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Molycorp

May 21, 2002

US NRC Region 1
485 Allandale Rd
King of Prussia, PA 19406
Attn. Craig Gordon

RE: Molycorp, Washington PA
Final Survey Packages

Dear Mr. Gordon:

Molycorps consultant, MACTEC, has completed final status surveys for buildings 2, 2W, 19, 21, 22, 23, 25, 31 and 37 located at Molycorps Washington, PA facility. Data for these buildings was submitted to ORISE. It is our understanding that confirmatory surveys of these buildings will be done by ORISE during their visit May 20, 2002.

If you have any further questions during this submittal please call me at the above number.

Sincerely,

George W. Dawes

George W. Dawes
Facility Superintendent

Cc: Ray Cherniske (email) w/o attach
Steve Rima, MACTEC (email) w/o attach
Tom McLaughlin, NRC
Wade Adams, ORISE (hand delivered 5/20)
Robert Maiers, PA DEP, Harrisburg w/o attach

Final Status Survey Report for Buildings 2, 2W, 19, 21, 22, 23, 31, and 37 at the Molycorp Site

Washington, PA

MACTEC, Inc.

Revision - 0
Dated 5/16/02

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Reviews:

MACTEC Radiological Engineer — Date: 5-16-02

MACTEC Radiological Engineering/H&S Manager — Date: 5/16/02

MACTEC Project Manager — Date: 5·16·02

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1.0 BACKGROUND INFORMATION

1.1 GENERAL INFORMATION AND OPERATING HISTORY

Molycorp, Inc.'s (Molycorp) predecessor, the Molybdenum Corporation of America, was formed from the Electric Reduction Company in Washington, Pennsylvania on June 16, 1920. The facility was purchased to manufacture ferroalloys.

Molybdenum manufacturing was begun in the 1920s. Processing of this material was idled in 1991. Although primarily manufacturing molybdenum products, the plant also produced ferrocolumbium (FeCb, 1964 to 1971), as well as other ferroalloys, e.g., tungsten.

In the late 1960s new federal requirements necessitated Molycorp to obtain a Source Material License from the Atomic Energy Commission for possession and use of materials containing 0.05 percent or greater by weight uranium, thorium, or a combination of both. Most of the material that was processed by the corporation for ferrocolumbium contained thorium above the 0.05 percent limit. The slag resulting from this production was in a glass/ceramic form containing an average of 1.2 percent thorium. Almost immediately upon receiving a Source Material License in December 1968, various investigations were undertaken to address the new regulatory requirements.

Applied Health Physics, Inc. was contracted by Molycorp to conduct a series of leaching studies on ferrocolumbium slag during the late 1960s. These studies indicated that radioactive materials were fixed and would not leach into the groundwater in excess of prescribed limits. During this period, Molycorp applied unsuccessfully to the Pennsylvania Department of Health's Industrial Wastes Section and AEC for an onsite burial permit. Ferrocolumbium slag cleanup was concentrated in the early to mid-1970s time frame.

In June 1971, an AEC compliance inspection revealed that thorium-bearing slag had been inadvertently buried onsite in violation of the terms and conditions of their license and AEC regulations. The AEC issued a Notice of Violation and requested Molycorp to take remedial action to excavate these materials and dispose of them in accordance with AEC regulations and guidance documents. Applied Health Physics was contracted to perform a thorough radiological survey of the site and to provide health physics and waste disposal services necessary to comply with AEC's request. Survey measurements indicated exposure levels at 1.2 mR/hr in some areas.

In 1972, thoriated material from the site was disposed of at the West Valley, New York, burial site. The disposal was terminated when New York officials decided that the volume of waste was too large and the contamination level insignificant to use up valuable burial area. Molycorp performed cleanup operations to segregate and stabilize the remaining thoriated material in a capped pile containing about 27,700 cubic yards of slag on the south property. A 1975 Applied Health Physics, Inc. report indicated the average concentration of thorium-232 in the slag pile was 1,250 pCi/g, with exposures within the 0.2 mR/hr Nuclear Regulatory Commission maximum level allowed at the time (AEC was reorganized as the NRC in 1974). This pile was eventually removed and disposed of.

In 1978, one of two molybdenum-roasting furnaces was shut down as part of a consent decree with the Pennsylvania Department of Environmental Resources (PADER) Air Quality Agency due to exceedances of SO_2 standards. All remaining processes continued until 1991.

Oak Ridge Associated Universities, an NRC contractor, conducted a radiological survey of the site in 1985. The survey identified elevated (twice background or greater) levels of thorium in the dikes that separated the surface impoundments, and indicated the potential of subsurface thoriated slags in the western portion of the site.

RSA, Inc. conducted a subsurface survey for Molycorp in 1990 to characterize the thorium contamination across the western portion of the site (i.e., the impoundment area), and the areas immediately to the north, west, and northwest. Thirty-two holes were drilled on the site and radiation measurements were logged at every six inches of depth from the surface down to bedrock, both above and below water table. Radiation levels were also logged in monitoring wells previously drilled on the site. In addition to the subsurface survey, RSA, Inc. conducted a survey of the radiation exposure rates inside the study area. This survey consisted of approximately 400 measurements of the gamma radiation field at a height of one meter above ground level. Findings reveled that; in general, the subsurface concentrations of thorium were above those in the surface soils in almost every hole drilled. A general pattern was that the underground radiation levels decreased to background at a depth of about ten feet. While a majority of the holes exhibited concentrations of greater than 0.01 percent thorium, in only a few holes did the thorium content exceed an average of 0.05 percent at some point below the surface of the ground.

The Molycorp Source Material License (SMB 1393) was renewed in 1992 and included an amendment incorporating a schedule for decommissioning the site. In November 1992, Molycorp submitted a Site Characterization Plan (SCP) to the NRC for approval.

Molycorp submitted the "Decommissioning Plan for the Washington, PA Facility" to the NRC in July 1995. In a letter dated June 1, 1999, (John C. Daniels, Molycorp Project Manager, to John W.N. Hickey, NRC Branch Chief) Molycorp informed the NRC that the Decommissioning Plan would be revised and re-submitted in two parts.

Part 1 Revision of the current Decommissioning Plan was submitted and approved June 30, 1999, and describes the activities required to remediate the site to unrestricted use levels in accordance with the SDMP Action Plan (57 FR 13389). The soil, slag or other material exceeding the SDMP Action Plan criteria will be transported to an NRC approved location for final disposition.

Part 2 Revision of the Decommissioning Plan was to provide for the disposition of the material that exceeded the SDMP Action Plan criteria to a designated on-site impound at the Washington, PA site. The Decommissioning Plan Part 2 Revision was never approved.

1.2 REASON FOR DECOMMISSIONING

Decommissioning of the Molycorp Washington, PA Facility is being performed due to the cessation of molybdenum production at the facility. Several factors, included age of equipment and the production of molybdenum elsewhere in the United States and overseas, have led to the shutdown of the

production process and closure of the facility. In December 2001, all activities were halted and a majority of the workforce was terminated.

1.3 MANAGEMENT APPROACH

This report focuses on the approach taken by management to decommission buildings located at the Molycorp Washington, PA Site. This report does not address the decommissioning activities of soils or subsurface contamination at the site.

The approach taken by management for the decommissioning of buildings includes the characterization and classification of site buildings and areas, performance of radiological surveys to identify and quantify surface radioactive material, identification of elevated dose rates, performance of remedial actions (as required), removal of materials and equipment from buildings, performance of the final surveys to release buildings from radiological controls, and the performance of any remedial action necessary to meet the release criteria of the final status survey.

Once buildings have been surveyed for final status, and the NRC has reviewed and approved the building Final Status Survey Report and completed their verification surveys, the buildings will be demolished and the rubble removed. As identified earlier, subsurface (soil) decommissioning activities are not being performed under the current work scope (decommissioning work.)

Management supported and required the use of all regulatory and approved decommissioning plans and standards for the decommissioning process at Molycorp. The final status survey was conducted in accordance with; NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination," RSI's "Decommission Plan for the Washington, PA Facility, Part 1 Revision," and the requirements of Molycorp's "U.S. Nuclear Regulatory Commission Material License, Amendment No. 5, SMB-1393." Individual requirements of each reference were compiled in MACTEC's "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site" and used as the plan for performing the final status survey.

Approved radiation protection procedures were used during the performance of radiological surveys in support of final status surveys. Qualified radiation protection staff was hired and trained to the requirements of the sampling plan. A radiological engineer (CHP) was assigned to support the project and oversee the day-to-day radiological survey operations. The MACTEC Corporate RSO was involved at all decision making levels, and communicated directly with the NRC, State of Pennsylvania, ORISE Support Personnel and MACTEC Senior Management.

Radiological survey equipment was identified and selected to provide the highest sensitivity for the existing site conditions. Radiological survey equipment selection was based partially on equipment used for earlier final status surveys performed by Radiological Services, Inc. (RSI) in 2001. Additional radiological survey equipment was selected and implemented to what RSI had used in the past. The selection and addition of a hand-held gas-filled proportional instrument and detector package provided a greater sensitivity for the detection of radioactive material, and complemented the previously used selection of instruments used by RSI. All radiological survey equipment used for final surveys was calibrated by an instrument calibration facility using radioactive sources traceable to National Institute of Science and Technology (NIST). When radiological survey instrumentation was due for calibration, or

the instrument malfunctioned, the instrument was removed from service and sent off-site for calibration or repair.

Radiation protection personnel worked closely with decommissioning and construction personnel on the project. The Project Manager interacted closely with the workforce, Radiological Engineer and the HP technicians. The Project Manager was provided weekly HP activity reports detailing the current week's activities and the coming week's goals.

2.0 SITE INFORMATION

2.1 SITE LOCATION

The Molycorp, Inc. project site (the site) is located in southwestern Pennsylvania on the outskirts of Washington County approximately 35 miles southwest of Pittsburgh. The site is separated from the populated City's urbanized are by the ramps and structures associated with Interstate 70 (I-70). The region is generally comprised of towns located close to transportation corridors surrounded by agricultural lands and open areas.

The site consists of approximately 20 acres, which represents the fenced portion of the 59-acre parcel owned by Molycorp Inc. that lies entirely within Canton Township at 300 Caldwell Avenue, Washington, Pennsylvania, 15301. The fenced area is situated between 1,010 and 1,045 feet above mean sea level with relatively flat topography.

Molycorp's property has frontage along two dedicated public streets in Canton Township – Caldwell Avenue and Weirich Avenue. The site is transversed by Chartiers Creek that flows south to north through the property. The property is served by the CSX operated railroad via two lines that were formerly owned by the Tylerdale Connecting Railroad Company and the Baltimore and Ohio Railroad.

Adjacent property owners can be classified into three major categories on the current use of the land – residential, industrial, and public. The residential property lies to the east of the site on Green Street and to the west along Weirich Avenue. The industrial property is located predominately north of the site and includes property under the ownership of the Findlay Refractories Company and Allegheny Ludlum Corporation. Darrt Development Company owns several scattered parcels located to the south and east of the site. Land under public ownership includes the Canton Township Volunteer Fire Company property, the right-of-way for I-70, and other public streets. The Washington Institute of Technology owns a 38-acre parcel with a commercial building adjacent to the southwestern property line. This building was used as a mining education and training facility. However, it has not been used for this purpose for some time and has fallen into a state of disrepair and, therefore, is considered a vacant parcel.

A ten-acre parcel of vacant land under the ownership of L. and C. Cox on Weirich Avenue between Comfort Lane and Point View Drive (behind Allegheny Lundlum) may be the site of future commercial development. The property owner has formally requested that the zoning be changed from R-2 Residential to General Commercial.

2.2 BUILDING STATUS

All buildings/areas did not have the same potential for residual contamination and therefore did not require the same level of survey coverage. For the purposes of establishing the degree of survey effort required, building surfaces were segregated into affected and unaffected buildings/areas. The definitions for the areas:

- Affected area: Accessible areas that have potential radioactive contamination (based on facility operating history) or known radioactive contamination (based on past or preliminary radiological surveillance).

- Unaffected area: All accessible areas not classified as affected. These areas are not expected to contain residual radioactivity, based on knowledge of site history and previous survey information.

All 21 buildings located on site had been characterized (as identified in NRC Material License, Amendment No. 5, SMB-1393) for radiological hazards and classified as either affected or unaffected. 15 buildings had been characterized and classified as unaffected; two (2) buildings had been surveyed for final status; and six (6) buildings had been characterized and classified as affected (or containing affected areas). Building classification and radiological information are described in Table 2.1

TABLE 2.1 - BUILDING CLASSIFICATION AND RADIOLOGICAL INFORMATION

Classification	Building	Radiological Information
A	1	Lab Area, soil samples in the lab and a small source in a lab office. Possible fixed contamination exists on the floor of one of the lab rooms.
A	19	Building contains rad material samples in an individual office. The office has been classified as an affected area.
A	26	Building 26 contains a temporary rad storage area (~20'x30') identified with a rad boundary and radiological postings. The building also contains an above ground 4 section tank (one section being potentially contaminated, internal) and a stainless steel filter (~3 ft. dia. by 4 ft.) that is contaminated.
A	29	Concrete floor with sumps, floor sumps are potentially contaminated and need to be characterized . The rest of the building is identified as unaffected.
A	31	Concrete floor with a steel liner on top. Steel walls and roof, insulated walls. Licensed material mixer was stored in building.

A	33	Concrete floor, steel walls and roof, insulated. Equipment/supplies were originally stored in building. The building was erected in 1979 and is otherwise radiologically clean. Categorized as affected due to the storage of sample containers (contaminated dirt) in the back corner of the building.
U	2	Heat exchange in front of Building 2. Several stories high, mixture of solid and grating floors. Concrete and tin construction.
U	13	Concrete floor, steel and brick walls, some insulation on walls and ceiling.
U	14	Most of the building internals have been removed, brick structure. Roof is rusted and partially disintegrated.
U	21	Concrete floor, steel and cinder block walls, steel ceiling. Maintenance shop in use until March, 2002.
U	22	Concrete floor, metal walls and roof. Equipment/supply storage is the main purpose of this building.
U	23	Concrete floor, steel walls and ceiling.
U	25	Concrete floor, steel walls and ceiling.
U	28	Concrete floor, steel walls and roof, 2 walls insulated, equipment/ supplies located previously stored on shelve located in the building.
U	32	Concrete floor, one wall insulated, steel roof, equipment/supplies previously stored on shelve located in the building, steel front door.
U	34	Concrete floor, steel walls and roof, large conveyor system inside building. Sand pits are located in building.
U	35	Concrete floor, insulated walls and ceiling. Equipment/supplies previously stored in the building. The building was erected in 1988.
U	36	Concrete floor with sumps, double walled construction ½ way up, insulated walls and ceiling.
U	37	Concrete floor, corrugated steel walls and roof. Smaller inside storage building, cinder block construction, roof area was used for storage of additional equipment/supplies.
FS Surveyed	39	Building 39 previously surveyed for final status.
FS Surveyed	42	Building 39 previously surveyed for final status.

2.3 GROUNDS

The Molycorp Washington, PA facility produced a ferrocolumbium alloy from Brazilian ore (pyrochlore) between 1946 and 1970. While the use of pyrochlore was commonplace by that time, this particular ore contained thorium as an accessory metal. The thorium was also in concentrations which required Molycorp to acquire a Source Materials License. This operation resulted in the production of a thorium-bearing slag. A portion of this slag was ball-milled (turned into a granular powder) and used as fill over portions of the site.

While significant amounts of this slag have been removed from the site, remaining slag in soil continued to play a significant role in the survey and release of buildings on site. Building steel walls and concrete floors showed significant readings above "normal" background levels when surveyed by hand-held or portable detectors.

