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**U.S. Department of Energy
Grand Junction Office Remedial Action Project
Final Report of the Radiological
Release Survey of Building 54
at the Grand Junction Office Facility**

September 1997

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GRAND JUNCTION OFFICE

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Grand Junction Office Remedial Action Project

**Final Report
of the Radiological Release Survey
of Building 54 at the
Grand Junction Office Facility**

September 1997

Prepared for
U.S. Department of Energy
Albuquerque Operations Office
Grand Junction Office

Prepared by
WASTREN-Grand Junction
Grand Junction, Colorado

WASTREN-Grand Junction has been granted authorization to conduct remedial action under the Decontamination and Decommissioning Program. Remedial action was conducted at the DOE-GJO facility in accordance with all applicable or relevant and appropriate requirements.

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Abstract

The U.S. Department of Energy (DOE) Grand Junction Office (GJO) occupies a 61.7-acre facility along the Gunnison River near Grand Junction, Colorado. This site was contaminated with uranium ore concentrates and mill tailings during vanadium refining activities of the Manhattan Engineer District, and during sampling, assaying, pilot milling, storage, and brokerage activities conducted for the U.S. Atomic Energy Commission's domestic uranium procurement program. The DOE Defense Decontamination and Decommissioning Program established the GJO Remedial Action Project (GJORAP) to clean up and restore the facility lands, improvements, and underlying aquifer. *WASTREN-Grand Junction* is the site contractor for the facility and the remedial action contractor for GJORAP.

Building 54 and the underlying soil were found not to be radiologically contaminated, and can be released for unrestricted use. Placards have been placed at the building entrances indicating the completion of the radiological release survey and prohibiting the introduction of any radioactive materials within the building without written approvals from the GJO Facilities Operations Manager. This document was prepared in response to a DOE-GJO request for an individual release report for each GJO building.

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Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>U.S. Code of Federal Regulations</i>
D&D	Decontamination and Decommissioning
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FOS	Facilities Operations & Support contractor (<i>WASTREN-Grand Junction</i>)
FUSRAP	Formerly Utilized Sites Remedial Action Program
GJO	Grand Junction Office
GJORAP	Grand Junction Office Remedial Action Project
GJPORAP	Grand Junction Projects Office Remedial Action Project
ICRP	International Commission on Radiological Protection
IVC	independent verification contractor (Oak Ridge National Laboratory)
LTSM	long-term surveillance and maintenance
MDC	minimum detectable concentration
ORNL	Oak Ridge National Laboratory
RDC	radon decay-product concentration
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SFMP	Surplus Facilities Management Program
TAR	Technical Assistance & Remediation contractor (MACTEC-ERS)
U.S.C.	United States Code
WL	working level

I. Introduction and Background

This report summarizes the results of the radiological release survey of Building 54 at the U.S. Department of Energy Grand Junction Office (DOE-GJO) facility. After all Grand Junction Office Remedial Action Project (GJORAP) remedial action is completed, the DOE-GJO facility will be transferred to the Long-Term Surveillance and Maintenance (LTSM) Program to monitor the passive restoration of the underlying aquifer. Additional reports summarize the remediation and release surveys of the exterior land areas, the other buildings, and associated utilities on the DOE-GJO facility.

Description of Facility

The DOE-GJO facility (Figure 1) is located approximately 0.6 mile (1 kilometer) south and west of populated areas of the city of Grand Junction in Sections 26 and 27, Township 1 South, Range 1 West, Ute Principal Meridian, Mesa County, Colorado. The facility occupies 61.7 acres (25 hectares) of floodplain within an accretionary bend along the east bank of the Gunnison River.

The elevation of the DOE-GJO facility is approximately 4,560 feet, or 1,390 meters (m). The facility is situated on silty sandy gravel underlain by mudstone bedrock. Two bodies of water with associated wetlands are located on the DOE-GJO facility: the North Pond and the South Pond. A freshwater alluvial aquifer underlying the facility is in direct hydraulic contact with the ponds and the Gunnison River. A semiarid climate prevails.

Access to the occupied portion of the facility currently is restricted by security personnel and a fence. There are approximately 36 structures on the facility. Beyond the fence are vehicle parking lots to the east and an earthen dike along the Gunnison River to the west and north. The area adjacent to the facility to the north was formerly Black Bridge Park, now owned by DOE. The facility is bordered on the east by the Union Pacific Railroad right-of-way.

DOE-GJO facility lands were acquired by the U.S. War Department in 1943 for the Manhattan Engineer District. A vanadium refinery was operated on the site from 1943 to 1946 to treat and concentrate uranium oxide. The U.S. Atomic Energy Commission operated a uranium-concentrate sampling plant and assay laboratory on the site until 1974. Pilot-scale uranium ore mills were operated from 1953 to 1958, processing 30,000 tons (27,200 metric tons) of ore (DOE 1987a). Mill operations were the primary source of contaminated materials at the DOE-GJO facility, resulting in the on-site burial of approximately 247,000 cubic yards (189,000 cubic meters) of uranium mill products. Other potential sources of contamination included laboratory and vehicle-maintenance wastes and byproducts, and activities related to sampling and stockpiling uranium concentrates (including yellowcake— U_3O_8). Approximately 22 acres (8.9 hectares) of open land and 19 buildings were contaminated.

Description of Project

In 1984, the DOE-GJO facility was accepted into the DOE Surplus Facilities Management Program (SFMP) for the purpose of eliminating health hazards resulting from uranium mill tailings and associated contaminated materials at the facility; and to bring contaminated portions of the facility, including the underlying aquifer, into compliance with applicable environmental regulations (DOE 1989a).

The facility was transferred to the DOE Decontamination and Decommissioning (D&D) Program in 1988. The D&D Program is responsible for the surveillance and maintenance of surplus DOE facilities, and performing any necessary decontamination and decommissioning activities. DOE-GJO has specific responsibility for GJORAP under the D&D Program.

WASTREN-Grand Junction (WASTREN) is the Facilities Operations & Support (FOS) contractor for DOE-GJO, and is the remedial action contractor for GJORAP. The GJORAP

Figure 1. DOE- GJO Site Map and Location of Building 54

organization and implementation strategy was defined in the *Grand Junction Projects Office Remedial Action Project Remedial Action Plan* (DOE 1990c). The project originally was administered as the Grand Junction Projects Office Remedial Action Project (GJPORAP).

Description of Building 54

Building 54 was installed on the DOE-GJO facility in 1992. It consists of 15 modular units joined together, with the interior reconstructed to accommodate office space and medical facilities. Prior to installation on the DOE-GJO facility, the units served as the student center and cafeteria during a remedial action project at Mesa State College in Grand Junction, Colorado. Building 54 presently serves as office space for facilities management, analytical laboratory, and medical personnel.

The footprint of the building is approximately 10,170 square feet, or 944.8 square meters (m²). The building was installed over compacted road base and is bordered by grass and concrete sidewalks. Interior walls are finished with sheetrock, and acoustical tile is used for the suspended ceiling. Fabric-covered dividers are used to divide office space in the center portion of the building, and are repositioned as necessary to meet changing work space needs.

Basis for Remedial Action

In 1980, the U.S. Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 *United States Code* [U.S.C.] 9601). In 1986, Congress amended CERCLA with the Superfund Amendments and Reauthorization Act (SARA). Section 120 of SARA and Executive Order 12580, *Superfund Implementation*, directed DOE to coordinate with the U.S. Environmental Protection Agency (EPA) to respond to actual or potentially imminent releases of hazardous substances into the environment at federally-owned DOE facilities. D&D Program policy specifies that remedial action will be conducted in accordance with DOE Order O 440.1, *Worker*

Protection Management for DOE Federal and Contractor Employees, and all other applicable environmental regulations.

The DOE-GJO facility was evaluated using the CERCLA Hazard Ranking System. Although the resulting score of 14.6 (DOE 1989b) did not qualify the facility for placement on the National Priorities List, remedial action under GJORAP conformed to the applicable provisions of CERCLA, as amended by SARA, the Uranium Mill Tailings Radiation Control Act (42 U.S.C. 7901), the National Environmental Policy Act (42 U.S.C. 4321), and other applicable Federal and State regulations. Remedial action has been conducted with an emphasis on maintaining all health and safety risks as low as reasonably achievable.

II. Decommissioning Criteria, Objectives, and Work Scope

Applicable Guidelines and Standards

Table 1 presents the guideline documents that specify the authorized limits for releasing GJORAP buildings and open land (the applicable authorized limits are provided in Table 3). Remedial action activities on the facility have been conducted in accordance with approved plans and procedures (Appendix A) which incorporate the applicable provisions of Title 10, *U. S. Code of Federal Regulations*, Part 830 (10 CFR 830), Section 120, "Quality Assurance Requirements."

III. Work Performed

Remedial Investigation/Feasibility Study and Record of Decision

The Remedial Investigation/Feasibility Study—Environmental Assessment for GJPORAP was released in 1989 (DOE 1989a). Building 54 was not included in this study because it was outside the original scope of GJPORAP. Consequently, the release survey of

Table 1. Applicable or Relevant and Appropriate Standards

Type of Occurrence	Standard
Contamination in Soil	40 CFR 192 ^a FUSRAP/SFMP Guidelines ^b DOE Order 5400.5 ^c
Surface Activity (building surfaces)	FUSRAP/SFMP Guidelines ^b DOE Order 5400.5 ^c
Gamma Exposure Rate (interior areas only)	40 CFR 192 ^a FUSRAP/SFMP Guidelines ^b DOE Order 5400.5 ^c
Radon Decay-Product Concentration (interior areas only)	40 CFR 192 ^a FUSRAP/SFMP Guidelines ^b DOE Order 5400.5 ^c

^a40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings."

^bGuidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program (FUSRAP) and Remote Surplus Facilities Management Program Sites (DOE 1987b).

^cDOE Order 5400.5, Radiation Protection of the Public and the Environment.

this building was not addressed in the Record of Decision (ROD) (DOE 1990a).

Post-ROD Changes—An Explanation of Significant Differences will be prepared at the conclusion of GJORAP remedial action activities to address departures from the ROD, including the release survey of Building 54.

Characterization

The modular units comprising Building 54 were surveyed prior to being moved from Mesa State College and found to be free of fixed or loose particle contamination (Chem-Nuclear Geotech, Inc. 1993).

Most of the soil area located beneath and within 3 m of the building at its current location was assessed and remediated during the decontamination and decommissioning of the exterior land areas prior to installation of the building (DOE 1995a). Excavations ranged from 12 to 100 inches (31 to 254 centimeters) deep. Radionuclide concentrations (including background) in the composite samples collected at the bottom of the excavations ranged from 1.0 to 4.6 picocuries per gram (pCi/g) for radium-226 (Ra-226), 1.0 to 3.1 pCi/g for

thorium-230 (Th-230), and 2.7 to 18.5 pCi/g for total uranium. Gamma exposure rates at the bottom of the excavations ranged from 14 to 22 microroentgens per hour (μ R/h).

Remedial Design

A remedial design was not required because no radioactive contamination was identified with Building 54.

IV. Final Release Survey

Building 54 was surveyed in February through April 1997 in accordance with the *Survey Plan for Releasing the Buildings at the Grand Junction Projects Office for Unrestricted Use* (DOE 1995b).

The soil areas adjacent to and beneath Building 54 were classified as unaffected because associated exterior land area had been assessed and remediated (DOE 1995a). One exterior soil survey unit was established: Survey Unit 1 (152.4 m²) consisting of the exterior ground surfaces within 3 m of the building foundation that had not been previously

remediated. This area was surveyed and sampled in April 1997.

The building surfaces were classified as unaffected areas because the history of the building indicated a low potential for contamination. Five survey units were established: Survey Unit 2 (925 m²) consisting of the ceiling surfaces; Survey Unit 3 (925 m²) consisting of the floor; Survey Unit 4 (944 m²) consisting of the roof; Survey Unit 5 (592 m²) consisting of the exterior walls; Survey Unit 6 (2560 m²) consisting of the permanent interior walls; and Survey Unit 7 (925 m²) consisting of the underside of the roof above the drop ceiling.

Oak Ridge National Laboratory at Grand Junction was the independent verification contractor (IVC) for GJORAP. Oversight activities were conducted by representatives of the FOS Safety & Health Group and GJORAP Project Management.

Instrumentation

Radiation detection instruments were calibrated and used in accordance with the FOS *Calibration and Control Program Manual*. The instruments were checked daily for current calibration and proper operation. Calibrations used traceable standards and complied with 10 CFR 835, "Occupational Radiation Protection," DOE Order O 420.1, *Facility Safety*, and DOE Order O 440.1 *Worker Protection Management for DOE Federal and Contractor Employees*. Minimum detectable concentrations (MDCs) were calculated to ensure sufficient instrument sensitivity for

measuring beta-gamma activity and gamma exposure rates at or below the authorized limits (*WASTREN* 1997b). MDCs are provided in Appendix B, Table B-1.

Background Determinations

Gamma-exposure-rate and radionuclide-concentration background values, determined for the DOE-GJO facility during previous investigations, are summarized in Table 2. Beta-gamma background activities used for this release survey were based on an average ambient air activity of 1500 disintegrations per minute per 100 square centimeters (dpm/100 cm²) plus material-specific activities determined from measurements collected on construction materials similar to those used on the DOE-GJO facility (*WASTREN* 1997a, DOE 1997). The applicable beta-gamma background activities are listed in Appendix B, Tables B-2 through B-8.

Reference Grids

A 1-m by 1-m survey grid, tied to the southwest corner of the building and the DOE-GJO facility survey grid, was established for the building-surface survey units. Survey Unit 1 (exterior ground surfaces) was divided into eight verification cells of 25 m² or less that covered previously unremediated areas.

Scanning Results

Previously unremediated exterior surface areas were scanned for surface gamma activity. Gross gamma exposure rate ranges are shown in Appendix B, Figure B-1. A previously

Table 2. Gamma Exposure Rate and Soil Concentration Background Values for the DOE-GJO Facility

Criterion	Background Value	Source of Data
Gamma Exposure Rate	14 μ R/h	DOE 1986
Radium-226 Concentration in Soil	1.0 pCi/g	DOE 1990b
Thorium-230 Concentration in Soil	2.0 pCi/g	DOE 1990b
Total Uranium Concentration in Soil	2.0 pCi/g	DOE 1990b

Key: μ R/h = microrentgens per hour; pCi/g = picocuries per gram

Appendix B, Figure B-1. A previously unremediated area under the southeast corner of the building was inaccessible for this survey, but a range (15 to 17 $\mu\text{R/h}$) was determined from an assessment survey conducted prior to remediation of the exterior land areas (UNC Geotech 1990).

One hundred percent of the floor was scanned for gamma activity. Gross gamma exposure rates are shown in Appendix B, Figures B-2A and B-2B.

One-square-meter grid blocks were scanned for beta-gamma activity at randomly-selected locations, covering a total of 10 percent of the building surface area of each survey unit. Measured activities are listed in Appendix B, Tables B-2 through B-7. Additional measurements on temporary office partitions are provided in Appendix B, Table B-8.

