reduction and MDC equations are provided in 3-PRO-112-RSP-02.01, Revision 1, "Radiological Instrumentation".

The NE Electra MDC is verified in a radiological engineering site operations technical basis document entitled "Methods to Demonstrate Compliance with Performance Requirements for Swipe Counting and Portable Contamination Survey Instrumentation used to Evaluate Property and Waste for Unrestricted Release", dated June 7, 1995.

5.4 Scan Surveys

Surface scans were conducted in each survey unit per one of the following two methods: 1) with the position-sensitive SCM system and 2) with conventional hand-held NE Electra dual scintillation detectors. The two methods are described in the following sections.

5.4.1 SCM/SIMS Scan Surveys

The majority of the surface scans were conducted using the Surface Contamination Monitor/Survey Information Management System (SCM/SIMS) developed by Shonka Research Associates, Inc. (SRA). The SCM/SIMS system consists of a position sensitive proportional counter (PSPC) coupled to a computerized data acquisition system. The PSPC is a long detector that acts as an array of many small radiation detectors. This allows the instrument to measure more area per unit time than a smaller detector and still separate out localized areas of contamination.

The SCM/SIMS detector surface area is 1800 cm². Corner detectors were utilized to survey units 78201 and 78203. The corner detector is a PSPC used in a static count mode with data binned in 5-cm increments. The corner detector accumulates data for ten seconds. The longer count time eliminated the need for a recount. The output of the corner detector is integrated into the SIMS software.

Surveys were conducted in accordance with equipment operation and calibration procedures developed by SRA and incorporated in the Millennium Services, Inc. Quality Assurance Plan. Detector efficiencies were determined with a NIST traceable Plutonium-238 source with an active area of approximately 50 cm² and an alpha energy of 5.5 MeV. The energy of the source is similar to the 5.1 MeV α of Plutonium-239, the principle isotope of the primary suspected contaminant. Periodic quality control checks were performed for each detector in use, and used to establish the efficiency for the detectors based on data that spanned the use of that detector during the survey (refer to Section 8.0). All quality control checks were performed under the same operating and environmental conditions as the surveys in accordance with applicable operating procedures.

The SCM/SIMS sensitivity for the surveys performed in the B779 Cluster is documented in the B779 project file. The Minimum Detectable Concentration (MDC) for alpha surveys with the corner detector (10-second count interval) for 100 cm² areas is approximately 80 dpm. Refer to Evaluation of Surface Contamination Monitor/Survey Information Management (SCM/SIMS) for the identification of contamination against the DCGL_{EMC} for the 779 Closure Project at the Rocky Flats Environmental Technology Site. The MDC for the rolling detector (at a speed of 0.8 inches/second) is approximately 150 dpm/100 cm². (All RFETS-specified instrument performance requirements are satisfied with SCM/SIMS survey methodology based on data discussion provided in Appendix 5 of the CRSR for Building 729, RF/RMRS-99-358.UN.

5.4.2 NE Electra Scan Surveys

Areas that were not scanned with the SCM/SIMS were scanned with the hand-held NE Electra with 100 cm² DP6 probes or NE Electra Plus with 600 cm² DP8 probes.

The scan rate for the DP6 was established as 1.5 inches per second in order to comply with the recommendations for probabilities of detection provided in ANSI N13.12, *Draft American National Standards: Control of Radioactive Surface Contamination on Materials, Equipment, and Facilities to be Released for Uncontrolled Use*. Scanned areas in excess of 225 dpm/100 cm² were flagged. If no flags were identified during the scan, the scan result was recorded as <225 dpm/100 cm² (refer to Tables A.1 through A.4 in Attachment A.)

Areas scanned with the DP8 detectors consisted of ten-second static counts. In the event that the ten-second count exceeded 225 dpm/100 cm², two additional measurements were performed at the same location. If one of the two additional measurements exceeded 225 dpm/100 cm², an investigation was performed.

Differentiation between SCM and handheld instrument surveys is captured within each individual survey package that is maintained in the project files.

6.0 DCGLs

The surface contamination criteria from DOE Order 5400.5 were used as the DCGLs for the final survey. The applicable transuranic DCGL_w for removable contamination, total surface activity measured by direct surface emission, and paint/media samples is as follows:

Category	DCGL _w Removable Alpha (dpm/100 cm ²)	DCGL _w Total Alpha (dpm/100 cm ²)	DCGL _{EMC} Total Alpha (dpm/100 cm ²)
Transuranic	20	100	300
Uranium	N/A	5000	15,000

7.0 Background

Final radiological surveys of buildings 727, 782, and 783 were focused on alpha emitting isotopes, principally Plutonium-239 and Plutonium-240. Natural activity present in construction materials was not expected to contribute a significant amount to the field measurements. Historical data from other RFETS building indicates that surface emission rates from concrete, typically the material containing the highest quantities of naturally-occurring alpha-emitting isotopes, would contribute negligible activity when compared to the $DCGL_{EMC}$. Therefore, no material background subtract was performed for alpha surface scan measurements, and results were compared directly to the applicable $DCGL_{EMC}$ defined in Section 6.0.

For total surface activity data collected with the NE Electra, a ninety-second background measurement was collected at each total surface activity location. The average of these measurements was calculated, and the mean value subtracted from total surface activity measurements to obtain the net total surface activity results. Refer to Attachments B through E for local area background results.

Paint/Surface media samples were analyzed by alpha spectroscopy methods. Individual isotopic data results are contained in Attachments D and E. Transuranic isotopes are not present in natural radioactivity; therefore no background concerns exist. Uranium isotopes, though present in nature, are not expected to exist in significant quantities in paint/surface media samples. As in surface activity measurements, total reported activity from paint/surface media sample analyses was evaluated against the applicable uranium or transuranic $DCGL_w$ defined in Section 6.0.

Other than instrument background, which is quantified prior to analysis, background is not a factor during performance of removable contamination surveys. Reported values from the removable contamination surveys were evaluated against the applicable $DCGL_w$ defined in Section 6.0.

8.0 Quality Assurance/Quality Control

Quality control for each type of instrument utilized in the surveys of buildings 727, 782, and 783 is discussed in the sections below. An additional quality control element includes the Software Quality Control Checklists (Verification of Calculations). This document was generated for each survey unit (refer to Building 779 Project files) to verify calculations within the data summaries (Attachments B through E). A data quality assessment (DQA) was also generated to discuss how the project implemented MARSSIM data quality guidelines and applicable DOE quality requirements (Attachment H).

8.1 Paint/Surface Media Samples

Measures of laboratory precision and accuracy were assessed per applicable laboratory procedures. All QA data indicated that sample results were valid (refer to Attachment H, Data Quality Assessment).

8.2 Removable Surface Contamination Surveys

The instruments utilized for removable surface contamination analysis (Eberline SAC-4) were calibrated with NIST-traceable sources. A daily background and QC check was also performed. All background and QC checks were within required tolerances as delineated in the Building 779 CRSP RF/RMRS-97-123.UN (also refer to Attachment H, Data Quality Assessment).

8.3 Total Surface Activity Surveys

An additional 5% of total surface activity measurements were obtained for quality control purposes (refer to Attachments B through E). The results from these measurements were compared to the applicable $DCGL_W$ to ensure survey compliance (i.e., all QC measurements were less than $DCGL_W$). All QC measurements were less than $DCGL_W$ (refer to Attachment H, Data Quality Assessment).

8.4 Scan Surveys

8.4.1 SCM/SIMS Scan Surveys

Quality control surveys for SCM/SIMS scans were performed with a NIST traceable Plutonium-238 source with an activity of 194,400 dpm. The source, RFETS ID# RS3911, Manufacturer's ID ER716, is a 71 mm x 71 mm (approximately 50 cm²) plated source. The source manufacturer's certificate is in the 779 Closure Project file. Quality control surveys consisted of a minimum of three measurements of the source by the detector in the configuration used in the actual survey. Corner detector quality control surveys consisted of measurements of the source placed on a surface and the data acquisition set for the survey time (i.e., 10 seconds).

A quality control survey was performed at the beginning and end of each detector use each day and periodically during the surveys. The response of the detector over the duration of its use became the basis for the detector's efficiency. Additionally, each survey was evaluated to ensure that it was bracketed by acceptable quality control surveys. At least two of the three measurements must fall within the specified tolerance (within 20% of the mean of all quality control surveys for each specific detector) in order for the data to be considered valid. The above criteria were satisfied. Therefore, the detector results were considered valid.

Source checks were conducted daily prior to start of survey, whenever the detector configuration was changed, and whenever any other electronic adjustments or maintenance was performed. The mean of the valid quality control surveys, determined from all acceptable results over the duration of the survey, was used to establish the efficiency for a specific detector. Attachment G includes the quality control charts for the SCM/SIMS detectors used during the survey.

8.4.2 NE Electra Scan Surveys

Performance checks were performed on the NE Electra prior to field use. The results were required to fall within the established range ($\pm 20\%$ in accordance with the applicable Radiological Safety Procedures) in order for the instrument and the associated data to be considered valid (refer to Attachment H, Data Quality Assessment).

9.0 Investigation Methodology

Follow up investigations were conducted for each scan result in excess of 75% of the DCGL_{EMC} (225 dpm/100cm²) by performing a survey of the flagged area with a hand held instrument, the NE Electra with a DP6 probe.

Investigation surveys utilizing the NE Electra were performed by first scanning the surrounding suspect area to determine if any elevated activity areas could be identified. Following the scan, a local area background measurement (ninety second count) and an direct measurement (ninety second count) were obtained in the area of highest activity identified during the scan.

Remediation and a follow-up survey were performed at each confirmed location that produced a NE Electra result in excess of 225 dpm/100 cm² (as described in Tables A.1 through A.4 in Attachment A).

Each investigation measurement was documented on an investigation form. In some cases, more than one investigation result was documented for a given grid. All scan investigation results are presented in Tables A.1 through A.4 in Attachment A.

10.0 Survey Results

10.1 Paint/Surface Media Samples

Paint/surface media samples were obtained in the survey units as stated in Section 5.1 to ensure contamination did not exist below painted surfaces or other forms of surface media such as roofing material, floor adhesive, or within the paint or roofing/adhesive material itself. These results were converted to units of surface activity (dpm/100 cm²) in order to compare to the DCGLs

Alpha spectroscopy was performed to determine the activity of Uranium-233/234, Uranium-235, Uranium-238, Plutonium-239/240, and Americium-241. Values for each isotope(s) are reported separately. The data for the survey units where media samples were obtained was below the applicable total uranium and total transuranic DCGL_w. With the exception of survey unit 78201, which is explained in section 5.1, the number of media samples obtained was verified to be adequate, by re-calculating the required number of samples with the actual survey unit sample standard deviation (refer to the "Post Survey Paint/Media Sample Summary Statistics Calculation Verification Worksheet" in the Building 779 project files, for each applicable survey unit). Tables 10.1 and 10.2 summarize the results of the paint/surface media samples.

Table 10.1
Paint/Surface Media Summary Results for Transuranics

Survey Unit	Alpha Activity (dpm/100 cm ²)				DCGL _w
	Minimum	Maximum	Mean	Standard Deviation	
72701	N/A	N/A	N/A	N/A	100
72702	N/A	N/A	N/A	N/A	100
78201	0.1	4.0	1.3	1.8	100
78203	0.0	5.0	1.0	1.3	100

**Table 10.2
Paint/Surface Media Summary Results for Uranium**

Survey Unit	Alpha Activity (dpm/100 cm ²)				DCGL _w
	Minimum	Maximum	Mean	Standard Deviation	
72701	N/A	N/A	N/A	N/A	5000
72702	N/A	N/A	N/A	N/A	5000
78201	0.4	34.4	12.6	15.9	5000
78203	0.7	24.6	4.4	5.5	5000

Detailed sampling instructions and paint/surface media sample results are on file in the Building 779 project files.

10.2 Removable Surface Contamination Surveys

Removable contamination measurements were obtained at each accessible grid location in accordance with approved instructions developed for each survey package. The minimum required removable contamination measurements were obtained for each survey unit. Removable contamination results for each survey unit are presented in Attachments B through E. Surveys were performed at each location from which paint/surface media samples were obtained, ensuring that the minimum required number of smears was collected for each survey unit. For those points, measurements were obtained prior to and after the media sample. For those areas from which no paint/media sample was obtained, a single removable contamination measurement was obtained. The results of all smears show that the removable contamination levels met the DCGL_w described in Section 6.0. The number of removable activity measurements obtained was verified to be adequate by re-calculating the required number of measurements with the actual survey unit measurement standard (refer to the "Post Survey Removable Contamination Summary Statistics Calculation Verification Worksheet" in the Building 779 project files, for each survey unit). Table 10.3 summarizes the results of removable surface contamination surveys.

**Table 10.3
Removable Surface Contamination Summary Results**

Survey Unit	Alpha Activity (dpm/100 cm ²)				DCGL
	Minimum	Maximum	Mean	Standard Deviation	
72701	-0.9	1.5	0.2	1.0	20
72702	-0.9	2.4	0.4	1.3	20
78201	-0.9	2.4	0.3	1.1	20
78203	-0.6	2.4	0.1	0.9	20

Detailed survey instructions and removable surface contamination results are on file in the Building 779 project files.

10.3 Total Surface Activity Surveys

Total surface activity measurements were obtained in accordance with approved instructions developed for each survey package, at each accessible grid location, ensuring that the minimum required total surface activity measurements were obtained for each survey unit. Total surface activity survey results for each survey unit are presented in Attachments B through E. Total surface activity surveys were performed at each location where paint/surface media samples were obtained. For those areas where no media sample was obtained, a single total surface activity measurement was obtained. The results of all surveys showed that all total surface activity levels were less than the DCGL_w described in Section 6.0. The number of total surface activity measurements obtained was verified to be adequate by re-calculating the required number of measurements with the actual survey unit standard deviation (refer to the "Post Survey Total Surface Activity Summary Statistics Calculation Verification Worksheet" in the Building 779 project files, for each survey unit). Table 10.4 summarizes the total surface contamination survey results.

Table 10.4
Total Surface Contamination Summary Results

Survey Unit	Alpha Activity (dpm/100 cm ²)				DCGL _w
	Minimum	Maximum	Mean	Standard Deviation	
72701	-4.9	27.6	7.2	8.1	100
72702	0.0	43.4	14.4	13.3	100
78201	6.3	65.1	34.1	18.5	100
78203	-6.5	32.3	7.6	10.2	100

Detailed survey instructions and total surface contamination results are on file in the Building 779 project files.

10.4 Scan Surveys

Scan surveys were performed at the required density in accordance with approved instructions developed for each survey package. The scan results are presented in Tables A.1 through A.4 in Attachment A. Survey results are grouped by survey unit. Each survey unit is divided into a number of subunits, which is typically represented by a single surface (e.g. floor, wall < 2 meters, wall > 2 meters, ceiling, etc.). Within each subunit, survey(s) are performed. For SCM scan surveys, a report is automatically generated. For the NE Electra scan surveys, the results are reported as < 225 dpm/100 cm² (given that no areas are flagged for investigation). For both scan methods, survey information is documented on survey forms and maps. A consistent numbering system (per the survey unit numbers outlined in the Final Survey Breakdown Structure, Rev 2) is used to identify the survey unit, subunit, survey number, and type of detector used.

The scan survey overlay maps (refer to Attachment F) delineate the subunit locations so that all surveys can be traced to the location surveyed. The yellow-shaded areas represent areas requiring 100% scan. The green-shaded areas represent requiring 50% scans. The blue-shaded areas represent areas requiring 10% scan. The required scan frequency for each survey unit, per the Closeout Radiological Survey Plan for the 779 Cluster was verified.

Due to the low expected count rate and the random nature of radioactivity, a low occurrence of individual 100 cm² area false positive results is expected. This phenomenon is amplified when using the SCM/SIMS system due to the large amounts of data generated (i.e. a result is recorded for each 25 cm² area scanned).

Surveys taken with the SCM operating in the timer mode are presented as a single survey. Survey time for those detectors have been increased to minimize the probability of false positives. Timer mode surveys are performed when the cart-mounted motor driven SCM is not utilized. The timer mode setting was 10 seconds, providing the same surface area measurement as the time measured by both the primary and recount operating at 1 cm/sec.

11.0 Conclusion

All survey/sample data collected from buildings 727, 782, and 783 were collected in accordance with the Closeout Radiological Survey Plan for the 779 Cluster and approved survey instructions. All data was verified and validated as described in Attachment H and is, therefore, satisfactory for comparison with release criteria.

Finally, all survey/sample results presented in this report are less than DCGLs as defined by the Closeout Radiological Survey Plan for the 779 Cluster.