In two instances during the final status survey of buildings 39 and 42, performed by RSI, survey results indicated elevated levels of radioactivity on building walls (even though smears in the same locations indicated that no removable radioactivity existed.) To identify the source of elevated radioactivity, two sections (approximately 2' by 2') of the building's wall were removed from the building by RSI. These wall pieces were resurveyed in areas where background radiation levels were considered "normal" and found to be free of radioactivity (no readings greater than background).

Because this elevated background condition exists at the Molycorp site, MACTEC devised instrument detector windows for some of their instruments and used them in areas where thorium slag in soil created a background nuisance during survey activities.

3.0 DECOMMISSIONING ACTIVITIES

Decommissioning activities of the buildings on site were performed as a "first step" to release the site for unrestricted future use. The scope of work conducted at the site during this phase of work included D and D of all above surface structures and buildings.

All existing structures (buildings, tanks, dryers, bag houses, utilities, etc.) will be removed from the site. Wastes created during the D and D activities will be identified, segregated, and processed for shipment to the appropriate waste facility. Waste will be removed from site in accordance with all applicable federal, state and local regulations and authorities.

3.1 OBJECTIVES

The objectives for this phase of D and D activities included:

- Removal of equipment and surplus supplies from buildings
- Characterization of hazards associated with the buildings (performance of effective radiological surveys)
- Remediation or disposal of hazards identified in the characterization process

- Completion of Final Status Survey
- Unrestricted release of buildings
- Demolition of buildings

3.2 RESULTS OF PREVIOUS SURVEYS

Numerous radiological studies and surveys have been conducted at the Molycorp Washington, PA site. Since the late 1960, regulatory requirements and pressure from local agencies have driven surveys and studies of the hazards associated with the production of various ferroalloys. Recently, RSI has completed and submitted for review the Final Status Survey for buildings 39 and 42. Listed below is a brief history of the previous surveys performed on the Molycorp site:

Applied Health Physics, Inc. was contracted by Molycorp to conduct a series of leaching studies on ferrocolumbium slag during the late 1960s. These studies indicated that radioactive materials were fixed and would not leach into the groundwater in excess of prescribed limits. During this period, Molycorp applied unsuccessfully to the Pennsylvania Department of Health's Industrial Wastes Section and AEC for an onsite burial permit. Ferrocolumbium slag cleanup was concentrated in the early to mid-1970s time frame.

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Foster Wheeler Environmental Corporation conducted a site characterization of the Molycorp Washington, PA site in 1994 and published its report titles "Site Characterization Report for License Termination of the Washington, PA Facility, 1995." This three volume report was conducted to meet the Site Characterization Plan's objectives:

- To determine the extent of the distribution of thoriated residues on the site, in the structures and in the environmental media.
- To determine the rate(s) of migration, if any, of thorium or its daughters through various pathways to man.
- To assess associated non-radiological constituents and determine their affects on the radiological constituents and potential impacts on decommissioning.
- To quantify parameters that affect potential human exposure to existing site radiological materials.
- To support evaluation of alternative decommissioning actions wan detailed planning of a preferred approach for decommissioning, decontamination, and waste disposal.

3.3 DECONTAMINATION PROCEDURES

Most of the above surface buildings have been previously decontaminated and identified as unaffected buildings or areas. These classifications are noted in Molycorp's NRC License, SMB-1393 and identified in Section 2.2. Buildings classified as affected will be surveyed, and where remediation is necessary, decontamination will be performed. It has been estimated that very little radioactive waste will be generated during the entire project scope. Items found to be contaminated above the limits have and will be controlled as radioactive material, temporarily stored on site, and ultimately disposed of as radioactive waste.

MACTEC's "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site" contains the procedures and requirements for the survey of the buildings on site. RSI's Radiation Protection

Procedures (currently the approved procedures used on site) contain the procedural requirements for operational radiation activities on the site.

4.0 FINAL SURVEY PROCEDURES

The basis of the Molycorp radiological survey design conformed to NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination," RSI's "Decommission Plan for the Washington, PA Facility, Part 1 Revision," and the requirements of Molycorp's "U.S. Nuclear Regulatory Commission Material License, Amendment No. 5, SMB-1393." These references provide adequate information and sampling requirements to ensure a proper survey had been planned and performed. The requirements listed in these references were compiled into a sampling plan (MACTEC's "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site") and used as the guidance document for sampling instructions.

4.1 SAMPLING PARAMETERS

Sampling parameters were identified from NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination," RSI's "Decommission Plan for the Washington, PA Facility, Part 1 Revision," and the requirements of Molycorp's "U.S. Nuclear Regulatory Commission Material License, Amendment No. 5, SMB-1393." QC samples were included in the sampling requirements.

Site buildings or areas were classified by contamination potential and grouped into survey units having a common history, contamination potential, or that were naturally distinguishable from other site areas, to assure that the number of survey data points from each survey unit adequately represented the radiological environment of that survey unit. Survey units are subdivisions of the whole area of interest within the sampling plan.

Unaffected survey units identified by direct measurement that exceed 25% of the guideline levels were reclassified as affected areas, gridded as necessary, and resurveyed accordingly.

Representative surveying was accomplished for buildings by using a systematic grid approach to ensure spatial representation of the survey unit of interest. The grid system provided reference locations to aid in proper sample identification and distribution, and ensured that minimum sample surface areas were sampled.

Direct and loose surface measurement locations were identified on the actual surface being surveyed. The physical probe location was traced on the surface being surveyed. When necessary, survey readings were recorded on the physical surface at the location of the survey.

Survey results were obtained and used for comparison against the limits for unrestricted release, as defined in the site's NRC License. These limits are included in MACTEC's "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site" as Appendix A.

Table 4.1 identifies the release limits of the license.

Table 4.1 - Acceptable Surface Contamination Levels (dpm/100cm^2)

Radionuclide [1]	Average	Maximum	Removable
U-nat, U-235, U-238, and associated decay products	5,000 α	15,000α	1,000α
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100	300	20
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1,000	3,000	200
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above	5,000	15,000	1,000

(1) Where surface contamination by both alpha and beta-gamma emitting nuclides exist, the limits established for alpha and beta-gamma emitting nuclides should apply independently.

Even though limited quantities of natural uranium have been identified at the Washington, PA site, and is included as a part of the site's NRC License, the more restrictive limits for release (for surface activity) are for the natural thorium radionuclide, which is the significant radionuclide of concern.. Therefore, the limits for release are due to the natural thorium radionuclide, and the limits are 1,000 dpm/100cm^2 average, 3,000 dpm/100cm^2 maximum and 200 dpm/100cm^2 removable.

Because both alpha and beta radiations are a product of the decay of natural thorium (in equilibrium), the limits listed above apply independently to both alpha radiation and beta radiation.

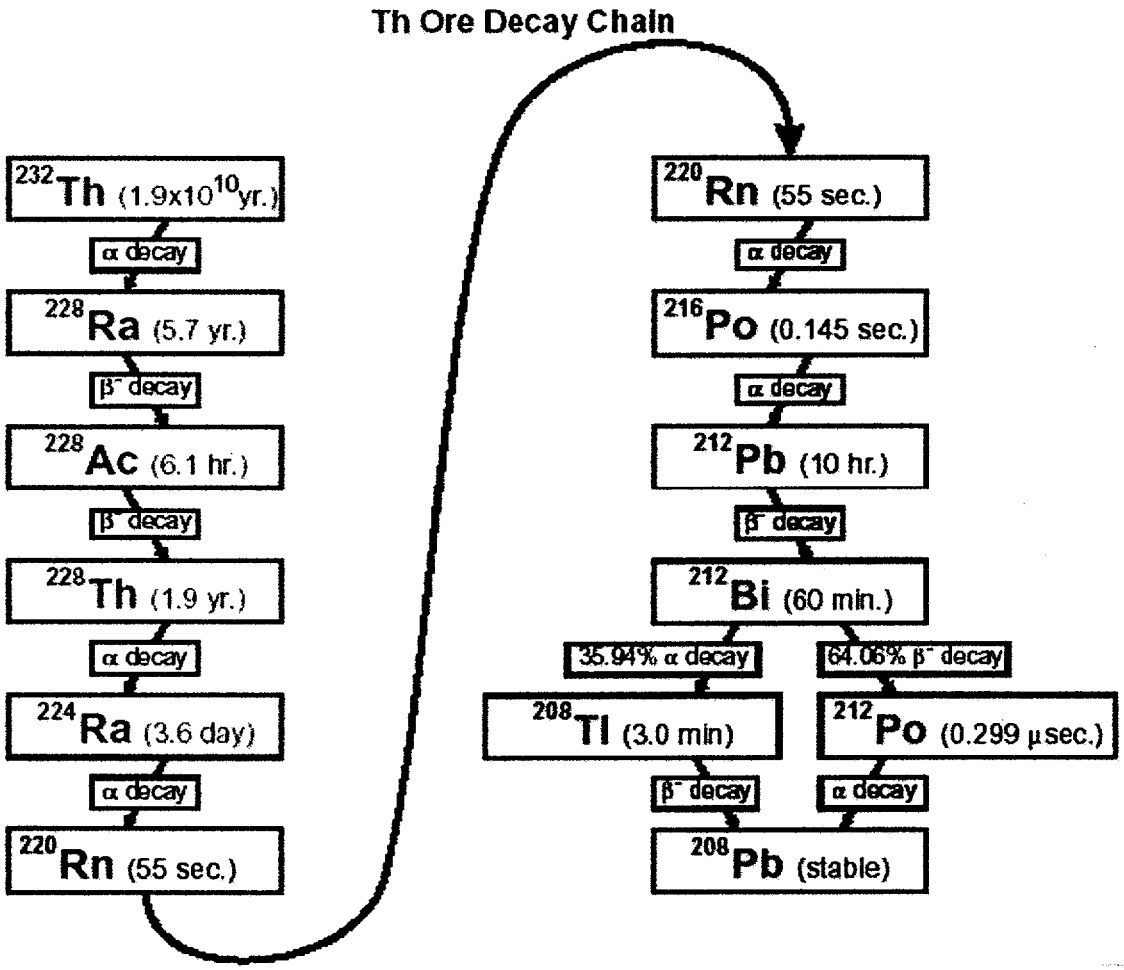
Due to the inherent difficulty of properly quantifying the alpha radiation component during the decay of natural thorium when using a hand-held instrument, a ratio of alpha decays to beta decays was identified and beta radiation was used as a surrogate to quantify the alpha activity. This was not the case for determining removable contamination. The Ludlum 2929 was calibrated and set up for the measurement of both alpha and beta radioactivity.

The detectable ratio of alpha to beta is a 2:1 for natural thorium decay. In actuality, the decay of natural thorium produces 6 alphas and 4 betas to reach stable lead. However, one of the betas emitted during the decay process (from Ra-228) is not detectable (39 keV E-max). The other three betas emitted are detectable and are suitable as a surrogate.

The alpha readings recorded on the various data forms and record sheets were actual instrument readings, obtained from the instrument during the survey, and do not represent this ratio factoring. The use of alpha to beta ratio factoring is incorporated in the data set just prior to statistical analysis and comparison to limit values.

Figure 4.1 is a graphical representation of the decay of natural thorium.

FIGURE 4.1 - NATURAL THORIUM DECAY CHAIN



4.2 SAMPLING SCHEDULE

Scanning of surfaces to identify locations of residual surface activity were performed according to Table 4.2.

TABLE 4.2 - SURFACE SCAN SCHEDULE

Building/ Structure Status	Survey Location	Surface Scan (4.6)
Affected Areas	Building floor and lower walls (<2 m from floor)	100% - Floor and lower walls (<2 m from floor) and other surfaces found to have residual activity in excess of guideline values during characterization surveys.
Affected Areas	Upper surfaces (>2 m from floor) of affected areas found to be non contaminated during the characterization	Limited - Areas found to be non contaminated during the characterization survey, scans in the immediate vicinity of direct measurement.
Affected Areas (4.10.1)	Exterior of piping, ventilation ducting, electrical boxes, conduit, or other interior surfaces that may contain residual contamination	B-G scans, biased, to determine locations that exceed 2x background. *At these locations, and available access points to pipe and duct interiors, direct alpha measurements and smear sample will be obtained.*
All Buildings (4.10.2)	Exterior surface of the roof	Gamma scan only - 1 measurement per 4 m^2 (see Exposure Rates Table)
All Buildings (4.10.2)	Exterior walls	B-G scan, 10% of lower wall surfaces (<2 m from floor).
Unaffected Areas	Building floor and lower wall surfaces (<2 m from floor)	B-G scan, 10% of floor and lower wall surfaces (<2 m from floor)
Equipment/ Structures Located in Affected Areas/Buildings	Equipment/Structure	Free Release Survey - If equipment/structure is identified as being used for processing licensed material. Biased - If equipment/structure was never used for processing licensed material.

Equipment/ Structures Located in Unaffected Areas/Buildings	Equipment/Structure	Biased - If equipment/structure is suspected of being used for processing licensed material. Not Required - If equipment/structure was never used for processing licensed material.
Result Requirements		Locations of surface activity exceeding twice background will be marked for further evaluation.

Building interior surface scans were conducted for alpha and beta-gamma radiations. Scans of exterior building surfaces were for beta and gamma radiations to identify the presence of elevated areas that might indicate residual gross activity.

For hand-held instrumentation, the detector was kept as close as possible to the surface and moved across the surface at a slow speed. Scan surveys were performed by moving the detector over the surface area at a maximum speed of 1-2 inches per second and a distance of approximately 1/2 inch for beta and 1/4 inch for alpha. When the count rate increased, the rate of movement of the detector was decreased or stopped. If the increase in count rate was real (not a random variation in the background count rate), a static 60-second measurement was performed over the area of increased count rate to quantify the activity. Audible indicators (headphones or instrument speaker) were used to identify locations having elevated activity levels. All scanning results were noted on standard survey forms as well as task-specific generated forms.

When elevated levels of surface activity were identified with the Ludlum Model 239-1F floor monitor, the surface was marked and scanned with a hand held unit with a detector size of ~ 100 cm^2 and an appropriate detector efficiency.

Gamma exposure rate measurements (gamma scan) were conducted with the instrument at 1 m above the floor at systematically and randomly selected locations.

Direct measurements were performed according to Table 4.3.

TABLE 4.3 - DIRECT SURFACE MEASUREMENT SCHEDULE

Building/ Structure Status	Survey Location	Direct Measurement (4.7)
Affected Areas	Building floor and lower walls (<2 m from floor)	Floor and lower walls (<2 m from floor) and other surfaces found to have residual activity in excess of guideline values during characterization surveys. (1)

Affected Areas	Upper surfaces (>2 m from floor) of affected areas found to be non contaminated during the characterization	Measurements will be performed at a minimum of 30 locations on both vertical and horizontal surfaces and sufficient additional locations to provide coverage at a minimum of one location per 20 m^2 of surface area. (1)
Affected Areas (4.10.1)	Exterior of piping, ventilation ducting, electrical boxes, conduit, or other interior surfaces that may contain residual contamination	Where B-G scans exceed 2x background - obtain direct alpha measurements. At available access points to pipe and duct interiors - obtain direct alpha measurements.
All Buildings (4.10.2)	Exterior and interior surfaces of air exhaust equipment and at roof drains	Biased
All Buildings (4.10.2)	Exterior walls	A minimum of 30 random direct measurements or an average of at least 1 measurement location per 50 m^2 surface area, whichever is greater, of the survey unit. (4.10.2)
All Buildings (4.10.2)	Exterior surface of the roof	Biased in areas of plausible contamination. (based on gamma scan results)
Unaffected Areas	Building floor and lower walls (<2 m from floor)	A minimum of 30 random direct measurements or an average of at least 1 measurement location per 50 m^2 surface area, whichever is greater. (5849)
Equipment/ Structures Located in Affected Areas/Buildings	Equipment/Structure	Free Release - If equipment/structure is identified as being used for processing licensed material. Biased - If equipment/structure was never used for processing licensed material.
Equipment/ Structures Located in Unaffected Areas/Buildings	Equipment/Structure	Biased - If equipment/structure is identified as being used for processing licensed material. Not Required - If equipment/structure was never used for processing licensed material.
Results Requirements		If direct measurements indicate residual activity exceeds 25% of the guideline, the area is surveyed per affected area requirements.