Direct Measurements

Direct beta-gamma measurements were taken at locations within the scanned grid blocks for statistical analysis. These measurement results are provided in Appendix B, Tables B-2 through B-7. Measurement locations are shown in Appendix B, Figures B-2A through B-6B. The projected upper limits of the mean activities, calculated at the 95 percent confidence level, indicate that the surface activities on the building surfaces do not exceed the authorized limits (Appendix B, Table B-11).

Alpha activity was not measured because any alpha-emitting contaminant at this site would also emit a detectable beta particle. For surfaces, uranium is the alpha-emitting contaminant of concern. Since uranium emits beta and alpha particles in a ratio nearly 1:1, compliance with authorized limits for beta-gamma activity demonstrates compliance with authorized limits for alpha activity.

Interior and exterior gamma exposure rates were measured 1 m above the floor or ground. Measurement locations are shown in Appendix B, Figures B-1, B-2A, and B-2B, and

results are provided in Appendix B, Table B-9. The projected upper limits of the mean exposure rates, calculated at the 95 percent confidence level, indicate that the gamma exposure rates do not exceed the interior authorized limit or exterior guideline (Appendix B, Table B-11).

RDC Results

The average of three radon decay-product concentration (RDC) measurements taken in Building 54 during a three-month-long period in 1997 was 0.0017 working level (WL), which is below the authorized limit.

Sample Results

Soil samples were collected from material underlying the imported base course within each verification cell. The samples were analyzed for Ra-226, Th-230, and total uranium. The results demonstrate that the radionuclide concentrations do not exceed the authorized limits for radionuclide concentrations in hot spots or averaged over 100 m^2 (Appendix B, Table B-10). The projected upper limits of the mean concentrations, calculated at the 95 percent confidence level, indicate that the radionuclide concentrations do not exceed the authorized limits. Ra-226 concentrations measured in a 2-m deep borehole at location 54-V-4A (Appendix B, Figure B-1) did not exceed the authorized limit for subsurface layers.

V. Cost and Schedule

Project costs and the schedule for the radiological release survey of Building 54 will be presented in a summary final report addressing all GJORAP buildings.

VI. Occupational Exposure

Health and safety procedures were followed in accordance with *The GJO Health and Safety Standards* and *The GJO Site Radiological Control Manual* to ensure personnel associated with the release survey activities were protected from radiological and nonradiological hazards.

VII. Waste Volumes

Building 54 did not require remediation; therefore, no radiologically-contaminated materials were generated.

VIII. Final Condition

All release requirements identified for GJORAP have been met for Building 54 (Table 3). The IVC will issue a Statement of Verification to signify concurrence that the release survey has achieved program objectives.

Building 54 can be released for unrestricted use. Placards have been placed at the building entrances indicating the completion of the radiological release survey and prohibiting the introduction of any radioactive materials within the building without written approvals from the GJO Facilities Operations Manager.

Because of the limitations of current technology and procedures for identifying and remediating radiologically-contaminated materials, unknown deposits of contamination may be identified in the future. The potential for encountering contamination during future construction activities will be determined and at-risk activities will be monitored for radiological and nonradiological contamination. The DOE-GJO facility is routinely surveyed for radiation and other hazards.

At the time of this report, contamination is still present in other buildings located on the DOE-GJO facility; access to these areas is controlled and will be addressed by future GJORAP remedial actions. After the interior remedial actions are completed, the facility will be managed as an LTSM site by DOE until the alluvial aquifer is restored by natural flushing.

IX. Lessons Learned

Several lessons were learned during release survey activities involving the DOE-GJO

buildings in FY 1997. The experience gained has been applied to subsequent surveys, and should be considered for use on other DOE projects. The following lessons have been learned:

- Radiological protection managers should ensure that survey technicians and their trainers are fully trained and tested on every type of equipment that will be used for performing release surveys. A small quantity of unusable data were collected because survey crew members misinterpreted the display on a new type of survey instrument. Although the problem was caught early, it could have resulted in a large quantity of useless and expensive data. Special care is required when new types of equipment are introduced into the field. Furthermore, it may be desirable to involve manufacturers' technical representatives in the initial training and testing of personnel who will use the equipment.
- Project team members should be encouraged to think critically about all project activities so that wasteful or otherwise inappropriate practices are recognized and eliminated as soon as possible. An example of this process occurred when personnel not directly involved in the release surveys questioned the practice of measuring beta-gamma background activity on surfaces in the same buildings being surveyed for release. This practice could mask contamination by incorporating its activity in the background measurement, thus compromising the validity of release survey results. A subsequent study of beta-gamma activities contributed by common building materials indicated that most background measurements for beta-gamma activity in the DOE-GJO buildings can be performed by measuring ambient background activity in air.
- Good communication and coordination of activities is essential for limiting unnecessary delays and costs. For example,

Table 3. Certification Summary for All Survey Units

Certification Criteria	Number of Observations	Authorized Limit	Results ^a
Surface Activity (building surfaces only)	654 direct beta-gamma measurements	Alpha or beta-gamma activity shall not exceed 5,000 dpm/100 cm ² fixed averaged over 1 m ² .	Maximum beta-gamma = 730 dpm/100 cm ² $\mu_{95\%}$ = 320 dpm/100 cm ² for Survey Unit 2 $\mu_{95\%}$ = -5.7 dpm/100 cm ² for Survey Unit 3 $\mu_{95\%}$ = -190 dpm/100 cm ² for Survey Unit 4 $\mu_{95\%}$ = -180 dpm/100 cm ² for Survey Unit 5 $\mu_{95\%}$ = -230 dpm/100 cm ² for Survey Unit 6 $\mu_{95\%}$ = -90 dpm/100 cm ² for Survey Unit 7
	0 smears ^b	Alpha or beta-gamma activity shall not exceed 1,000 dpm/100 cm ² removable.	Maximum direct beta-gamma = 730 dpm/100 cm ²
	864 scan beta-gamma measurements ^b	Alpha or beta-gamma activity shall not exceed 15,000 dpm/100 cm ² maximum averaged over 100 cm ² .	Maximum direct beta-gamma = 730 dpm/100 cm ²
Gamma Exposure Rate (habitable areas only)	70 static measurements ^c	$\leq 20 \mu\text{R/h}$ above background ^d	Maximum rate = -2.3 $\mu\text{R/h}$ $\mu_{95\%}$ = -2.7 $\mu\text{R/h}$
	100% floor scan	$\leq 20 \mu\text{R/h}$ above background ^d	Ranged from -3.6 to -1.5 $\mu\text{R/h}$
Radon Decay-Product Concentration (habitable areas only)	3 three-month measurements	Annual average shall not exceed 0.02 WL, to the extent practicable, and in no case shall exceed 0.03 WL.	$\bar{x}$ = 0.0017 WL
Radionuclide Concentrations in Soil	2 individual samples (samples include material from subsurface layer)	Ra-226 and Th-230: Shall not exceed 5 pCi/g above background ^d in the 15-cm surface layer, averaged over 100 m ² .	Ra-226: $\bar{x}$ = 1.1 pCi/g Th-230: $\bar{x}$ = -1.0 pCi/g
	8 individual sample (2 samples include material from surface layer)	Shall not exceed 15 pCi/g above background ^d in any 15-cm-thick soil layer more than 15 cm below the surface, averaged over 100 m ² .	Ra-226: $\bar{x}$ = 1.2 pCi/g $\mu_{95\%}$ = 1.4 pCi/g Th-230: $\bar{x}$ = -0.3 pCi/g $\mu_{95\%}$ = 0.3 pCi/g
	8 individual samples	Total uranium: Shall not exceed 106 pCi/g above background ^d in any 15-cm-thick layer, averaged over 100 m ² .	$\bar{x}$ = 9.3 pCi/g $\mu_{95\%}$ = 18 pCi/g
Soil Hot-Spot Criteria	As required for samples exceeding authorized limits	Limit = (authorized limit) x (100/area) ^{0.5}	Not applicable: maximum concentrations are below authorized limits.

^aNet results (background subtracted).

^bCompliance was demonstrated by a combination of scans and direct measurements. Direct measurements were made at locations of highest elevated activity if elevated activity was present. Otherwise, direct measurements were made at the centers of the 1-m² grid blocks.

^cGamma exposure rates were measured 1 m above the floor.

^dBackground values are summarized in Table 2.

Table 3 (continued). Certification Summary for All Survey Units

Key for Table 3:

dpm/100 cm ²	=	disintegrations per minute per 100 square centimeters	μR/h	=	microrentgens per hour
cm	=	centimeter(s)	WL	=	working level
m ²	=	square meter(s)	Ra-226	=	radium-226
μ ₉₅	=	upper limit of the true population mean at the 95 percent confidence level	Th-230	=	thorium-230
			pCi/g	=	picocuries per gram
			$\bar{x}$	=	mean of sample concentrations

organizations that prepare survey plans should also be involved in the release surveys. A staff member from the organization that prepared the GJORAP survey plan met with the survey crews each morning and occasionally during each day to answer survey crews' questions and observe the work. As a result, problems related to staffing, recording data, reading survey instruments, and interpreting the plan were identified and corrected before they resulted in delays to the project or significantly increased costs.

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of Energy Grand Junction Projects Office,
Grand Junction, Colorado, April.

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Office Remedial Action Project Remedial Action
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Inc., for the U.S. Department of Energy Grand
Junction Projects Office, Grand Junction,
Colorado, December.

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Decontamination and Decommissioning of the
Exterior Land Areas at the Grand Junction
Projects Office Facility*, prepared by Rust
Geotech for the U.S. Department of Energy
Grand Junction Projects Office, Grand Junction,
Colorado, September.

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the Buildings at the Grand Junction Projects
Office for Unrestricted Use*, prepared by Rust
Geotech for the U.S. Department of Energy
Grand Junction Projects Office, Grand Junction,
Colorado, December.

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Background Activities of Common Building
Materials*, prepared by WASTREN-Grand
Junction for the U.S. Department of Energy
Grand Junction Office, Grand Junction,
Colorado, August.

WASTREN-Grand Junction, 1997a. *Ambient Air
Activity for Release Surveys of Buildings 11, 19,
29, 30B, 54, and 56*, memorandum from
S.G. Corle to GJORAP Building Files, U.S.
Department of Energy Grand Junction Office,
Grand Junction, Colorado, August 8.

_____, 1997b. *MDC Calculations for
GJORAP*, memorandum from R.L. Morris to
S.G. Corle, U.S. Department of Energy Grand
Junction Office, Grand Junction, Colorado,
August 22.

Appendix A

Applicable Program and Quality Assurance Requirements and Procedures

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The following manuals and guidance documents were used as applicable for conducting GJORAP administrative and performance activities. The specific manuals and documents pertinent to the activities associated with the release of this building are noted in the text of this report.

Joint Contractor Manuals

The GJO Quality Assurance Manual (GJO 1)

The GJO Health and Safety Standards (GJO 2)

The GJO Site Radiological Control Manual (GJO 3)

The GJO Training Manual (GJO 4)

The GJO Construction Procedures Manual (GJO 5)

The GJO Environmental Procedures Catalog (GJO 6)

The GJO Formality of Operations Manual (GJO 7)

The GJO Emergency Preparedness & Response Plan (GJO 8)

FOS Contractor Manuals

Safety and Health Manual

Environmental Compliance Manual

Operations Management Manual

Information Services Manual

Project Management Controls System Description

Budget Manual

Site Management Manual

Calibration and Control Program Manual

Information Management Support Manual

Grand Junction Projects Office Remedial Action Project Quality Assurance Program Plan (P-GJPO-141, Rev. 6)

Grand Junction Projects Office Remedial Action Project Records Management Plan (P-GJPO-143)

Grand Junction Projects Office Remedial Action Project Health and Safety Plan (P-GJPO-144, Rev. 7)

Engineering Support Procedures Manual

AutoCAD Standards Manual

Analytical Chemistry Laboratory Administrative Plan and Quality Control Procedures

Analytical Chemistry Laboratory Handbook of Analytical and Sample Preparation Procedures, Volumes I, II, III, and IV

TAR Contractor Manual

Field Services Procedures Manual (Manual MAC-3000)

Other Guidance

10 CFR 830, "Nuclear Safety Management."

10 CFR 835, "Occupational Radiation Protection."

40 CFR 192, "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings."

40 CFR 261, "Identification and Listing of Hazardous Waste."

40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan."

A Manual for Implementing Residual Radioactive Material Guidelines Using RESRAD Version 4.0, Argonne National Laboratory, June 1989.

"Approval of the Grand Junction Projects Office Remedial Action Project: National Environmental Policy Act and Comprehensive Environmental Response, Compensation, and Liability Act Documents," DOE, February 29, 1990.

"Calculation of Total Uranium Specific Activity From Total Uranium Chemical Concentration by Weight," Rust Geotech, November 11, 1994.

Community Relations in Superfund: A Handbook, EPA, January 1992.

Defense Decontamination and Decommissioning Program: Program Management Plan, DOE, December 1989.

DOE Order O 420.1, *Facility Safety*.

DOE Order O 440.1, *Worker Protection Management for DOE Federal and Contractor Employees*.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, Change 2.

DOE Order 5700.6C, *Quality Assurance*, Change 1.

DOE Order 5820.2A, *Radioactive Waste Management*.

Environmental Implementation Guide for Radiological Survey Procedures, draft report, DOE, November 1992.

GJPORAP/IVC Project Management Summary, ORNL, May 1994.

Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material, U.S. Nuclear Regulatory Commission, 1982.

Guidelines for Residual Radioactive Material at Formerly Utilized Sites Remedial Action Program and Remote Surplus Facilities Management Program Sites, Rev. 2, DOE, March 1987.

Interim Final Guidance on Preparing Superfund Decision Documents: The Proposed Plan, The Record of Decision, Explanation of Significant Differences, The Record of Decision Amendment, EPA, July 1989.

Limits for Intakes of Radionuclides by Workers, International Commission on Radiological Protection (ICRP), August 1982.

Manual for Conducting Radiological Surveys in Support of License Termination, NUREG/CR 5849 [draft], prepared by Oak Ridge Associated Universities for the U.S. Nuclear Regulatory Commission, June 1992.

Procedures for Completion and Deletion of National Priority List Sites, EPA, October 1988.

Project Plan for the U.S. Department of Energy Grand Junction Projects Office Remedial Action Project, DOE, March 1986.

Proposed GJPORAP Release Criteria and Scope Impacts," DOE, July 20, 1989.

Public Participation in Environmental Restoration Activities, DOE, November 1991.

Quality Assurance Program for Nuclear Facilities, ANSI/ASME NQA-1, American Society of Mechanical Engineers, 1989.

Recommendations of the ICRP, ICRP, August 1987.

Record of Decision for Remedial Action at the Climax Uranium Company Uranium Mill Site, Grand Junction, Colorado, DOE, August 1988.

SFMP Resource Manual, DOE, 1989.

Verification and Certification Protocol for the Office of Environmental Restoration, Formerly Utilized Sites Remedial Action Program and Decontamination and Decommissioning Program, Rev. 3, DOE, November 1990.