ATTACHMENT A
Scan Data Summaries

Table A.1
Survey Unit 72701 Scan Data Summary

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00100190	1/21/00	<225	n/a	n/a	n/a	No	n/a
00100290	1/21/00	<225	n/a	n/a	n/a	No	n/a
00100390	1/26/00	<225	n/a	n/a	n/a	No	n/a
00120190	1/20/00	<225	n/a	n/a	n/a	No	n/a
00120290	1/21/00	<225	n/a	n/a	n/a	No	n/a
00120390	1/20/00	<225	n/a	n/a	n/a	No	n/a
00120490	1/21/00	<225	n/a	n/a	n/a	No	n/a
00120590	1/25/00	<225	n/a	n/a	n/a	No	n/a
00120690	1/25/00	<225	n/a	n/a	n/a	No	n/a
00120890	1/25/00	<225	n/a	n/a	n/a	No	n/a
00165190	1/21/00	<225	n/a	n/a	n/a	No	n/a
00165290	1/21/00	<225	n/a	n/a	n/a	No	n/a
00165390	1/21/00	<225	n/a	n/a	n/a	No	n/a
00165490	1/21/00	<225	n/a	n/a	n/a	No	n/a
00165590	1/26/00	<225	n/a	n/a	n/a	No	n/a
00165690	1/26/00	<225	n/a	n/a	n/a	No	n/a
00165790	1/26/00	<225	n/a	n/a	n/a	No	n/a
00165890	1/26/00	<225	n/a	n/a	n/a	No	n/a
00185190	1/21/00	<225	n/a	n/a	n/a	No	n/a
00185290	1/26/00	<225	n/a	n/a	n/a	No	n/a

- (1) The first six characters represent the survey subunit number. The last two numbers represent the detector type.
- (2) NE Electra scan results are reported as <225 dpm/ 100 cm² when no areas are flagged.
- (3) One-square meter averages are verified as less than 75 dpm/ 100 cm² when individual measurements in excess of 100 dpm/ 100 cm² are present.
- (4) In some cases, dedicated decon personnel worked in parallel with the Millennium Services survey technicians such that elevated areas were immediately decontaminated. For these cases, the follow-up Electra investigation value (refer to Column 6) will reflect the post-decon radiological status of the area.

Detailed scan survey instructions and results are on file in the Building 779 project files.

Table A.2
Survey Unit 72702 Scan Data Summary

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00220190	1/20/00	<225	n/a	n/a	n/a	No	n/a
00220290	1/19/00	<225	n/a	n/a	n/a	No	n/a
00220390	1/20/00	<225	n/a	n/a	n/a	No	n/a
00220490	1/19/00	<225	n/a	n/a	n/a	No	n/a
00220590	1/22/00	<225	n/a	n/a	n/a	No	n/a
00220690	1/22/00	<225	n/a	n/a	n/a	No	n/a
00220790	1/22/00	<225	n/a	n/a	n/a	No	n/a
00220890	1/22/00	<225	n/a	n/a	n/a	No	n/a
00265190	1/20/00	<225	n/a	n/a	n/a	No	n/a
00265290	1/20/00	<225	n/a	n/a	n/a	No	n/a
00265390	1/20/00	<225	n/a	n/a	n/a	No	n/a
00265490	1/20/00	<225	n/a	n/a	n/a	No	n/a
00265590	1/22/00	<225	n/a	n/a	n/a	No	n/a
00265690	1/22/00	<225	n/a	n/a	n/a	No	n/a
00265790	1/22/00	<225	n/a	n/a	n/a	No	n/a
00265890	1/22/00	<225	n/a	n/a	n/a	No	n/a
00295190	1/31/00	<225	n/a	n/a	n/a	No	n/a
00295290	1/31/00	<225	n/a	n/a	n/a	No	n/a

- (1) The first six characters represent the survey subunit number. The last two numbers represent the detector type.
- (2) NE Electra scan results are reported as <225 dpm/ 100 cm² when no areas are flagged.
- (3) One-square meter averages are verified as less than 75 dpm/ 100 cm² when individual measurements in excess of 100 dpm/ 100 cm² are present.
- (4) In some cases, dedicated decon personnel worked in parallel with the Millennium Services survey technicians such that elevated areas were immediately decontaminated. For these cases, the follow-up Electra investigation value (refer to Column 6) will reflect the post-decon radiological status of the area.

Detailed scan survey instructions and results are on file in the Building 779 project files.

22

Table A.3
Survey Unit 78201 Scan Data Summary

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00120100	5/24/99	274	00120191	274	120	No	n/a
00120101	4/2/99	274	00120190	274	55	No	n/a
				274	51	No	n/a
				274	92	No	n/a
				240	65	No	n/a
00120200	5/24/99	274	00120290	274	42	No	n/a
00120201	4/21/99	303	00120291	237	14	No	n/a
				303	60	No	n/a
				258	32	No	n/a
				231	23	No	n/a
00120300	5/24/99	137	n/a	n/a	n/a	No	n/a
00120301	4/21/99	312	00120390	274	32	No	n/a
				239	37	No	n/a
				239	55	No	n/a
				240	28	No	n/a
				230	60	No	n/a
				308	37	No	n/a
				312	23	No	n/a
				240	55	No	n/a
				240	55	No	n/a
00120400	4/12/99	254	00120490	254	65	No	n/a
00120401	4/20/99	308	00120491	308	61	No	n/a
00120500	4/19/99	240	00120590	240	37	No	n/a
00120501	4/20/99	206	n/a	n/a	n/a	No	n/a
00120600	4/19/99	240	00120690	240	55	No	n/a
00120601	4/20/99	274	00120691	274	28	No	n/a
				270	42	No	n/a
00120700	4/19/99	268	00120791	228	14	No	n/a
				240	52	No	n/a
				268	42	No	n/a
00120701	4/20/99	206	n/a	n/a	n/a	No	n/a
00120800	4/20/99	308	00120890	240	56	No	n/a
				264	52	No	n/a
				240	42	No	n/a
				308	33	No	n/a
				240	66	No	n/a
00120801	4/20/99	206	n/a	n/a	n/a	No	n/a
00120900	4/20/99	271	00120990	271	75	No	n/a
				231	75	No	n/a
				240	51	No	n/a

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00120902	4/20/99	272	00120990	272	75	No	n/a
00121000	5/27/99	171	n/a	n/a	n/a	No	n/a
00121100	6/2/99	206	n/a	n/a	n/a	No	n/a
00121200	5/27/99	197	n/a	n/a	n/a	No	n/a
00121300	5/27/99	166	n/a	n/a	n/a	No	n/a
00121400	5/27/99	239	00121490	239	47	No	n/a
00121500	5/27/99	372	00121590	372	75	No	n/a
				240	47	No	n/a
00121600	5/27/99	274	00121690	240	75	No	n/a
				274	80	No	n/a
				240	89	No	n/a
00121602	2/3/00	421	00121691	421	56	No	n/a
				345	60	No	n/a
				287	56	No	n/a
				302	40	No	n/a
				298	60	No	n/a
				251	52	No	n/a
				229	52	No	n/a
00121701	6/2/99	240	00121790	240	117	No	n/a
00121702	2/3/00	335	00121791	291	80	No	n/a
				255	48	No	n/a
				262	76	No	n/a
				255	49	No	n/a
				255	48	No	n/a
				335	60	No	n/a
				255	28	No	n/a
				255	44	No	n/a
				314	24	No	n/a
00121801	6/2/99	131	n/a	n/a	n/a	No	n/a
00121900	4/20/99	1234	00121990	1234	23	No	n/a
	4/21/99	308	00121991	308	136	No	n/a
				274	33	No	n/a
				240	103	No	n/a
00121902	4/21/99	262	00121990	239	89	No	n/a
				262	75	No	n/a
				240	84	No	n/a
00122000	4/21/99	267	00122090	267	80	No	n/a
				239	70	No	n/a
				240	70	No	n/a
				233	65	No	n/a
				240	89	No	n/a
00122001	4/21/99	3458	00122091	240	80	No	n/a
				3458	108	No	n/a
				258	103	No	n/a

24

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00122100	4/21/99	274	00122190	274	88	No	n/a
				240	51	No	n/a
				240	74	No	n/a
				240	51	No	n/a
				274	69	No	n/a
				267	106	No	n/a
				240	79	No	n/a
				00122101	4/21/99	206	n/a
00122200	4/21/99	308	00122290	240	60	No	n/a
				274	74	No	n/a
				240	60	No	n/a
				240	51	No	n/a
				308	60	No	n/a
				274	60	No	n/a
00122201	4/21/99	308	00122291	308	61	No	n/a
				239	47	No	n/a
00122300	4/21/99	308	00122391	240	66	No	n/a
				240	70	No	n/a
				240	47	No	n/a
				274	89	No	n/a
				308	42	No	n/a
00122301	4/21/99	240	00122390	240	103	No	n/a
				239	80	No	n/a
00122400	4/21/99	342	00122490	240	47	No	n/a
				274	28	No	n/a
				274	66	No	n/a
				342	33	No	n/a
				240	56	No	n/a
				240	42	No	n/a
				239	98	No	n/a
				260	52	No	n/a
				240	66	No	n/a
				240	70	No	n/a
				240	61	No	n/a
274	52	No	n/a				
00122401	4/21/99	192	n/a	n/a	n/a	No	n/a
00122402	4/21/99	206	n/a	n/a	n/a	No	n/a
00122500	6/2/99	205	n/a	n/a	n/a	No	n/a
00122600	6/2/99	240	00122690	240	56	No	n/a
00122700	6/2/99	171	n/a	n/a	n/a	No	n/a
00122800	6/2/99	171	n/a	n/a	n/a	No	n/a
00122900	6/2/99	206	n/a	n/a	n/a	No	n/a
00123000	5/27/99	206	n/a	n/a	n/a	No	n/a
00165500	6/3/99	274	00165590	240	32	No	n/a

25

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00165500	6/3/99	274	00165590	235	83	No	n/a
				274	46	No	n/a
				239	46	No	n/a
				228	60	No	n/a
00165501	6/10/99	239	00165590	239	149	No	n/a
00165600	6/3/99	259	00165690	240	42	No	n/a
				240	28	No	n/a
				240	46	No	n/a
				259	65	No	n/a
				240	28	No	n/a
				239	69	No	n/a
				225	37	No	n/a
00165700	6/3/99	342	00165790	239	69	No	n/a
				342	79	No	n/a
				240	42	No	n/a
				240	28	No	n/a
				274	46	No	n/a
				240	14	No	n/a
00165701	6/10/99	274	00165790	274	108	No	n/a
				240	72	No	n/a
00165800	6/3/99	274	00165890	240	55	No	n/a
				252	79	No	n/a
				240	51	No	n/a
				274	28	No	n/a
				240	69	No	n/a
				240	42	No	n/a
				240	37	No	n/a
				234	102	No	n/a
				240	51	No	n/a
00166602	2/3/00	363	00166690	298	104	No	n/a
				363	80	No	n/a
00166702	2/3/00	287	00166790	262	100	No	n/a
				287	76	No	n/a
				273	88	No	n/a
				260	160	No	n/a
00167000	6/3/99	274	00167090	274	14	No	n/a
				240	64	No	n/a
				274	33	No	n/a
				240	42	No	n/a
				274	84	No	n/a
00167200	6/3/99	308	00167290	274	47	No	n/a
				240	79	No	n/a
				292	79	No	n/a
				240	51	No	n/a

26

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00167200	6/3/99	308	00167290	274	51	No	n/a
				308	70	No	n/a
				308	89	No	n/a
				274	51	No	n/a
				274	75	No	n/a
				274	70	No	n/a
				260	42	No	n/a
				274	56	No	n/a
				240	65	No	n/a
				274	93	No	n/a
00167300	6/3/99	411	00167390	342	103	No	n/a
				254	70	No	n/a
				259	84	No	n/a
				273	56	No	n/a
				240	37	No	n/a
				232	70	No	n/a
				274	56	No	n/a
				240	70	No	n/a
				274	79	No	n/a
				240	107	No	n/a
				411	65	No	n/a
				240	56	No	n/a
				263	65	No	n/a
				274	84	No	n/a
				274	131	No	n/a
				274	79	No	n/a
				274	103	No	n/a
240	65	No	n/a				
231	84	No	n/a				
238	75	No	n/a				
240	75	No	n/a				
239	61	No	n/a				
239	65	No	n/a				
375	75	No	n/a				
240	84	No	n/a				
308	84	No	n/a				
273	65	No	n/a				
240	84	No	n/a				
240	107	No	n/a				
274	61	No	n/a				
309	61	No	n/a				
00167500	6/3/99	617	00167590	617	84	No	n/a
				240	47	No	n/a
				514	65	No	n/a

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00167500	6/3/99	617	00167590	274	51	No	n/a
				259	84	No	n/a
				271	56	No	n/a
				240	70	No	n/a
				342	177	No	n/a
				240	98	No	n/a
				239	42	No	n/a
				292	42	No	n/a
				240	56	No	n/a
				240	51	No	n/a
				274	98	No	n/a
				240	84	No	n/a
				240	131	No	n/a
00195190	2/7/00	<225	n/a	<225	n/a	No	n/a
00195290	2/7/00	<225	n/a	<225	n/a	No	n/a
00195390	2/7/00	<225	n/a	<225	n/a	No	n/a
00195490	2/7/00	<225	n/a	<225	n/a	No	n/a
00195590	2/7/00	<225	n/a	<225	n/a	No	n/a
00195690	2/7/00	<225	n/a	<225	n/a	No	n/a

- (1) The first six characters represent the survey subunit number. The last two numbers represent the detector type.
- (2) NE Electra scan results are reported as <225 dpm/ 100 cm² when no areas are flagged.
- (3) One-square meter averages are verified as less than 75 dpm/ 100 cm² when individual measurements in excess of 100 dpm/ 100 cm² are present.
- (4) In some cases, dedicated decon personnel worked in parallel with the Millennium Services survey technicians such that elevated areas were immediately decontaminated. For these cases, the follow-up Electra investigation value (refer to Column 6) will reflect the post-decon radiological status of the area.

Detailed scan survey instructions and results are on file in the Building 779 project files.

28

Table A.4
Survey Unit 78203 Scan Data Summary

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00300100	2/1/00	291	00300191	291	24	No	n/a
00300190	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300200	2/1/00	236	00300291	236	52	No	n/a
00300290	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300300	2/1/00	331	00300391	331	44	No	n/a
00300390	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300400	2/1/00	582	00300491	582	20	No	n/a
				229	40	No	n/a
00300490	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300500	2/1/00	564	00300591	564	16	No	n/a
00300590	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300600	2/1/00	255	00300691	255	32	No	n/a
00300690	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300790	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300890	2/2/00	<225	n/a	n/a	n/a	No	n/a
00300900	2/1/00	2472	00300991	2472	36	No	n/a
				255	20	No	n/a
				246	16	No	n/a
				225	56	No	n/a
00300990	2/2/00	256	n/a	256	n/a	Yes	6
00301000	2/1/00	225	00301091	225	12	No	n/a
00301090	2/2/00	<225	n/a	n/a	n/a	No	n/a
00301190	2/2/00	<225	n/a	n/a	n/a	No	n/a
00301290	2/2/00	<225	n/a	n/a	n/a	No	n/a
00301300	2/2/00	362	00301391	225	16	No	n/a
				362	-8	No	n/a
00301390	2/1/00	<225	n/a	n/a	n/a	No	n/a
00301400	2/1/00	187	n/a	n/a	n/a	No	n/a
00301490	2/1/00	<225	n/a	n/a	n/a	No	n/a
00301500	1/31/00	276	00301591	276	17	No	n/a
00301590	2/1/00	<225	n/a	n/a	n/a	No	n/a
00301600	2/2/00	189	n/a	n/a	n/a	No	n/a
00301690	2/1/00	<225	n/a	n/a	n/a	No	n/a
00301700	2/2/00	545	00301791	545	24	No	n/a
00301790	2/2/00	<225	n/a	n/a	n/a	No	n/a
00301800	1/31/00	201	n/a	n/a	n/a	No	n/a
00301890	2/1/00	<225	n/a	n/a	n/a	No	n/a
00301900	1/31/00	255	00301991	255	20	No	n/a
00302000	2/2/00	236	00302091	236	20	No	n/a
00302090	1/31/00	<225	n/a	n/a	n/a	No	n/a