[1] If scanning methods are capable of detecting residual Th activity of less than 1,000 dpm/100 cm^2, direct surface activity measurements will be systematically performed at two meter intervals on floors and lower walls and at the same intervals on upper surfaces. If scanning methods produce an MDA that exceeds 1,000 dpm/100 cm^2, measurements will be performed at one meter intervals. On upper surfaces of affected areas that are not scanned for the presence of residual activity, measurements will be performed at a minimum of 30 locations on both vertical and horizontal surfaces. These locations will include surfaces where radioactive material would likely settle and sufficient additional locations to provide coverage at a minimum of one location per 20 m^2 of surface area.

Direct surface measurements were conducted by integrating counts over a 1-minute period.

When scans or measurement exceeds guideline levels, the location was noted for further remediation or resolution. Localized scanning and measurements were repeated after any remediation activities were performed.

Smear surveys were preformed according to Table 4.4.

TABLE 4.4 - LOOSE SURFACE MEASUREMENT SCHEDULE

Building/ Structure Status	Survey Location	Removable Surface Activity
Affected Areas	Building floor and lower walls (<2 m from floor)	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).
Affected Areas	Upper surfaces (>2 m from floor) of affected areas found to be non contaminated during the characterization.	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).
Affected Areas (4.10.1)	Exterior of piping, ventilation ducting, electrical boxes, conduit, or other interior surfaces that may contain residual contamination.	Where B-G scans exceed 2x background - obtain alpha smear sample. At available access points to pipe and duct interiors - obtain alpha smear sample.
All Buildings (4.10.2)	Exterior and interior surfaces of air exhaust equipment and at roof drains.	Biased to locations where contamination is most likely.
All Buildings (4.10.2)	Exterior walls	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).

All Buildings (4.10.2)	Exterior surface of the roof	Samples of roofing material (volumetric) will be obtained where direct measurements indicate contamination is present.
Unaffected Areas	Building and Structure Surfaces	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).
Equipment/ Structures Located in Affected Areas/Buildings	Equipment/Structure	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).
Equipment/ Structures Located in Unaffected Areas/Buildings	Equipment/Structure	Collected from each location where a direct surface activity measurement is made (alpha and beta analysis).

A smear for removable contamination was obtained at each location where a direct surface activity measurement was taken, unless otherwise stated in Table 4.3.

Smears were counted for gross alpha and beta with the appropriate instrument.

As a precaution against accidental contamination of the instrumentation used to analyze the smear samples, screening of samples that had a high potential of containing elevated levels of radioactivity was performed.

Exposure rate measurements were performed according to Table 4.5.

TABLE 4.5 - EXPOSURE RATE MEASUREMENT SCHEDULE

Building/ Structure Status	Survey Location	Exposure Rate Measurement (4.8)
Affected Areas	Building Surfaces	Gamma exposure rates measured 1 meter perpendicular to building surfaces at 1 measurement per 4 m^2.
All Buildings	Exterior Roof Surface (gamma scan)	Gamma exposure rates measured 1 meter perpendicular to building surfaces at 1 measurement per 4 m^2. (4.10.2)

Unaffected Areas	Building Surfaces	Gamma exposure rates measured 1 meter perpendicular to building surfaces at 1 measurement per 50 m^2 (calibrated for natural thorium).

Gamma exposure rates were measured at 1 m above ground or floor surfaces using a gamma scintillation instrument.

Where necessary, samples of paint were obtained from 100 cm^2 areas of painted surfaces where direct and removable activity measurements suggest contamination (> surface contamination levels) may have been painted over. These samples were analyzed for beta activity. Direct measurements and smear surveys were made of the underlying surface, after removal of the paint.

Samples of roofing materials (non-metal roofs) were obtained where direct measurements indicate contamination was present in the roofing material. Roof material samples were controlled as volumetric samples and analyzed as such.

Cotton swabs were used for sampling in hard-to-reach areas such as inside wall and floor penetrations, anchor-bolt holes, and floor cracks or expansion joints.

Each piece of equipment that required monitoring was its own entity and was described by name and serial number on survey forms and/or logs. Special attention (increased sample density) was given to areas where there was a high potential for contamination. Equipment previously identified as not affected (not contaminated) was not surveyed unless there was indication that it had become contaminated.

4.3 BACKGROUND LEVELS IDENTIFIED

Material-specific background levels were established by RSI in late 2001 for each type of instrument used for total surface contamination measurements during their final status surveys of buildings 39 and 42. Similar instrumentation was selected for use by MACTEC to take advantage of this previously available information.

Background measurements were collected on surfaces of similar construction as the buildings at the site and having no possibility of being impacted by site operations. Measurements to establish background for a specific material were collected from multiple locations to provide an estimate of the variability or uncertainty. Background determination was performed using the same instrumentation that was used for final status survey data collection. An average background value was determined for each material surveyed and this value was subtracted from each measurement to determine a net count or count rate. Background determinations were required and performed for concrete and a class of material designated a generic material.

The required number of background measurements per material type is as follows:

- Concrete - minimum of 20 measurements
- Cinderblock - minimum of 20 measurements

- Generic Material - minimum of 10 measurements for each type of material surveyed (i.e., wood, insulation, corrugated steel, etc.)

It was previously identified in the final status survey report for buildings 39 and 42, submitted by RSI, that significant background radiation levels existed at the Molycorp site, primarily due to gamma radiation from the thorium slag in the soil. RSI had reported levels as high as 30 micro-R per hour.

During survey activities performed by MACTEC at the site, a significant component of the measured activity was indeed identified to be from the elevated gamma background coming from the slag in the soil. A method was devised to minimize the interference of this background radiation when using the hand-held detectors, and produce more accurate results of beta activity, the primary indicator used for the detection and quantification of natural thorium. A shield, or "beta window" was used to eliminate the beta component of a measurement made in areas where background levels proved to be a nuisance. A second measurement was taken without the shield in place. This measurement process produced two readings, one containing a beta-gamma interaction with the detector, and one containing only a gamma interaction with the detector. The difference between the two readings provided a beta-only component of the measurement, with the gamma background removed. This reading was then compared against the materials background that was determined at the off-site location and a net beta reading was obtained.

The material used to shield the beta radiation was a thin piece of aluminum (approximately 3/16 inch think). A test was performed to validate the aluminum's ability to shield the beta radiation. A beta source was counted without the shield, and then the shield was put in place. The source was again counted. Results of the tests indicated that in all cases, when the shield was in place , the instrument indicated background values and completely shielded out any beta radiation.

4.4 MAJOR CONTAMINATES IDENTIFIED

The major contaminate (significant radionuclide of concern) at the Molycorp Washington, PA site was identified to be natural thorium. Trace amounts of natural uranium were also identified as a contaminate. Both of these materials are identified in the site's NRC License.

No other licensed material has been brought on site, based on the site Facility Superintendent's knowledge of process and site operations.

Results of preliminary assessment and characterization survey support the conclusion and identify the significant radiological contaminant to be thorium-232, from the processing of certain types of ore concentrates in the production of ferrocolumbium. Most of the material Molycorp processed for ferrocolumbium was a pyrochlore, which contained thorium above the 0.05 percent limit. It is possible that buildings and structures involved with the processing of pyrochlore and production of ferrocolumbium may have been contaminated with thorium-232. The average activity ratio of Th-228 and Th-230 to Th-232 found in slag/soil samples are:

Th-228:Th-232	1.03%
Th-230:Th-232	0.16 %

4.5 GUIDELINES ESTABLISHED

All final status survey measurements were compared to the values listed in the Site's NRC License. The criteria specified in the guideline for natural thorium are more conservative than natural uranium, and were applied at the site for final status survey.

4.6 EQUIPMENT AND PROCEDURES SELECTED

Instrument and procedure selection was based on several criteria. The first criteria that was considered was the use of instruments and procedures that had been previously used on site for final status surveys. Since RSI had just completed the final status survey of two buildings at the site, prior to MACTEC's arrival, using similar procedures and instruments made sense. Because MACTEC's radiation protection operating procedures had not yet been approved for use at the site, RSI's radiation protection procedures were used. RSI's radiation protection procedures had previously been approved for use on site by the NRC. Verbal approval was given by the NRC to allow MACTEC to continue work using RSI's radiation protection procedures until their procedures were approved.

4.7 INSTRUMENT MDA

The detection sensitivity of a measurement system refers to the statistically determined quantity of radioactive material or radiation that can be measured or detected at a preselected confidence level. This sensitivity is a factor of both the instrumentation and the technique or procedure being used. Typically, detection sensitivity has been defined (EPA 1980) as the level above which there is less than a 5% probability that radioactivity will be reported present when it is really absent (Type I error) or reported absent when it is really present (Type II error).

Minimum detectable activity (MDA) is an *a priori* estimate of the minimum activity level which is practically measurable with a specific instrument, and sampling and/or measurement technique. The basic equation for determining field instrument MDA (NUREG/CR-5849) is:

$$MDA = \frac{2.71 + 4.65\sqrt{B_R * t}}{t * E * \frac{A}{100}}$$

Where:

B_R	=	background count rate
t	=	sample count time (min)
E	=	efficiency
A	=	area of probe

FIGURE 4.2

Instrument MDAs were calculated on a daily basis and recorded on the applicable survey forms. Where instrument MDAs did not meet criteria (25% of the release limit value,) instrument background count times and sample count times were increased until MDA values became acceptable.

4.8 INSTRUMENT SELECTION

Instrument and equipment selection was made based on previous use and the criteria of NUREG/CR-5849, for MDA sensitivity. In addition to the previous use criteria, instruments were selected based on the ability to detect the desired radiation and at a desired level, ease of use, availability and cost.

- For dose rate measurements, the Ludlum Micro-R meter was selected and used. It was selected due to it's relatively flat energy response curve and because it had been used on site previously for final status surveys.

- For surface scans of large areas (floor and walls), the Ludlum Floor Monitor (239-1F/2350-1) with the 582 cm^2 detector (43-37) was selected. The MDA for the instrument was considered acceptable until an area of elevated activity was detected by the instrument. During surveys with the floor monitor, when an area of elevated activity was detected, the probe size was theoretically reduced from 582 cm^2 to a size of 100 cm^2 (a postulated physical size of elevated activity). The MDA of the instrument with it's newly reduced probe size (100 cm^2 probe size) became unacceptable for scanning. For areas where the floor monitor detected elevated activity, the area was identified and resurveyed with a 100 cm^2 hand-held gas proportional detector. Instrument MDA was calculated and recorded at the start of the job, at the job site. If the instrument was relocated to a different location during the same day of work, the MDA was again calculated and recorded for the new location. The floor monitor was set up and calibrated to detect both alpha and beta radiations.

- For surface scans of areas with elevated readings, the Ludlum 2350-1 with the 43-68 or 43-106 was selected. Due to the detector's relative size (compared to the 43-37) the MDA for the detector was acceptable. However, using a hand-held instrument to survey large surface areas is not efficient in either cost or time. The primary duty of the large area hand-held gas-flow proportional detector was scanning areas where elevated levels of activity had been identified by the floor monitor. When required to be used, the instrument's MDA was calculated and recorded at the start of the job, at the job site. If the instrument was relocated to a different location during the same day of work, the MDA was again calculated and recorded for the new location. This instrument was not used for static measurements due to the added effort of the surveyor (moving the gas bottle around with the instrument) and the added cost to use the instrument. The instrument's lower MDA allowed for the sample population density of other sample mediums (for affected area surveys units) to be less dense. When the MDA of the scanning instrument could not reach 25% of the release limit, the sample population density increased for the other sample mediums (direct and loose surface measurements) and a greater number of samples were required to be obtained. The instrument was set up and calibrated to detect both alpha and beta radiations.

- For static (direct) surface measurements, the Ludlum 2360 with the 43-89 detector was selected. The MDA was acceptable. Instrument MDA was calculated and recorded at the start of the job, at the job site. If the instrument was relocated to a different location during the same day of work, the MDA was again calculated and recorded for the new location. When background radiation created an unacceptable MDA for this instrument, the instrument was reconfigured to count with a longer count time. Background count times were also increased to lower instrument MDA to acceptable levels. Durability, ease of use and cost were a consideration in the selection of this instrument. The instrument was set up and calibrated to detect both alpha and beta radiations.

- For counting samples (smears and air samples), the Ludlum 2929 with 43-10-1 detector was selected. Instrument MDA was calculated and recorded daily, and found to be acceptable.

Durability, ease of use, familiarity and cost were a consideration in the selection of this instrument. The instrument was set up and calibrated to detect both alpha and beta radiations.

Table 4.6 provides information on the instruments selected to be used for final status surveys at the Molycorp Washington, PA site. Information on MDA calculations can be found in "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site," Appendix B.

TABLE 4.6 - INSTRUMENT SELECTION

Instruments	Probe	Radiation	MDA (dpm/100 cm^2)	Use
Ludlum, Model 2360	43-89	Alpha	67	Static Surveys
Ludlum, Model 2360	43-89	Beta	520	Static Surveys
Ludlum, Model 2929	43-10-1	Alpha	29	Counter Scaler
Ludlum, Model 2929	43-10-1	Beta	182	Counter Scaler
Ludlum, Model 2350-1	43-68/43-106	Alpha	105	Scan Surveys
Ludlum, Model 2350-1	43-68/43-106	Beta	625	Scan Surveys
Ludlum, Model 239-1F	43-37	Alpha	64	Floor Monitor
Ludlum, Model 239-1F	43-37	Beta	1186	Floor Monitor
Ludlum, Model 19	Internal	Gamma		Exposure Rates

4.9 INSTRUMENT USE TECHNIQUES

Instruments selected for performing final status surveys were provided by GTS Duratek, Field Engineering and Field Services group, Kingston, TN. Prior to delivery, instrument calibrations and operations were verified by the vendor, and shipped to Washington, PA. Upon arrival, the instruments were inspected and verified operational. Instrument backgrounds were preformed. QC check control limits were established and Chi-squared tests were performed.

Prior to daily use, instruments were response checked and compared against their two and three sigma warning and control limit values. For scaler instruments, daily backgrounds were determined and MDCs were calculated in addition to their response checks. After daily use, hand-held instruments were once again source response checked to ensure that the instrument did not fail during the day's work. All instrument "daily checks" data was logged in the appropriate data log record.

Qualified HP technicians were trained on the use of the instruments, and provided access to the instrument's User Manuals. Surveys were performed in accordance with approved radiological survey procedures on site. Survey results were reviewed by the Radiological Engineer for accuracy and completeness.

4.10 PROCEDURES FOLLOWED

The requirements of NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination" were followed for most statistical methodologies used during the performance of surveys and testing of data for the final status survey. In one instance, the methodology found in "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) was used for determining the scanning MDA of those instruments used for scanning. This methodology provided a more accurate MDA result than would have been calculated from the guidance found in NUREG/CR-5849.

4.11 SURVEYING ORGANIZATION

Characterization and final status surveys were performed by a team composed of qualified personnel currently employed or subcontracted by MACTEC.

The team was operated under the supervision of the Project Manager, Mr. Vern Taylor, of MACTEC, Inc who has overall authority of the project.

The day to day operations of the site were the responsibility of the Site Superintendent, Mr. John Peek of MACTEC, Inc.

Radiological field measurements and sample collection were the responsibility of Mr. Michael McDonald of MACTEC, Inc. Mike is a Board Certified Health Physicist (CHP) in comprehensive practice and a Registered Radiation Protection Technologist (RRPT).

Radiological surveys were performed by a team of HP technicians. One Senior HP Technician was assigned as the Lead Technician and was given the responsibility of the team.