*Work Plan for Independent Verification of the
Grand Junction Projects Office Remedial Action
Project, ORNL, October 1991.*

Appendix B

Final Radiological Conditions

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Appendix B Table Summary

Table B-1 provides MDC calculation results for the instruments used for beta-gamma activity and gamma exposure rate measurements. Beta-gamma scan and direct-measurement survey data for the building surfaces are listed in Tables B-2 through B-7. Table B-8 presents the results of additional measurements made during the release survey. Interior and exterior static gamma exposure rate measurement data are provided in Table B-9. Listed in Table B-10 are the soil sample results for the exterior ground area located within 3 meters of Building 54. Table B-11 presents the statistical summary of the measurement results.

Appendix B Figure Summary

The verification cells and sample and measurement locations for the exterior ground area are shown on Figure B-1. Figures B-2A through B-6B show the locations where beta-gamma scans were performed and direct measurements were made on the surfaces of the building. Interior gamma scans of the floor surface and static gamma measurement locations (1 m above the floor) are shown on Figures B-2A and B-2B.

Table B-1. Survey Instrumentation Sensitivities

Type of Measurement	Instrumentation		MDC ^a	
	Detector	Meter	Static	Scan
Beta-Gamma	Eberline SHP-340 Gas Proportional	Eberline E-600	530 dpm/100 cm ²	1700 dpm/100 cm ²
Gamma	Same as meter	Mount Sopris SC-132 Portable Scintillometer ^b	Not calculated ^c	3.4 μR/h

^aCalculations include background counts for a specified time period. Equations and calculations are provided in MDC Calculations for GJORAP (WASTREN 1997b).

^bThe instrument has a 1.5 x 1.5-inch sodium iodide detector.

^cThe calculation of MDC for static gamma measurements is not appropriate due to empirical characteristics of the measurement method and associated variables. However, instrument detection is expected to be at least as sensitive as the scan MDC.

Key for Table B-1:

MDC = minimum detectable concentration
dpm/100 cm² = disintegrations per minute per 100 square centimeters
μR/h = microrentgens per hour

The following equations and factors were used to calculate instrument sensitivities (from WASTREN 1997b):

$$\text{Static MDC}_{\beta-\gamma} = \frac{3 + 4.65 * \sqrt{C_b}}{T * \epsilon_T * A * K} = \frac{3 + 4.65 * \sqrt{230}}{1 * 0.19 * 73 * 0.01} = 530 \text{ dpm/100 cm}^2$$

$$\text{Scan MDC}_{\beta-\gamma} = \frac{\frac{d' * \sqrt{B_r * T}}{T}}{\sqrt{E_{hf}} * \epsilon_T * A * K} = \frac{\frac{2 * \sqrt{230 * 1/60}}{1/60}}{\sqrt{1} * 0.19 * 73 * 0.01} = 1700 \text{ dpm/100 cm}^2$$

$$\text{Scan MDC}_{\gamma} = \frac{\frac{d' * \sqrt{B_r * T}}{T}}{\sqrt{E_{hf}} * \epsilon_i * K} = \frac{\frac{2 * \sqrt{6300 * 1/60}}{1/60}}{\sqrt{0.65} * 450 * 1} = 3.4 \text{ μR/h}$$

Where:

MDC_{β-γ} = minimum detectable concentration for measuring beta-gamma activities
MDC_γ = minimum detectable concentration for measuring gamma exposure rates
C_b = background counts for a count time T
T = count time or observational interval in minutes
ε_T = total detector efficiency in counts per disintegration (based on 1997 calibration)
A = probe area in square centimeters
K = unit or time conversion factors
d' = index of sensitivity
B_r = applicable background count rate in counts per minute
E_{hf} = human factors efficiency
ε_i = instrument efficiency in counts per minute per μR/h (based on 1997 calibration where exposure rate (μR/h) = cps x 0.0748 + 6.03; therefore 105 cps = 13.9 μR/h, and 1 μR/h = 450 cpm)

Table B-2. Survey Unit 2 (Ceiling) Surface Measurement Data

Loc. No.	Surface	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
2	Lower Side	Ceiling Tile	1500	2150	1503	650	3	NM	N/A
2	Upper Side	Ceiling Tile	1500	2310	1445	810	-55	1947	447
4	Lower Side	Ceiling Tile	1500	2316	1110	816	-390	NM	N/A
4	Upper Side	Ceiling Tile	1500	2293	1220	793	-280	1914	414
5	Lower Side	Ceiling Tile	1500	2230	1560	730	60	NM	N/A
5	Upper Side	Ceiling Tile	1500	2300	1240	800	-260	1966	466
6	Lower Side	Ceiling Tile	1500	2560	1314	1060	-186	NM	N/A
6	Upper Side	Ceiling Tile	1500	2310	1013	810	-487	1826	326
7	Lower Side	Ceiling Tile	1500	2290	1104	790	-396	NM	N/A
7	Upper Side	Ceiling Tile	1500	2320	1208	820	-292	1738	238
8	Lower Side	Ceiling Tile	1500	2110	1311	610	-189	NM	N/A
8	Upper Side	Ceiling Tile	1500	2190	1311	690	-189	1904	404
9	Lower Side	Ceiling Tile	1500	2350	1157	850	-343	NM	N/A
9	Upper Side	Ceiling Tile	1500	2540	1290	1040	-210	1841	341
10	Lower Side	Ceiling Tile	1500	2010	1160	510	-340	NM	N/A
10	Upper Side	Ceiling Tile	1500	2300	1471	800	-29	1892	392
11	Lower Side	Ceiling Tile	1500	2540	1355	1040	-145	NM	N/A
11	Upper Side	Ceiling Tile	1500	2450	1173	950	-327	1798	298
12	Lower Side	Ceiling Tile	1500	1794	988	294	-512	NM	N/A
12	Upper Side	Ceiling Tile	1500	2410	1202	910	-298	1536	36
14	Lower Side	Ceiling Tile	1500	2380	986	880	-514	NM	N/A
14	Upper Side	Ceiling Tile	1500	2120	1014	620	-486	1738	238
15	Lower Side	Ceiling Tile	1500	2310	998	810	-502	NM	N/A
15	Upper Side	Ceiling Tile	1500	2270	1213	770	-287	1910	410
17	Lower Side	Ceiling Tile	1500	2410	1101	910	-399	NM	N/A
17	Upper Side	Ceiling Tile	1500	2160	1213	660	-287	1801	301
18	Lower Side	Ceiling Tile	1500	2410	1102	910	-398	NM	N/A
18	Upper Side	Ceiling Tile	1500	2180	998	680	-502	1741	241
19	Lower Side	Ceiling Tile	1500	2140	1130	640	-370	NM	N/A
19	Upper Side	Ceiling Tile	1500	2280	1127	780	-373	1625	125
20	Lower Side	Ceiling Tile	1500	2150	997	650	-503	NM	N/A
20	Upper Side	Ceiling Tile	1500	2440	1205	940	-295	1830	330
21	Lower Side	Ceiling Tile	1500	2560	1323	1060	-177	NM	N/A
21	Upper Side	Ceiling Tile	1500	2490	1278	990	-222	1735	235
22	Lower Side	Ceiling Tile	1500	2300	1575	800	75	NM	N/A
22	Upper Side	Ceiling Tile	1500	2350	1537	850	37	1996	496
23	Lower Side	Ceiling Tile	1500	2280	1380	780	-120	NM	N/A
23	Upper Side	Ceiling Tile	1500	2350	1603	850	103	1742	242
24	Lower Side	Ceiling Tile	1500	2200	1160	700	-340	NM	N/A
24	Upper Side	Ceiling Tile	1500	2410	1260	910	-240	1806	306
25	Lower Side	Ceiling Tile	1500	2290	1031	790	-469	NM	N/A
25	Upper Side	Ceiling Tile	1500	2420	1520	920	20	1869	369
26	Lower Side	Ceiling Tile	1500	2410	1010	910	-490	NM	N/A
26	Upper Side	Ceiling Tile	1500	2180	1214	680	-286	1720	220
27	Lower Side	Ceiling Tile	1500	2340	1380	840	-120	NM	N/A
27	Upper Side	Ceiling Tile	1500	2400	1210	900	-290	1638	138
28	Lower Side	Ceiling Tile	1500	2170	940	670	-560	NM	N/A

Table B-2 (continued). Survey Unit 2 (Ceiling) Surface Measurement Data

Loc. No.	Surface	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
28	Upper Side	Ceiling Tile	1500	2410	1029	910	-471	1727	227
29	Lower Side	Ceiling Tile	1500	2030	1002	530	-498	NM	N/A
29	Upper Side	Ceiling Tile	1500	2410	1003	910	-497	1973	473
31	Lower Side	Ceiling Tile	1500	2210	1082	710	-418	NM	N/A
31	Upper Side	Ceiling Tile	1500	2280	956	780	-544	1567	67
33	Lower Side	Ceiling Tile	1500	2410	1260	910	-240	NM	N/A
33	Upper Side	Ceiling Tile	1500	2390	1188	890	-312	1860	360
34	Lower Side	Ceiling Tile	1500	2360	1640	860	140	NM	N/A
34	Upper Side	Ceiling Tile	1500	2160	1170	660	-330	1612	112
35	Lower Side	Ceiling Tile	1500	2318	1020	818	-480	NM	N/A
35	Upper Side	Ceiling Tile	1500	2380	1100	880	-400	1914	414
36	Lower Side	Ceiling Tile	1500	2160	990	660	-510	NM	N/A
36	Upper Side	Ceiling Tile	1500	2480	1015	980	-485	1824	324
37	Lower Side	Ceiling Tile	1500	2310	1100	810	-400	NM	N/A
37	Upper Side	Ceiling Tile	1500	2376	1255	876	-245	1666	166
38	Lower Side	Ceiling Tile	1500	1630	1220	130	-280	NM	N/A
38	Upper Side	Ceiling Tile	1500	2110	1166	610	-334	1510	10
40	Lower Side	Ceiling Tile	1500	2180	1010	680	-490	NM	N/A
40	Upper Side	Ceiling Tile	1500	2330	1216	830	-284	1626	126
41	Lower Side	Ceiling Tile	1500	2290	1180	790	-320	NM	N/A
41	Upper Side	Ceiling Tile	1500	2196	1056	696	-444	1506	6
42	Lower Side	Ceiling Tile	1500	2470	1244	970	-256	NM	N/A
42	Upper Side	Ceiling Tile	1500	2430	885	930	-615	1947	447
43	Lower Side	Ceiling Tile	1500	2130	1080	630	-420	NM	N/A
43	Upper Side	Ceiling Tile	1500	2196	1280	696	-220	1658	158
44	Lower Side	Ceiling Tile	1500	2190	1406	690	-94	NM	N/A
44	Upper Side	Ceiling Tile	1500	2280	1444	780	-56	1566	66
46	Lower Side	Ceiling Tile	1500	2230	1527	730	27	NM	N/A
46	Upper Side	Ceiling Tile	1500	2410	1492	910	-8	2020	520
48	Lower Side	Ceiling Tile	1500	2080	988	580	-512	NM	N/A
48	Upper Side	Ceiling Tile	1500	2320	1226	820	-274	1551	51
49	Lower Side	Ceiling Tile	1500	2280	1323	780	-177	NM	N/A
49	Upper Side	Ceiling Tile	1500	2410	1519	910	19	1904	404
50	Lower Side	Ceiling Tile	1500	2080	956	580	-544	NM	N/A
50	Upper Side	Ceiling Tile	1500	2150	1152	650	-348	1868	368
52	Lower Side	Ceiling Tile	1500	2310	1140	810	-360	NM	N/A
52	Upper Side	Ceiling Tile	1500	2195	1100	695	-400	1717	217
54	Lower Side	Ceiling Tile	1500	2335	1190	835	-310	NM	N/A
54	Upper Side	Ceiling Tile	1500	2110	1125	610	-375	1730	230
55	Lower Side	Ceiling Tile	1500	2160	1081	660	-419	NM	N/A
55	Upper Side	Ceiling Tile	1500	2130	1076	630	-424	1804	304
56	Lower Side	Ceiling Tile	1500	2340	1004	840	-496	NM	N/A
56	Upper Side	Ceiling Tile	1500	2110	861	610	-639	1888	388
57	Lower Side	Ceiling Tile	1500	2130	1034	630	-466	NM	N/A
57	Upper Side	Ceiling Tile	1500	2250	1106	750	-394	1578	78
58	Lower Side	Ceiling Tile	1500	2460	1580	960	80	NM	N/A
58	Upper Side	Ceiling Tile	1500	2450	1410	950	-90	2120	620

Table B-2 (continued). Survey Unit 2 (Ceiling) Surface Measurement Data

Loc. No.	Surface	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
59	Lower Side	Ceiling Tile	1500	2160	1098	660	-402	NM	N/A
59	Upper Side	Ceiling Tile	1500	2290	1260	790	-240	1846	346
60	Lower Side	Ceiling Tile	1500	2100	1135	600	-365	NM	N/A
60	Upper Side	Ceiling Tile	1500	2480	1230	980	-270	1815	315
61	Lower Side	Ceiling Tile	1500	2190	1130	690	-370	NM	N/A
61	Upper Side	Ceiling Tile	1500	1789	1210	289	-290	1790	290
62	Lower Side	Ceiling Tile	1500	2560	961	1060	-539	NM	N/A
62	Upper Side	Ceiling Tile	1500	2530	1187	1030	-313	1798	298
63	Lower Side	Ceiling Tile	1500	1866	1070	366	-430	NM	N/A
63	Upper Side	Ceiling Tile	1500	2270	1110	770	-390	1868	368
64	Lower Side	Ceiling Tile	1500	2110	1210	610	-290	NM	N/A
64	Upper Side	Ceiling Tile	1500	2210	1160	710	-340	1697	197
66	Lower Side	Ceiling Tile	1500	2120	1182	620	-318	NM	N/A
66	Upper Side	Ceiling Tile	1500	2460	1260	960	-240	1907	407
69	Lower Side	Ceiling Tile	1500	2220	1052	720	-448	NM	N/A
69	Upper Side	Ceiling Tile	1500	2640	1101	1140	-399	1897	397
70	Lower Side	Ceiling Tile	1500	2370	759	870	-741	NM	N/A
70	Upper Side	Ceiling Tile	1500	2470	1449	970	-51	1954	454
71	Lower Side	Ceiling Tile	1500	2285	1140	785	-360	NM	N/A
71	Upper Side	Ceiling Tile	1500	2275	1230	775	-270	1848	348
72	Lower Side	Ceiling Tile	1500	2500	1122	1000	-378	NM	N/A
72	Upper Side	Ceiling Tile	1500	2470	1059	970	-441	1947	447
73	Lower Side	Ceiling Tile	1500	2090	775	590	-725	NM	N/A
73	Upper Side	Ceiling Tile	1500	2300	886	800	-614	1664	164
74	Lower Side	Ceiling Tile	1500	2320	1613	820	113	NM	N/A
74	Upper Side	Ceiling Tile	1500	2300	1446	800	-54	1714	214
75	Lower Side	Ceiling Tile	1500	2300	917	800	-583	NM	N/A
75	Upper Side	Ceiling Tile	1500	2210	1160	710	-340	1703	203
76	Lower Side	Ceiling Tile	1500	2360	1160	860	-340	NM	N/A
76	Upper Side	Ceiling Tile	1500	2220	1110	720	-390	1553	53
77	Lower Side	Ceiling Tile	1500	1849	1062	349	-438	NM	N/A
77	Upper Side	Ceiling Tile	1500	2420	1046	920	-454	1651	151
78	Lower Side	Ceiling Tile	1500	2210	1160	710	-340	NM	N/A
78	Upper Side	Ceiling Tile	1500	2190	1008	690	-492	1782	282
80	Lower Side	Ceiling Tile	1500	1861	1020	361	-480	NM	N/A
80	Upper Side	Ceiling Tile	1500	2130	970	630	-530	1763	263
81	Lower Side	Ceiling Tile	1500	1784	980	284	-520	NM	N/A
81	Upper Side	Ceiling Tile	1500	2150	1080	650	-420	1599	99
82	Lower Side	Ceiling Tile	1500	2300	1180	800	-320	NM	N/A
82	Upper Side	Ceiling Tile	1500	2320	1060	820	-440	1840	340
83	Lower Side	Ceiling Tile	1500	2290	1098	790	-402	NM	N/A
83	Upper Side	Ceiling Tile	1500	2130	1273	630	-227	1827	327
84	Lower Side	Ceiling Tile	1500	1895	1442	395	-58	NM	N/A
84	Upper Side	Ceiling Tile	1500	2100	1217	600	-283	1770	270
85	Lower Side	Ceiling Tile	1500	1994	1060	494	-440	NM	N/A
85	Upper Side	Ceiling Tile	1500	2088	1130	588	-370	1384	-116
86	Lower Side	Ceiling Tile	1500	2310	1160	810	-340	NM	N/A