29

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00302100	2/2/00	218	n/a	n/a	n/a	No	n/a
00302190	2/1/00	<225	n/a	n/a	n/a	No	n/a
00302200	2/2/00	331	00302291	329	52	No	n/a
				291	144	No	n/a
				229	24	No	n/a
				331	12	No	n/a
00302290	2/1/00	<225	n/a	n/a	n/a	No	n/a
00302300	2/2/00	373	00302391	373	16	No	n/a
00302390	2/1/00	<225	n/a	n/a	n/a	No	n/a
00302400	2/2/00	230	00302491	230	-4	No	n/a
00302490	2/1/00	<225	n/a	n/a	n/a	No	n/a
00302590	2/1/00	<225	n/a	n/a	n/a	No	n/a
00302690	2/1/00	<225	n/a	n/a	n/a	No	n/a
00320190	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320290	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320390	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320490	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320491	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320590	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320690	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320790	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320890	2/2/00	<225	n/a	n/a	n/a	No	n/a
00320990	2/2/00	<225	n/a	n/a	n/a	No	n/a
00321090	2/2/00	<225	n/a	n/a	n/a	No	n/a
00321091	2/3/00	<225	n/a	n/a	n/a	No	n/a
00321190	2/2/00	<225	n/a	n/a	n/a	No	n/a
00321290	2/2/00	<225	n/a	n/a	n/a	No	n/a
00321390	2/2/00	<225	n/a	n/a	n/a	No	n/a
00321400	2/2/00	120	n/a	n/a	n/a	No	n/a
00321500	2/2/00	140	n/a	n/a	n/a	No	n/a
00321600	2/2/00	127	n/a	n/a	n/a	No	n/a
00321700	2/2/00	167	n/a	n/a	n/a	No	n/a
00321800	2/2/00	189	n/a	n/a	n/a	No	n/a
00321900	2/2/00	189	n/a	n/a	n/a	No	n/a
00322090	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322190	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322290	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322390	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322490	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322590	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322690	2/1/00	<225	n/a	n/a	n/a	No	n/a
00322790	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365190	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365290	2/1/00	<225	n/a	n/a	n/a	No	n/a

0

Final Scan Survey Number ⁽¹⁾	Scan Survey Date	Max. Result (dpm/100cm ²) ⁽²⁾	Investigation Survey Number	Scan value >75% of EMC (dpm/100cm ²) ⁽⁴⁾	Electra Investigation Result (dpm/100cm ²) ⁽³⁾	Decon Required (Y/N)	Final Investigation Value (dpm/100cm ²) ⁽³⁾
00365390	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365490	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365590	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365690	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365790	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365890	2/1/00	<225	n/a	n/a	n/a	No	n/a
00365990	2/1/00	<225	n/a	n/a	n/a	No	n/a
00366090	2/1/00	<225	n/a	n/a	n/a	No	n/a
00366190	2/1/00	<225	n/a	n/a	n/a	No	n/a
00366290	2/1/00	<225	n/a	n/a	n/a	No	n/a
00385190	1/31/00	<225	n/a	n/a	n/a	No	n/a
00385290	2/1/00	<225	n/a	n/a	n/a	No	n/a
00385390	2/1/00	<225	n/a	n/a	n/a	No	n/a
00385490	2/1/00	<225	n/a	n/a	n/a	No	n/a

- (1) The first six characters represent the survey subunit number. The last two numbers represent the detector type.
- (2) NE Electra scan results are reported as <225 dpm/ 100 cm² when no areas are flagged.
- (3) One-square meter averages are verified as less than 75 dpm/ 100 cm² when individual measurements in excess of 100 dpm/ 100 cm² are present.
- (4) In some cases, dedicated decon personnel worked in parallel with the Millennium Services survey technicians such that elevated areas were immediately decontaminated. For these cases, the follow-up Electra investigation value (refer to Column 6) will reflect the post-decon radiological status of the area.

Detailed scan survey instructions and results are on file in the Building 779 project files.

ATTACHMENT B

Survey Unit 72701 Data Summary

SURVEY UNIT 72701 DATA

Survey Unit 72701 Data Summary

Total Surface Activity Measurements

15	15
Number Required	Number Obtained

MIN	-4.9	dpm/100 cm ²
MAX	27.6	dpm/100 cm ²
MEAN	7.2	dpm/100 cm ²
STD DEV	8.1	dpm/100 cm ²

TRANSURANIC DCGL _w	100	dpm/100 cm ²
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Removable Activity Measurements

15	15
Number Required	Number Obtained

MIN	-0.9	dpm/100 cm ²
MAX	1.5	dpm/100 cm ²
MEAN	0.2	dpm/100 cm ²
STD DEV	1.0	dpm/100 cm ²

TRANSURANIC DCGL _w	20	dpm/100 cm ²
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Media Sample Activity

Media Samples	N/A	N/A
Number Required	Number Obtained	

Total Uranium Results

MIN	N/A	dpm/100 cm ²
MAX	N/A	dpm/100 cm ²
MEAN	N/A	dpm/100 cm ²
STD DEV	N/A	dpm/100 cm ²

DCGL _w	N/A	dpm/100 cm ²
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Total Transuranic Results

MIN	N/A	dpm/100 cm ²
MAX	N/A	dpm/100 cm ²
MEAN	N/A	dpm/100 cm ²
STD DEV	N/A	dpm/100 cm ²

DCGL _w	N/A	dpm/100 cm ²
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Survey Unit 72701 Building 779 Total Surface Contamination Results

Total Surface Activity Survey				Quality Control Survey			
Meter Model:	NE Electra w/ DP6 Probe	Local Area Bkgd (cpm)	NE Electra w/ DP6 Probe	Serial #	Date	MDA (dpm/100 cm ²)	Local Area Bkgd (cpm)
Instrument #:	2376	N/A	N/A	2373	N/A	N/A	0.7
Cal. Due Date:	3/23/00	N/A	N/A	5/4/00	N/A	N/A	
Efficiency (cid):	0.206	N/A	N/A	0.211	N/A	N/A	
Total Surface Activity Measurements							
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)	Serial #	Date
1	2376	01/05/00	3.3	41	1.4		
2	2376	01/05/00	2.0	41	-4.9		
3	2376	01/05/00	3.3	41	1.4		
4	2376	01/05/00	5.3	41	11.1		
5	2376	01/05/00	4.7	41	8.2		
6	2376	01/05/00	6.0	41	14.5		
7	2376	01/05/00	6.0	41	14.5		
8	2376	01/05/00	2.7	41	-1.5	2373	01/05/00
9	2376	01/05/00	4.7	41	8.2		
10	2376	01/05/00	4.0	41	4.8		
11	2376	01/05/00	8.7	41	27.6		
12	2376	01/05/00	3.3	41	1.4		
13	2376	01/05/00	4.7	41	8.2		
14	2376	01/05/00	3.3	41	1.4		
15	2376	01/05/00	5.3	41	11.1		
				MIN	-4.9		
				MAX	27.6		
				MEAN	7.2		
				SD	8.1		
				Transuranic DCGI	100		
Quality Control Measurements							
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(cpm)	Serial #	Date
	2373	01/05/00	2.7	24	24	2373	01/05/00
	2373	01/05/00	3.3	24	24	2373	01/05/00
	2373	01/05/00	3.3	24	24	2373	01/05/00

Survey Unit 72701 Building 779 Smear Results

Smear Location Number	Smear Results				
	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA
1	1160	1/5/00	0.5	1.5	4.1
2	814	1/5/00	0.0	-0.9	8.3
3	814	1/5/00	0.0	-0.9	8.3
4	1160	1/5/00	0.0	0.0	4.1
5	1160	1/5/00	0.5	1.5	4.1
6	1160	1/5/00	0.0	0.0	4.1
7	814	1/5/00	0.0	-0.9	8.3
8	814	1/5/00	0.0	-0.9	8.3
9	1160	1/5/00	0.5	1.5	4.1
10	814	1/5/00	0.0	-0.9	8.3
11	1160	1/5/00	0.5	1.5	4.1
12	814	1/5/00	0.5	0.6	8.3
13	1160	1/5/00	0.0	0.0	4.1
14	814	1/5/00	0.5	0.6	8.3
15	814	1/5/00	0.5	0.6	8.3
			MIN	-0.9	
			MAX	1.5	
			MEAN	0.2	
			SD	1.0	
			Transuranic DCG _{LW}	20	

36

ATTACHMENT C

Survey Unit 72702 Data Summary

Survey Unit 72702 Data Summary

Total Surface Activity Measurements

15	16
Number Required	Number Obtained
MIN	dpm/100 cm ²
MAX	43.4 dpm/100 cm ²
MEAN	14.4 dpm/100 cm ²
STD DEV	13.3 dpm/100 cm ²
TRANSURANIC DCGL _w	100 dpm/100 cm ²

Removable Activity Measurements

15	16
Number Required	Number Obtained
MIN	dpm/100 cm ²
MAX	-0.9 dpm/100 cm ²
MEAN	2.4 dpm/100 cm ²
STD DEV	0.4 dpm/100 cm ²
TRANSURANIC DCGL _w	1.3 dpm/100 cm ²
	20 dpm/100 cm ²

Media Sample Activity

Media Samples	N/A
Number Required	Number Obtained

Total Uranium Results

MIN	N/A	dpm/100 cm ²
MAX	N/A	dpm/100 cm ²
MEAN	N/A	dpm/100 cm ²
STD DEV	N/A	dpm/100 cm ²
DCGL _w	N/A	dpm/100 cm ²

Total Transuranic Results

MIN	N/A	dpm/100 cm ²
MAX	N/A	dpm/100 cm ²
MEAN	N/A	dpm/100 cm ²
STD DEV	N/A	dpm/100 cm ²
DCGL _w	N/A	dpm/100 cm ²

Survey Unit 72702 Building 779 Total Surface Contamination Results

Total Surface Activity Survey				Quality Control Survey			
Meter Model:	NE Electra w/ DP6 Probe	Local Area Bkgd (cpm)	NE Electra w/ DP6 Probe	Local Area Bkgd (cpm)	Serial #	Date	MDA (dpm/100 cm ²)
Instrument #:	2373	2.9	1262	4.0	1262		
Cal. Due Date:	5/4/00		5/30/00		5/30/00		
Efficiency (cid):	0.211		0.206		0.206		
Total Surface Activity Measurements							
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)	Serial #	Date
1	2373	01/04/00	8.0	39	24.3		
2	2373	01/04/00	5.3	38	11.5		
3	2376	01/05/00	28.0	40	0.0 (1)		
4	1262	01/18/00	16.0	40	0.0 (1)	1262	01/18/00
5	2373	01/04/00	12.0	39	43.3		
6	2373	01/04/00	4.0	39	5.3		
7	2376	01/05/00	21.3	40	0.0 (1)		
8	2376	01/05/00	23.3	40	0.0 (1)		
9	2373	01/04/00	5.3	39	11.5		
10	2376	01/05/00	7.3	40	21.5		
11	2376	01/05/00	8.0	40	24.9		
12	2373	01/04/00	5.3	39	11.5		
13	2373	01/04/00	4.7	39	8.6		
14	2373	01/04/00	6.7	39	16.1		
15	2373	01/04/00	10.0	39	33.8		
				MIN	5.3		
				MAX	43.3		
				MEAN	19.5		
				SD	11.6		
				Transuranic DCGI _w	100		

(1) Elevated results were observed at locations 3, 4, 7, and 8 (all located on steel B783 roof). Those results were 122, 63.7, 89.5, and 99.2 dpm/100 cm², respectively. A coupon sample was collected at an elevated location on the roof. The associated total surface activity result was ~130 dpm/100 cm². The coupon sample did not indicate the presence of any transuranic isotopes. However, elevated Po-210 (a radon progeny) was identified. Therefore, ALL of the activity at locations 3, 4, 7, and 8 will be considered due to Po-210 (i.e. zero activity due to DOE-added material).

(2) OA results for locations 3 and 8 were 45.1 and 64.6 dpm/100 cm², respectively. These elevated measurement results will also be considered due to naturally-occurring Po-210, as explained in Footnote (1).

Survey Unit 72702 Building 779 Smear Results

Smear Location Number		Smear Results				
Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA		
1	814	1/4/00	0.5	0.9	7.5	
2	814	1/4/00	0.5	0.9	7.5	
3	814	1/5/00	0.5	0.6	8.3	
4	1160	1/18/00	0.0	-0.6	7.5	
5	814	1/4/00	0.0	-0.6	7.5	
6	814	1/4/00	1.0	2.4	7.5	
7	814	1/5/00	0.0	-0.9	8.3	
8	814	1/5/00	0.0	-0.9	8.3	
9	814	1/4/00	1.0	2.4	7.5	
10	814	1/5/00	0.5	0.6	8.3	
11	814	1/5/00	0.0	-0.9	8.3	
12	814	1/4/00	1.0	2.4	7.5	
13	814	1/4/00	0.0	-0.6	7.5	
14	814	1/4/00	0.0	-0.6	7.5	
15	814	1/4/00	0.0	-0.6	7.5	
16	814	1/20/00	0.5	1.5	4.1	
			MIN	-0.9		
			MAX	2.4		
			MEAN	0.4		
			SD	1.3		
			Transuranic DCGL _w	20		

ATTACHMENT D

Survey Unit 78201 Data Summary

SURVEY UNIT 78201 DATA

Survey Unit 78201 Data Summary and Approval Sheet

Total Surface Activity Measurements

15	33
Number Required	Number Obtained
MIN 6.3	dpm/100 cm ²
MAX 65.1	dpm/100 cm ²
MEAN 34.1	dpm/100 cm ²
STD DEV 18.5	dpm/100 cm ²
TRANSURANIC DCGL _w	100 dpm/100 cm ²

Removable Activity Measurements

15	33
Number Required	Number Obtained
MIN -0.9	dpm/100 cm ²
MAX 2.4	dpm/100 cm ²
MEAN 0.3	dpm/100 cm ²
STD DEV 1.1	dpm/100 cm ²
TRANSURANIC DCGL _w	20 dpm/100 cm ²

Media Sample Activity

Media Samples	4 ⁽¹⁾
Number Required	Number Obtained

Total Uranium Results

MIN 0.4	dpm/100 cm ²
MAX 34.4	dpm/100 cm ²
MEAN 12.6	dpm/100 cm ²
STD DEV 15.9	dpm/100 cm ²
DCGL _w	5000 dpm/100 cm ²

Total Transuranic Results

MIN 0.1	dpm/100 cm ²
MAX 4.0	dpm/100 cm ²
MEAN 1.3	dpm/100 cm ²
STD DEV 1.8	dpm/100 cm ²
DCGL _w	100 dpm/100 cm ²

(1) A total of 16 measurements were originally collected. However, elevated results were observed on the roof locations. Subsequently, the roof was removed. Therefore, these four locations which were initially randomly selected are now considered biased locations.

Survey Unit 78201 Building 779 Total Surface Contamination Results

Total Surface Activity Survey				Quality Control Survey					
Model:	NE Electra w/ DP6 Probe	Local Area Blg#1 (cpm)	Local Area Blg#2 (cpm)	NE Electra w/ DP6 Probe	Local Area Blg#1 (cpm)	Local Area Blg#2 (cpm)			
Instrument #:	1265 2376 2373	2.8	5.4	2380	1552	N/A	0.7		
Cal. Exp. Date:	7/19/00 3/23/00 5/4/00			2/29/00	5/3/00	N/A			
Efficiency (avg):	0.222 0.206 0.211			0.197	0.219	N/A			
Total Surface Activity Measurements									
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	Local Area Blg#1 (cpm)	Local Area Blg#2 (cpm)	MDA (dpm/100 cm ²)		
1	1370	09/10/99	5.3	36	12.2				
2	1370	09/10/99	4.0	36	6.3				
3	1370	09/10/99	7.3	36	21.2				
4	1370	09/10/99	4.7	36	8.5				
5	1265	02/06/00	10.0	52	22.3				
6	1265	02/06/00	16.0	52	51.4				
7	1265	02/06/00	11.3	52	28.6				
8	1265	02/06/00	8.7	52	18.0				
9	1265	02/06/00	14.0	52	41.7				
10	1265	02/06/00	6.7	52	16.9				
11	1265	02/06/00	6.7	52	16.9				
12	1265	02/06/00	7.3	52	9.2				
13	1265	02/06/00	8.7	52	16.9				
14	1265	02/06/00	8.0	52	12.6				
15	1265	02/06/00	8.7	52	16.9				
16	1265	02/06/00	8.7	52	16.9				
17	2376	01/03/00	13.3	39	52.0				
18	2376	01/03/00	10.0	39	35.9				
19	2376	01/03/00	15.3	39	61.7				
20	2376	01/03/00	15.3	39	61.7				
21	2376	01/03/00	15.3	39	61.7				
22	2373	01/04/00	12.0	39	44.6				
23	2376	01/03/00	12.7	39	48.1				
24	2373	01/04/00	12.0	39	44.6				
25	2376	01/03/00	13.3	39	52.0				
26	2376	01/03/00	7.3	39	22.8				
27	2376	01/03/00	8.7	39	20.6				
28	2376	01/04/00	12.0	39	45.7				
29	2373	01/04/00	11.3	38	41.3				
30	2373	01/04/00	12.0	38	44.6				
31	2376	01/03/00	14.0	39	55.4				
32					65.1				
33	2376	01/03/00	12.0	39	48.7				
					MIN				
					6.3				
					MAX				
					65.1				
					MEAN				
					34.1				
					SD				
					19.5				
					Transmittance DOCL				
					100				
					2380	01/06/00	16.0	25	78.1
					1552	02/07/00	6.7	35	28.1
					1552	02/07/00	5.3	35	13.7
					2380	01/06/00	16.0	25	44.8

NOTE: The results for location #32 represent the square-meter average. See page 6 of 6 for clarification.
 NOTE: The results for locations 5-16 represent post-sample results (noct media was removed during DAD).