5.0 SURVEY FINDINGS

Detailed data reports (Survey Findings Report) for each survey unit sampled are provided as an appendix to this report. Field data collection forms, survey report forms, instrumentation information (background, QC, MDA, and source response data forms), statistical test results, and comparisons to release limits are all provided as a single package. Each package also contains a summary of the final status survey for that survey unit and includes information on anomalies discovered during the survey process. Where significant differences existed between final status survey results and results of previous surveys for the survey unit, explanations are provided.

Raw survey data was compiled into survey data tables, where appropriate, and presented with calculational results and comparisons, and are presented in the Survey Findings Report.

5.1 TECHNIQUES FOR REDUCING/EVALUATING DATA

Survey information was obtained from the instrument's meter face used at the time of the survey. This data was recorded on a Radiological Survey Location Indicator data sheet, in the instrument's units. For scans and static measurements, the units were in counts per minute (cpm). Smear data was recorded

after counting, subtracting background, and conversion to units of disintegrations per minute per 100 square centimeters (dpm/100cm^2). Dose rate measurements were recorded in units of micro-Roentgen per hour (uR/hr) and taken directly from the instruments meter face. Information used in the conversion from cpm to dpm (instrument efficiencies) was recorded on both the Radiological Survey Location Indicator data sheet and the Radiation Protection Survey Report form. For scans, the highest reading for the given immediate scan area was recorded in cpm.

Where "hot spots" needed to be evaluated, additional readings were taken and the average hot spot activity was calculated in accordance with NUREG/CR-5849, Section 8.5.2 - Elevated Areas of Activity.

5.2 Statistical Evaluation and Comparison Tables

The statistical methodology used to provide the true representation of the data in relationship to the applicable limits is found in Sections 2.0 and 8.0 of NUREG/CR-5849. Comparison tables and tests used in the analysis are presented as part of each survey unit's Survey Findings Report package, as an appendix to this report.

6.0 SUMMARY

Final status survey of the buildings located at the Molycorp Washington, PA site were performed in accordance with the requirements listed in NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination," RSI's "Decommission Plan for the Washington, PA Facility, Part 1 Revision," Molycorp's "U.S. Nuclear Regulatory Commission Material License, Amendment No. 5, SMB-1393," and MACTEC's "Survey Plan for Determining the Final Status of Buildings at the Molycorp Site."

According to the findings of the final status surveys performed at the Molycorp Washington, PA site, all release criteria have been met. Results of the final status survey demonstrate that the residual radioactivity in Buildings XXX is below the unrestricted use criteria and confirm that the buildings are suitable for unrestricted use.

7.0 REFERENCES

1) *Manual for Conducting Radiological Surveys in Support of License Termination*, NUREG/CR-5849, Draft, December 1993.

2) *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Revision 1*, NUREG-1575, Rev. 1, US Nuclear Regulatory Commission, Office of Nuclear Regulatory Research, Washington, DC, August 2000.

3) *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*, American National Standard, ANSI/ASQC E4-1994.

4) *Quality Assurance for Radiological Monitoring Program - Effluent Streams and the Environment*, NRC Regulatory Guide 4.15, 1979.

5) *Termination of Operating Licenses for Nuclear Reactors*, Nuclear Regulatory Commission, Regulatory Guide 1.86, 1974.

6) *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions*, NUREG/CR-1507, Final, 1997.

7) *Statistical Methods for Evaluating the Attainment of Cleanup Standards*, Pacific Northwest Laboratory, Richland, WA, December 1992.

8) *Radiation Detection and Measurement*, Knoll, 1979.

9) *Washing, PA Facility, Decommissioning Plan, Part 1 Revision*, June 30, 1999, Radiological Services Inc.

10) *Radiation Protection Program, Health Physics Procedures*, June 1999, Radiological Services Inc.

11) *Site Characterization Report for License Termination of the Washington, PA Facility*, January 1995, Radiological Services Inc.

12) *U.S. Nuclear Regulatory Commission Materials License*, Molycorp, Inc, SMB-1393, Docket No. 040-08778, Amendment 5.

13) Antech Ltd. - Waltz Mill, Project No. 02-0284W, *Analytical Survey Results for Composite Tile Sample at Molycorp, Washington, PA*, May 13, 2002.

Appendix A

Building 2 Data Package

Molycorp Washington, PA

Building 2 Data Package

This data package contains final status survey information for Building 2, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

No anomalies were reported during the survey of Building 2. Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities.

Results from the final status survey of Building 2 provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 2 is suitable for unrestricted use.

DDO-138 Radiation Protection Survey Report

Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #2 - 1st Floor

Date:	Time:	Location:	Survey Issue Log Number:
5-6-02	1700	Bldg 1ST FLOOR	02-0145

RWP Number: N/A

Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ ~~Other:~~

Page 1 of 10

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11	See	
12	Attached	
13	Sheets	
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Floor BKG MDA
β⁻ 78 β⁻ = 476
α 2.4 α = 64

Equipment Walls BKG MDA
β⁻ 8 β⁻ = 172
α 3.7 α = 96

Walls Cinder Blocks BKG MDA
β⁻ 49 β⁻ = 383
α 3.7 α = 76

Bkgd Readings: 6 - 11 micro Rem/hr

Legend:
00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier
00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | □ = Bulk Material Sample

Section 2: Instrument Used

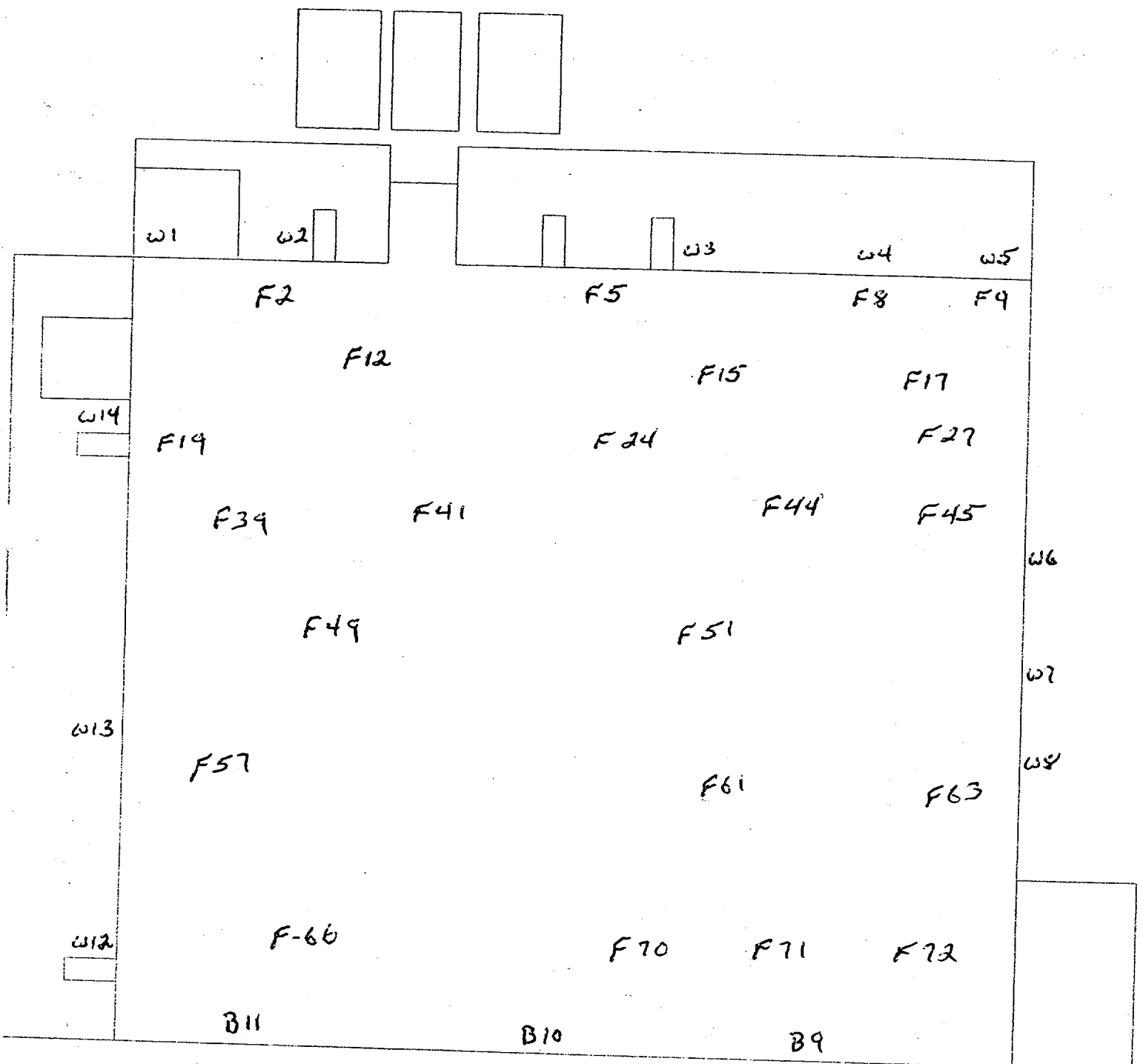
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other Bkgd.
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .127 / α .207	β⁻ 182 / α 20.6	β⁻ 1376 / α 10.4
2350-1/117563	8-12-02	43-10/128912	8-6-02	.251/.212	573/55	231.6/1.5
2929/152202	2-6-03	43-10/156519	2-6-03	β⁻ .165 α .344	β⁻ 158 α 11.6	β⁻ 48 α .08
2224-1/129463	8-6-02	43-89/~~8-6-0~~ 169230	8-6-02	β⁻ .092 α .154	See Above	
19/115870	8-6-02					

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Steve Kavalchi	☐ Yes ☐ No ☒ Not Required	5-6-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 5-15-02 0900

02-0145

Building 2
1st Floor
North



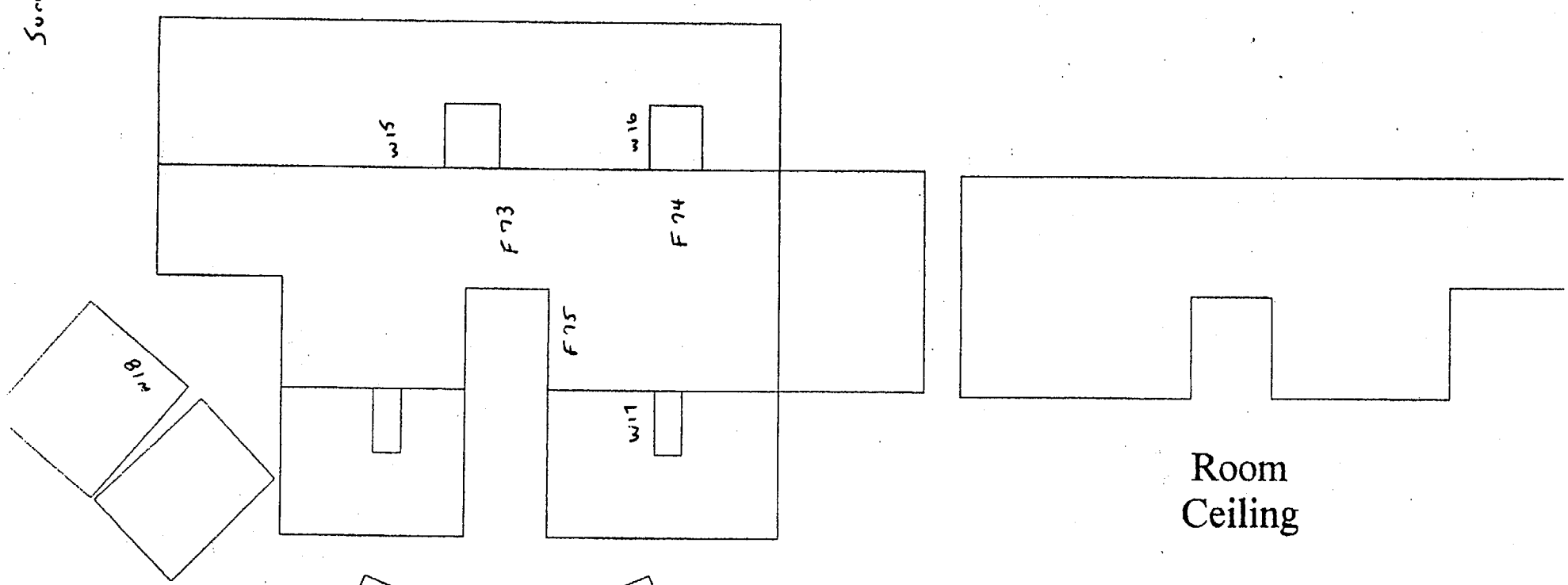
W1-5, 15-21 Block
W6-8 Concrete
B9-11 Beams

Interior

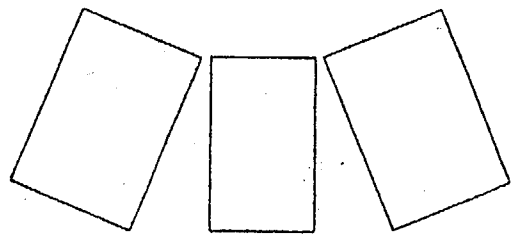
Scale:
4m x 4m

Survey # 02-0145

Building 2
Room A, 1st Floor
North



Room
Ceiling

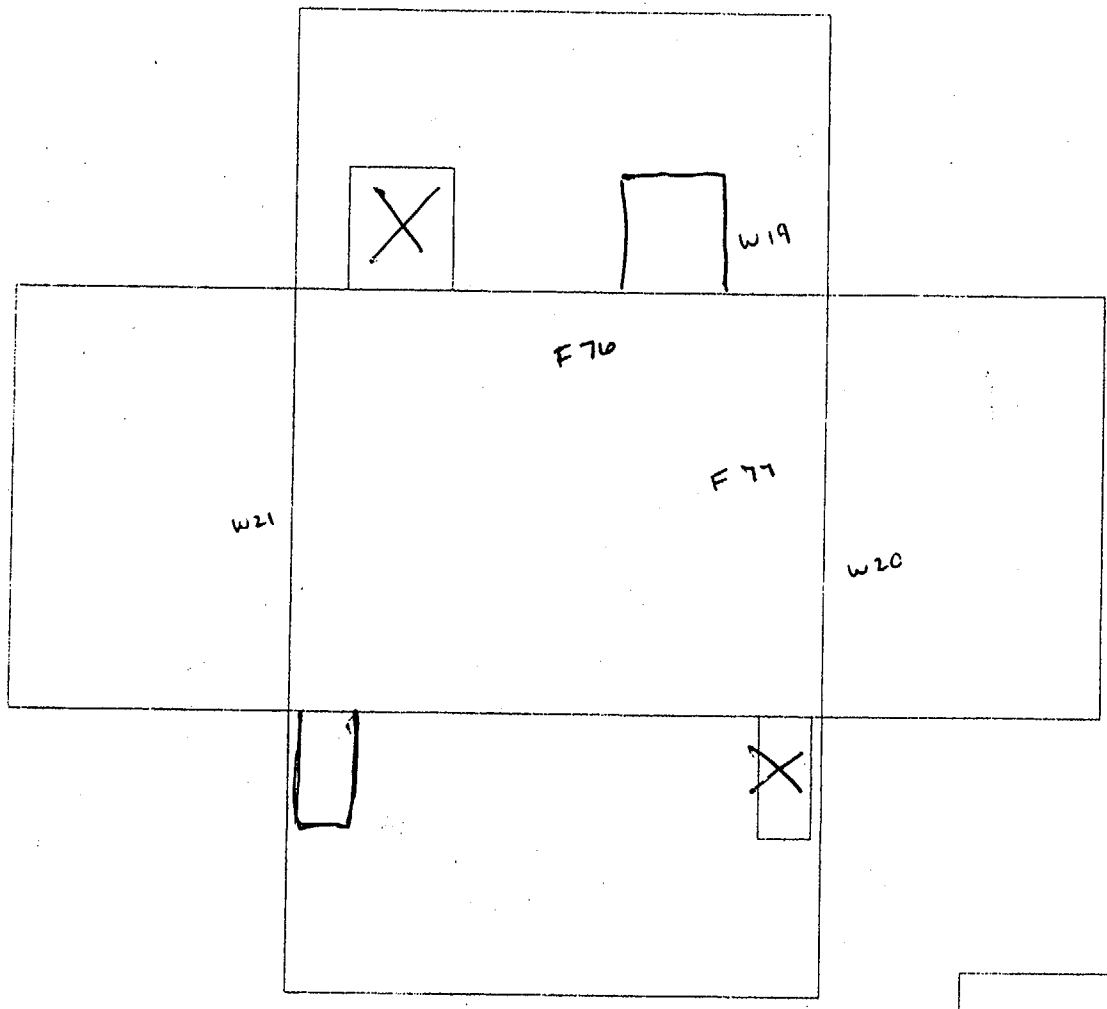


Room
Interior

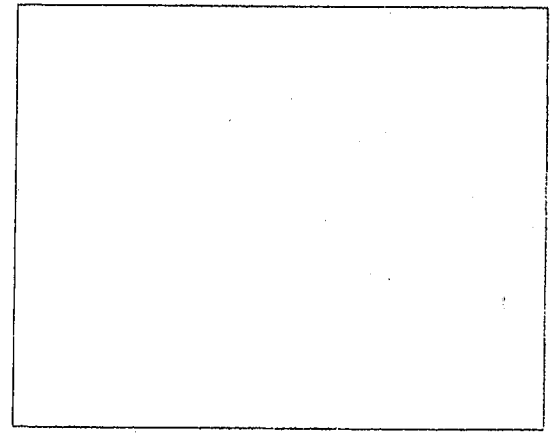
Scale:
4m x 4m

Survey # 03-0145

Building 2
Room B, 1st Floor
North



Room
Interior



Room
Ceiling

Scale:
4m x 4m

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:	MARK BLANCHARD	Mark Blanchard	5-6-02