Table B-2 (continued). Survey Unit 2 (Ceiling) Surface Measurement Data

Loc. No.	Surface	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
86	Upper Side	Ceiling Tile	1500	2460	1230	960	-270	1850	350
87	Lower Side	Ceiling Tile	1500	2360	1560	860	60	NM	N/A
87	Upper Side	Ceiling Tile	1500	2680	1640	1180	140	2090	590
88	Lower Side	Ceiling Tile	1500	2730	1120	1230	-380	NM	N/A
88	Upper Side	Ceiling Tile	1500	2230	1066	730	-434	1650	150
89	Lower Side	Ceiling Tile	1500	2280	1620	780	120	NM	N/A
89	Upper Side	Ceiling Tile	1500	2102	976	602	-524	1643	143
90	Lower Side	Ceiling Tile	1500	2400	1167	900	-333	NM	N/A
90	Upper Side	Ceiling Tile	1500	1953	976	453	-524	1451	-49
91	Lower Side	Ceiling Tile	1500	2030	1334	530	-166	NM	N/A
91	Upper Side	Ceiling Tile	1500	2560	1780	1060	280	1634	134
92	Lower Side	Ceiling Tile	1500	2280	1543	780	43	NM	N/A
92	Upper Side	Ceiling Tile	1500	2180	1609	680	109	1848	348
93	Lower Side	Ceiling Tile	1500	2350	1330	850	-170	NM	N/A
93	Upper Side	Ceiling Tile	1500	2350	1030	850	-470	1794	294
94	Lower Side	Ceiling Tile	1500	2360	1323	860	-177	NM	N/A
94	Upper Side	Ceiling Tile	1500	2120	1195	620	-305	1795	295
95	Lower Side	Ceiling Tile	1500	2120	1580	620	80	NM	N/A
95	Upper Side	Ceiling Tile	1500	2270	1428	770	-72	1789	289
96	Lower Side	Ceiling Tile	1500	2160	1002	660	-498	NM	N/A
96	Upper Side	Ceiling Tile	1500	2180	1213	680	-287	1911	411
97	Lower Side	Ceiling Tile	1500	2390	1429	890	-71	NM	N/A
97	Upper Side	Ceiling Tile	1500	2280	1328	780	-172	2230	730
98	Lower Side	Ceiling Tile	1500	2460	1486	960	-14	NM	N/A
98	Upper Side	Ceiling Tile	1500	2380	1414	880	-86	2200	700
99	Lower Side	Ceiling Tile	1500	2410	1401	910	-99	NM	N/A
99	Upper Side	Ceiling Tile	1500	2460	1583	960	83	2000	500
100	Lower Side	Ceiling Tile	1500	2350	1242	850	-258	NM	N/A
100	Upper Side	Ceiling Tile	1500	2210	1367	710	-133	1731	231
101	Lower Side	Ceiling Tile	1500	2230	1220	730	-280	NM	N/A
101	Upper Side	Ceiling Tile	1500	2268	1310	768	-190	1618	118
102	Lower Side	Ceiling Tile	1500	2320	1270	820	-230	NM	N/A
102	Upper Side	Ceiling Tile	1500	2310	1370	810	-130	1788	288
103	Lower Side	Ceiling Tile	1500	2270	1690	770	190	NM	N/A
103	Upper Side	Ceiling Tile	1500	2170	1340	670	-160	1599	99
104	Lower Side	Ceiling Tile	1500	2160	1244	660	-256	NM	N/A
104	Upper Side	Ceiling Tile	1500	1854	1122	354	-378	1955	455
105	Lower Side	Ceiling Tile	1500	2130	1263	630	-237	NM	N/A
105	Upper Side	Ceiling Tile	1500	2190	1461	690	-39	1834	334
106	Lower Side	Ceiling Tile	1500	2200	1100	700	-400	NM	N/A
106	Upper Side	Ceiling Tile	1500	2120	1200	620	-300	1855	355
107	Lower Side	Ceiling Tile	1500	2340	987	840	-513	NM	N/A
107	Upper Side	Ceiling Tile	1500	2270	1220	770	-280	1907	407
108	Lower Side	Ceiling Tile	1500	1959	890	459	-610	NM	N/A
108	Upper Side	Ceiling Tile	1500	2340	1059	840	-441	1932	432
109	Lower Side	Ceiling Tile	1500	2170	1032	670	-468	NM	N/A
109	Upper Side	Ceiling Tile	1500	2350	1680	850	180	2280	780

Table B-2 (continued). Survey Unit 2 (Ceiling) Surface Measurement Data

Loc. No.	Surface	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
110	Lower Side	Ceiling Tile	1500	2270	1050	770	-450	NM	N/A
110	Upper Side	Ceiling Tile	1500	2160	1088	660	-412	1648	148
111	Lower Side	Ceiling Tile	1500	2110	970	610	-530	NM	N/A
111	Upper Side	Ceiling Tile	1500	2130	1311	630	-189	1950	450
112	Lower Side	Ceiling Tile	1500	2380	1660	880	160	NM	N/A
112	Upper Side	Ceiling Tile	1500	2090	1120	590	-380	1697	197
113	Lower Side	Combination	1500	2120	980	620	-520	NM	N/A
113	Upper Side	Combination	1500	2320	1230	820	-270	1809	309
114	Lower Side	Ceiling Tile	1500	2260	1520	760	20	NM	N/A
114	Upper Side	Ceiling Tile	1500	2240	1030	740	-470	1546	46

^aCombination media includes ceiling tile, metal vents, and/or plastic light panels.

^bBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Key for Table B-2:

NM = no measurement

N/A = not applicable

Table B-3. Survey Unit 3 (Floor) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
1	Carpet	1500	2118	1228	618	-272	1527	27
2	Carpet	1500	1790	992	290	-508	1417	-83
3	Carpet	1500	1889	1318	389	-182	1383	-117
4	Carpet	1500	1967	1110	467	-390	1297	-203
5	Carpet	1500	1837	1110	337	-390	1573	73
6	Carpet	1500	1744	1130	244	-370	1389	-111
7	Carpet	1500	1809	1105	309	-395	1507	7
8	Carpet	1500	1848	1196	348	-304	1287	-213
9	Carpet	1500	2050	809	550	-691	1516	16
10	Carpet	1500	1946	1187	446	-313	1319	-181
11	Carpet	1500	1931	894	431	-606	1368	-132
12	Carpet	1500	1989	1318	489	-182	1475	-25
13	Carpet	1500	1804	938	304	-562	1432	-68
14	Carpet	1500	1861	1164	361	-336	1334	-166
15	Carpet	1500	1833	974	333	-526	1276	-224
16	Carpet	1500	1851	1177	351	-323	1512	12
17	Carpet	1500	2040	828	540	-672	1530	30
18	Carpet	1500	1865	940	365	-560	1283	-217
19	Carpet	1500	1894	1153	394	-347	1289	-211
20	Carpet	1500	1834	1087	334	-413	1534	34
21	Carpet	1500	1881	936	381	-564	1326	-174
22	Carpet	1500	1897	1155	397	-345	1461	-39
23	Carpet	1500	2050	752	550	-748	1319	-181
24	Carpet	1500	2040	1087	540	-413	1547	47
25	Carpet	1500	1688	906	188	-594	1537	37
26	Carpet	1500	1679	1013	179	-487	1308	-192
27	Carpet	1500	1922	1078	422	-422	1284	-216
28	Vinyl	1500	2109	1191	609	-309	1560	60
29	Vinyl	1500	1910	1291	410	-209	1455	-45
30	Carpet	1500	2103	1294	603	-206	1520	20
31	Carpet	1500	1953	1331	453	-169	1347	-153
32	Carpet	1500	1596	1176	96	-324	1340	-160
33	Carpet	1500	1812	1178	312	-322	1777	277
34	Carpet	1500	1977	1303	477	-197	1505	5
35	Carpet	1500	2000	1280	500	-220	1678	178
36	Carpet	1500	1648	1013	148	-487	1433	-67
37	Carpet	1500	1888	1262	388	-238	1447	-53
38	Carpet	1500	1817	1192	317	-308	1383	-117
39	Carpet	1500	1920	1117	420	-383	1467	-33
40	Carpet	1500	1880	1077	380	-423	1333	-167
41	Carpet	1500	1990	1004	490	-496	1368	-132
42	Carpet	1500	1818	963	318	-537	1361	-139
43	Carpet	1500	2030	1220	530	-280	1544	44
44	Carpet	1500	1954	1140	454	-360	1657	157
45	Carpet	1500	1918	1013	418	-487	1453	-47
46	Carpet	1500	2040	1045	540	-455	1305	-195
47	Carpet	1500	1798	1074	298	-426	1523	23
48	Carpet	1500	1720	957	220	-543	1507	7

Table B-3 (continued). Survey Unit 3 (Floor) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
49	Carpet	1500	1887	862	387	-638	1540	40
50	Carpet	1500	1979	1148	479	-352	1333	-167
51	Carpet	1500	1913	1107	413	-393	1629	129
52	Carpet	1500	1895	904	395	-596	1368	-132
53	Carpet	1500	1899	1020	399	-480	1742	242
54	Carpet	1500	1747	962	247	-538	1455	-45
55	Carpet	1500	1912	1037	412	-463	1537	37
56	Carpet	1500	1819	1027	319	-473	1290	-210
57	Carpet	1500	1786	1005	286	-495	1551	51
58	Carpet	1500	1930	988	430	-512	1585	85
59	Carpet	1500	1670	975	170	-525	1468	-32
60	Carpet	1500	1810	990	310	-510	1619	119
61	Carpet	1500	1990	873	490	-627	1487	-13
62	Carpet	1500	2220	1407	720	-93	1580	80
63	Carpet	1500	2030	1066	530	-434	1306	-194
64	Carpet	1500	1628	960	128	-540	1415	-85
65	Carpet	1500	1988	1110	488	-390	1428	-72
66	Carpet	1500	1920	980	420	-520	1546	46
67	Carpet	1500	2112	1210	612	-290	1799	299
68	Carpet	1500	1912	1178	412	-322	1559	59
69	Carpet	1500	1964	1176	464	-324	1474	-26
70	Carpet	1500	2050	1103	550	-397	1178	-322
71	Carpet	1500	1540	860	40	-640	1383	-117
72	Carpet	1500	1906	1174	406	-326	1481	-19
73	Carpet	1500	2040	1188	540	-312	1468	-32
74	Carpet	1500	1545	680	45	-820	1284	-216
75	Carpet	1500	1813	988	313	-512	1612	112
76	Carpet	1500	1943	1078	443	-422	1509	9
77	Carpet	1500	2100	1120	600	-380	1595	95
78	Carpet	1500	1994	1135	494	-365	1326	-174
79	Carpet	1500	1885	1081	385	-419	1573	73
80	Carpet	1500	1720	1116	220	-384	1446	-54
81	Carpet	1500	2010	1110	510	-390	1448	-52
82	Carpet	1500	2010	1216	510	-284	1495	-5
83	Carpet	1500	2120	1133	620	-367	1347	-153
84	Carpet	1500	2160	988	660	-512	1422	-78
85	Carpet	1500	2020	1119	520	-381	1396	-104
86	Carpet	1500	1810	1040	310	-460	1796	296
87	Carpet	1500	2008	912	508	-588	1713	213
88	Carpet	1500	1915	890	415	-610	1402	-98
89	Carpet	1500	1940	1112	440	-388	1305	-195
90	Carpet	1500	1925	1184	425	-316	1432	-68
91	Carpet	1500	1828	1190	328	-310	1499	-1
92	Carpet	1500	1906	865	406	-635	1403	-97
93	Carpet	1500	1936	897	436	-603	1303	-197
94	Carpet	1500	1922	860	422	-640	1516	16
95	Carpet	1500	1969	826	469	-674	1467	-33
96	Carpet	1500	1990	958	490	-542	1340	-160

Table B-3 (continued). Survey Unit 3 (Floor) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
97	Carpet	1500	1516	814	16	-686	2020	520
98	Carpet	1500	1924	960	424	-540	1417	-83
99	Carpet	1500	1780	740	280	-760	1551	51
100	Carpet	1500	2015	1150	515	-350	1865	365
101	Carpet	1500	1980	940	480	-560	1479	-21
102	Carpet	1500	1932	980	432	-520	1439	-61
103	Carpet	1500	1833	986	333	-514	1241	-259
104	Carpet	1500	2190	979	690	-521	1756	256
105	Carpet	1500	2120	840	620	-660	1777	277
106	Carpet	1500	2119	976	619	-524	1389	-111
107	Carpet	1500	1947	1010	447	-490	1467	-33
108	Carpet	1500	2120	1145	620	-355	1650	150

^aBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Table B-4. Survey Unit 4 (Roof) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
347	Rubber	1500	1537	1127	37	-373	1399	-101
348	Rubber	1500	1465	1035	-35	-465	1413	-87
350	Rubber	1500	1575	926	75	-574	1477	-23
351	Rubber	1500	1491	881	-9	-619	1349	-151
352	Rubber	1500	1743	1194	243	-306	1576	76
353	Rubber	1500	1689	1294	189	-206	1569	69
354	Rubber	1500	1578	960	78	-540	1448	-52
355	Rubber	1500	1359	955	-141	-545	1257	-243
356	Rubber	1500	1607	909	107	-591	1282	-218
357	Rubber	1500	1362	818	-138	-682	1320	-180
358	Rubber	1500	1368	825	-132	-675	1186	-314
359	Rubber	1500	1491	1052	-9	-448	1406	-94
360	Rubber	1500	1734	1243	234	-257	1342	-158
361	Rubber	1500	1740	1214	240	-286	1434	-66
362	Rubber	1500	1594	1115	94	-385	1413	-87
363	Rubber	1500	1615	1175	115	-325	1349	-151
364	Rubber	1500	1397	925	-103	-575	1356	-144
365	Rubber	1500	1443	1065	-57	-435	1257	-243
366	Rubber	1500	1594	1086	94	-414	1370	-130
367	Rubber	1500	1493	910	-7	-590	1273	-227
368	Rubber	1500	1582	1178	82	-322	1271	-229
369	Rubber	1500	1475	908	-25	-592	1477	-23
370	Rubber	1500	1544	1187	44	-313	1441	-59
371	Rubber	1500	1559	906	59	-594	1211	-289
372	Rubber	1500	1607	1052	107	-448	1391	-109
373	Rubber	1500	1589	1080	89	-420	1292	-208
374	Rubber	1500	1414	1188	-86	-312	1370	-130
375	Rubber	1500	1543	1107	43	-393	1526	26
376	Rubber	1500	1675	990	175	-510	1605	105
377	Rubber	1500	1540	1215	40	-285	1690	190
378	Rubber	1500	1378	1005	-122	-495	1306	-194
379	Rubber	1500	1753	740	253	-760	1224	-276
380	Rubber	1500	1488	808	-12	-692	1152	-348
381	Rubber	1500	1584	1189	84	-311	1342	-158
382	Rubber	1500	1584	978	84	-522	1363	-137
383	Rubber	1500	1624	1049	124	-451	1562	62
384	Rubber	1500	1445	962	-55	-538	1342	-158
385	Rubber	1500	1657	1203	157	-297	1356	-144
386	Rubber	1500	1511	1195	11	-305	1434	-66
387	Rubber	1500	1799	1087	299	-413	1384	-116
388	Rubber	1500	1672	1136	172	-364	1619	119
389	Rubber	1500	1542	964	42	-536	1235	-265
390	Rubber	1500	1578	1004	78	-496	1391	-109
391	Rubber	1500	1717	791	217	-709	1132	-368
392	Rubber	1500	1541	752	41	-748	1080	-420
393	Rubber	1500	1476	1011	-24	-489	1289	-211
394	Rubber	1500	1780	912	280	-588	1119	-381
395	Rubber	1500	1814	740	314	-760	1230	-270

Table B-4 (continued). Survey Unit 4 (Roof) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
396	Rubber	1500	1489	1125	-11	-375	1367	-133
397	Rubber	1500	1309	1037	-191	-463	1299	-201
398	Rubber	1500	1540	1301	40	-199	1455	-45
399	Rubber	1500	1475	1161	-25	-339	1257	-243
400	Rubber	1500	1515	981	15	-519	1271	-229
402	Rubber	1500	1403	1037	-97	-463	1015	-485
403	Rubber	1500	1188	922	-312	-578	1278	-222
404	Rubber	1500	1489	938	-11	-562	1380	-120
405	Rubber	1500	1355	842	-145	-658	1289	-211
406	Rubber	1500	1298	753	-202	-747	1022	-478
407	Rubber	1500	1504	836	4	-664	1438	-62
408	Rubber	1500	1427	750	-73	-750	1289	-211
409	Rubber	1500	1570	808	70	-692	1217	-283
410	Rubber	1500	1355	856	-145	-644	1237	-263
411	Rubber	1500	1336	1054	-164	-446	1157	-343
412	Rubber	1500	1330	828	-170	-672	1074	-426
413	Rubber	1500	1502	707	2	-793	1048	-452
415	Rubber	1500	1377	971	-123	-529	1221	-279
416	Rubber	1500	1476	959	-24	-541	1080	-420
417	Rubber	1500	1469	942	-31	-558	970	-530
418	Rubber	1500	1461	1025	-39	-475	1243	-257
419	Rubber	1500	1649	1142	149	-358	1321	-179
420	Rubber	1500	1434	894	-66	-606	1185	-315
421	Rubber	1500	1475	806	-25	-694	1341	-159
422	Rubber	1500	1407	828	-93	-672	1158	-342
423	Rubber	1500	1703	974	203	-526	1119	-381
424	Rubber	1500	1472	844	-28	-656	1143	-357
425	Rubber	1500	1356	959	-144	-541	1158	-342
426	Rubber	1500	1428	943	-72	-557	1224	-276
427	Rubber	1500	1287	835	-213	-665	1224	-276
428	Rubber	1500	1435	1067	-65	-433	1158	-342
429	Rubber	1500	1635	1241	135	-259	1269	-231
430	Rubber	1500	1297	935	-203	-565	1193	-307
431	Rubber	1500	1593	842	93	-658	1445	-55
432	Rubber	1500	1569	964	69	-536	1302	-198
433	Rubber	1500	1544	756	44	-744	1224	-276
434	Rubber	1500	1563	1204	63	-296	1491	-9
435	Rubber	1500	1510	838	10	-662	1237	-263
436	Rubber	1500	1322	839	-178	-661	1263	-237
437	Rubber	1500	1388	791	-112	-709	1308	-192
438	Rubber	1500	1333	964	-167	-536	1269	-231
439	Rubber	1500	1334	927	-166	-573	1280	-220
440	Rubber	1500	1421	1017	-79	-483	1250	-250
441	Rubber	1500	1225	661	-275	-839	1150	-350
442	Rubber	1500	1506	1037	6	-463	1334	-166
443	Rubber	1500	1476	1006	-24	-494	1295	-205
444	Rubber	1500	1507	898	7	-602	1126	-374
445	Rubber	1500	1797	876	297	-624	1132	-368

Table B-4 (continued). Survey Unit 4 (Roof) Surface Measurement Data

Loc. No.	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
446	Rubber	1500	1427	825	-73	-675	970	-530
447	Rubber	1500	1360	994	-140	-506	1145	-355
448	Rubber	1500	1560	886	60	-614	1230	-270
449	Rubber	1500	1514	976	14	-524	1367	-133
450	Rubber	1500	1197	780	-303	-720	1185	-315
451	Rubber	1500	1245	764	-255	-736	1156	-344
452	Rubber	1500	1403	952	-97	-548	1328	-172
453	Rubber	1500	1564	726	64	-774	1417	-83
454	Rubber	1500	1713	1012	213	-488	1343	-157

^aBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Table B-5. Survey Unit 5 (Exterior Walls) Surface Measurement Data

Loc. No.	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
115	0.5	Wood	1500	1681	872	181	-628	1393	-107
115	2.5	Wood	1500	1605	924	105	-576	1321	-179
115	3.5	Wood	1500	1713	812	213	-688	1315	-185
116	1.5	Wood	1500	1693	1069	193	-431	1335	-165
117	1.5	Wood	1500	1813	961	313	-539	1145	-355
117	3.5	Wood	1500	1580	912	80	-588	1386	-114
118	3.5	Wood	1500	1838	912	338	-588	1256	-244
118	2.5	Wood	1500	1787	1017	287	-483	1315	-185
119	3.5	Wood	1500	1621	999	121	-501	1139	-361
120	2.5	Wood	1500	1636	937	136	-563	1562	62
121	2.5	Wood	1500	1707	909	207	-591	1406	-94
122	4.13	Wood	1500	1587	1021	87	-479	1191	-309
122	0.5	Wood	1500	1931	1025	431	-475	1302	-198
123	3.5	Wood	1500	1761	962	261	-538	1139	-361
123	0.5	Combination	1500	1963	1012	463	-488	1451	-49
124	0.5	Wood	1500	2010	775	510	-725	1556	56
124	1.5	Wood	1500	1897	990	397	-510	1523	23
125	3.5	Wood	1500	1797	877	297	-623	1276	-224
126	1.5	Wood	1500	1896	995	396	-505	1399	-101
127	1.5	Combination	1500	2104	1064	604	-436	1412	-88
128	2.5	Wood	1500	1704	990	204	-510	1323	-177
129	1.5	Wood	1500	1901	968	401	-532	1289	-211
130	0.5	Wood	1500	1962	975	462	-525	1321	-179
131	3.5	Wood	1500	1710	911	210	-589	1308	-192
132	2.5	Wood	1500	1712	979	212	-521	1107	-393
133	3.5	Wood	1500	1912	978	412	-522	1328	-172
134	1.5	Wood	1500	1634	807	134	-693	1302	-198
135	0.5	Wood	1500	1897	1093	397	-407	1582	82
136	2.5	Wood	1500	1560	791	60	-709	1434	-66
137	4.13	Wood	1500	1513	812	13	-688	1167	-333
138	2.5	Wood	1500	1493	937	-7	-563	1100	-400
139	1.5	Wood	1500	1530	951	30	-549	1145	-355
140	2.5	Wood	1500	1530	903	30	-597	1178	-322
141	3.5	Wood	1500	1573	937	73	-563	1276	-224
142	3.5	Wood	1500	1513	942	13	-558	1211	-289
143	1.5	Wood	1500	1679	934	179	-566	1106	-394
144	3.5	Wood	1500	1562	990	62	-510	1211	-289
145	2.5	Wood	1500	1575	910	75	-590	1152	-348
146	1.5	Wood	1500	1604	926	104	-574	1347	-153
147	3.5	Wood	1500	1611	982	111	-518	1139	-361
148	3.5	Wood	1500	1653	905	153	-595	1022	-478
148	1.5	Wood	1500	1571	979	71	-521	1114	-386
149	3.5	Wood	1500	1587	821	87	-679	1041	-459
150	1.5	Wood	1500	1790	1095	290	-405	1480	-20
151	0.5	Wood	1500	1933	1206	433	-294	1493	-7
151	1.5	Wood	1500	1698	931	198	-569	1405	-95
152	1.5	Wood	1500	1690	873	190	-627	1196	-304

Table B-5 (continued). Survey Unit 5 (Exterior Walls) Surface Measurement Data

Loc. No.	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
				Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
153	3.5	Wood	1500	1757	940	257	-560	1009	-491
154	0.5	Wood	1500	1658	974	158	-526	1534	34
155	2.5	Wood	1500	1605	975	105	-525	1158	-342
156	3.5	Wood	1500	1857	924	357	-576	1412	-88
156	0.5	Wood	1500	1922	1087	422	-413	1399	-101
156	2.5	Wood	1500	1432	928	-68	-572	1198	-302
157	1.5	Wood	1500	1850	1012	350	-488	1263	-237
158	1.5	Wood	1500	1621	1007	121	-493	1217	-283
158	2.5	Wood	1500	1525	906	25	-594	1367	-133
159	2.5	Wood	1500	1617	1003	117	-497	1321	-179
160	3.5	Wood	1500	1819	1067	319	-433	1360	-140
160	2.5	Wood	1500	1590	989	90	-511	1139	-361
160	1.5	Wood	1500	1552	1083	52	-417	1315	-185
161	4.13	Wood	1500	1806	1061	306	-439	1347	-153
162	2.5	Wood	1500	1331	787	-169	-713	1243	-257
163	0.5	Wood	1500	1759	840	259	-660	1269	-231
164	2.5	Wood	1500	1697	966	197	-534	1346	-154
164	1.5	Wood	1500	1527	906	27	-594	1301	-199
165	2.5	Wood	1500	1697	795	197	-705	1256	-244
166	4.13	Wood	1500	1699	1015	199	-485	1198	-302
166	1.5	Wood	1500	1742	852	242	-648	1260	-240
167	3.5	Wood	1500	1802	954	302	-546	1191	-309
168	0.5	Wood	1500	1698	1144	198	-356	1186	-314
169	0.5	Wood	1500	1799	1242	299	-258	1597	97
170	3.5	Wood	1500	1906	1040	406	-460	1458	-42
171	1.5	Wood	1500	1780	891	280	-609	1335	-165
172	2.5	Wood	1500	1694	992	194	-508	1263	-237
173	1.5	Wood	1500	1522	740	22	-760	1334	-166
174	0.5	Wood	1500	1868	955	368	-545	1425	-75
174	1.5	Wood	1500	1624	924	124	-576	1150	-350
175	0.5	Wood	1500	1738	895	238	-605	1335	-165
175	2.5	Wood	1500	1784	945	284	-555	1235	-265
176	2.5	Wood	1500	1623	1060	123	-440	1186	-314
177	3.5	Wood	1500	1891	1055	391	-445	1263	-237
178	3.5	Wood	1500	1892	906	392	-594	1432	-68
179	0.5	Wood	1500	1717	1038	217	-462	1335	-165
179	2.5	Wood	1500	1581	930	81	-570	1434	-66
180	0.5	Wood	1500	1634	899	134	-601	1391	-109
341	2.5	Wood	1500	1822	989	322	-511	1562	62
343	1.5	Wood	1500	1721	825	221	-675	1321	-179
344	2.5	Wood	1500	1874	907	374	-593	1269	-231

^aCombination media includes wood and metal.

^bBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Key for Table B-5: m = meters(s)

Table B-6. Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
181	North	1.5	Metal	1500	1728	941	228	-559	1384	-116
182	West	1.5	Sheetrock	1500	1773	1013	273	-487	1165	-335
184	North	0.5	Sheetrock	1500	2150	1473	650	-27	1534	34
185	North	1.5	Sheetrock	1500	1431	846	-69	-654	1077	-423
186	North	0.5	Sheetrock	1500	1316	721	-184	-779	1022	-478
187	North	1.5	Sheetrock	1500	1505	937	5	-563	1328	-172
188	North	0.5	Sheetrock	1500	1632	1043	132	-457	1239	-261
189	West	0.5	Sheetrock	1500	1220	914	-280	-586	982	-518
189	East	1.3 - 2.3	Sheetrock	1500	1278	928	-222	-572	NM	N/A
190	East	2.15	Sheetrock	1500	1871	954	371	-546	1572	72
190	West	2.0 - 2.3	Sheetrock	1500	1650	1045	150	-455	NM	N/A
191	North	2.15	Sheetrock	1500	1927	952	427	-548	1340	-160
192	West	1.5	Sheetrock	1500	1571	1096	71	-404	1182	-318
192	East	1.5 - 2.3	Sheetrock	1500	1502	1225	2	-275	NM	N/A
193	West	1.5	Sheetrock	1500	1440	960	-60	-540	1276	-224
193	East	1.0 - 2.0	Sheetrock	1500	1279	961	-221	-539	NM	N/A
194	East	0.5	Sheetrock	1500	1492	1177	-8	-323	1277	-223
194	West	1.5	Sheetrock	1500	1581	1156	81	-344	1338	-162
194	East	1.0 - 2.0	Sheetrock	1500	1491	1168	-9	-332	NM	N/A
195	North	2.15	Sheetrock	1500	1467	917	-33	-583	1282	-218
196	South	0.5	Sheetrock	1500	1906	738	406	-762	1100	-400
197	East	2.5	Sheetrock	1500	1697	930	197	-570	1106	-394
197	West	2.0 - 3.0	Sheetrock	1500	1592	817	92	-683	NM	N/A
199	North	1.5	Sheetrock	1500	1530	792	30	-708	1278	-222
200	West	1.5	Sheetrock	1500	1513	1072	13	-428	1217	-283
200	East	1.0 - 2.0	Sheetrock	1500	1119	882	-381	-618	NM	N/A
201	East	2.5	Sheetrock	1500	1834	931	334	-569	1334	-166
202	East	0.5	Sheetrock	1500	1546	981	46	-519	1165	-335
202	West	0.0 - 1.0	Sheetrock	1500	1477	900	-23	-600	NM	N/A
203	West	2.15	Sheetrock	1500	1900	1048	400	-452	1251	-249
203	East	2.0 - 2.3	Sheetrock	1500	1763	736	263	-764	NM	N/A
204	West	1.5	Sheetrock	1500	1390	980	-110	-520	1165	-335
204	East	1.0 - 2.0	Sheetrock	1500	1552	999	52	-501	NM	N/A
205	East	0.5	Sheetrock	1500	2010	1305	510	-195	1437	-63
206	East	2.15	Sheetrock	1500	1430	855	-70	-645	1118	-382
206	West	2.0 - 2.3	Sheetrock	1500	1673	1015	173	-485	NM	N/A
207	West	1.5	Sheetrock	1500	1548	914	48	-586	1254	-246
207	East	1.0 - 2.0	Sheetrock	1500	1497	956	-3	-544	NM	N/A
208	East	0.5	Sheetrock	1500	1510	935	10	-565	1093	-407
208	West	1.0 - 2.0	Sheetrock	1500	1398	827	-102	-673	NM	N/A
209	West	2.15	Sheetrock	1500	1768	679	268	-821	1438	-62
209	East	2.0 - 2.3	Sheetrock	1500	1326	654	-174	-846	NM	N/A
210	West	2.15	Sheetrock	1500	1560	988	60	-512	1310	-190
210	East	2.0 - 2.3	Sheetrock	1500	1910	1060	410	-440	NM	N/A
211	North	0.5	Sheetrock	1500	1457	743	-43	-757	1193	-307
211	South	1.0 - 2.0	Sheetrock	1500	1511	923	11	-577	NM	N/A
212	West	2.15	Sheetrock	1500	1627	684	127	-816	1305	-195