45

Survey Unit 78201 Building 779 Smear Results

Smear Location Number	Smear Results					
	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA	MDA
1	814	9/10/99	0.0	-0.9	8.3	8.3
2	814	9/10/99	0.0	-0.9	8.3	8.3
3	814	9/10/99	0.5	0.6	8.3	8.3
4	814	9/10/99	0.5	0.6	8.3	8.3
5	1411	2/7/00	0.5	0.9	7.5	7.5
6	1411	2/7/00	0.5	0.9	7.5	7.5
7	1411	2/7/00	0.0	-0.6	7.5	7.5
8	1411	2/7/00	0.0	-0.6	7.5	7.5
9	1411	2/7/00	0.0	-0.6	7.5	7.5
10	1411	2/7/00	0.0	-0.6	7.5	7.5
11	1411	2/7/00	0.0	-0.6	7.5	7.5
12	1411	2/7/00	0.0	-0.6	7.5	7.5
13	1411	2/7/00	0.5	0.9	7.5	7.5
14	1411	2/7/00	0.0	-0.6	7.5	7.5
15	1411	2/7/00	1.0	2.4	7.5	7.5
16	1411	2/7/00	0.0	-0.6	7.5	7.5
17	814	1/4/00	0.5	0.9	7.5	7.5
18	814	1/4/00	0.0	-0.6	7.5	7.5
19	814	1/4/00	0.5	0.9	7.5	7.5
20	814	1/4/00	0.0	-0.6	7.5	7.5
21	814	1/4/00	1.0	2.4	7.5	7.5
22	814	1/4/00	1.0	2.4	7.5	7.5
23	814	1/4/00	0.0	-0.6	7.5	7.5
24	814	1/4/00	0.0	-0.6	7.5	7.5
25	814	1/4/00	0.5	0.9	7.5	7.5
26	814	1/4/00	0.0	-0.6	7.5	7.5
27	814	1/4/00	1.0	2.4	7.5	7.5
28	814	1/4/00	0.5	0.9	7.5	7.5
29	814	1/4/00	1.0	2.4	7.5	7.5
30	814	1/4/00	0.0	-0.6	7.5	7.5
31	814	1/4/00	0.0	-0.6	7.5	7.5
32	814	1/4/00	0.5	0.9	7.5	7.5
33	814	1/4/00	0.0	-0.6	7.5	7.5
			MIN	-0.9		
			MAX	2.4		
			MEAN	0.3		
			SD	1.1		
			Transuranic DCG _{LW}	20		

46

Survey Unit 78201 Building 779 Paint/Solid Media Sample Results

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in ²)	INDIVIDUAL NUCLIDE (dpm/100cm ²)	ESTIMATED MDA (dpm/100cm ²)	URANIUM TOTAL (dpm/100cm ²) DCGL _w =5000	TRANSURANIC TOTAL (dpm/100cm ²) DCGL _w =100
North Airlock Exterior Door	1	001.001	U-233/234	0.290	0.142	1.30	40	0.3	0.2	1.1	0.1
			U-235	0.007	0.154			0.0	0.2		
			U-238	0.641	0.041			0.7	0.0		
			Pu-239/240	0.060	0.098			0.1	0.1		
			Am-241	0.024	0.064			0.0	0.1		
South Wind Wall	2	002.001	U-233/234	0.260	0.089	69.06	40	15.4	5.3	34.4	4.0
			U-235	0.007	0.089			0.4	5.3		
			U-238	0.312	0.110			18.5	6.5		
			Pu-239/240	0.025	0.111			1.5	6.6		
			Am-241	0.042	0.142			2.5	8.4		
North Wind Wall	3	003.001	U-233/234	0.154	0.216	34.32	40	4.5	6.4	14.6	1.0
			U-235	0.000	0.109			0.0	3.2		
			U-238	0.339	0.040			10.0	1.2		
			Pu-239/240	0.018	0.133			0.5	3.9		
			Am-241	0.016	0.134			0.5	4.0		
South Airlock Exterior Door	4	004.001	U-233/234	0.061	0.138	2.69	40	0.1	0.3	0.4	0.2
			U-235	0.034	0.082			0.1	0.2		
			U-238	0.096	0.101			0.2	0.2		
			Pu-239/240	0.053	0.065			0.1	0.2		
			Am-241	0.042	0.140			0.1	0.3		

NOTE: These previously random data points now represent biased locations. The data for locations 5-16 indicated high elevated results (all collected on B782 roof). The roof was subsequently removed.

MIN	0.4	0.1
MAX	34.4	4.0
MEAN	12.6	1.3
SD	15.9	1.8
DCGL _w =	5000	100

Survey Unit 78201 Building 779 Investigation Survey Results

Total Surface Activity Survey				Quality Control Survey					
Meter Model:	NE Electra w/ DP6 Probe	Local Area Bkgd 1 (cpm)	Local Area Bkgd 2 (cpm)	NE Electra w/ DP6 Probe	Local Area Bkgd (cpm)	MDA (dpm/100 cm ²)	Local Area Bkgd (cpm)		
Instrument #:	2376	N/A	1.3	2372	N/A		1.3		
Cal. Due Date:	3/23/00	N/A		1/21/00	N/A				
Efficiency (cid):	0.206	N/A		0.213	N/A				
Total Surface Activity Measurements				Quality Control Measurements					
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)
32	2376	01/03/00	20.0	41	82.6	2372	01/05/00	20.0	29
32A	2379	01/06/00	22.7	29	100.8				
32B	2379	01/06/00	15.3	29	65.9				
32C	2379	01/06/00	12.0	29	50.4				
32D	2379	01/06/00	15.3	29	65.9				
32E	2379	01/06/00	18.0	29	78.7				
32F	2379	01/06/00	10.7	29	44.3				
32G	2379	01/06/00	10.0	29	41.0				
32H	2379	01/06/00	13.3	29	56.5				
				MIN	41.0				
				MAX	100.8				
				MEAN	65.1				
				SD	19.6				
				Transuranic DCGLow	100				

ATTACHMENT E

Survey Unit 78203 Data Summary

SURVEY UNIT 78203 DATA

Survey Unit 78203 Data Summary

Total Surface Activity Measurements

15	20
Number Required	Number Obtained

MIN	-6.2	dpm/100 cm ²
MAX	32.3	dpm/100 cm ²
MEAN	7.4	dpm/100 cm ²
STD DEV	10.1	dpm/100 cm ²

TRANSURANIC DCGL _w	100	dpm/100 cm ²
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Removable Activity Measurements

15	20
Number Required	Number Obtained

MIN	-0.6	dpm/100 cm ²
MAX	2.4	dpm/100 cm ²
MEAN	0.1	dpm/100 cm ²
STD DEV	0.9	dpm/100 cm ²

TRANSURANIC DCGL _w	20	dpm/100 cm ²
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Media Sample Activity

Media Samples	15	20
	Number Required	Number Obtained

Total Uranium Results

MIN	0.7	dpm/100 cm ²
MAX	24.1	dpm/100 cm ²
MEAN	4.3	dpm/100 cm ²
STD DEV	5.4	dpm/100 cm ²

DCGL _w	5000	dpm/100 cm ²
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Total Transuranic Results

MIN	0.0	dpm/100 cm ²
MAX	5.0	dpm/100 cm ²
MEAN	1.0	dpm/100 cm ²
STD DEV	1.3	dpm/100 cm ²

DCGL _w	100	dpm/100 cm ²
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Survey Unit 78203 Building 779 Total Surface Contamination Results

Total Surface Activity Survey				Quality Control Survey						
Meter Model:		NE Electra w/ DP6 Probe		NE Electra w/ DP6 Probe		Local Area Blgd (cpm)				
Instrument #:	2376	2378	N/A	1262	N/A	N/A	3.7			
Cal. Due Date:	3/23/00	5/3/00	N/A	5/30/00	N/A	N/A				
Efficiency (cfd):	0.206	0.216	N/A	0.206	N/A	N/A				
Total Surface Activity Measurements				Quality Control Measurements						
Sample Location Number	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)	Serial #	Date	(cpm)	MDA (dpm/100 cm ²)	(dpm/100 cm ²)
1	2376	01/14/00	2.0	39	-3.1	1262	01/15/00	15.3	44	56.6
2	2376	01/14/00	4.0	39	6.6					
3	2376	01/14/00	4.0	39	6.6					
4	2376	01/14/00	3.3	39	3.2					
5	2376	01/14/00	5.3	39	12.9					
6	2376	01/15/00	6.7	39	19.7					
7	2376	01/14/00	4.7	39	10.0					
8	2376	01/14/00	9.3	39	32.3					
9	2376	01/14/00	2.0	39	-3.1					
10	2376	01/14/00	5.3	39	12.9					
11	2378	01/15/00	2.0	38	-3.0					
12	2378	01/15/00	6.0	39	15.5					
13	2378	01/15/00	2.7	39	0.3					
14	2378	01/15/00	3.3	38	3.1					
15	2378	01/15/00	6.0	39	15.5					
16	2378	01/15/00	2.0	39	-3.0					
17	2378	01/15/00	6.0	39	15.5					
18	2378	01/15/00	1.3	39	-6.2					
19	2376	01/15/00	2.0	39	-3.0					
20	2378	01/15/00	6.0	39	15.5					
				MIN	-8.2					
				MAX	32.3					
				MEAN	7.4					
				SD	10.1					
				Transuranic DCG _{Low}	100					

52

Survey Unit 78203 Building 779 Smear Results

Smear Location Number	Smear Results				
	Serial Number	Date Counted	Gross (cpm)	(dpm/100 cm ²)	MDA
1	814	1/14/00	0.0	-0.6	7.5
2	1160	1/14/00	0.5	1.5	8.3
3	814	1/14/00	0.0	-0.6	7.5
4	814	1/14/00	0.0	-0.6	7.5
5	1160	1/14/00	0.0	0.0	8.3
6	814	1/17/00	0.5	0.9	7.5
7	1160	1/14/00	0.0	0.0	8.3
8	814	1/14/00	0.0	-0.6	7.5
9	814	1/14/00	0.0	-0.6	7.5
10	1160	1/14/00	0.0	0.0	8.3
11	814	1/17/00	0.5	0.9	7.5
12	814	1/17/00	0.5	0.9	7.5
13	814	1/17/00	1.0	2.4	7.5
14	814	1/17/00	0.0	-0.6	7.5
15	814	1/17/00	0.5	0.9	7.5
16	814	1/17/00	0.5	0.9	7.5
17	814	1/17/00	0.0	-0.6	7.5
18	814	1/17/00	0.0	-0.6	7.5
19	814	1/17/00	0.0	-0.6	7.5
20	814	1/17/00	0.0	-0.6	7.5
			MIN	-0.6	
			MAX	2.4	
			MEAN	0.1	
			SD	0.9	
			Transuranic DCG _{Lw}	20	

Survey Unit 78203 Building 779 Paint/Solid Media Sample Results

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in ²)	INDIVIDUAL NUCLIDE (dpm/100cm ²)	ESTIMATED MDA (dpm/100cm ²)	URANIUM TOTAL (dpm/100cm ²) DCGL _w =5000	TRANSURANIC TOTAL (dpm/100cm ²) DCGL _w =100
West Wall	1	001.001	U-233/234	0.350	0.100	9.10	40	2.7	0.8	5.5	
			U-235	0.035	0.072			0.3	0.6		
			U-238	0.320	0.064			2.5	0.5		
			Pu-239/240	0.018	0.063			0.1	0.5		
			Am-241	0.025	0.022			0.2	0.2		
West Wall	2	002.001	U-233/234	0.790	0.097	7.70	40	5.2	0.6	8.5	
			U-235	0.086	0.110			0.6	0.7		
			U-238	0.400	0.100			2.6	0.7		
			Pu-239/240	0.006	0.058			0.0	0.4		
			Am-241	0.019	0.059			0.1	0.4		
West Wall	3	003.001	U-233/234	0.810	0.050	16.70	40	11.6	0.7	24.1	0.2
			U-235	0.187	0.050			2.7	0.7		
			U-238	0.680	0.050			9.8	0.7		
			Pu-239/240	0.027	0.076			0.4	1.1		
			Am-241	0.017	0.024			0.2	0.3		
Floor	4	004.001	U-233/234	0.149	0.056	3.10	40	0.4	0.1	0.9	1.4
			U-235	0.036	0.050			0.1	0.1		
			U-238	0.149	0.053			0.4	0.1		
			Pu-239/240	0.240	0.085			0.6	0.2		
			Am-241	0.300	0.048			0.8	0.1		
Floor	5	005.001	U-233/234	0.370	0.110	5.40	40	1.7	0.5	2.5	
			U-235	0.091	0.110			0.4	0.5		
			U-238	0.087	0.120			0.4	0.6		
			Pu-239/240	0.520	0.026			2.4	0.1		
			Am-241	0.092	0.023			0.4	0.1		
Floor	7	007.001	U-233/234	0.217	0.034	11.2	40	2.1	0.3	5.7	2.8
			U-235	0.022	0.027			0.2	0.3		
			U-238	0.357	0.010			3.4	0.1		
			Pu-239/240	0.360	0.026			3.5	0.3		
			Am-241	0.156	0.050			1.5	0.5		
Floor	8	008.001	U-233/234	0.390	0.110	4.90	40	1.6	0.5	3.0	5.0
			U-235	0.166	0.093			0.7	0.4		
			U-238	0.151	0.100			0.6	0.4		
			Pu-239/240	0.180	0.065			0.8	0.3		
			Am-241	0.137	0.088			0.6	0.4		

54

Survey Unit 78203 Building 779 Paint/Solid Media Sample Results

LOCATION DESCRIPTION	SAMPLE LOCATION NUMBER	SITE SAMPLE ID	NUCLIDE	pCi/g	MDA (pCi/g)	WEIGHT (g)	SURFACE AREA (in ²)	INDIVIDUAL NUCLIDE (dpm/100cm ²)	ESTIMATED MDA (dpm/100cm ²)	URANIUM TOTAL (dpm/100cm ²) DCGL _w =5000	TRANSURANIC TOTAL (dpm/100cm ²) DCGL _w =100
Floor	9	009.001	U-233/234	0.119	0.080	6.50	40	0.7	0.4	1.7	2.6
			U-235	0.117	0.032			0.7	0.2		
			U-238	0.065	0.066			0.4	0.4		
			Pu-239/240	0.280	0.069			1.6	0.4		
			Am-241	0.180	0.088			1.0	0.5		
Floor	10	010.001	U-233/234	0.520	0.110	10.40	40	4.7	1.0	7.3	2.1
			U-235	0.107	0.070			1.0	0.6		
			U-238	0.190	0.086			1.7	0.8		
			Pu-239/240	0.189	0.026			1.7	0.2		
			Am-241	0.048	0.078			0.4	0.7		
Ceiling	11	011.001	U-233/234	0.203	0.080	4.70	40	0.8	0.3	1.5	0.1
			U-235	0.061	0.028			0.2	0.1		
			U-238	0.109	0.058			0.4	0.2		
			Pu-239/240	0.016	0.029			0.1	0.1		
			Am-241	0.000	0.026			0.0	0.1		
Ceiling	12	012.001	U-233/234	0.279	0.055	5.80	40	1.4	0.3	2.5	0.3
			U-235	0.051	0.048			0.3	0.2		
			U-238	0.176	0.034			0.9	0.2		
			Pu-239/240	0.031	0.028			0.2	0.1		
			Am-241	0.022	0.079			0.1	0.4		
Ceiling	13	013.001	U-233/234	0.174	0.120	5.60	40	0.8	0.6	1.9	0.4
			U-235	0.056	0.110			0.3	0.5		
			U-238	0.170	0.098			0.8	0.5		
			Pu-239/240	0.035	0.075			0.2	0.4		
			Am-241	0.039	0.081			0.2	0.4		
Ceiling	14	014.001	U-233/234	0.251	0.028	3.80	40	0.8	0.1	1.5	0.1
			U-235	0.049	0.035			0.2	0.1		
			U-238	0.168	0.035			0.5	0.1		
			Pu-239/240	0.000	0.027			0.0	0.1		
			Am-241	0.030	0.027			0.1	0.1		
Ceiling	15	015.001	U-233/234	0.400	0.083	5.40	40	1.9	0.4	3.3	0.2
			U-235	0.082	0.083			0.4	0.4		
			U-238	0.229	0.055			1.1	0.3		
			Pu-239/240	-0.004	0.052			0.0	0.2		
			Am-241	0.040	0.065			0.2	0.3		