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	280	2	282	212	3	8	-.23	6
W-2	340	4	301	239	3	8	2.7	30
W-3	360	3	321	247	12	7	-.23	0
W-4	290	1.6	251	200	3	8	-.23	-12
W-5	380	2.4	288	241	4	8	2.7	36
W-6	300	1.4	273	195	3	6	-.23	6
W-6QC	-	-	268	189	2	7	-.23	-6
W-7	340	2.8	275	236	2	7	2.7	-18
W-8	320	1.8	290	220	4	6	-.23	0
B-9	280	2.0	186	194	1	6	-.23	30
B-10	290	2.6	173	166	3	6	-.23	6
W-11	250	2	189	179	1	6	-.23	24
W-12	270	4	189	181	0	6	-.23	0
W-13	290	2	196	167	2	8	-.23	-18
W-14	280	2	203	181	1	9	-.23	30
W-15	320	2.4	313	236	0	8	2.7	-6
W-16	300	4	286	225	2	8	-.23	24
W-17	330	2	294	268	2	11	-.23	6
W-18	320	2	303	279	3	10	-.23	-12
W-19	340	2.6	433	451	4	8	2.7	0
W-20	350	2	301	231	2	8	-.23	-12
W-21	320	2	298	248	1	8	-.23	18

1-5 = Cinder Block
6-7-8 = Cement
15-21 Block

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #2 - 1ST Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-2	1440	14	319	256	8	8	-.23	6
F-5	1490	11	329	232	5	7	-.23	12
F-8	1540	19	297	285	2	7	-.23	-6
F-9	1750	16	351	253	0	8	2.7	18
F-12	1410	14	276	215	4	6	-.23	6
F-15	1440	10	304	232	6	6	-.23	0
F-17	1480	12	320	261	5	7	-.23	24
F-19	1580	16	331	241	2	6	-.23	18
F-24	1440	12	316	248	3	6	-.23	6
F-24 QC	—	—	293	203	3	6	-.23	-12
F-27	1500	15	323	223	5	6	-.23	18
F-31	1490	10	289	269	4	7	-.23	6
F-33	1600	10	303	221	3	6	-.23	0
F-36	1480	10	316	259	5	7	2.7	-12
F-39	1610	18	287	233	4	6	2.7	6
F-41	1610	12	322	229	3	6	2.7	18
F-44	1540	12	316	243	7	7	-.23	24
F-45	1580	10	342	255	2	7	2.7	6
F-49	1680	15	341	242	2	6	-.23	18
F-51	1650	14	328	238	4	7	2.7	6
F-57	1580	10	332	277	3	7	2.7	12
F-61	1600	12	294	220	0	7	-.23	-12
F-63	1610	11	347	276	6	6	-.23	24
F-66	1500	10	340	271	3	6	2.7	6
F-70	1530	9	324	269	2	6	-.23	12
F-71	1650	9	330	246	3	6	-.23	18
F-72	1620	12	342	248	2	6	-.23	6

02-0145

Radiological Survey Results - Survey Location Indicator

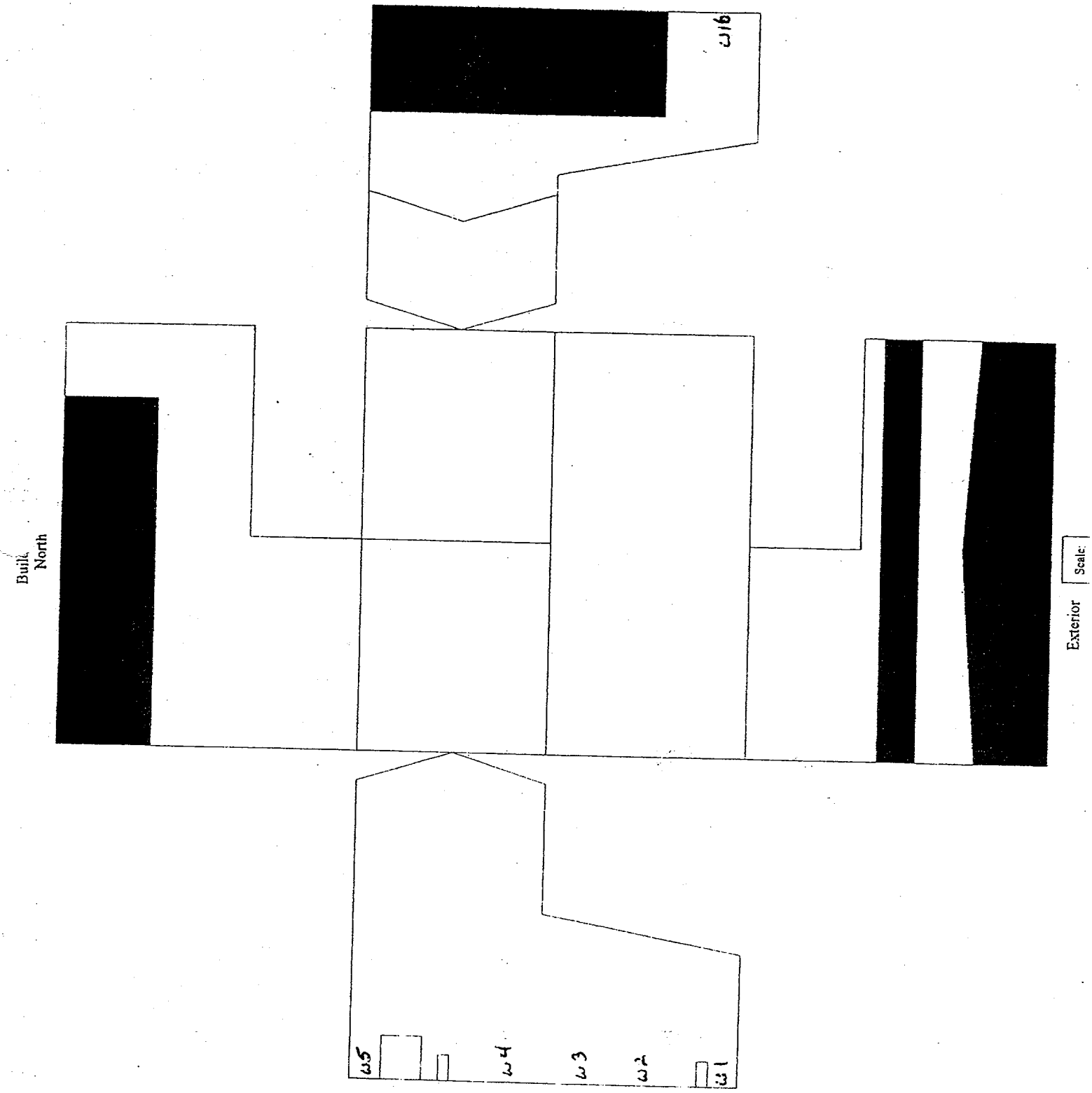
Survey Area Information: Bldg 2 1st Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-73	1520	14	315	276	2	8	-.23	6
F-74	1500	16	352	276	3	8	2.7	12
F-75	1700	16	316	298	1	11	2.7	0
F-76	1620	15	346	268	0	8	-.23	-12
F-77	1600	15	358	288	2	8	-.23	-12

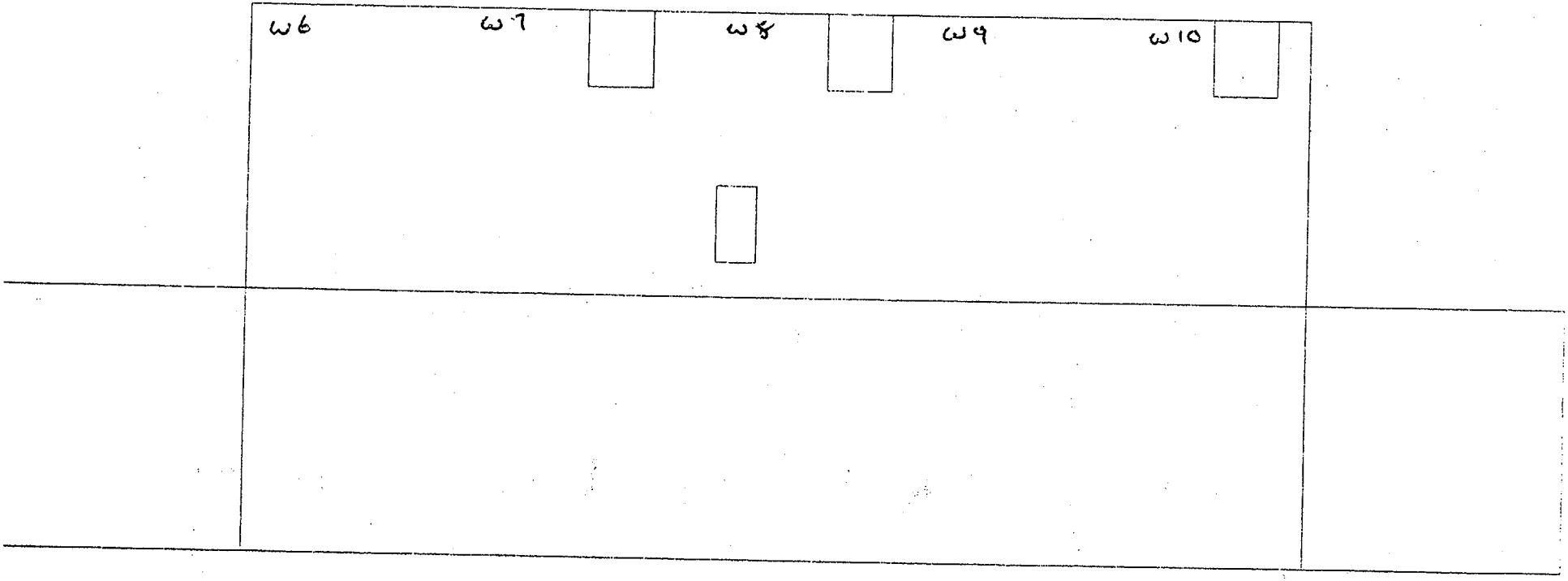
02-0145



07-0145

Building 2
North Side Extention

North



Exterior

Scale:
4m x 4m

Radiological Survey Results - Survey Location Indicator Survey # 02-0175

Survey Area Information: BLDG 2 EXTERIOR WALL

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

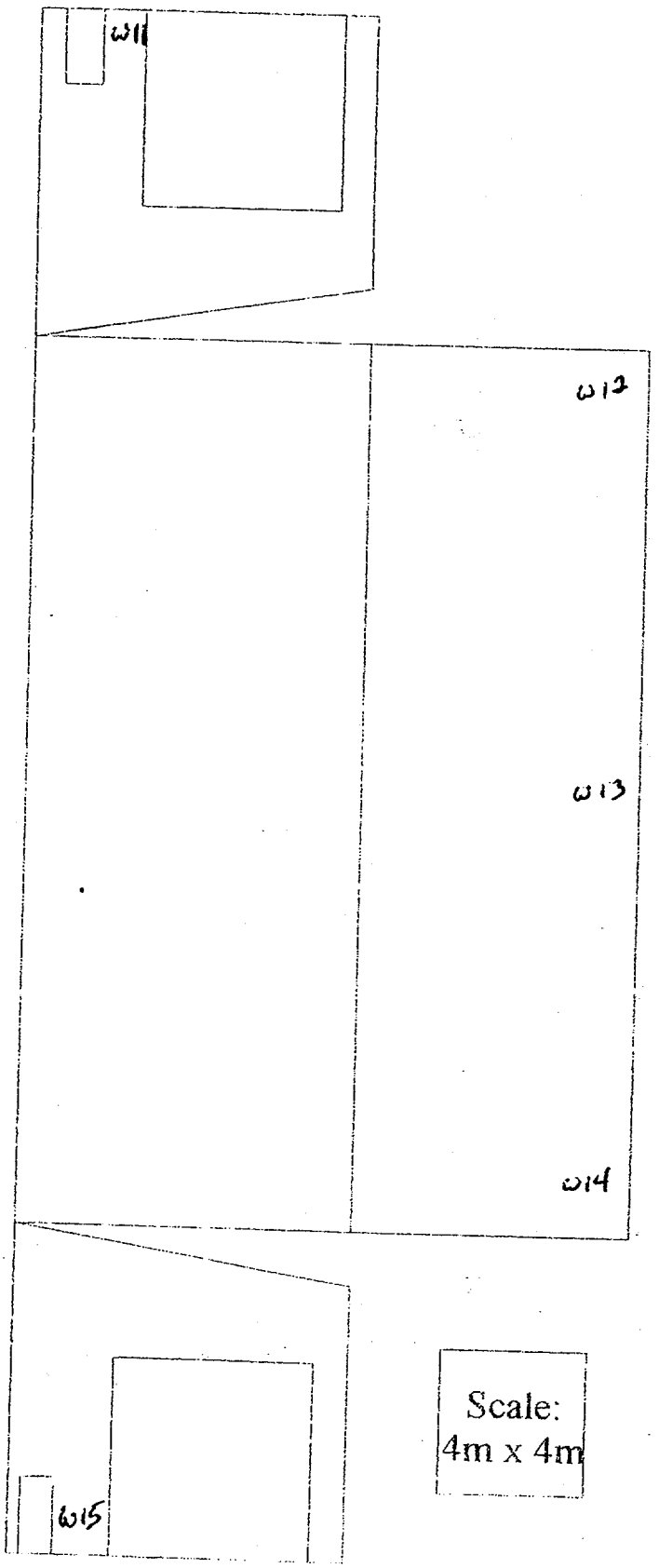
	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	220	1	210	178	5	8	-.23	0
W-2	220	1	211	209	8	8	-.23	6
W-3	265	1.4	254	222	5	6	2.7	-6
W-4	210	.8	158	199	2	6	-.23	12
W-5	200	1	190	179	8	8	-.23	0
* W-6	300	2	307	250	9	9	2.7	-18
* W-7	290	1	284	232	1	8	-.23	6
* W-8	271	1.6	249	202	7	9	-.23	-12
* W-9	286	.8	291	225	7	9	-.23	6
* W-10	280	1.2	294	238	3	9	-.23	12
* W-10 QC	—	—	300	228	8	6	2.7	0
W-11	210	1	180	196	5	6	-.23	18
W-12	220	1	205	215	2	6	-.23	-18
* W-13	240	2.2	244	207	7	6	-.23	24
W-14	240	1.8	220	192	5	5	-.23	30
W-15	210	2.9	204	215	5	5	-.23	-12
W-16	200	1.6	205	212	3	6	2.7	-6