Table B-6 (continued). Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
212	East	2.0 - 2.3	Sheetrock	1500	1286	698	-214	-802	NM	N/A
213	South	1.5	Sheetrock	1500	1515	860	15	-640	1172	-328
213	North	1.0 - 2.0	Sheetrock	1500	1610	950	110	-550	NM	N/A
214	North	2.15	Sheetrock	1500	1835	978	335	-522	1531	31
214	South	2.0 - 2.3	Sheetrock	1500	1597	861	97	-639	NM	N/A
215	North	2.15	Sheetrock	1500	1724	1065	224	-435	1432	-68
215	South	2.0 - 2.3	Sheetrock	1500	1460	847	-40	-653	NM	N/A
216	North	1.5	Sheetrock	1500	1390	1082	-110	-418	1236	-264
216	South	1.0 - 2.0	Sheetrock	1500	1464	1078	-36	-422	NM	N/A
217	North	0.5	Combination	1500	1820	968	320	-532	1250	-250
217	South	0.0 - 1.0	Combination	1500	1726	894	226	-606	NM	N/A
218	North	2.15	Sheetrock	1500	1395	1067	-105	-433	1465	-35
218	South	2.0 - 2.3	Sheetrock	1500	1297	1045	-203	-455	NM	N/A
220	North	1.5	Sheetrock	1500	1330	976	-170	-524	1106	-394
220	South	1.0 - 2.0	Sheetrock	1500	1426	850	-74	-650	NM	N/A
221	North	0.5	Wood	1500	1603	1085	103	-415	1550	50
221	South	0.0 - 1.0	Wood	1500	1697	1393	197	-107	NM	N/A
222	North	1.5	Sheetrock	1500	1655	809	155	-691	1143	-357
222	South	1.0 - 2.0	Sheetrock	1500	1797	861	297	-639	NM	N/A
223	South	0.5	Wood	1500	1707	859	207	-641	1186	-314
223	North	0.0 - 1.0	Wood	1500	1710	861	210	-639	NM	N/A
224	East	0.5	Sheetrock	1500	1809	793	309	-707	1186	-314
224	West	0.0 - 1.0	Sheetrock	1500	1444	767	-56	-733	NM	N/A
225	South	1.5	Wood	1500	1610	1019	110	-481	1358	-142
225	North	1.0 - 2.0	Wood	1500	1660	999	160	-501	NM	N/A
226	West	0.5	Combination	1500	1840	880	340	-620	1284	-216
227	East	0.5	Sheetrock	1500	1277	956	-223	-544	1158	-342
227	West	0.0 - 1.0	Sheetrock	1500	1561	974	61	-526	NM	N/A
228	North	1.5	Sheetrock	1500	1653	787	153	-713	1171	-329
228	South	1.0 - 2.0	Sheetrock	1500	2070	875	570	-625	NM	N/A
229	East	1.5	Sheetrock	1500	1460	955	-40	-545	1074	-426
229	West	1.0 - 2.0	Sheetrock	1500	1396	920	-104	-580	NM	N/A
230	North	0.5	Sheetrock	1500	1940	888	440	-612	1119	-381
230	South	0.0 - 1.0	Sheetrock	1500	1910	960	410	-540	NM	N/A
231	West	0.5	Sheetrock	1500	2030	1110	530	-390	1295	-205
231	East	0.0 - 1.0	Sheetrock	1500	1640	975	140	-525	NM	N/A
232	West	1.3	Sheetrock	1500	1593	1215	93	-285	1290	-210
232	East	1.0 - 1.7	Sheetrock	1500	1512	1229	12	-271	NM	N/A
232	West	0.5	Sheetrock	1500	1440	847	-60	-653	1145	-355
232	East	0.0 - 1.0	Sheetrock	1500	1583	840	83	-660	NM	N/A
234	South	2.15	Sheetrock	1500	1889	918	389	-582	1322	-178
234	North	2.0 - 2.3	Sheetrock	1500	1964	1134	464	-366	NM	N/A
238	North	1.5	Sheetrock	1500	1239	808	-261	-692	1111	-389
238	South	2.0 - 2.3	Sheetrock	1500	1405	813	-95	-687	NM	N/A
239	East	0.5	Sheetrock	1500	1454	928	-46	-572	1152	-348
239	West	1.0 - 2.0	Sheetrock	1500	1541	798	41	-702	NM	N/A
240	West	2.15	Sheetrock	1500	1640	960	140	-540	1305	-195

Table B-6 (continued). Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
240	East	2.0 - 2.3	Sheetrock	1500	1960	1010	460	-490	NM	N/A
241	East	0.5	Sheetrock	1500	1540	941	40	-559	1295	-205
241	West	0.0 - 1.0	Sheetrock	1500	1880	930	380	-570	NM	N/A
243	West	0.5	Sheetrock	1500	1812	796	312	-704	1093	-407
243	East	2.0 - 2.3	Sheetrock	1500	1542	785	42	-715	NM	N/A
244	South	2.5	Sheetrock	1500	1332	870	-168	-630	992	-508
244	North	2.0 - 3.0	Sheetrock	1500	1278	912	-222	-588	NM	N/A
245	South	2.5	Sheetrock	1500	1467	971	-33	-529	1080	-420
245	North	2.0 - 3.0	Sheetrock	1500	1373	1099	-127	-401	NM	N/A
246	South	0.5	Combination	1500	1730	720	230	-780	1466	-34
246	North	0.0 - 1.0	Combination	1500	1660	933	160	-567	NM	N/A
247	East	0.5	Sheetrock	1500	1598	918	98	-582	1256	-244
247	West	0.0 - 1.0	Sheetrock	1500	1459	711	-41	-789	NM	N/A
248	West	0.5	Sheetrock	1500	1844	834	344	-666	1322	-178
248	East	0.0 - 1.0	Sheetrock	1500	1796	719	296	-781	NM	N/A
249	East	0.5	Sheetrock	1500	1797	827	297	-673	1282	-218
249	West	0.0 - 1.0	Sheetrock	1500	1496	844	-4	-656	NM	N/A
252	East	2.15	Sheetrock	1500	1538	1145	38	-355	1297	-203
252	West	2.0 - 2.3	Sheetrock	1500	1500	980	0	-520	NM	N/A
253	West	1.15	Sheetrock	1500	1780	868	280	-632	1143	-357
253	East	2.0 - 2.3	Sheetrock	1500	1604	837	104	-663	NM	N/A
254	South	2.15	Sheetrock	1500	1798	890	298	-610	1377	-123
254	North	2.0 - 2.3	Sheetrock	1500	1720	852	220	-648	NM	N/A
255	West	0.5	Sheetrock	1500	1287	828	-213	-672	1100	-400
256	East	0.5	Sheetrock	1500	1806	1115	306	-385	1591	91
256	East	2.15	Sheetrock	1500	1976	1240	476	-260	1550	50
257	West	1.5	Sheetrock	1500	1810	970	310	-530	1260	-240
257	East	1.0 - 2.0	Sheetrock	1500	2020	1030	520	-470	NM	N/A
258	South	1.5	Sheetrock	1500	1610	989	110	-511	1210	-290
258	North	1.0 - 2.0	Sheetrock	1500	1580	1040	80	-460	NM	N/A
259	South	1.5	Sheetrock	1500	1771	925	271	-575	1471	-29
259	North	1.0 - 2.0	Sheetrock	1500	1910	811	410	-689	NM	N/A
260	West	1.35	Sheetrock	1500	1756	822	256	-678	1175	-325
260	East	1.0 - 1.7	Sheetrock	1500	1643	886	143	-614	NM	N/A
262	North	1.5	Sheetrock	1500	1672	933	172	-567	859	-641
262	South	2.0 - 2.3	Sheetrock	1500	1650	783	150	-717	NM	N/A
263	West	0.5	Sheetrock	1500	1667	891	167	-609	1186	-314
263	East	0.0 - 1.0	Sheetrock	1500	1635	856	135	-644	NM	N/A
264	North	1.5	Sheetrock	1500	1486	966	-14	-534	1125	-375
264	South	0.0 - 1.0	Sheetrock	1500	1541	994	41	-506	NM	N/A
265	North	0.5	Sheetrock	1500	1901	1169	401	-331	1357	-143
265	South	0.0 - 1.0	Sheetrock	1500	1741	909	241	-591	NM	N/A
268	East	0.5	Sheetrock	1500	1410	946	-90	-554	1207	-293
268	West	0.0 - 1.0	Sheetrock	1500	1722	1016	222	-484	NM	N/A
269	North	1.5	Wood	1500	2060	1120	560	-380	1385	-115
269	South	1.0 - 2.0	Wood	1500	1980	990	480	-510	NM	N/A
270	West	1.35	Sheetrock	1500	1705	840	205	-660	1148	-352

Table B-6 (continued). Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
270	East	0.0 - 1.0	Sheetrock	1500	1440	771	-60	-729	NM	N/A
274	East	1.5	Combination	1500	1840	765	340	-735	1203	-297
274	West	1.0 - 2.0	Combination	1500	1728	871	228	-629	NM	N/A
275	West	1.5	Sheetrock	1500	1897	1171	397	-329	1106	-394
275	East	1.5	Sheetrock	1500	1904	1062	404	-438	1478	-22
276	East	1.5	Sheetrock	1500	1428	787	-72	-713	1334	-166
276	West	1.0 - 2.0	Sheetrock	1500	1520	757	20	-743	NM	N/A
282	South	0.5	Combination	1500	1710	960	210	-540	1311	-189
282	North	0.0 - 1.0	Combination	1500	1740	1000	240	-500	NM	N/A
283	West	1.5	Sheetrock	1500	1432	818	-68	-682	1139	-361
284	South	2.15	Sheetrock	1500	1797	917	297	-583	1250	-250
284	North	2.0 - 2.3	Sheetrock	1500	1650	936	150	-564	NM	N/A
285	South	0.5	Sheetrock	1500	1380	1060	-120	-440	1213	-287
285	North	0.0 - 1.0	Sheetrock	1500	1424	1095	-76	-405	NM	N/A
286	West	2.15	Sheetrock	1500	1552	918	52	-582	1230	-270
286	East	2.0 - 2.3	Sheetrock	1500	1557	905	57	-595	NM	N/A
287	North	1.5	Sheetrock	1500	1802	948	302	-552	1185	-315
287	South	1.0 - 2.0	Sheetrock	1500	1630	869	130	-631	NM	N/A
288	East	2.15	Sheetrock	1500	1581	791	81	-709	1106	-394
288	West	2.0 - 2.3	Sheetrock	1500	1530	793	30	-707	NM	N/A
288	East	1.5	Sheetrock	1500	1784	894	284	-606	1332	-168
288	West	1.0 - 2.0	Sheetrock	1500	1798	942	298	-558	NM	N/A
289	South	0.5	Sheetrock	1500	1805	1187	305	-313	1537	37
289	North	0.0 - 1.0	Sheetrock	1500	1722	918	222	-582	NM	N/A
290	South	0.5	Sheetrock	1500	1869	733	369	-767	1163	-337
290	North	0.0 - 1.0	Sheetrock	1500	1933	932	433	-568	NM	N/A
291	South	1.5	Combination	1500	1620	1098	120	-402	1317	-183
291	North	1.0 - 2.0	Combination	1500	1560	807	60	-693	NM	N/A
291	South	2.15	Combination	1500	1680	998	180	-502	1304	-196
291	North	2.0 - 2.3	Combination	1500	1580	826	80	-674	NM	N/A
292	South	1.5	Sheetrock	1500	1962	870	462	-630	1242	-258
292	North	1.0 - 2.0	Sheetrock	1500	1978	742	478	-758	NM	N/A
293	West	2.15	Sheetrock	1500	1540	1130	40	-370	1171	-329
293	East	2.0 - 2.3	Sheetrock	1500	2140	897	640	-603	NM	N/A
294	South	0.5	Sheetrock	1500	1220	960	-280	-540	1015	-485
294	North	0.0 - 1.0	Sheetrock	1500	1360	990	-140	-510	NM	N/A
295	South	1.5	Sheetrock	1500	1884	777	384	-723	1180	-320
295	North	1.0 - 2.0	Sheetrock	1500	1810	776	310	-724	NM	N/A
296	South	2.15	Combination	1500	1427	974	-73	-526	1113	-387
296	North	2.0 - 2.3	Combination	1500	1413	1013	-87	-487	NM	N/A
297	South	0.5	Combination	1500	1747	846	247	-654	1272	-228
297	North	0.0 - 1.0	Combination	1500	1656	870	156	-630	NM	N/A
298	East	1.5	Sheetrock	1500	1490	842	-10	-658	1306	-194
298	West	1.0 - 2.0	Sheetrock	1500	1347	792	-153	-708	NM	N/A
299	East	1.5	Sheetrock	1500	1504	829	4	-671	1114	-386
299	West	1.0 - 2.0	Sheetrock	1500	1631	1035	131	-465	NM	N/A
300	East	1.5	Sheetrock	1500	1635	920	135	-580	1282	-218