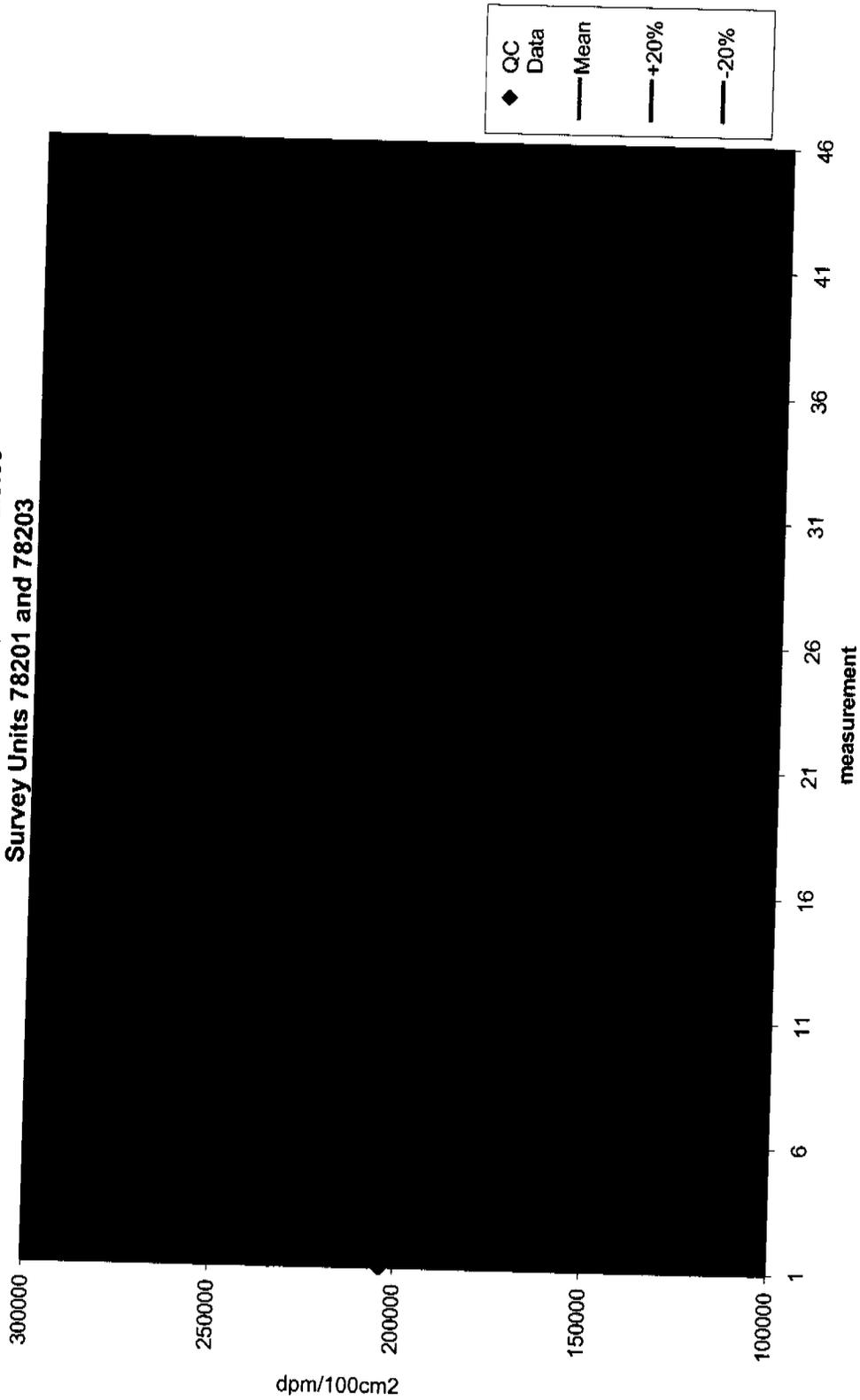
ATTACHMENT F

Survey Unit Overlay Maps

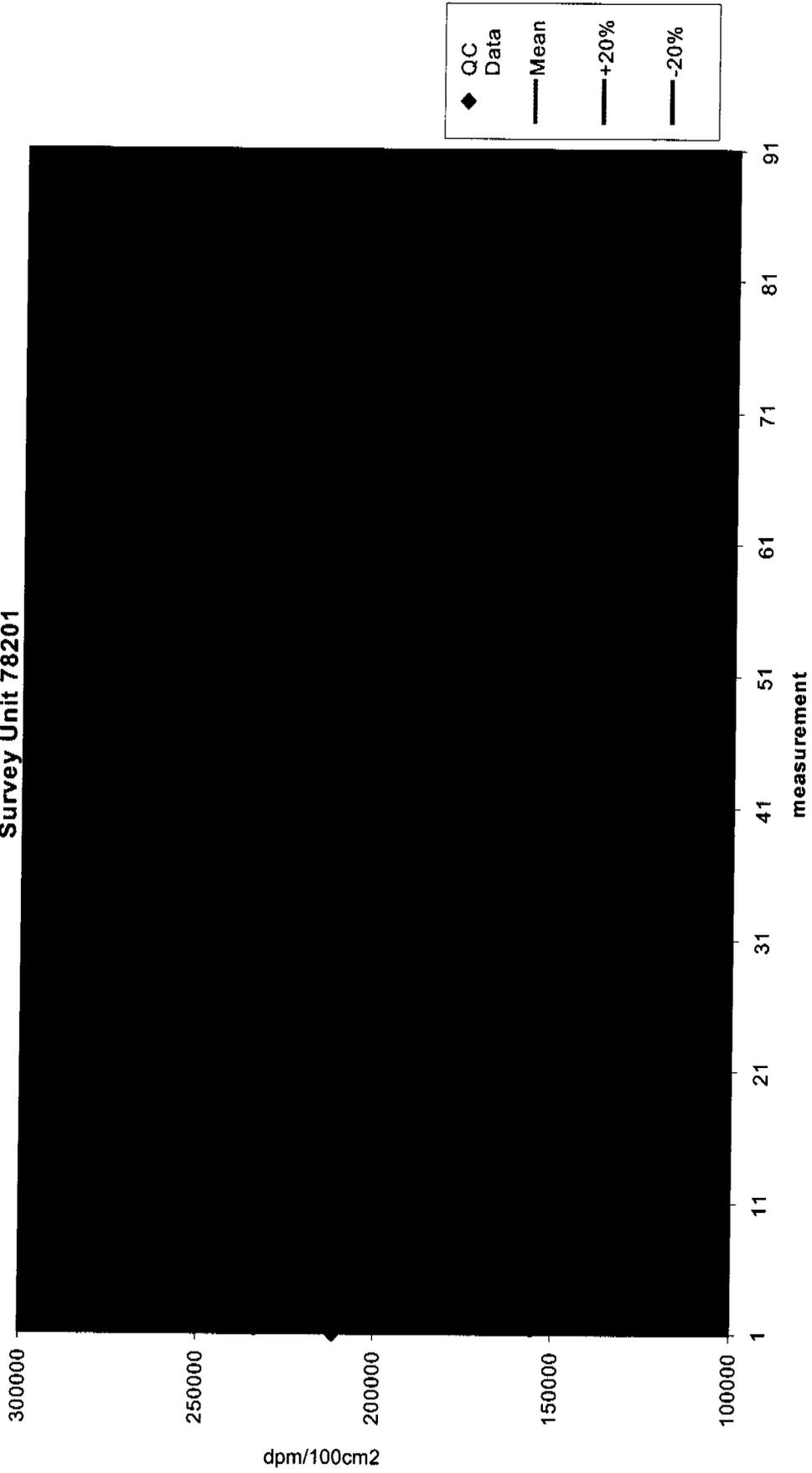
ATTACHMENT G

SCM/SIMS Quality Control Charts

B782 Interior and Exterior, Alpha Final Status Survey Quality Control Chart
SCM1 180corner mode, 1.31.00 - 2.3.00
Survey Units 78201 and 78203



B782 Exterior Walls and Roof, Alpha Final Status Survey Quality Control Chart
SCM2 180corner mode, 4.21.99 - 9.23.99
Survey Unit 78201



60

ATTACHMENT H

Data Quality Assessment

ATTACHMENT H

DATA QUALITY ASSESSMENT for the BUILDINGS 727, 782, & 783, 779 CLUSTER

1.0 INTRODUCTION

Data used in making management decisions for waste management remedial actions must be of adequate quality to support the decisions. Adequate data quality for decision-making is required by applicable RMRS and K-H corporate policies (RMRS, 1998, §6.4 and K-H, 1997, §7.1.4 and 7.2.2), as well as by the customer (DOE, RFFO; Order O 414.1, Quality Assurance, §4.b.(2)(b)). Regulators and the public also expect decisions and data that are technically and legally defensible. Verification and validation of the data ensure that data used in decisions resulting from the FSS are usable and defensible.

Verification and validation (V&V) of this Closeout Radiological Survey Report (CRSR) are the primary components of the DQA. V&V constitutes the cornerstone of the DQA because statistical tests and background determinations relative to decision-making for radiological survey units were not implemented nor required per the approved CRSP for the 779 Cluster. Instead, measurement results were compared, on a one-to-one basis, with free-release criteria given in DOE Order 5400.5. The FSS results could be used to conduct Sign Tests for decisions, but because all individual measurements were less than the DCGL_w, the survey units meet release criteria without further data reduction. Use of Order 5400 is more conservative than MARRSIM or EPA QA/G-9 techniques, as it allows averaging of measurement results to only 1 m² or less (vs. averaging over an entire survey unit).

The DQA presented in this Attachment supports conclusions in the report through implementation of the guidelines adopted from the following MARSSIM sections:

- §4.9, Quality Control
- §8.2, Data Quality Assessment
- §9.0, Quality Assurance & Quality Control
- Appendix E, Assessment Phase of the Data Life Cycle
- Appendix N, Data Validation using Data Descriptors

The MARSSIM-recommended criteria for V&V of final status survey data, listed above, are concisely summarized in Table H-1 (page 9 of 9). The MARRSIM criteria are listed across the top of the table whereas the project's proof of implementation is listed along the left-hand side of the page. An "X" in the box indicates the MARSSIM criterion (column header) was implemented through the quality-record or components of the CRSR listed in the left-most column.

2.0 VERIFICATION OF RESULTS

Verification ensures that data produced and used by the project are documented and traceable per quality requirements. Verification consisted of reviewing the project's data relative to three subsets: 1) radiological scans with the SCM/SIMS, 2) static surveys for removable and total contamination, and 3) radiochemical data resulting from samples taken and subsequently analyzed via alpha spectrometry. Consistent with previous reports, verification confirmed that

- Chain-of-Custody was intact from initial sampling through transport and final analysis;
- preservation and hold-times were within tolerance
- format and content of the data are clearly presented relative to goals of the project, i.e., to determine, with at least 95% confidence, that the survey units of interest (Buildings 727, 782, and 783) are adequate for radiological free release.

Verification of Building 727/782/783 FSS data will also address quality records representing implementation of the following quality controls:

- calibrations (radiochemistry & surveys), for accuracy
- laboratory control samples (LCS -- radiochemistry), for accuracy
- blanks (radiochemistry), for accuracy
- duplicate measurements (radiochemistry & surveys), for precision
- chemical yield (radiochemistry), for accuracy
- count times (radiochemistry & surveys), for sensitivity
- sample preparations (radiochemistry), for accuracy, representativeness

SCM data were systematically managed and verified as follows:

- A Survey Summary Sheet was generated for each survey unit, which lists all Final Survey Reports, including the associated investigation surveys.
- The Survey Summary Sheet was compared to the electronic (computer) directory structure, the Project File (handwritten survey data) and SIMS-generated survey data for a "3-way" verification.
- The Survey Summary Sheet, ordered by survey unit, is maintained at the front of the electronic database file structure as well as in the file cabinet.

Areas requiring 10% survey coverage were verified as follows:

- The area covered by the survey was summed for each subunit that required 10% coverage.
- The subunit size was electronically calculated in Turbocad using scaled maps.
- The sum of all subunits in the survey unit that require 10% coverage was summed.
- The area surveyed was divided by the sum of the 10% subunit size to determine the percent surveyed.

Areas requiring 10% to 50% survey coverage were verified as follows:

- The area covered by the survey was summed for each subunit.
- The subunit size was electronically calculated in Turbocad using scaled maps.
- The sum of all subunits in the survey unit was summed.
- The area surveyed was divided by the sum of the subunit size to determine the percent surveyed.

Upon completion of the data management activities listed above, an independent peer review was performed on each surveys package.

All relevant quality records associated with Buildings 727/782/783 D&D final status survey decisions will be submitted to the RMRS Records Center for permanent storage within 30 days of the conclusion of the 779 project.

03

3.0 VALIDATION OF RESULTS

Validation consists of a technical review of all data that directly support the FSS decisions, so that any limitations of the data relative to project goals are delineated, and the associated data are qualified (caveated) accordingly. Data were validated relative to

- 1) the DQOs of the project as defined in the CRSP for the 779 Cluster (i.e., did the final data achieve the initial DQOs of the project?), and
- 2) quality criteria discussed throughout various sections in the MARSSIM (sections noted previously).

MARSSIM criteria for the broad topic of "data quality assessment" used in final status surveys generally falls within the generic categories of quality assurance, quality control, data validation, and data assessment (including verification and validation). Table H-1 provides a "crosswalk" that lists the primary MARSSIM sections and generic data quality criteria (at top) and their corresponding implementation via the CRSP, CRSR, and project files.

All of the significant MARSSIM criteria listed in Table H-1 are summarily discussed within the "PARCC Parameters" section. PARCC parameters are congruent with "data descriptors" in the MARSSIM parlance and address characteristics of the data that must be defined for scientific integrity and defensibility. Recall that at least one "X" in each column of the table constitutes achievement of the MARSSIM quality objective (vs. one "X" in each row). The next section, which addresses the PARCC parameters -- Precision, Accuracy, Representativeness, Comparability, and Completeness, will also include discussion on bias and sensitivity, two more data descriptors emphasized in MARSSIM.

Validation of data to K-H contractual requirements (K-H Statements of Work is currently performed on a site-wide basis at ~25% frequency by the K-H Analytical Services Division. Satisfactory validation at this frequency indicates that subcontracted labs are operating competently relative to industry-wide standards, and more specifically, that sample custody and analytical procedures are implemented under defined quality controls on a sitewide programmatic basis. Sitewide data validation coupled with annual lab audits provides the inference that all analytical and radiochemical results not *specifically* validated, are represented by the percentage that is validated. Radiochemistry performed for this FSS were verified as meeting K-H contractual requirements -- Module RC01-B.3 for alpha spectrometry (4/24/98 and Module 9, 7/6/98).

PARCC PARAMETERS

PRECISION

Fundamental reproducibility of measurements, at levels near MDA and between different types/brands of instruments, are discussed at length in the "B779 Final Status Survey Meeting Resolution of CDPHE/EPA/IVC Comments, 6/30/99", which is included as Appendix 5 to the *Closeout Radiological Survey Report for Building 729*.

1) Radiological Surveys

Precision of the radiological instrumentation was satisfactory based on tolerance charting of daily source measurements for each individual sensor used on the project, which includes all measurement types (scans and static measures for total contamination, swipes for removable). Adequate precision was established through instrument performance within a $\pm 20\%$ range as defined by measurement results compared to a standard source value. Based on standard protocol (*Radiological Safety Practices*) any measurement exceeding the defined tolerance limits required corrective action (repair or replacement) prior to the instrument's use in final survey.

For the SCM, three (3) measurements were taken for each QC check "episode", i.e., before and after each set of measurements per work shift (Millennium QAP, 3/99). Of the 3 measurements, 2 consecutive measurements had to pass specifications. This criterion has a probabilistic basis to accommodate occurrence of false positives and negatives inherent with all SIMS measurements, including the QC checks. Specifically, 2 consecutive measurements within tolerance significantly increase confidence (over just 1 measurement) that instrument output is truly within tolerance (and not within tolerance due to random chance). Performance checks performed on the SCM are displayed through control charting (Attachment G).

Duplicate TSA measurements were also periodically acquired ($\geq 5\%$ frequency of real surveys) on the MARSSIM survey grids. All duplicate measurements were within tolerance based on the acceptance criterion that both results be below $DCGL_w$ (note that, even if populations were "significantly" different between real and duplicate results, if both duplicate and real population statistics are less than action levels, the difference between duplicate and real values is, ultimately, insignificant relative to free-release decisions).

2) Radiochemistry

Results from laboratory duplicates indicate adequate reproducibility based on duplicate results within statistical tolerance values ($>90\%$ confidence of equivalency between the original sample and the duplicate). Although blind duplicate samples were not acquired for determination of overall project precision, agreement between the multiple samples to within a range less than the $DCGL_w$ indicate that reproducibility is adequate for project decisions (i.e., relative to free-release of materials).

ACCURACY (and Bias)

1) Radiological Surveys

Accuracy of radiological surveys is satisfactory based on RFETS-programmatic annual calibrations that establish instrument efficiencies and sensitivities for all instrumentation used on this project. Daily source checks also provided periodic checks to ensure that all sensors are within tolerance during daily operations. Calibration and calibration check results were within the RFETS and industry-standard requirement of 20% of the applicable reference standard values. Full-scale multi-point calibrations provided accuracy of $\pm 10\%$ prior to implementation of survey instruments in the field, consistent with guidelines put forth in ANSI-N323. All protocols that control instrumentation accuracy are included in the reference section, and may be referenced through the site document control system (site documents) or in the 779 Project File (Millennium QAP).