* Block

02-0145

Building 2
Loading Dock
North



Exterior

DDO-138 Radiation Protection Survey Report

Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg 2 2nd Floor (Control Room / Lab area)

Date:	Time:	Location:	Survey Issue Log Number:
5-6-02	1000	2nd FLOOR	02-0144

RWP Number: NA

Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:

Page 1 of 8

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
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20		
21		
22		
23		
24		
25		
26		

	BKGD	MDA
FLOOR	β⁻ 78	476
	α 2.4	64
WALL	β⁻ 8	172
	α 3.7	76

Model 19# 115870 08/06/02

Bkgd Readings: 5 microRem/HR

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | —①— = Large Area Wipe | = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: β⁻	MDA: α	Other BKGD β⁻	Other BKGD α
2350-1/117566	8/6/02	43-106/133866	8/6/02	β⁻.248/~~.511~~	578	57	230	1.6
2350-1/95359	8/6/02	43-37/092503	8/6/02	β⁻.27/~~.207~~	191	19	1515	9
2224-1/129463	8/6/02	43-89/169230	8/6/02	β⁻.092/~~.154~~	See	Above	←	
2929/152202	2/6/03	43-10/156519	2/6/03	β⁻.165/~~.344~~	158	11.6	48	.08
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Michael A. Blondel	☐ Yes ☐ No ☑ Not Required	05/06/02 1000
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 5-15-02 0930

Radiological Survey Results - Survey Location Indicator 02-0144

Survey Area Information:

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1400	6	327	236	1	5	-.23	18
F-2	1500	8	356	282	3	5	-.23	-12
F-3	1400	10	311	248	2	6	2.7	0
F-4	1500	5	309	246	3	6	-.23	6
F-5	1300	7	303	242	7	6	2.7	-6
F-6	1580	6	312	226	5	6	-.23	0
F-7	1360	11	310	259	2	6	2.7	-12
F-8	1680	10	311	219	3	6	-.23	6
F-9	1500	11	295	245	2	6	-.23	24
F-10	1280	14	320	262	1	6	-.23	12
F-11	1600	3	285	206	1	5	-.23	0
F-12	1500	4	319	236	7	5	2.7	6
F-13	1600	7	318	208	5	5	2.7	18
F-14	1400	5	313	214	1	5	-.23	12
F-15	1200	9	322	214	2	5	-.23	0
F-16	1500	8	327	227	1	5	-.23	30
F-16 QC			316	244	3	5	-.23	12
W-17	280	2	200	159	3	5	-.23	6
W-18	240	2	225	186	0	5	-.23	12
W-19	242	3	238	218	2	6	-.23	30
W-20	275	1	196	190	2	6	-.23	12
W-21	249	2	191	176	2	6	2.7	30
W-22	274	2	188	227	2	6	-.23	0
W-23	250	1	196	188	1	6	-.23	6
W-24	247	2	170	179	4	6	2.7	24
W-25	264	2	185	189	2	6	-.23	12
W-26	267	1	202	220	2	5	-.23	6

Radiological Survey Results - Survey Location Indicator

02-0144

Survey Area Information:

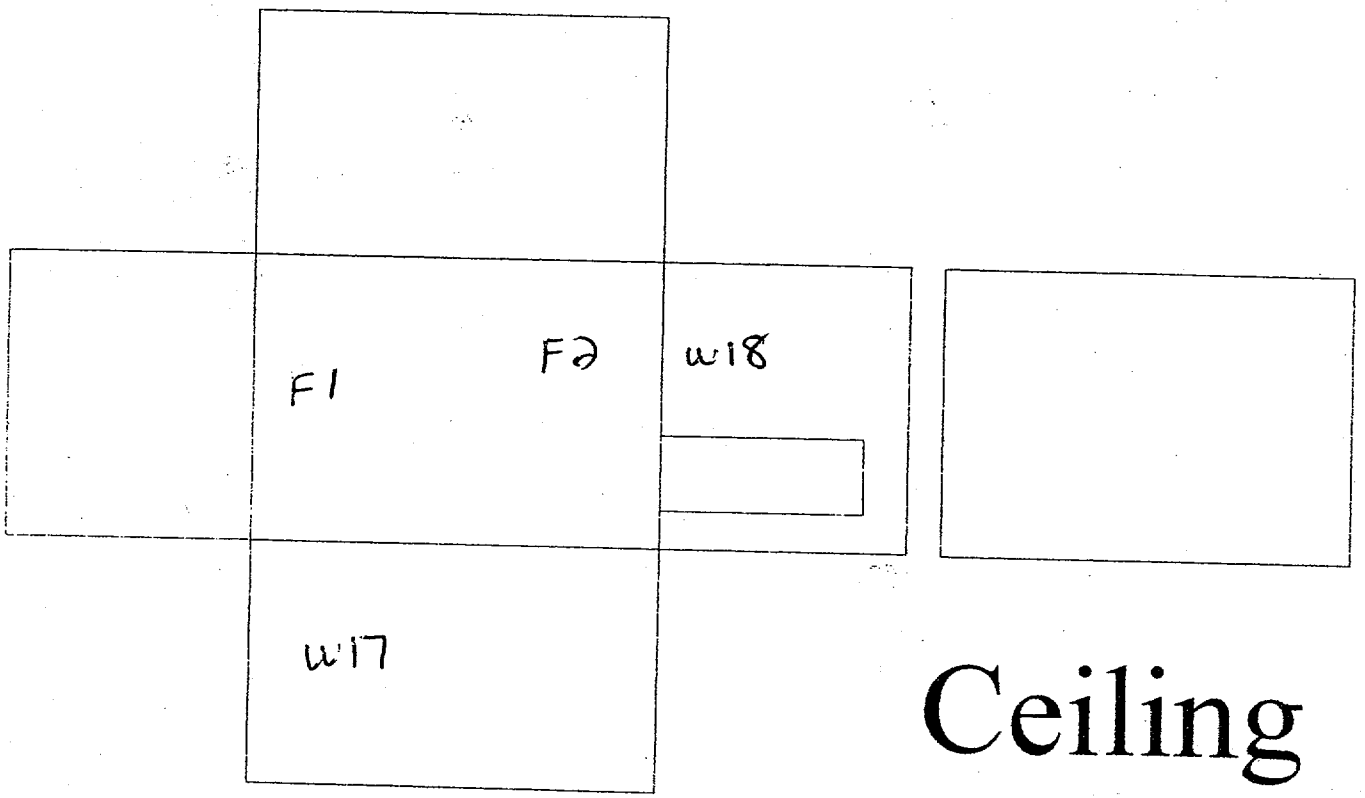
	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-27	255	1	197	202	3	5	-.23	0
W-28	284	1	224	216	3	5	-.23	-12
W-29	257	0	183	181	2	5	-.23	24
W-30	250	1	194	194	2	5	-.23	0
W-31	237	0	187	173	1	5	-.23	18
W-32	286	1	242	221	0	5	-.23	12
W-32 QC	246	1	200	171	0	5	-.23	12
W-33	286	1	224	227	3	5	2.7	6
W-34	282	1	223	216	0	5	-.23	0
W-35	285	1	189	208	2	5	2.7	-6