Table B-6 (continued). Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
301	South	1.5	Sheetrock	1500	1699	1010	199	-490	1478	-22
301	North	1.5	Sheetrock	1500	1734	1068	234	-432	1526	26
302	South	2.15	Sheetrock	1500	1860	1040	360	-460	1376	-124
302	North	2.0 - 2.3	Sheetrock	1500	1720	998	220	-502	NM	N/A
303	South	2.15	Sheetrock	1500	1552	857	52	-643	1139	-361
303	North	2.0 - 2.3	Sheetrock	1500	1687	918	187	-582	NM	N/A
304	North	2.15	Sheetrock	1500	1660	978	160	-522	1260	-240
304	South	2.0 - 2.3	Sheetrock	1500	1680	950	180	-550	NM	N/A
305	South	0.5	Sheetrock	1500	1877	984	377	-516	1405	-95
305	North	0.5	Sheetrock	1500	1933	1035	433	-465	1268	-232
305	North	2.15	Sheetrock	1500	1715	1002	215	-498	1405	-95
305	South	2.15	Sheetrock	1500	1604	981	104	-519	1381	-119
306	South	1.5	Sheetrock	1500	1840	970	340	-530	1340	-160
306	North	1.0 - 2.0	Sheetrock	1500	1990	1160	490	-340	NM	N/A
307	West	0.5	Sheetrock	1500	1361	610	-139	-890	1064	-436
307	East	1.3 - 2.3	Sheetrock	1500	1394	814	-106	-686	NM	N/A
308	West	1.5	Combination	1500	1410	790	-90	-710	1119	-381
308	East	1.0 - 2.0	Combination	1500	1410	920	-90	-580	NM	N/A
309	North	2.15	Sheetrock	1500	1837	650	337	-850	1349	-151
309	North	1.5	Sheetrock	1500	1853	744	353	-756	1331	-169
309	South	1.0 - 2.0	Plywood	1500	1782	831	282	-669	NM	N/A
309	South	2.0 - 2.3	Plywood	1500	1293	882	-207	-618	NM	N/A
310	East	1.5	Sheetrock	1500	1821	1009	321	-491	1456	-44
310	West	1.0 - 2.0	Sheetrock	1500	1694	998	194	-502	NM	N/A
311	West	2.15	Sheetrock	1500	1956	911	456	-589	1154	-346
311	East	2.0 - 2.3	Sheetrock	1500	2010	1081	510	-419	NM	N/A
312	West	1.5	Wood	1500	1576	782	76	-718	1214	-286
312	East	1.0 - 2.0	Combination	1500	1604	714	104	-786	NM	N/A
313	East	2.15	Sheetrock	1500	1661	938	161	-562	1341	-159
314	West	1.5	Sheetrock	1500	1660	970	160	-530	1426	-74
314	East	1.0 - 2.0	Sheetrock	1500	2020	1340	520	-160	NM	N/A
314	East	1.5	Sheetrock	1500	1905	1094	405	-406	1537	37
314	West	1.0 - 2.0	Sheetrock	1500	1406	879	-94	-621	NM	N/A
315	South	1.5	Sheetrock	1500	1573	905	73	-595	1122	-378
315	North	1.0 - 2.0	Sheetrock	1500	1585	709	85	-791	NM	N/A
316	West	2.15	Sheetrock	1500	1606	918	106	-582	1186	-314
317	East	0.5	Sheetrock	1500	1574	980	74	-520	1206	-294
318	East	1.5	Sheetrock	1500	1883	1075	383	-425	1663	163
318	West	1.0 - 2.0	Sheetrock	1500	1827	1125	327	-375	NM	N/A
319	South	0.5	Sheetrock	1500	1380	944	-120	-556	908	-592
320	South	0.5	Sheetrock	1500	1634	893	134	-607	1179	-321
320	South	2.15	Sheetrock	1500	1280	925	-220	-575	1186	-314
321	South	2.15	Sheetrock	1500	1820	915	320	-585	1411	-89
322	East	0.5	Sheetrock	1500	1235	865	-265	-635	1071	-429
322	West	0.0 - 1.0	Sheetrock	1500	1671	970	171	-530	NM	N/A
323	South	2.15	Sheetrock	1500	1330	887	-170	-613	1061	-439
324	South	2.15	Sheetrock	1500	1761	830	261	-670	1411	-89

Table B-6 (continued). Survey Unit 6 (Interior Walls) Surface Measurement Data

Loc. No.	Side of Wall	Height Above Floor (m)	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
325	South	1.5	Sheetrock	1500	1347	813	-153	-687	1071	-429
326	South	1.5	Sheetrock	1500	1660	1010	160	-490	1405	-95
327	South	2.15	Combination	1500	1580	960	80	-540	1398	-102
328	South	0.5	Sheetrock	1500	1440	891	-60	-609	1191	-309
329	West	2.15	Sheetrock	1500	1666	1009	166	-491	1056	-444
329	East	2.0 - 2.3	Sheetrock	1500	1543	897	43	-603	NM	N/A
329	West	1.5	Sheetrock	1500	1791	973	291	-527	1322	-178
329	East	1.0 - 2.0	Sheetrock	1500	1680	922	180	-578	NM	N/A
330	West	0.5	Sheetrock	1500	1455	911	-45	-589	1358	-142
330	East	1.5 - 2.3	Sheetrock	1500	1705	951	205	-549	NM	N/A
331	South	0.5	Combination	1500	1758	876	258	-624	1243	-257
332	South	1.5	Sheetrock	1500	1624	847	124	-653	1249	-251
333	West	1.5	Sheetrock	1500	1851	796	351	-704	1347	-153
333	East	1.0 - 2.0	Sheetrock	1500	1769	899	269	-601	NM	N/A
334	West	1.5	Sheetrock	1500	1538	954	38	-546	1168	-332
334	East	0.0 - 1.0	Sheetrock	1500	1594	919	94	-581	NM	N/A
335	West	2.5	Sheetrock	1500	1718	929	218	-571	1087	-413
336	West	2.15	Combination	1500	1535	976	35	-524	1145	-355
336	East	2.0 - 2.3	Combination	1500	1610	1020	110	-480	NM	N/A
337	North	1.5	Sheetrock	1500	1793	891	293	-609	1468	-32
337	South	1.0 - 2.0	Sheetrock	1500	1658	850	158	-650	NM	N/A
338	West	0.5	Sheetrock	1500	1752	540	252	-960	1145	-355
338	East	0.0 - 1.0	Combination	1500	1874	898	374	-602	NM	N/A
340	East	1.5	Metal	1500	1562	825	62	-675	1178	-322
340	West	1.0 - 2.0	Metal	1500	1445	792	-55	-708	NM	N/A
342	West	0.5	Sheetrock	1500	1544	789	44	-711	950	-550
342	East	0.0 - 1.0	Sheetrock	1500	1586	791	86	-709	NM	N/A
345	East	0.5	Sheetrock	1500	1387	721	-113	-779	996	-504
345	West	0.0 - 1.0	Sheetrock	1500	1215	880	-285	-620	NM	N/A
346	South	1.5	Sheetrock	1500	1627	824	127	-676	1008	-492
346	North	1.0 - 2.0	Sheetrock	1500	1542	941	42	-559	NM	N/A

^aCombination media includes sheetrock, wood, and/or metal.

^bBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Key for Table B-6:

m = meters(s)
 NM = no measurement
 N/A = not applicable

Table B-7. Survey Unit 7 (Underside of Roof) Surface Measurement Data

Loc. No.	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
2	Sheetrock	1500	1875	1225	375	-275	1319	-181
4	Combination	1500	1916	1010	416	-490	1442	-58
5	Sheetrock	1500	1880	1080	380	-420	1383	-117
6	Sheetrock	1500	2230	894	730	-606	1494	-6
7	Sheetrock	1500	2312	1068	812	-432	1486	-14
8	Sheetrock	1500	1691	1075	191	-425	1375	-125
9	Sheetrock	1500	2030	910	530	-590	1566	66
10	Sheetrock	1500	1682	878	182	-622	1422	-78
11	Sheetrock	1500	1990	1130	490	-370	1396	-104
12	Sheetrock	1500	1908	796	408	-704	1230	-270
14	Sheetrock	1500	2180	1118	680	-382	1412	-88
15	Sheetrock	1500	2230	1090	730	-410	1441	-59
17	Sheetrock	1500	2290	1004	790	-496	1510	10
18	Sheetrock	1500	2180	1000	680	-500	1386	-114
19	Combination	1500	1620	1000	120	-500	1306	-194
20	Sheetrock	1500	1772	713	272	-787	1353	-147
21	Sheetrock	1500	2140	974	640	-526	1410	-90
22	Combination	1500	1846	1084	346	-416	1488	-12
23	Combination	1500	1968	1105	468	-395	1467	-33
24	Combination	1500	1780	1000	280	-500	1588	88
25	Sheetrock	1500	2220	1086	720	-414	1403	-97
26	Sheetrock	1500	2140	980	640	-520	1388	-112
27	Combination	1500	1860	1008	360	-492	1320	-180
28	Sheetrock	1500	1842	886	342	-614	1302	-198
29	Sheetrock	1500	1813	891	313	-609	1261	-239
31	Sheetrock	1500	1731	988	231	-512	1334	-166
33	Combination	1500	1688	860	188	-640	1468	-32
34	Combination	1500	1900	980	400	-520	1402	-98
35	Combination	1500	1755	1060	255	-440	1478	-22
36	Sheetrock	1500	1994	884	494	-616	1610	110
37	Combination	1500	1610	940	110	-560	1251	-249
38	Combination	1500	1599	1065	99	-435	1232	-268
40	Combination	1500	1660	1086	160	-414	1297	-203
41	Combination	1500	1700	944	200	-556	1199	-301
42	Sheetrock	1500	1886	937	386	-563	1333	-167
43	Combination	1500	2160	990	660	-510	1501	1
44	Combination	1500	1683	1039	183	-461	1290	-210
46	Combination	1500	1728	1112	228	-388	1354	-146
48	Metal Duct	1500	1922	939	422	-561	1196	-304
49	Sheetrock	1500	1697	1003	197	-497	1721	221
50	Sheetrock	1500	1934	996	434	-504	1178	-322
52	Combination	1500	1790	1140	290	-360	1680	180
54	Combination	1500	1810	1165	310	-335	1402	-98
55	Sheetrock	1500	1861	872	361	-628	1273	-227
56	Sheetrock	1500	1641	734	141	-766	1110	-390
57	Metal Duct	1500	1544	810	44	-690	1145	-355
58	Sheetrock	1500	1997	1098	497	-402	1417	-83
59	Combination	1500	1600	1060	100	-440	1310	-190

Table B-7 (continued). Survey Unit 7 (Underside of Roof) Surface Measurement Data

Loc. No.	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
60	Combination	1500	1688	966	188	-534	1442	-58
61	Combination	1500	1640	1010	140	-490	1355	-145
62	Sheetrock	1500	1580	739	80	-761	1594	94
63	Combination	1500	1810	1265	310	-235	1520	20
64	Combination	1500	1997	1000	497	-500	1297	-203
66	Combination	1500	1880	988	380	-512	1297	-203
69	Sheetrock	1500	2240	993	740	-507	1700	200
70	Sheetrock	1500	2090	994	590	-506	1587	87
71	Combination	1500	1713	990	213	-510	1278	-222
72	Sheetrock	1500	2310	1050	810	-450	1439	-61
73	Sheetrock	1500	1899	801	399	-699	1208	-292
74	Combination	1500	1953	1272	453	-228	1523	23
75	Sheetrock	1500	1854	801	354	-699	1445	-55
76	Combination	1500	1890	1070	390	-430	1389	-111
77	Sheetrock	1500	1512	891	12	-609	1096	-404
78	Combination	1500	1726	1002	226	-498	1386	-114
80	Sheetrock	1500	1990	897	490	-603	1231	-269
81	Sheetrock	1500	1443	993	-57	-507	1272	-228
82	Combination	1500	1935	968	435	-532	1468	-32
83	Sheetrock	1500	1449	857	-51	-643	1197	-303
84	Sheetrock	1500	1860	1105	360	-395	1382	-118
85	Combination	1500	1990	1063	490	-437	1435	-65
86	Combination	1500	1720	989	220	-511	1487	-13
87	Fiberboard	1500	1980	1180	480	-320	1417	-83
88	Fiberboard	1500	1780	968	280	-532	1417	-83
89	Fiberboard	1500	2713	1033	1213	-467	1547	47
90	Fiberboard	1500	1894	1008	394	-492	1414	-86
91	Fiberboard	1500	1654	862	154	-638	1275	-225
92	Combination	1500	1965	1310	465	-190	1664	164
93	Combination	1500	1580	998	80	-502	1337	-163
94	Fiberboard	1500	1836	813	336	-687	1125	-375
95	Combination	1500	2190	1139	690	-361	1310	-190
96	Sheetrock	1500	1867	923	367	-577	1244	-256
97	Sheetrock	1500	1790	1212	290	-288	1516	16
98	Sheetrock	1500	2210	1191	710	-309	1523	23
99	Sheetrock	1500	1780	1081	280	-419	1685	185
100	Sheetrock	1500	1571	741	71	-759	1334	-166
101	Combination	1500	1610	960	110	-540	1238	-262
102	Combination	1500	1560	789	60	-711	1328	-172
103	Sheetrock	1500	1980	1020	480	-480	1389	-111
104	Combination	1500	2080	956	580	-544	1086	-414
105	Sheetrock	1500	1593	1224	93	-276	1347	-153
106	Combination	1500	1814	1010	314	-490	1409	-91
107	Combination	1500	1897	1080	397	-420	1560	60
108	Sheetrock	1500	1635	941	135	-559	1315	-185
109	Sheetrock	1500	2040	1200	540	-300	1256	-244
110	Sheetrock	1500	1778	919	278	-581	1321	-179
111	Sheetrock	1500	1775	834	275	-666	1374	-126

Table B-7 (continued). Survey Unit 7 (Underside of Roof) Surface Measurement Data

Loc. No.	Media ^a	Background Activity ^b	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
			Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
112	Sheetrock	1500	1810	980	310	-520	1147	-353
113	Sheetrock	1500	1860	1120	360	-380	1442	-58
114	Combination	1500	2110	1110	610	-390	1830	330

^aCombination media includes sheetrock, fiberboard, wood, and/or metal.

^bBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Table B-8. Additional Surface Measurement Data (Interior Movable Office Partitions)

Loc. No.	Side of Wall	Height Above Floor (m)	Media	Background Activity ^a	Scan Beta-Gamma Activity				Direct Beta-Gamma Activity	
					Gross Max.	Gross Min.	Net Max.	Net Min.	Gross	Net
219	South	1.35	Fabric	1500	1370	788	-130	-712	1447	-53
219	North	1.0 - 1.7	Fabric	1500	1968	641	468	-859	NM	N/A
233	West	0.5	Fabric	1500	1551	1029	51	-471	1217	-283
233	East	1.0 - 1.7	Fabric	1500	1270	869	-230	-631	NM	N/A
235	West	0.5	Fabric	1500	1380	732	-120	-768	1290	-210
235	East	0.0 - 1.0	Fabric	1500	1410	910	-90	-590	NM	N/A
236	South	1.35	Fabric	1500	1945	957	445	-543	1322	-178
236	North	1.0 - 1.7	Fabric	1500	1399	638	-101	-862	NM	N/A
237	North	1.35	Fabric	1500	1606	1260	106	-240	1566	66
237	South	1.0 - 1.7	Fabric	1500	1410	975	-90	-525	NM	N/A
242	West	0.5	Fabric	1500	1545	1117	45	-383	1521	21
242	East	0.0 - 1.0	Fabric	1500	1693	1078	193	-422	NM	N/A
250	West	0.5	Fabric	1500	1519	1293	19	-207	1297	-203
250	East	1.0 - 1.7	Fabric	1500	1441	982	-59	-518	NM	N/A
251	East	1.35	Fabric	1500	1745	1077	245	-423	1109	-391
251	West	1.0 - 1.7	Fabric	1500	1710	1009	210	-491	NM	N/A
261	West	0.5	Fabric	1500	1660	921	160	-579	1230	-270
261	East	1.0 - 1.7	Fabric	1500	1343	960	-157	-540	NM	N/A
266	East	0.5	Fabric	1500	1786	899	286	-601	1287	-213
266	West	0.0 - 1.0	Fabric	1500	1959	1053	459	-447	NM	N/A
267	East	0.5	Fabric	1500	1743	1012	243	-488	1447	-53
267	West	0.0 - 1.0	Fabric	1500	1598	1000	98	-500	NM	N/A
271	West	1.35	Fabric	1500	1606	1008	106	-492	1387	-113
271	East	1.0 - 1.7	Fabric	1500	1583	1180	83	-320	NM	N/A
272	North	1.35	Fabric	1500	1773	1050	273	-450	1287	-213
272	South	1.0 - 1.7	Fabric	1500	1632	950	132	-550	NM	N/A
273	South	0.5	Fabric	1500	1706	983	206	-517	1322	-178
273	North	1.0 - 1.7	Fabric	1500	1632	1087	132	-413	NM	N/A
277	North	1.35	Fabric	1500	1936	1002	436	-498	1100	-400
277	South	1.0 - 1.7	Fabric	1500	1794	938	294	-562	NM	N/A
278	North	0.5	Fabric	1500	1694	1004	194	-496	1358	-142
278	South	0.0 - 1.0	Fabric	1500	1818	1149	318	-351	NM	N/A
279	North	0.5	Fabric	1500	1785	991	285	-509	1358	-142
279	South	0.7 - 1.7	Fabric	1500	1659	834	159	-666	NM	N/A
280	West	0.5	Fabric	1500	1460	940	-40	-560	1121	-379
280	East	0.0 - 1.0	Fabric	1500	1755	1058	255	-442	NM	N/A
281	South	1.35	Fabric	1500	1556	890	56	-610	1171	-329
281	North	1.0 - 1.7	Fabric	1500	1736	881	236	-619	NM	N/A

^aBackground activity includes average background ambient air and average material-specific activities (DOE 1997, WASTREN 1997a).

Note: All measurements were read in dpm/100 cm² and were collected with an Eberline E-600 meter with an Eberline SHP-340 probe to measure gross beta-gamma activity.

Key for Table B-8:

m = meters(s)
 NM = no measurement
 N/A = not applicable

Table B-9. Gamma Exposure Rate Measurement Data

Interior Static Measurements

Loc. No.	Gross		Net ^a
	cps	$\mu\text{R/h}$	$\mu\text{R/h}$
G1	75	11.7	-2.3
G2	65	11.0	-3.0
G3	75	11.7	-2.3
G4	70	11.3	-2.7
G5	75	11.7	-2.3
G6	65	11.0	-3.0
G7	75	11.7	-2.3
G8	65	11.0	-3.0
G9	75	11.7	-2.3
G10	60	10.6	-3.4
G11	75	11.7	-2.3
G12	60	10.6	-3.4
G13	75	11.7	-2.3
G14	75	11.7	-2.3
G15	70	11.3	-2.7
G16	65	11.0	-3.0
G17	60	10.6	-3.4
G18	70	11.3	-2.7
G19	65	11.0	-3.0
G20	60	10.6	-3.4

Loc. No.	Gross		Net ^a
	cps	$\mu\text{R/h}$	$\mu\text{R/h}$
G21	70	11.3	-2.7
G22	65	11.0	-3.0
G23	70	11.3	-2.7
G24	70	11.3	-2.7
G25	70	11.3	-2.7
G26	65	11.0	-3.0
G27	75	11.7	-2.3
G28	70	11.3	-2.7
G29	60	10.6	-3.4
G30	70	11.3	-2.7
G31	75	11.7	-2.3
G32	70	11.3	-2.7
G33	65	11.0	-3.0
G34	65	11.0	-3.0
G35	70	11.3	-2.7
G36	65	11.0	-3.0
G37	70	11.3	-2.7
G38	70	11.3	-2.7
G39	60	10.6	-3.4
G40	70	11.3	-2.7

Exterior Static Measurements

Location Number	Gross		Net ^a
	cps	$\mu\text{R/h}$	$\mu\text{R/h}$
54-V-1	100	13.5	-0.5
54-V-2	110	14.3	0.3
54-V-3	100	13.5	-0.5
54-V-4	110	14.3	0.3
54-V-5	95	13.1	-0.9
54-V-6	90	12.8	-1.2
54-V-7	90	12.8	-1.2
54-V-8	90	12.8	-1.2

^aBackground gamma exposure rate for the facility is 14 $\mu\text{R/h}$ (Table 2).

Note: Gamma exposure rates were read in cps and were measured with a Mount Sopris SC-132 scintillometer at 1 m above the floor or ground.

Key for Table B-9:

cps = counts per second

$\mu\text{R/h}$ = microrentgens per hour ($\mu\text{R/h} = \text{cps} \times 0.0748 + 6.1$ for interior measurements, and
 $\mu\text{R/h} = \text{cps} \times 0.0748 + 6.03$ for exterior measurements, based on survey and instrument calibration dates)

Table B-10. Soil Sample Results for Exterior Areas

Sample Number	Cell Area (m ²)	Soil Sample Ticket No.	Sample Depth ^a (cm)	Concentration (pCi/g)					
				Ra-226		Th-230		Total Uranium	
				Gross	Net ^b	Gross	Net ^b	Gross	Net ^b
54-V-1	18.8	NDL 016	23 - 38	2.49 ± 0.74	1.5	1.7	-0.3	4.3	2.3
54-V-2	20.0	NDL 015	30 - 46	1.97 ± 0.80	1.0	1.2	-0.8	6.1	4.1
54-V-3	21.0	NDL 014	46 - 61	1.61 ± 0.51	0.6	1.3	-0.7	6.7	4.7
54-V-4	23.4	NDL 013	61 - 76	2.09 ± 0.66	1.1	1.4	-0.6	5.1	3.1
54-V-5	20.0	NDL 012	8 - 23	1.81 ± 0.38	0.8	0.77	-1.2	2.0	0.0
54-V-6	20.7	NDL 011	30 - 46	1.99 ± 0.48	1.0	3.4	1.4	41.3	39.3
54-V-7	16.1	NDL 010	30 - 46	2.91 ± 0.60	1.9	2.7	0.7	20.2	18.2
54-V-8	12.4	NDL 009	8 - 23	2.26 ± 0.49	1.3	1.3	-0.7	4.5	2.5

^aSubsurface soil sample depths indicate the presence of overlying pavement or backfill material not included in the sample.

^bSee Table 2 for background concentrations used to calculate net concentrations.

Notes:

- 1) Ra-226 was analyzed by gamma spectrometry.
- 2) Th-230 and total uranium were analyzed by induction-coupled plasma-mass spectrometry with a flow-injection analysis system.
- 3) Analytical laboratory measurement methods, results, uncertainties, and quality control for these samples are contained in the Grand Junction Office Analytical Laboratory *Analytical Report*, Volumes 1 and 2, for Project L20A41000, June 11, 1997. All Ra-226 results were above minimum detectable activities. Uncertainties were not calculated for Th-230 and total uranium.

Key for Table B-10:

m² = square meter(s)
cm = centimeter(s)
pCi/g = picocuries per gram
Ra-226 = radium-226
Th-230 = thorium-230

Table B-11. Statistical Summary of Measurement Surveys

Net Building Surface Beta-Gamma Activity

Survey Unit	Surfaces	n	Z _{95%}	Net Activity (dpm/100 cm ²)		
				$\bar{x}$	s	$\mu_{95\%}$
2	Ceiling	99	1.645	290.91	163.84	320
3	Floor	108	1.645	-28.76	145.69	-5.7
4	Roof	105	1.645	-208.03	140.59	-190
5	Exterior Walls	88	1.645	-202.13	132.55	-180
6	Interior Walls	155	1.645	-250.38	149.09	-230
7	Underside of Roof	99	1.645	-114.07	144.63	-90

Net Interior Gamma Exposure Rates

n	Z _{95%}	Net Gamma Exposure Rates (μ R/h)		
		$\bar{x}$	s	$\mu_{95\%}$
40	1.645	-2.78	0.38	-2.7

Net Exterior Gamma Exposure Rates

n	t _{95%,d.f.}	Net Gamma Exposure Rates (μ R/h)		
		$\bar{x}$	s	$\mu_{95\%}$
8	1.895	-0.61	0.63	-0.2

Net Soil Concentrations (Surface Layer)

Contaminant	n	t _{95%,d.f.}	Net Concentrations (pCi/g)		
			$\bar{x}$	s	$\mu_{95\%}$
Ra-226	8	1.895	1.15	0.41	1.4
Th-230	8	1.895	-0.28	0.87	0.3
Total Uranium	8	1.895	9.28	13.35	18

Note: See Tables B-2 through B-7, B-9, and B-10 for the survey data.

Table B-11 (continued). Statistical Summary of Measurement Surveys

Key for Table B-11:

dpm/100 cm ²	=	disintegrations per minute per 100 square centimeters
μR/h	=	microrentgens per hour
n	=	number of measurements
t _{95%,d.f.}	=	Student's t distribution statistic for n-1 degrees of freedom at 95% confidence (n≤30)
Z _{95%}	=	z distribution statistic at 95% confidence (n>30)
$\bar{x}$	=	sample mean
s	=	sample standard deviation
μ _{95%}	=	upper limit of the true population mean at the 95% confidence level, derived from:

n ≤ 30

$$\mu_{95\%} = \bar{x} + t_{95\%,d.f.} \frac{s}{\sqrt{n}}$$

n > 30

$$\mu_{95\%} = \bar{x} + Z_{95\%} \frac{s}{\sqrt{n}}$$

Figure B-1. Building 54

(X,Y)=(0,0) BUILDING COORDINATE SYSTEM
=(339.93, 659.72) FACILITY COORDINATE SYSTEM [UNITS IN METERS]

LEGEND

- ◆ BASE COORDINATE FOR 1-METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- SOIL SAMPLE LOCATION
- △ BOREHOLE LOCATION
- 54-V-2 SOIL SAMPLE IDENTIFIER
- V-133 AREA REMEDIATED AND VERIFIED PRIOR TO CONSTRUCTION OF BUILDING
- 12.8 GAMMA EXPOSURE RATE MEASUREMENT AT 1M ABOVE GROUND ($\mu\text{R/h}$)
- 12-14 GAMMA EXPOSURE RATE RANGE AT GROUND LEVEL ($\mu\text{R/h}$)
- EXTERIOR VERIFICATION AREA BOUNDARY

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-1		BUILDING 54 EXTERIOR GROUND SURVEY	
PREPARED: 	CHECKED: 	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00072AA

LEGEND

- BASE COORDINATE FOR 1 METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- GAMMA EXPOSURE RATE MEASUREMENT LOCATION AT 1M ABOVE FLOOR
- 35 MEASUREMENT LOCATION NUMBER
- 12-14 GAMMA EXPOSURE RATE RANGE AT FLOOR LEVEL ($\mu R/h$)
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
BUILDING 54 Figure B-2A FLOOR AND INTERIOR GAMMA SURVEY			
PREPARED: <i>C. S. W.</i>	CHECKED: <i>R. W.</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00073AA

Figure B-2B. Building 54 Floor

LEGEND

- ◆ BASE COORDINATE FOR 1 METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- GAMMA EXPOSURE RATE MEASUREMENT LOCATION AT 1M ABOVE FLOOR
- 35 MEASUREMENT LOCATION NUMBER
- 12-14 GAMMA EXPOSURE RATE RANGE AT FLOOR LEVEL ($\mu R/h$)
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-2B		BUILDING 54 FLOOR SURVEY	
PREPARED: <i>Csw</i>	CHECKED: <i>RMS</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00073AA

Figure B-3A. Building 54 Ceiling

(X,Y)=(0,0) BUILDING COORDINATE SYSTEM
 =(339.93, 659.72) FACILITY COORDINATE
 SYSTEM [UNITS IN METERS]

LEGEND

- ◆ BASE COORDINATE FOR 1-METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
BUILDING 54 CEILING AND UNDERSIDE OF ROOF SURVEY			
PREPARED:	CHECKED:	DATE PREPARED:	
<i>Csw</i>	<i>RW</i>	JULY 1997	
PROJECT NUMBER:		FILENAME:	
TCR-031-0018-00-000		T00074AA

Figure B-3B. Building 54 Ceiling

LEGEND

- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-3B BUILDING 54 CEILING AND UNDERSIDE OF ROOF SURVEY			
PREPARED: <i>[Signature]</i>	CHECKED: <i>[Signature]</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00074AA

Figure B-4A. Building 54

$(X,Y)=(0,0)$ BUILDING COORDINATE SYSTEM
 $= (339.93, 659.72)$ FACILITY COORDINATE SYSTEM [UNITS IN METERS]

LEGEND

- ◆ BASE COORDINATE FOR 1-METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
BUILDING 54 Figure B-4A		INTERIOR WALL SURVEY	
PREPARED: <i>Csw</i>	CHECKED: <i>RH</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00075AA

Figure B-4B. Building 5

LEGEND

- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER
- 3 ROOM NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-4B		BUILDING 54 INTERIOR WALL SURVEY	
PREPARED: 	CHECKED: 	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00075AA	

Interior Wall Survey

Figure B-5A. Building 5A

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SCALE IN METERS

(X,Y)=(0,0) BUILDING COORDINATE SYSTEM
 =(339.93, 659.72) FACILITY COORDINATE
 SYSTEM [UNITS IN METERS]

LEGEND

- ◆ BASE COORDINATE FOR 1-METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER

BUILDING 54 - FIGURE INDEX

122 123 124 125 126 344

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-5A		BUILDING 54 EXTERIOR WALL SURVEY	
PREPARED: <i>CSE</i>	CHECKED: <i>RMS</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00076AA

Figure B-5B. Building 5B

LEGEND

- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-5B		BUILDING 54 EXTERIOR WALL SURVEY	
PREPARED: <i>CSW</i>	CHECKED: <i>PKS</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00076AA	

Exterior Wall Survey

Figure B-6A. Building

(X,Y)=(0,0) BUILDING COORDINATE SYSTEM
 =(339.93, 659.72) FACILITY COORDINATE
 SYSTEM [UNITS IN METERS]

LEGEND

- ◆ BASE COORDINATE FOR 1-METER GRID SYSTEM
- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER

BUILDING 54 - FIGURE INDEX

		U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
Figure B-6A		BUILDING 54 ROOF SURVEY	
PREPARED: <i>CSW</i>	CHECKED: <i>RM</i>	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00077AA

Figure B-6B. Build

LEGEND

- DIRECT MEASUREMENT LOCATION
- 35 MEASUREMENT LOCATION NUMBER

BUILDING 54 - FIGURE INDEX

U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE, COLORADO	
BUILDING 54 Figure B-6B ROOF SURVEY			
PREPARED:	CHECKED:	DATE PREPARED: JULY 1997	
PROJECT NUMBER: TCR-031-0018-00-000		FILENAME: T00077AA	