25

Distance measurements recorded by the SCM/SIMS are within 3% of actual distances for mapping and location purposes, as documented in the "Incremental Encoder Calibration Verification Data Sheet."

Key work-controlling procedures that contributed to accuracy (and representativeness) of the radiological surveys consisted of the following:

- Kaiser-Hill, LLC., 1999. *Radiological Safety Practices*. RFETS, Golden, CO
- Millennium Services, Inc. 1999. *Quality Assurance Plan for Radiological Surveys at RFETS, 779 Cluster*.
- Ibid., 1999. SCM Procedure 010, *Conduct of Operations for Surveys using the SCM/SIMS at RFETS*
- Ibid., 1999. SCM Procedure 005, *Requirements for the Completion of Surveys using the SCM*
- Ibid., 1999. SCM Procedure 006, *Performing a Position Calibration*
- Ibid., 1999. SCM Procedure 007, *Response Check of any Detector Configuration Installed on the SCM*
- Ibid. SCM Procedure 001, *Calibration and Field Confirmatory Tests of the Incremental Encoder included on the SCM*

SCM measurements for the project were consistently within accuracy tolerances based on periodic measurements of reference standards, which are shown in the daily performance check data compiled collectively on control charts (Attachment G). Points falling outside the band of control did not necessarily disqualify the SCM from use; the standard operating procedure mandates at least two of three standards measurements to be within tolerance for each shift of SCM use as discussed in the "Precision" subsection. Only SCM data bracketed by successful QC performance checks were used for making free-release decisions.

No significant biases were noted in control charts constructed for removable alpha instrumentation (Eberline SAC-4) and total alpha surface activity instruments (Electra DP-6 and DP-8). High biases are not a concern as they are conservative (i.e., the error would not cause a free-release of material that was, in fact, contaminated). Low bias is not, individually, cause for rejection of data, as each performance check was within the predefined tolerance limit of $\pm 20\%$. Average values of the bias, i.e., arithmetic means taken from each control chart, were well below the absolute tolerance limit of $\pm 20\%$. All TSA and removable alpha surveys yielded average results less than 50% of the free-release levels. Given these average measurement levels for both survey unit measurements and performance checks, the magnitude of any low bias would not impact any free-release decisions of the project. Stated differently, if the worst case bias values were added to current survey results, all survey units of the Buildings of interest would continue to easily pass free-release thresholds.

2) Radiochemistry

Accuracy of radiochemical results were within tolerance and acceptable based on the associated results of LCS and calibrations at the lab. Preparation blanks also confirmed that no significant cross-contamination occurred in the analysis process. Uncertainties of the radiochemical results are quantified for each sample by both 2-sigma error (probabilistic) and Total error (systematic + probabilistic). Uncertainties associated with the alpha-spec analyses were within standard industry magnitudes and did not impact project decisions.

REPRESENTATIVENESS

Samples and surveys are representative based on the following criteria:

- familiarity with facilities -- multiple walk-downs and collaborations by management and technical staff;
- implementation of industry-standard Chain-of-Custody protocols;
- compliance with sample preservation and hold times;
- documented and (site) approved methods:
 - radiochemistry - alpha spectrometry via K-H Module RC01-B.3 (4/24/98)
 - radiological surveys - K-H RSP 7.02
- compliance with the CRSP (RMRS, March 1999) -- reviewed & approved by technical and management consensus prior to implementation

COMPLETENESS

Data packages for the Building 727/782/783 Survey Units are complete with respect to the required content and appropriate reviews/approvals (management, technical, and QA). Details of planned vs. actual survey/sample data are listed, by Survey Unit, in Table H-2.

TABLE H-2
DATA COMPLETENESS for BUILDINGS 727, 782, & 783, 779 CLUSTER

Rad Measurement Type	Required # of Samples/ Surveys	Actual # of Samples/ Surveys	Comments
Survey Unit 72701			
Shonka: SCM/SIMS (total)	≥10% areal coverage ¹	>10%	DQO achieved
NE Electra (total)	15	15	DQO achieved
Eberline SAC-4 (removable)	15	15	DQO achieved
Radiochemical	NA	NA	NA
Survey Unit 72702			
Shonka: SCM/SIMS (total)	≥10% areal coverage ¹	40%	DQO achieved
NE Electra (total)	15	16	DQO achieved
Eberline SAC-4 (removable)	15	16	DQO achieved
Radiochemical	NA	NA	NA
Survey Unit 78201			
Shonka: SCM/SIMS (total)	≥10% areal coverage ¹	21%	DQO achieved
NE Electra (total)	15	33	DQO achieved
Eberline SAC-4 (removable)	15	33	DQO achieved
Radiochemical	15	4 ⁽²⁾	DQO achieved
Survey Unit 78203			
Shonka: SCM/SIMS (total)	≥10% areal coverage ¹	38%	DQO achieved
NE Electra (total)	15	20	DQO achieved
Eberline SAC-4 (removable)	15	20	DQO achieved
Radiochemical	15	20	DQO achieved

(1) where requirements are consistent with MARSSIM guidelines, relative to Survey Unit classification

(2) The roof was removed because of contamination, 12 media sample results were therefore omitted. This resulted in only 4 media samples remaining in the survey unit.

Consistent with EPA's G-4 DQO process, the sampling design was optimized through back-calculating actual measurement results (acquired during final status survey) and comparing model output with original estimates. Use of actual sample/survey (result) variances in MARSSIM's DQO model provided confirmation that an adequate number of samples/surveys had been acquired. Inputs required for decision-making as stated in the original (planning) DQOs included coverage of originally planned 3-dimensional boundaries of the structure. All radiological results are valid without qualification, and form data sets with adequate quantities and quality of data for free-release decisions on all four (4) survey units of interest.

COMPARABILITY

All results presented are comparable with radiological survey and radiochemistry data on a site- and DOE-complex wide basis. This comparability is based on:

- use of standardized engineering units in the reporting of measurement results
- consistent sensitivities of measurements at $\leq 50\%$ DCGL_w ($\leq 50\%$ DCGL_{EMC} for scans)
- use of site-approved procedures (RSPs)
- systematic quality controls
- thorough documentation of the planning, sampling/analysis process, and data reduction into formats designed for making decisions posed from the project's original data quality objectives.

SENSITIVITY

Adequate sensitivities, in units of dpm/100² cm, were attained for all surveys and radiochemical methods implemented based on MDAs at 50% of the transuranic DCGL_w ($\leq 50\%$ DCGL_{EMC} for scans). The nominal MDAs for each survey and radiochemical method are summarized as follows:

- SCM/SIMS - scan surveys/total contamination: <225 dpm/100cm² and <275 dpm/100cm²
- Surveys (Eberline SAC-4) - removable contamination: 10 dpm/100cm²
- Surveys (NE Electra) - total contamination: 50 dpm/100cm²
- Radiochemistry (alpha spec) - total contamination: <10 dpm/100cm²

4.0 QA ELEMENTS OF DOE Order 414.1 and 10CFR830.120

Adequate implementation of the ten quality elements required by DOE Quality Assurance Order (414.1) was corroborated through the verification and validation process described above. The ten DOE quality elements, or criteria, are inherent within the MARSSIM guidance, as DOE was a co-authoring organization to the MARSSIM. Quality elements deserving emphasis include qualifications of project personnel and additional controls in the areas of engineering design and computer software.

All personnel performing quality-affecting activities within the FSS project were qualified to perform their specific tasks. Suitable training and qualification documentation for personnel performing the work, from the laborers to technical professionals to management, is documented in several ways. T&Q status for personnel is included in the *Building 779 Cluster Closure Project Health & Safety Plan* (Rev. 6, 18 August 1998) and personnel dossiers controlled by company-specific Human Resource departments.

UB

Software quality control for the SCM/SIMS is chronologically documented and archived within the QA/QC folder (for Millennium Services) of the Project File. Software used to reduce data from radiochemical sampling and hand-held instrumentation was modified to record verifications and any alterations to calculations following V&V of the calculations. Details of the verification process were also improved through use of a checklist, which was completed for each Survey Unit Data Summary.

Quality Assurance (independent) oversight was performed throughout the project and focused on planning and procedural compliance, as well as data reduction and archival. Oversight results for the 779 Project are documented via the Plant Action Tracking, V&V Checklists (referenced above), and RMRS Surveillance Reports conducted in accordance with RMRS-QA-10.02. Reports are available through the RMRS Records Center; no conditions adverse to data quality are currently outstanding.

In summary, the data presented in this report have been verified and are qualified as valid and complete for comparison with free-release criteria (action levels) as stated in the original DQOs. All media sampled and surveyed, relative to both total and removable alpha activities, yielded results less than action levels for the associated contaminants of concern. Therefore, the Survey Units in question meet the free-release criteria with the confidences stated in this section and throughout the report.

29

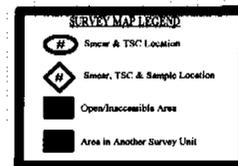
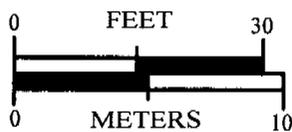
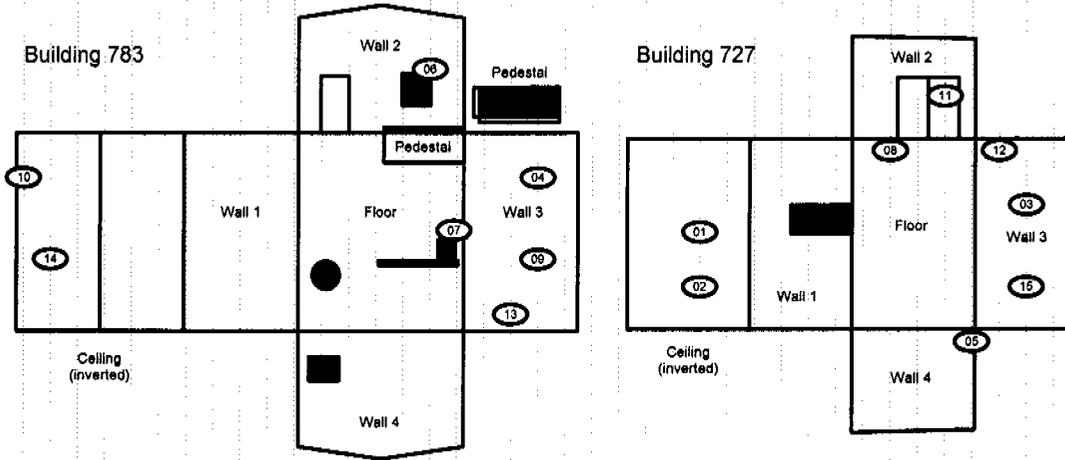
ATTACHMENT I

Sample/Survey Measurement Location Maps

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

Survey Area: K Survey Unit: 72701 Classification: 3
Building: 727 & 783
Survey Unit Description: B727 & B783 Interior
Total Floor Area: 74 sq. m Total Area: 345 sq. m Grid Size: N/A

SURVEY UNIT 72701 - MAP 1 OF 1



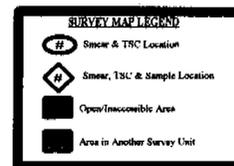
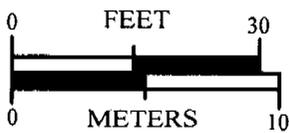
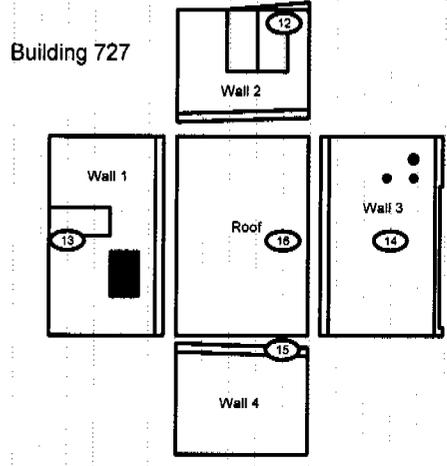
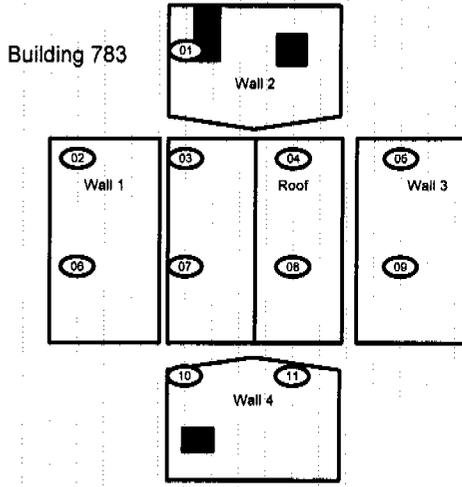
72

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

Survey Area: K Survey Unit: 72702 Classification: 2
Building: 727 & 783
Survey Unit Description: B727 & B783 Exterior

Total Floor Area: 84 sq. m Total Area: 297 sq. m Grid Size: 4.0 m x 4.0 m

SURVEY UNIT 72702 - MAP 1 OF 1

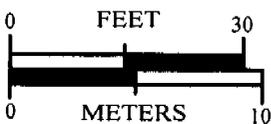
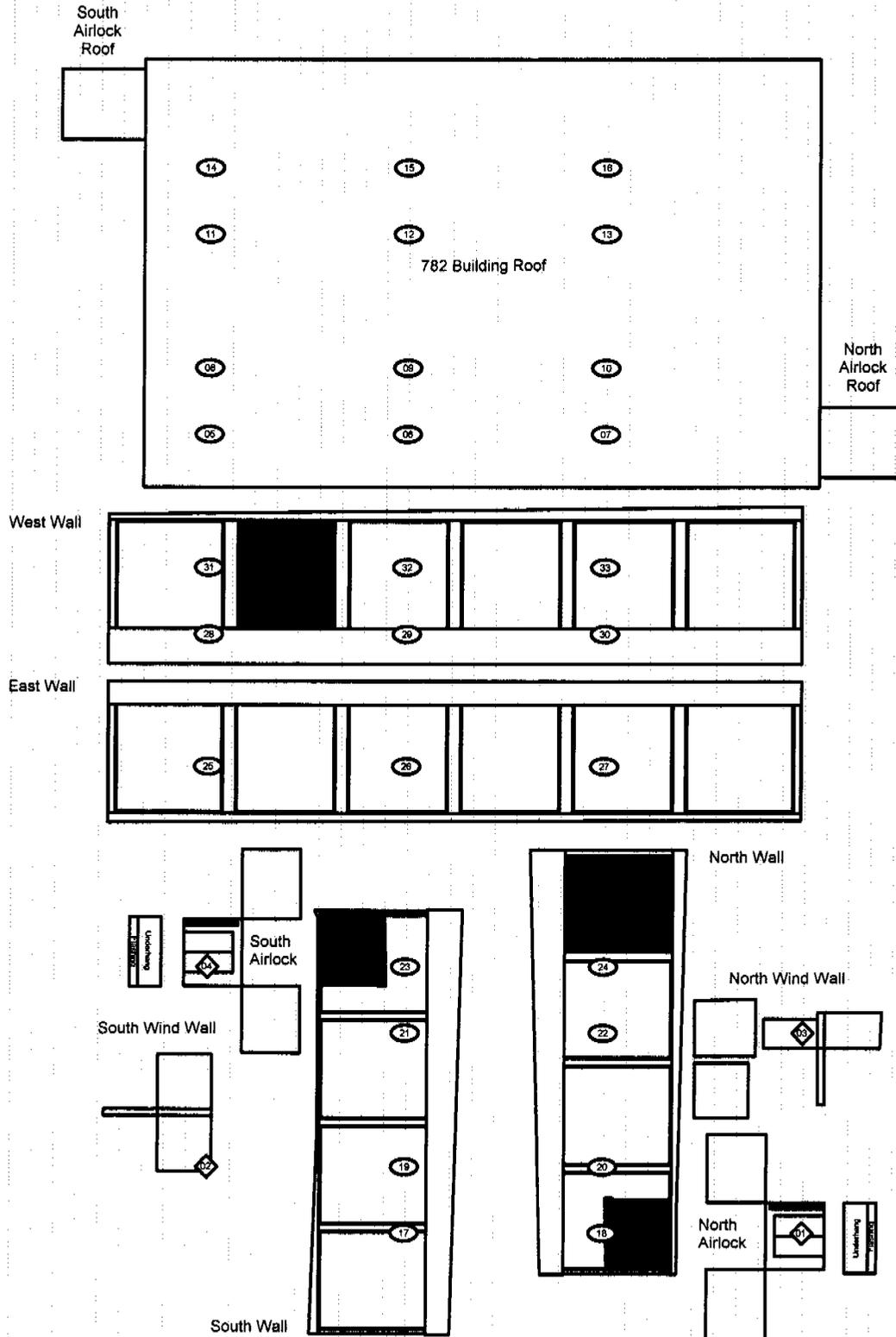


73

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

Survey Area: J Survey Unit: 78201 Classification: 2
 Building: 782
 Survey Unit Description: Bldg. 782 Outside Walls & Roof (Except North Wall-West Section)
 Total Area: 1327 sq. m Grid Size: 9.0 m x 9.0 m

SURVEY UNIT 78201 - MAP 1 OF 1



SURVEY MAP LEGEND

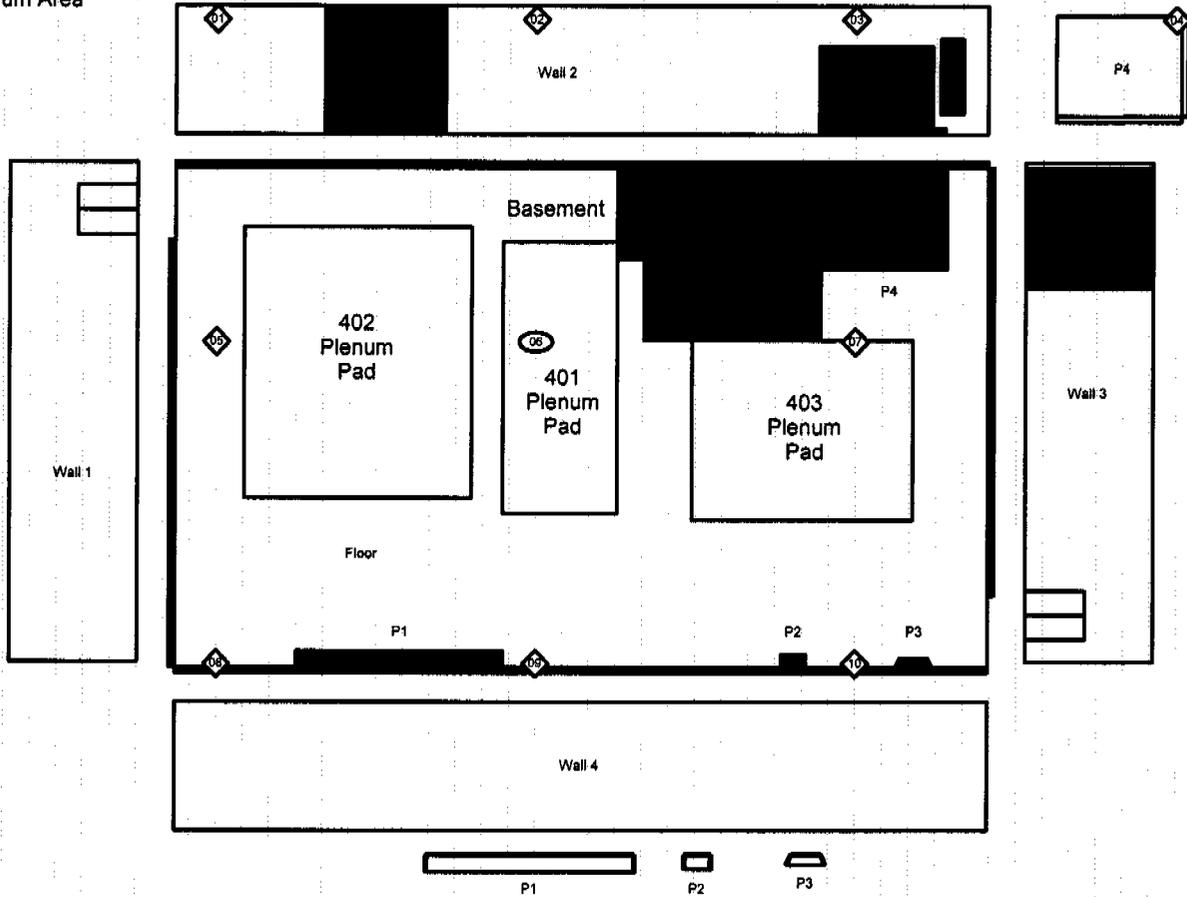
- Sensor & TSC Location
- ◇ Sensor, TSC & Sample Location
- Open/inaccessible Area
- Area in Another Survey Unit

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

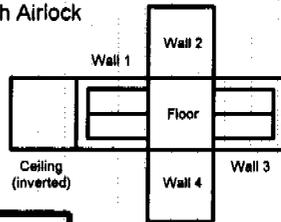
Survey Area: J Survey Unit: 78203 Classification: 2
 Building: 782
 Survey Unit Description: Bldg. 782 Plenum Area
 Total Floor Area: 513 sq. m Total Area: 2242 sq. m Grid Size: 12.0 m x 12.0 m

SURVEY UNIT 78203 - MAP 1 OF 2

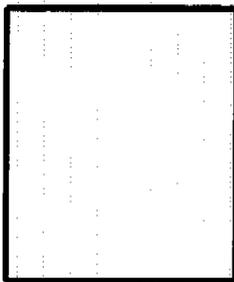
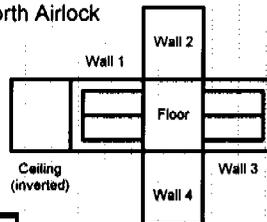
Plenum Area



South Airlock



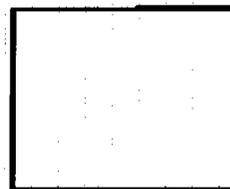
North Airlock



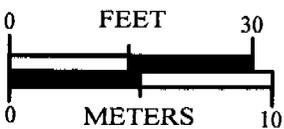
402 Plenum Pad



401 Plenum Pad



403 Plenum Pad

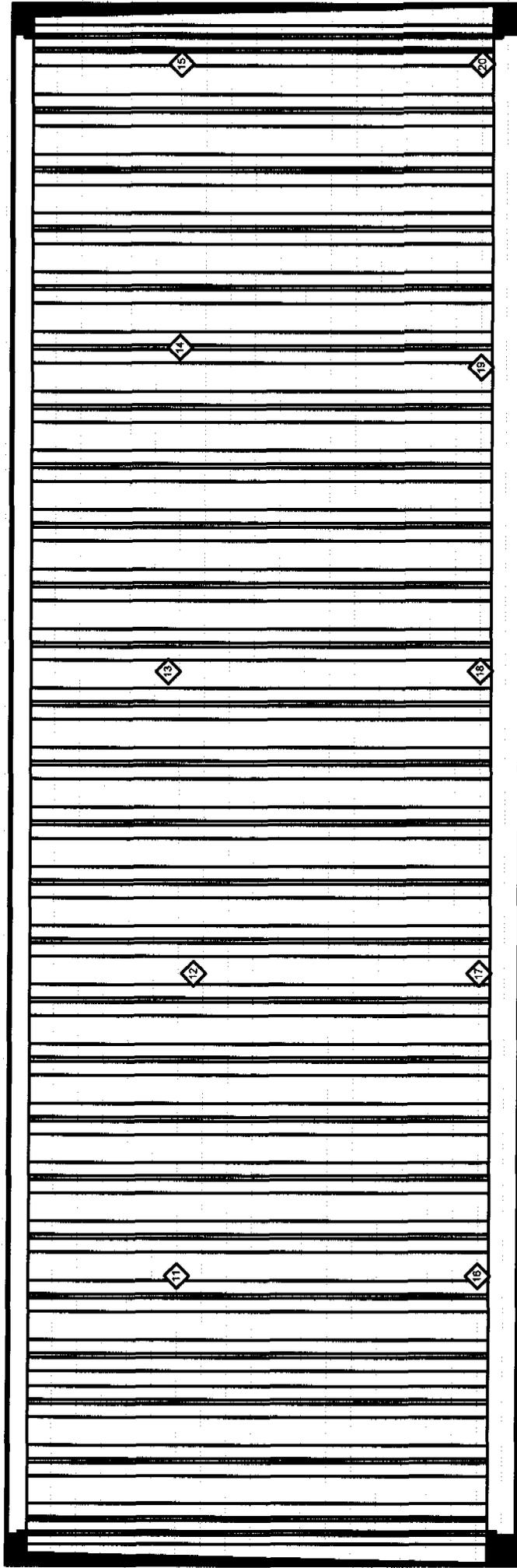


RADIOLOGICAL CLOSEOUT SURVEY FOR THE 779 CLUSTER

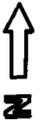
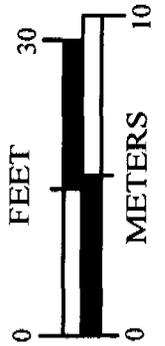
Survey Area: J Survey Unit: 78203 Classification: 2
Building: 782
Survey Unit Description: Bldg. 782 Plenum Area
Total Floor Area: 513 sq. m Total Area: 2242 sq. m Grid Size: 12.0 m x 12.0 m

SURVEY UNIT 78203 - MAP 2 OF 2

Plenum Area



Ceiling
(inverted)



SURVEY MAP LEGEND

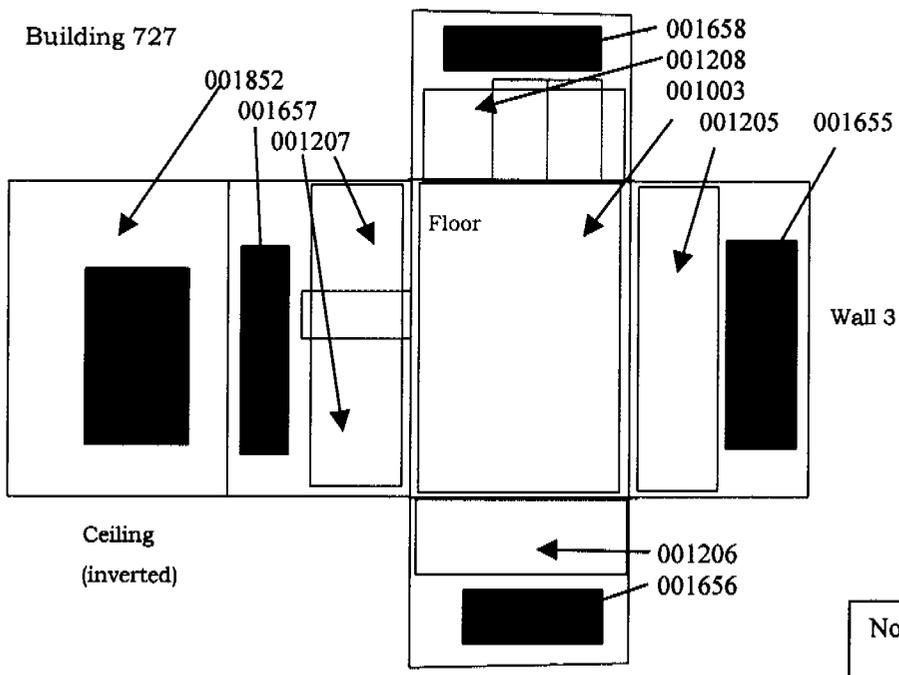
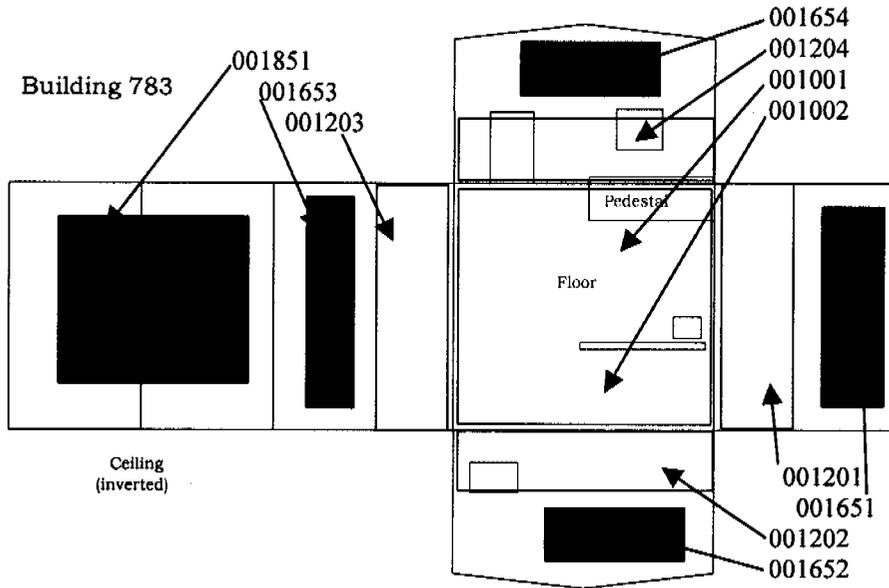
- ① #
- ◆ Smeat & TSC Location
- ◆ Smeat, TSC & Sample Location
- Operable Area
- Area in Another Survey Unit

76

ATTACHMENT F

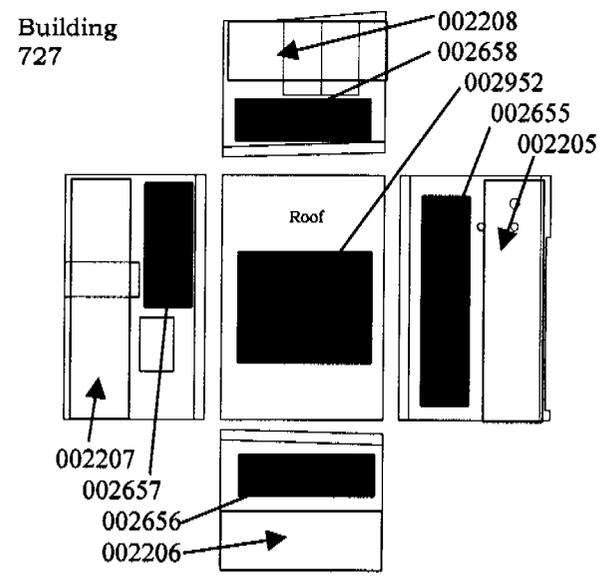
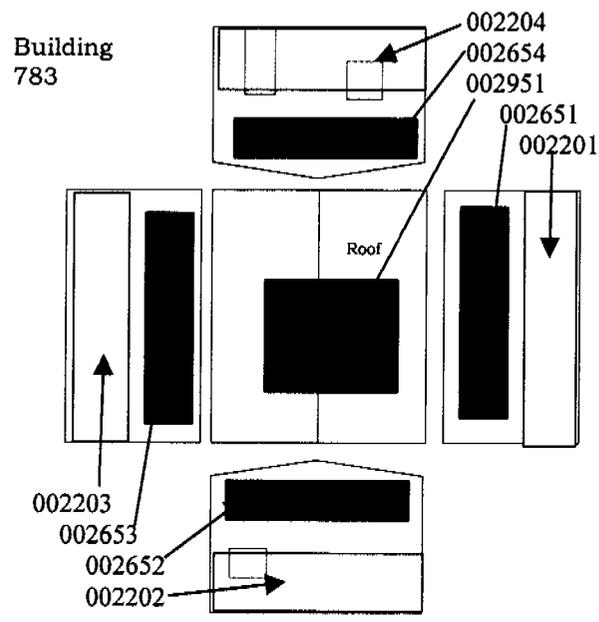
Survey Unit Overlay Maps

**Survey Unit: 72701
B727 and B783 Interior
Map 1 of 1**



78

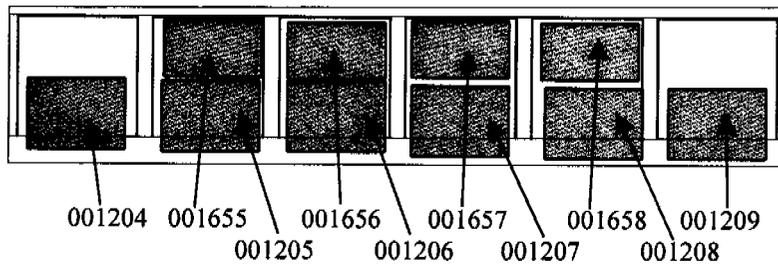
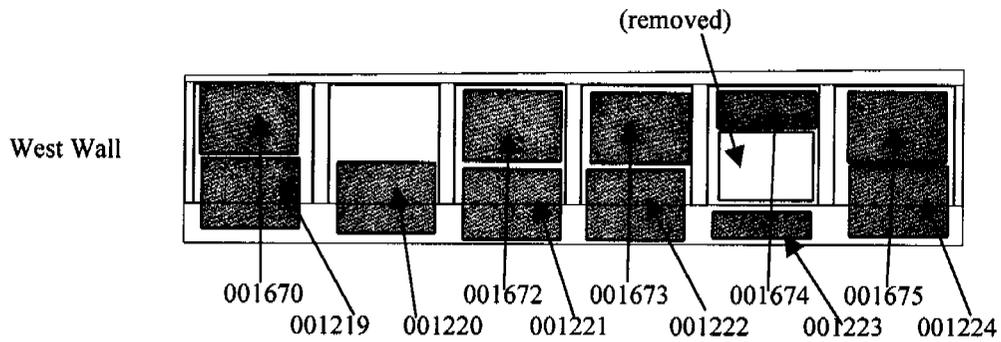
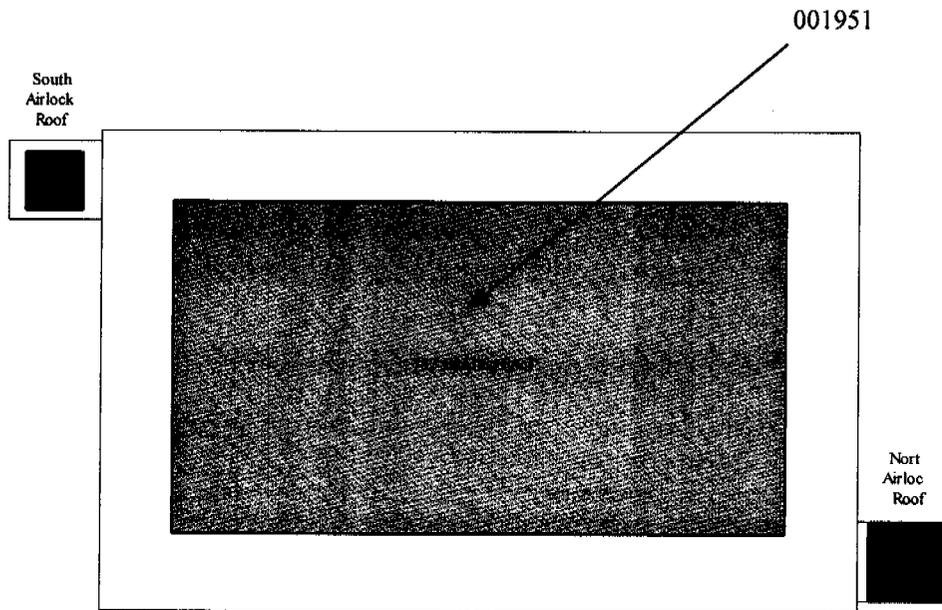
Survey Unit: 72702
B727 and B783 Exterior
Map 1 of 1



North →

79

**Survey Unit: 78201
B782 Exterior Walls and Roof
Map 1 of 2**

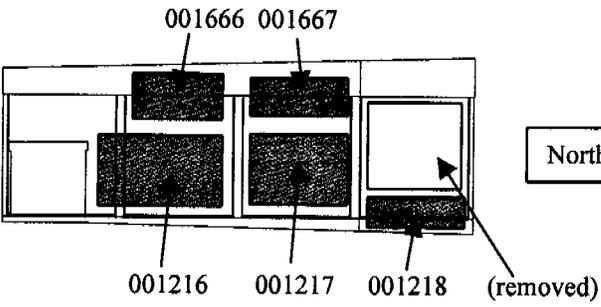


East Wall

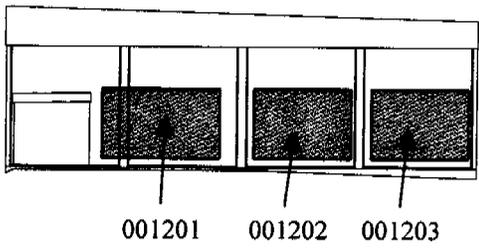
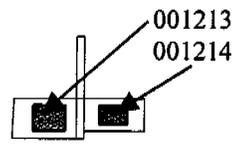
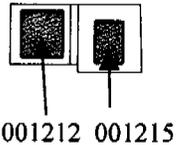
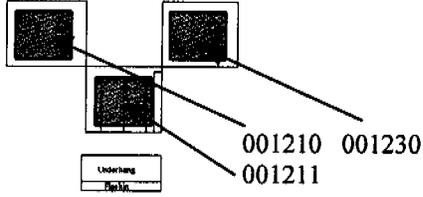
North →

80

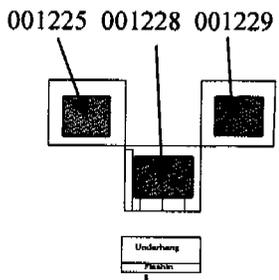
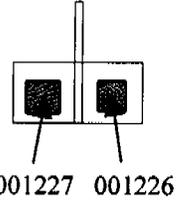
**Survey Unit: 78201
B782 Exterior Walls and Roof
Map 2 of 2**



North Wall



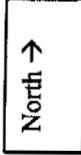
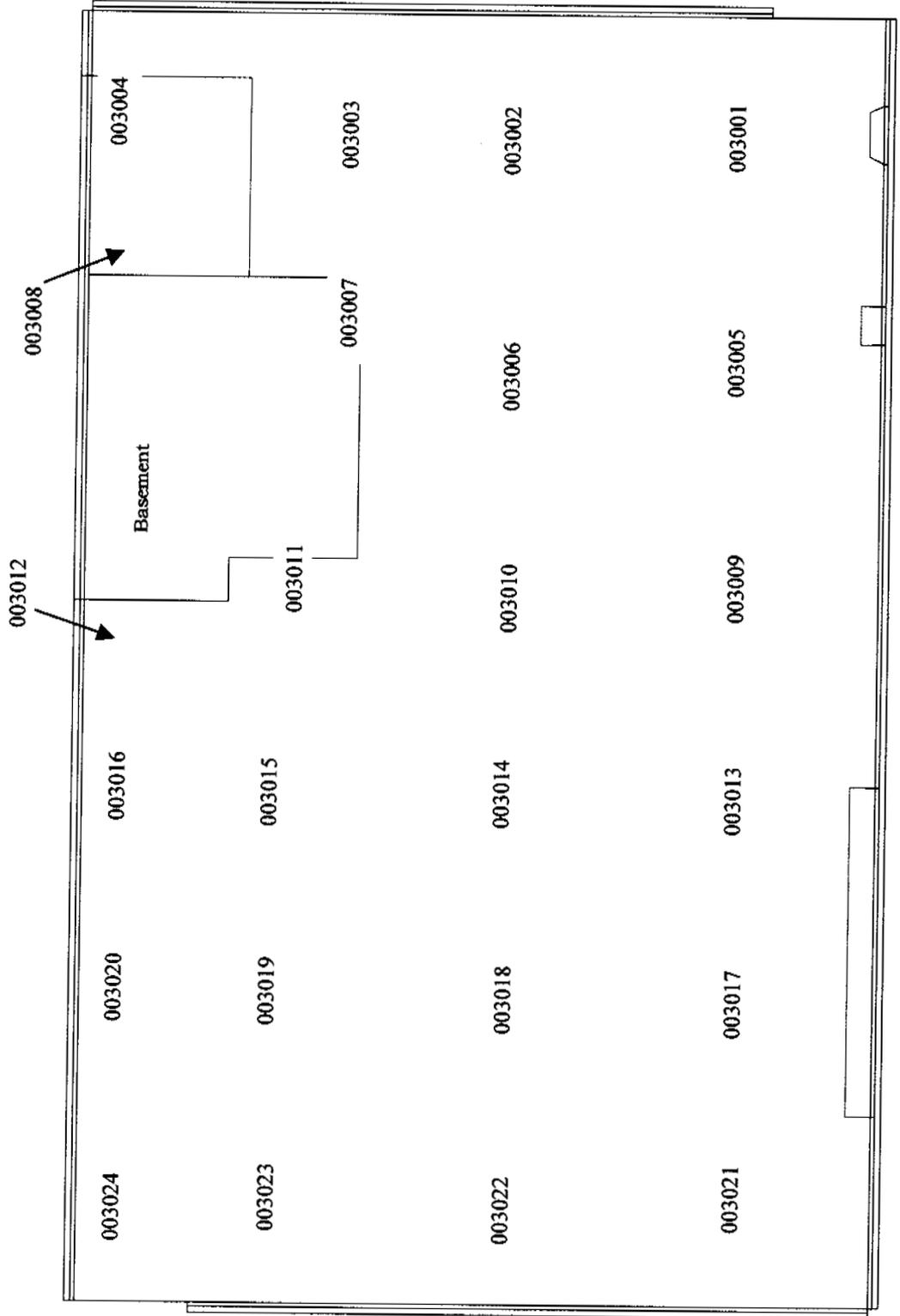
South Wall



North →

31

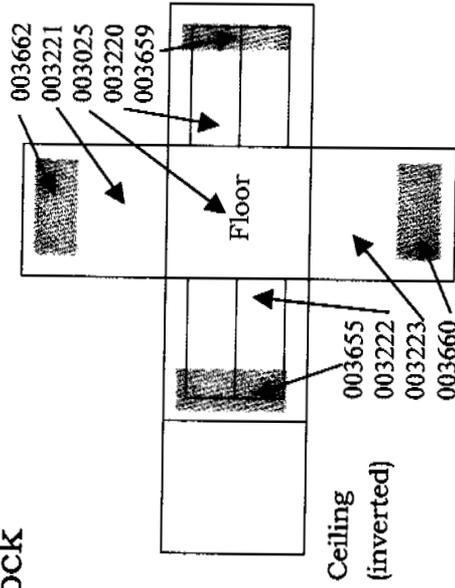
**Survey Unit: 78203
B782 Interior Floor
Map 1 of 4**



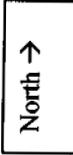
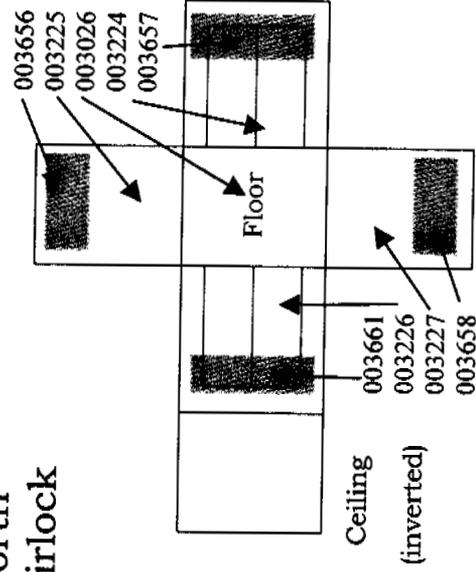
32

Survey Unit: 78203
 B782 Interior Airlocks
 Map 2 of 4

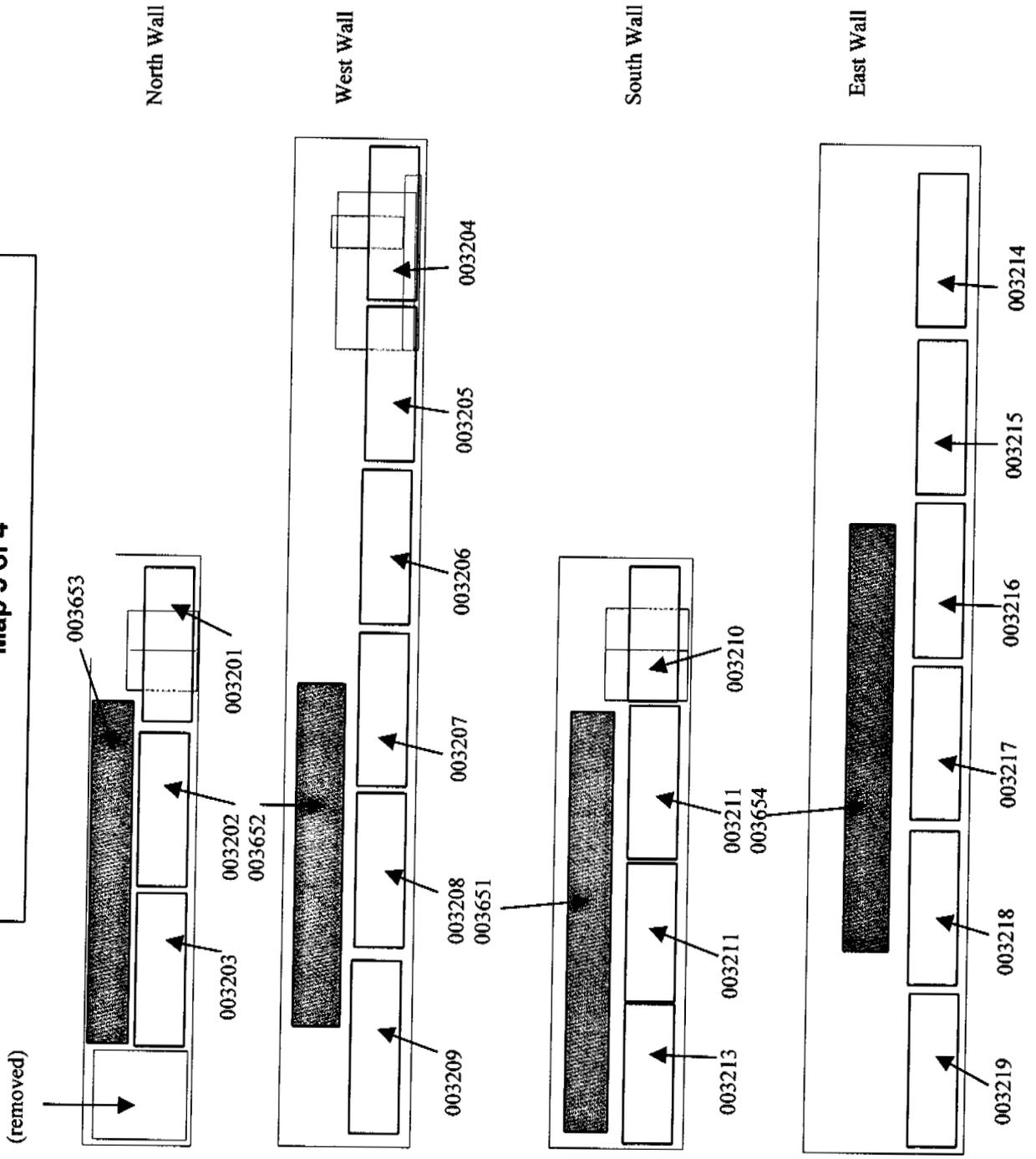
South
 Airlock



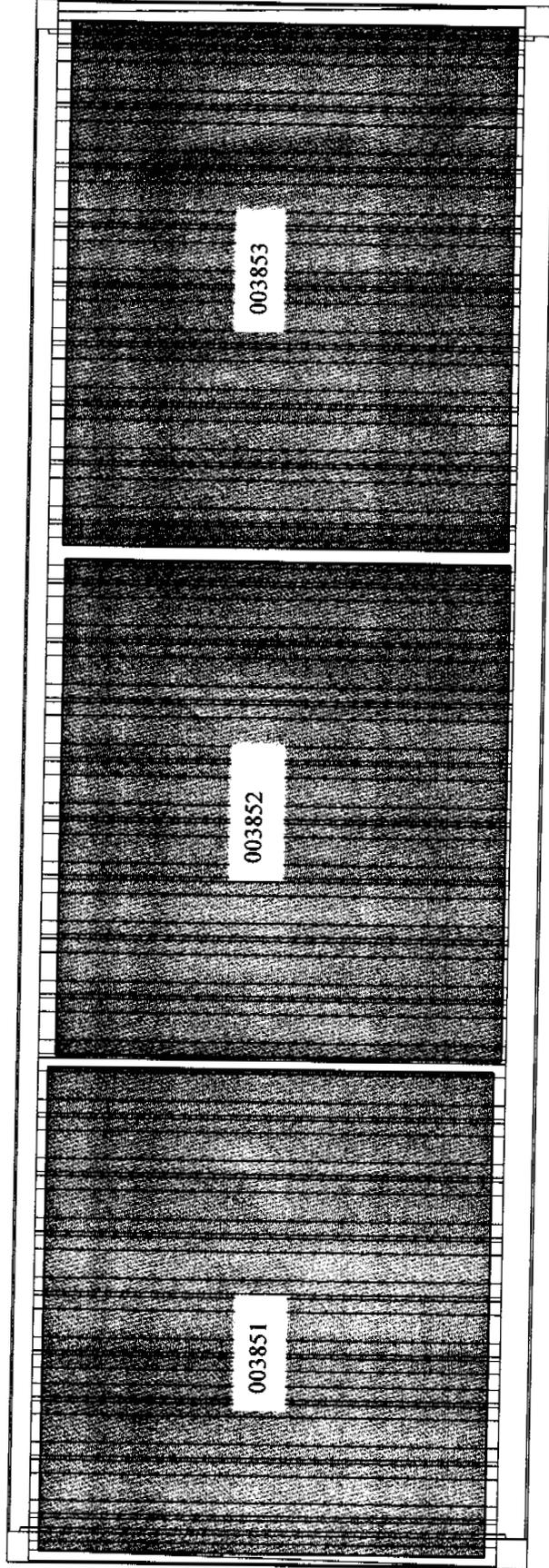
North
 Airlock



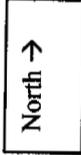
**Survey Unit: 78203
B782 Interior Walls
Map 3 of 4**



Survey Unit: 78203
B782 Ceiling
Map 4 of 4



Ceiling (inverted)



85/85