Building 2
Room C, 2nd Floor
North

Survey # 02-0144



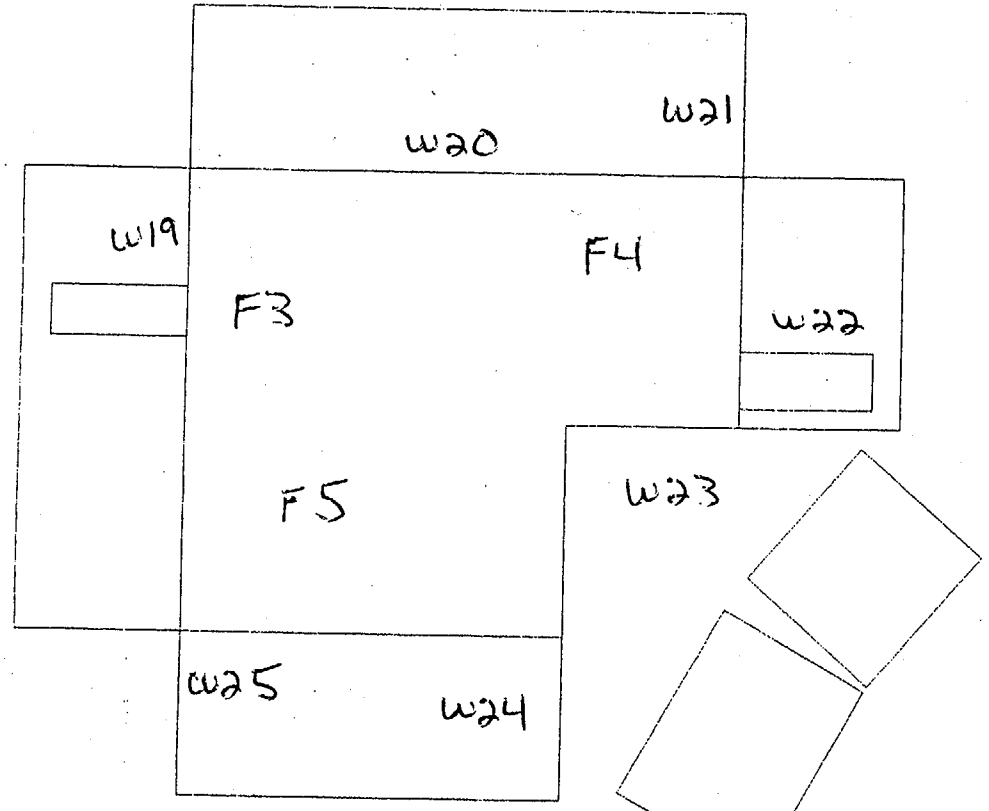
Ceiling

Interior

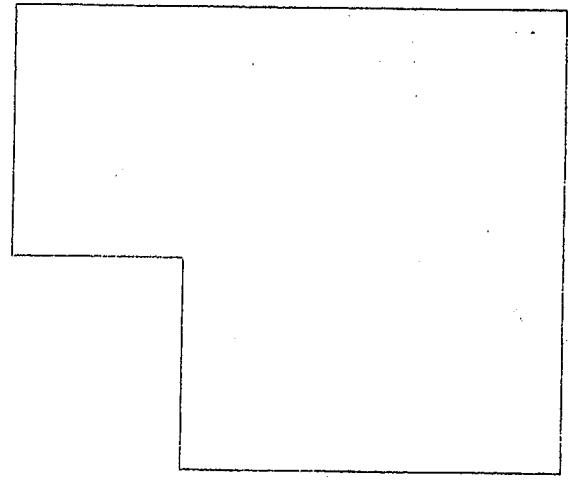
F = Floor Surface
W = Wall Surface

Scale:
4m x 4m

Building 2
Room D, 2nd Floor
North



Interior



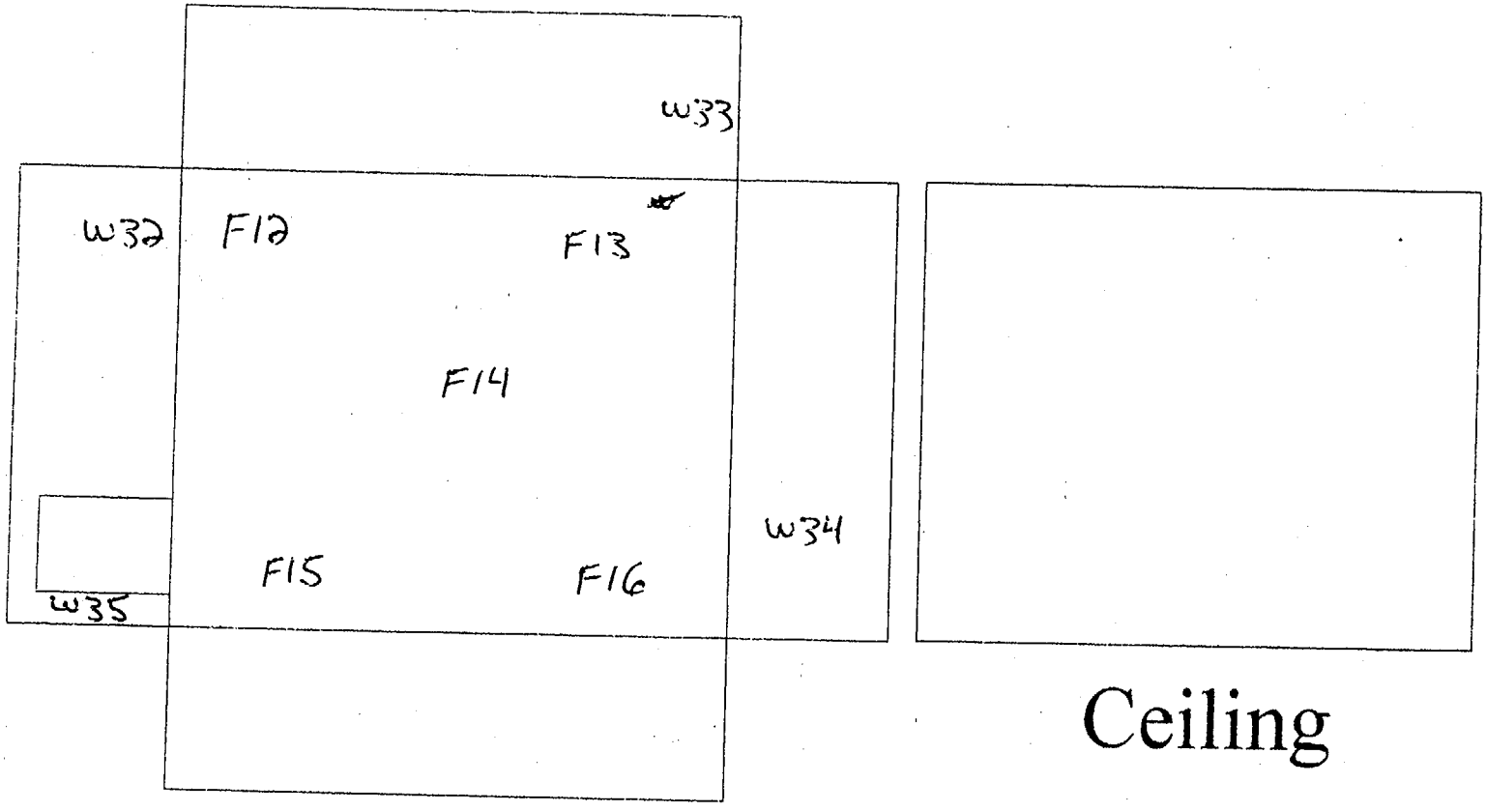
Ceiling

Survey # 02-0144

F = Floor Surface
W = Wall Surface

Scale:
4m x 4m

Building 2
Room G, 2nd Floor
North



Ceiling

Interior

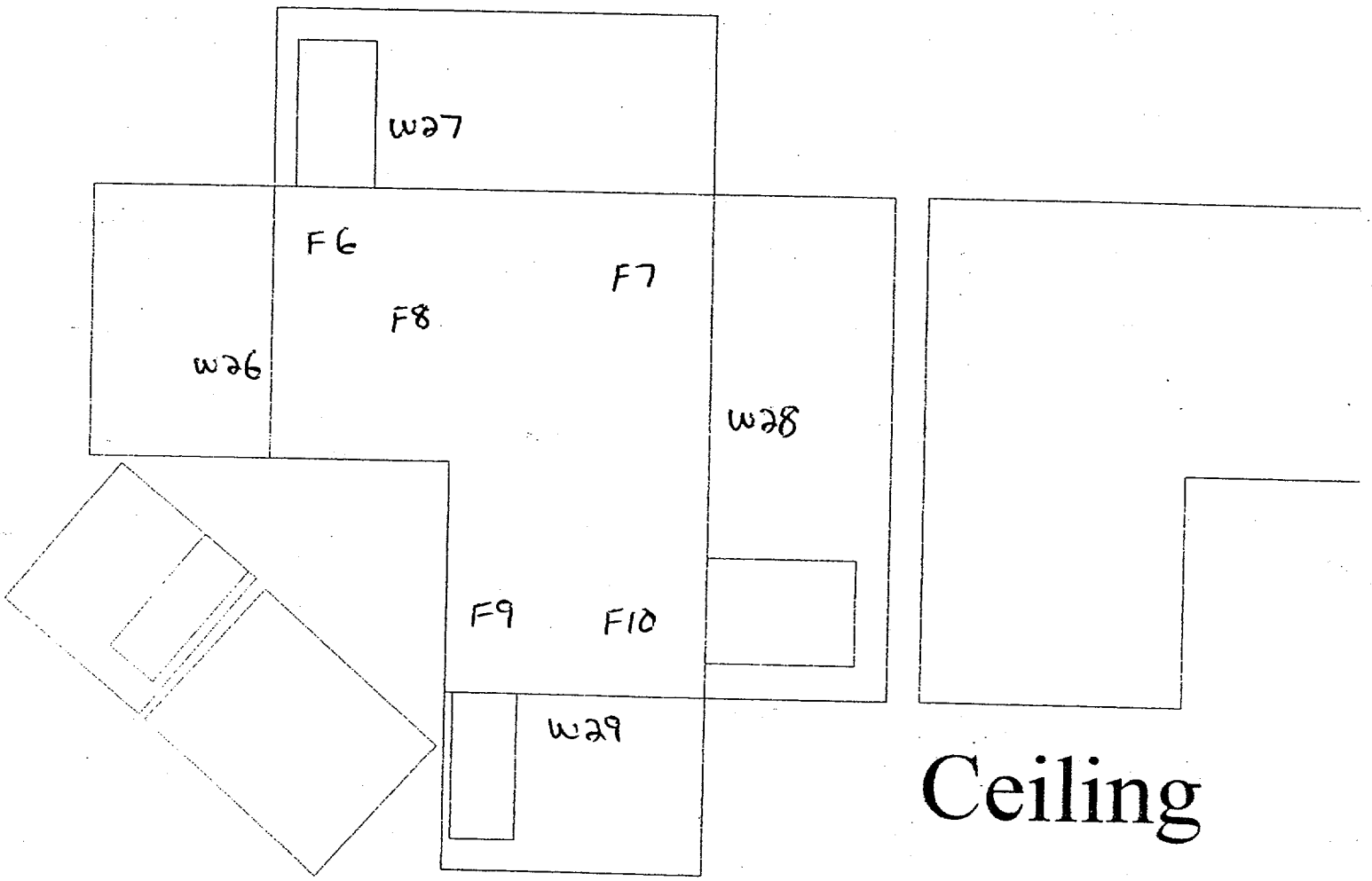
F = Floor Surface
W = Wall Surface

Survey # 02-0144

Scale:
4m x 4m

Building 2
Room F, 2nd Floor
North

Survey # 02-0144



Ceiling

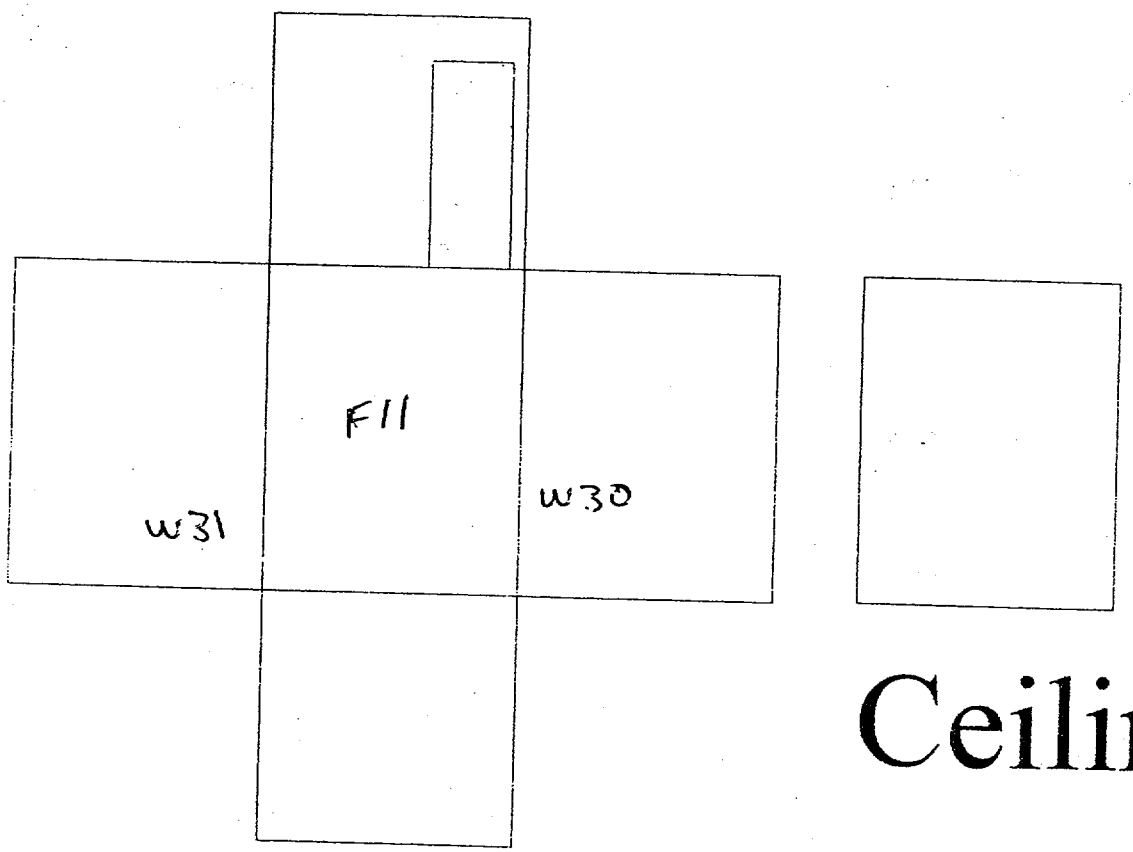
Interior

W = WALL SURFACE
F = FLOOR SURFACE

Scale:
4m x 4m

Building 2
Room E, 2nd Floor
North

Survey # 02-0144



Ceiling

Interior

Scale:
4m x 4m

F = Floor Surface
W = Wall Surface

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information 2nd Floor

Date:	Time:	Location:	Survey Issue Log Number:
5-6-02	1100	Bldg 2	02-0143

RWP Number:	Purpose of Survey:	Page 1 of 4
NA	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:	

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
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10		
11		
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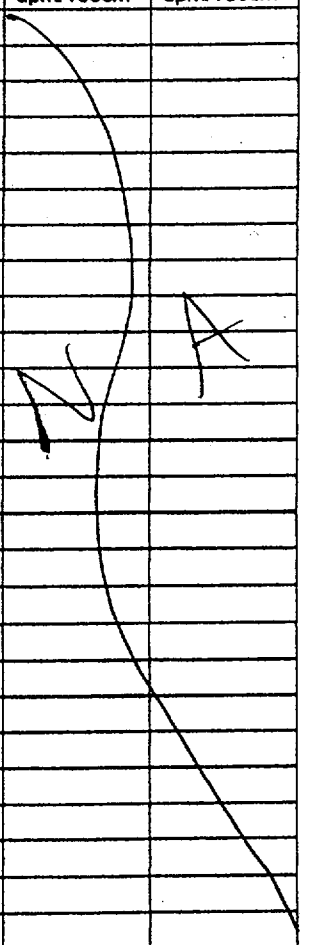
22		
23		
24		
25		
26		



Model 19 # 115870 8-6-02

	BKG	MDA
WALL	B^- 8	180
	α 3.7	76

Bkgd Readings: 2-6 micro Rem/hr

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | –①– = Large Area Wipe | ☐ = Bulk Material Sample

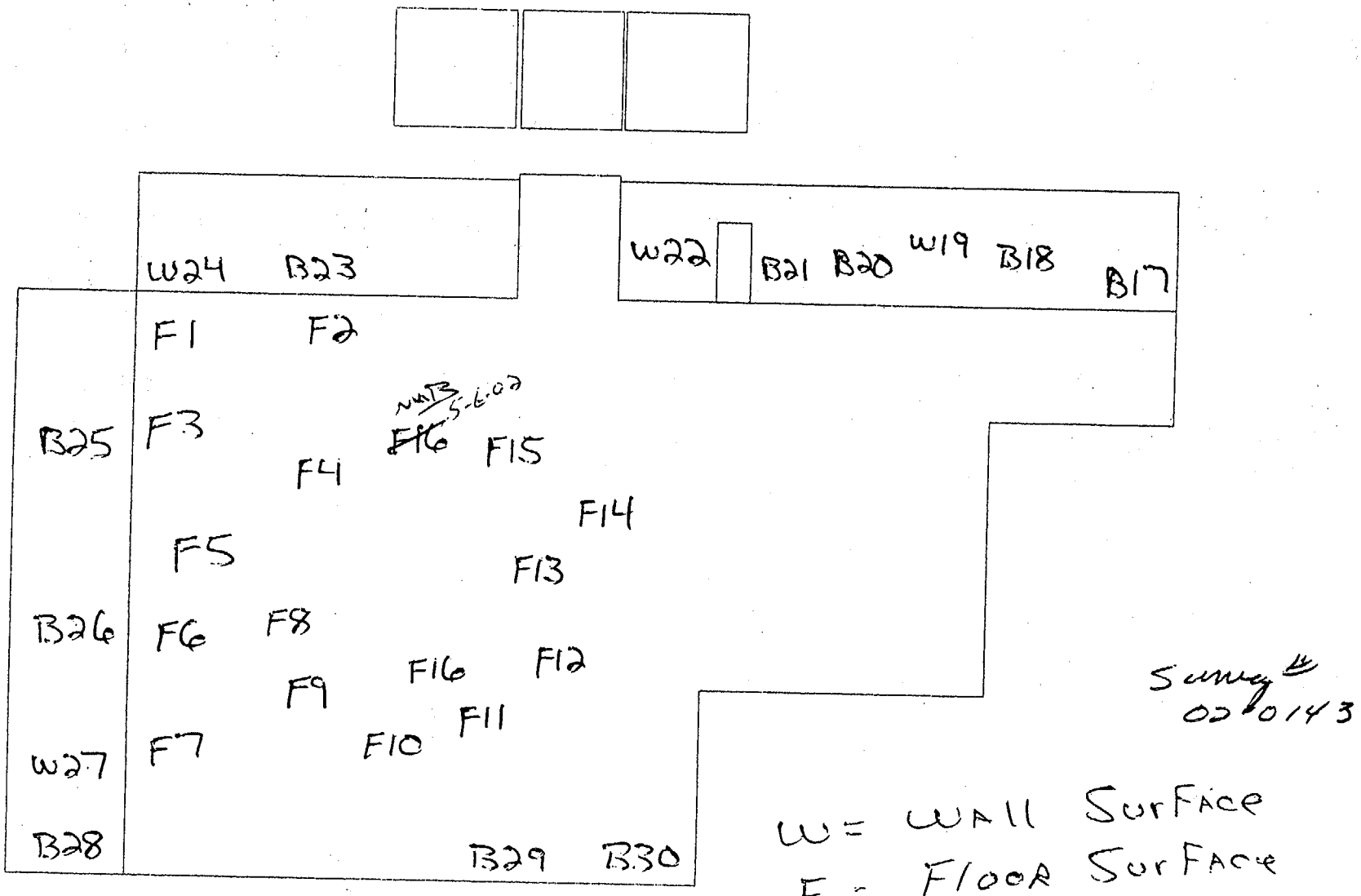
Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
					B^- / α	B^- BKG / α
2350-1/95359	8-6-02	43-37/092503	8-6-02	.27 / .207	144 / 19	860 / 9
2360/156371	8-15-02	43-89/164832	8-5-02	.088 / .153	See Above	
2350-1/117566	8-6-02	43-106/133866	8-6-02	.248 / .211	482 / 49	160 / 1.2
2929/152202	2-6-03	43-10/156519	2-6-03	.165 / .344	158 / 11.6	48 / .08

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Michael A. McDonald	☐ Yes ☐ No ☑ Not Required	05/06/02 1430
Radiation Safety Officer (Print Name & Sign):		**Date and Time:**
Mike McDonald		5-15 02 0930

Buildir _ 2
2nd Floor
North



Survey 02 0143

W = Wall Surface
F = Floor Surface
B = Steel Beam

Interior

Scale: 4m x 4m

Page 2 of 4

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #2 - 2nd Floor Survey # 02-0143

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	912	14	199	190	2	2	-.23	-6
F-2	930	6	172	190	4	3	-.23	0
F-3	840	8	188	198	3	3	-.23	-12
F-4	910	14	195	189	4	2	2.7	-18
F-4 QC	—	—	190	182	2	4	-.23	0
F-5	970	18	189	178	1	4	2.7	6
F-6	910	10	175	179	6	4	-.23	-6
F-7	960	12	171	186	2	4	-.23	18
F-8	1010	12	195	197	8	4	2.7	0
F-9	940	7	180	212	2	5	-.23	-12
F-10	910	10	200	211	2	5	-.23	24
F-11	860	12	165	188	2	5	2.7	12
F-12	790	12	202	173	5	4	-.23	0
F-13	1030	15	229	199	4	6	-.23	24
F-14	940	12	190	178	6	6	-.23	30
F-15	970	12	197	225	1	4	-.23	12
F-16	950	6	159	168	2	4	-.23	-18
B-17	190	1.4	151	173	1	2	2.7	0
B-18	200	2.6	177	167	8	3	-.23	-12
W-19	200	3	163	159	1	3	-.23	12
B-20	190	2	180	154	4	4	-.23	-6
B-21	210	2	173	162	3	3	2.7	-6
W-22	200	1	162	165	2	3	-.23	12
B-23	220	1.4	137	143	4	3	-.23	24
W-24	220	1.2	157	145	1	3	-.23	18
W-25	230	1.6	169	180	5	4	-.23	0
B-26	240	1.8	195	178	2	4	-.23	6

W = Wall Surface
B = Steel Beam
F = Floor Surface

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Survey # 02-0143

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-27	200	2	156	195	1	3	-.23	0
B-28	210	1.6	152	147	Ø	3	-.23	6
B-29	220	4	128	125	4	2	-.23	18
B-30	200	2.2	164	152	1	2	-.23	-6

RPP-OP-019

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #2 - 3rd Floor

Date: 5-2-02	Time: 1700	Location: Bldg 2-	Survey Issue Log Number: 02-0141
RWP Number: NA	Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:		Page 1 of 4

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm^2	Alpha dpm/100cm^2
1	N	A
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

	BKG	MDA
Wall + Diamond Plate	β 8	180
	α 3.7	76

Model 19 115870 8-6-02

Bkgd Readings: 2-4 micro Rem/hr

Legend:

00 = mRem/h gamma; 00 C = mRem/h gamma contact; ① = Smear Location; ∇ = Air Sample Location; -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta; 00 βC = mRem/h beta contact; –①– = Large Area Wipe; ☐ = Bulk Material Sample

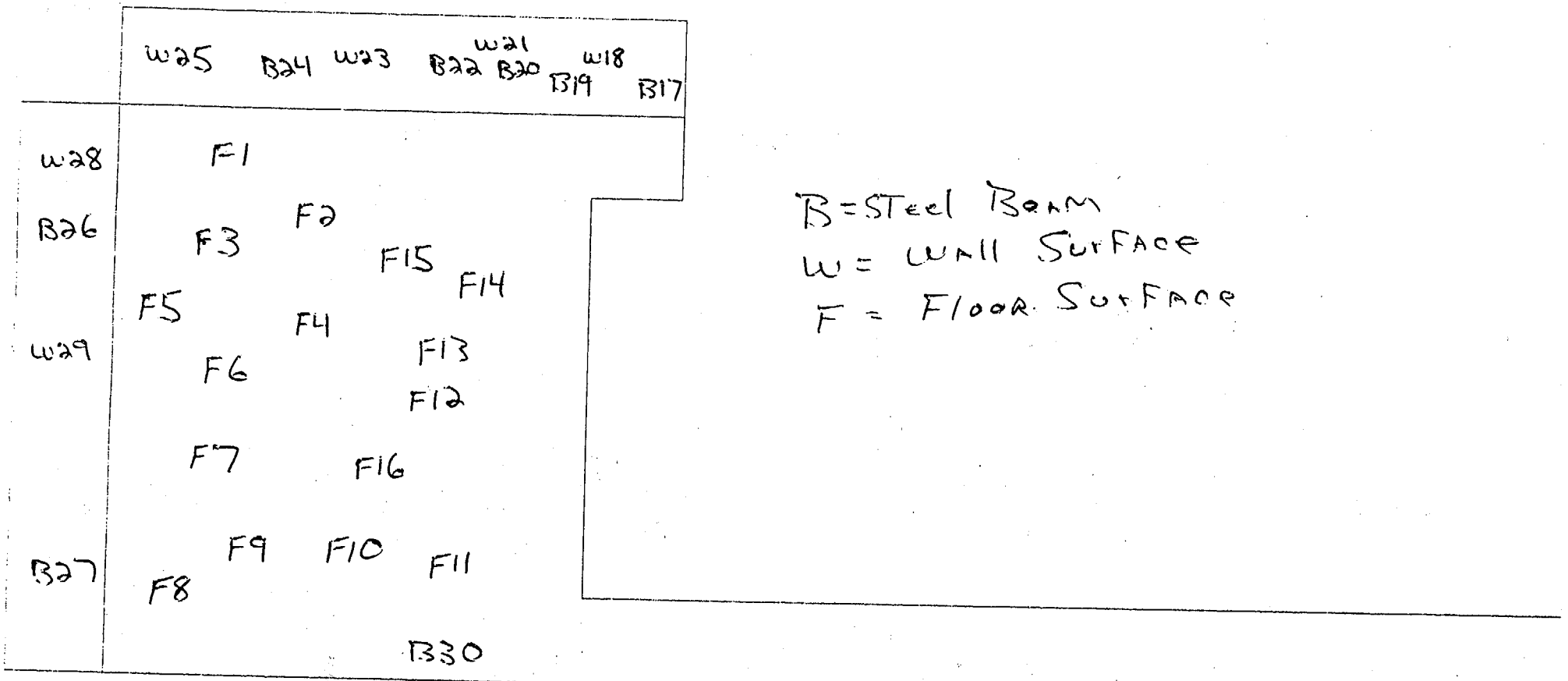
Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
				β α	β α	β Bkgd α
2350-1/95359	8-6-02	43-37/692563	8-6-02	.27 .207	144 ~~39~~ 19	860 9
2350-1/117566	8-6-02	43-106/133866	8-6-02	.248 .211	482 ~~49~~ 30	160 1.2
2360/156371	8-15-02	43-89/164832	8-5-02	.088 .153	See above	
2929/152202	2-6-03	43-10/156519	2-6-03	.165 .344	β 152 12	β 47 .15

Section 3: Review and Approval

Survey Performed By (Sign): Mark Blazevich	Area Posted and/or Barricaded: ☐ Yes ☐ No ☒ Not Required	Date and Time: 5-2-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald [signature]		Date and Time: 5-15-02 0730

Building 2
3rd Floor
North



Radiological Survey Results - Survey Location Indicator

Survey # 02-0141

Survey Area Information: Bldg #2 - 3rd Floor

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	890	14	188	161	3	4	-.4	6
F-2	915	5	168	176	1	3	2.5	0
F-3	870	7	203	187	1	3	-.4	24
F-4	1050	15	199	167	1	3	-.4	79
F-5	860	10	207	179	2	3	2.5	0
F-6	1010	9	206	176	1	3	-.4	6
F-7	980	8	219	210	3	4	-.4	-12
F-8	850	12	202	183	2	5	2.5	12
F-9	900	10	166	200	3	4	-.4	-6
F-10	860	8	180	189	4	4	2.5	6
F-11	840	6	174	199	3	4	-.4	0
F-12	1010	7	216	180	2	5	-.4	12
F-13	940	9	172	188	1	6	-.4	-6
F-14	870	10	159	163	2	5	-.4	6
F-15	950	6	209	174	4	4	-.4	-18
F-16	~~845~~ 845	∅	206	194	2	4	2.5	18
B-17	230	∅	148	150	2	3	-.4	24
W-18	238	∅	165	144	2	3	-.4	0
B-19	206	1	155	157	4	2	-.4	6
B-20	210	2	132	161	4	2	2.5	30
W-21	220	∅	178	152	0	2	-.4	6
B-22	219	∅	159	142	0	2	-.4	-24
W-23	220	1	176	159	2	3	-.4	6
B-24	190	1	153	146	2	3	-.4	-12
W-25	188	∅	128	145	1	2	-.4	0
B-26	193	∅	173	156	4	3	-.4	-6
B-27	190	∅	143	149	2	4	2.5	6

W = Wall Surface
B = Steel Beam
F = Floor Surface

Radiological Survey Results - Survey Location Indicator Survey # 02-0141

Survey Area Information: Bldg 2 3RD FLOOR

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
L-28	210	0	190	176	2	4	-.4	-6
L-29	210	1	169	197	4	3	-.4	-18
L-30	200	0	184	191	1	3	-.4	6
L-30 QC	200	1	182	188	2	3	2.5	12

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg 2 4th Floor

Date:	Time:	Location:	Survey Issue Log Number:
5-1-02	1700	Bldg #2	02-0140

RWP Number:	Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:	Page 1 of 4

Survey Title: unaffected

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
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13		
14		
15		
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18		
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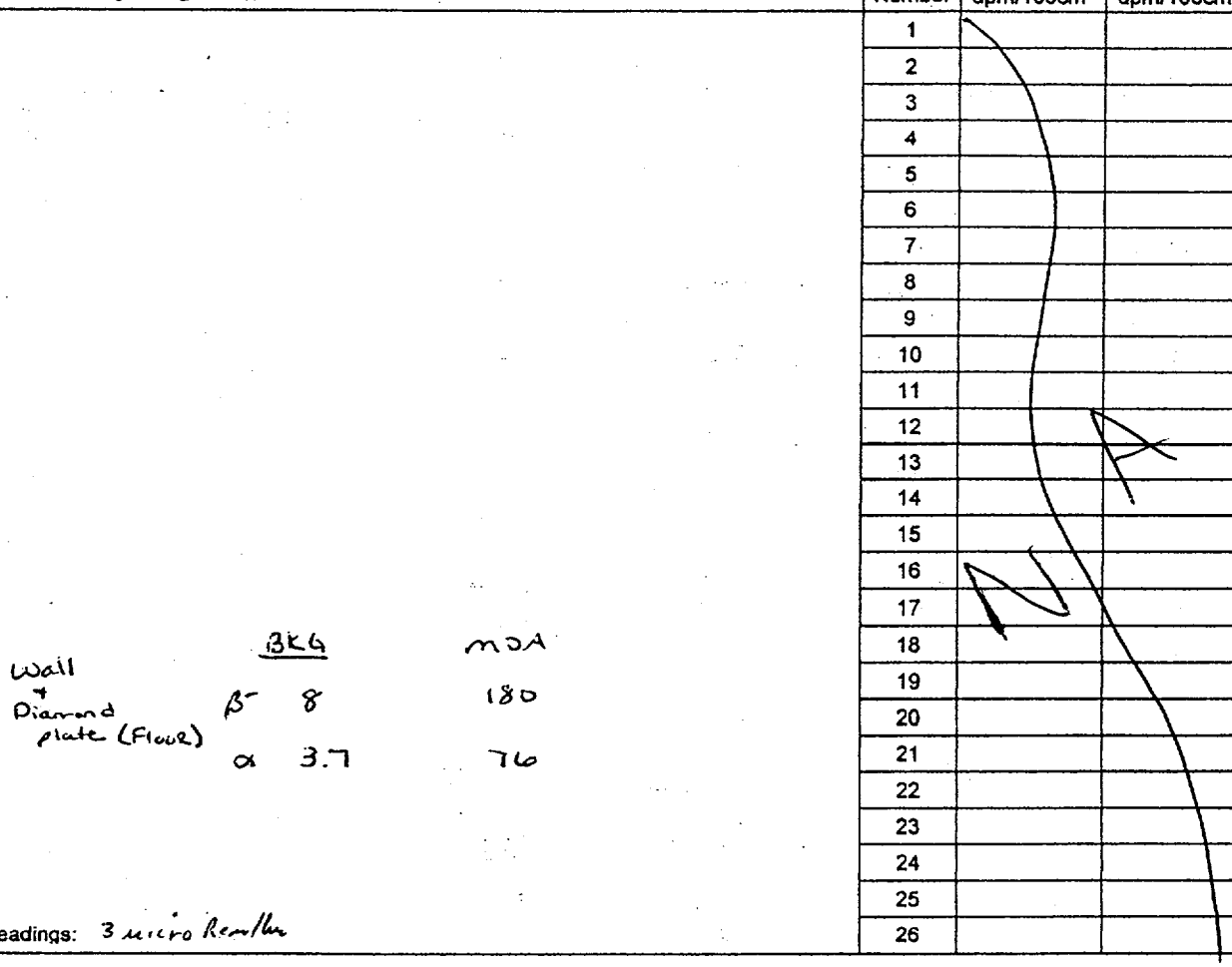
21		
22		
23		
24		
25		
26		



	BKG	MDA
Wall + Diamond plate (Floor)	β⁻ 8	180
	α 3.7	76

Bkgd Readings: 3 micro Rem/hr

Legend:
00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier
00 β = mRem/h beta | 00 βC = mRem/h beta contact | –①– = Large Area Wipe | □ = Bulk Material Sample

Section 2: Instrument Used

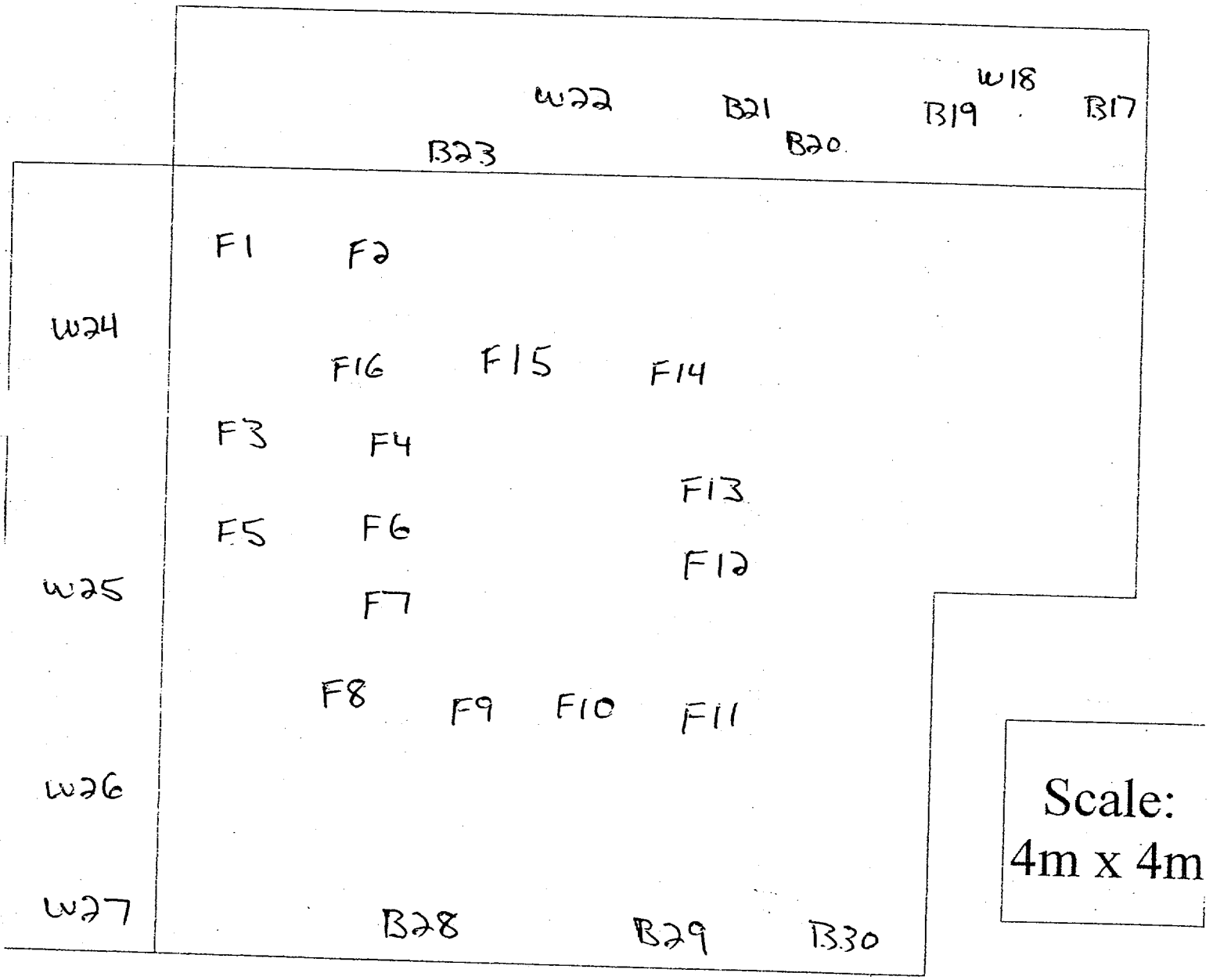
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27 α .207	β⁻ 144 α 19	β⁻ Bkgd 860 α 9
2350-1/117566	8-6-02	43-106/133866	8-6-02	β⁻ .248 α .211	β⁻ 482 α 99	β⁻ 160 α 1.2
2360/156371	8-15-02	43-89/164832	8-3-02	β⁻ .088 α .153	See above	
2929/152202	2-6-03	43-10/156519	2-6-03	β⁻ .165 α .344	β⁻ 152 α 12	β⁻ 47 α .13
19/165870	8-6-02					

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blanchard	☐ Yes ☐ No ☑ Not Required	5-1-02 | 1700
Radiation Safety Officer (Print Name & Sign):		**Date and Time:**
Mike McDonald		5-15-02 0930

02-0140

Building 2
4th Floor
North



Scale:
4m x 4m

Interior

W = Wall Surface
F = Floor Surface
B = Steel Beam

Survey # 02-0140

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg # 2 - 4th Floor - Floors/Walls

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	870	5	201	172	1	2	-.4	0
F-2	915	4	188	183	4	3	-.4	6
F-3	940	4	176	187	4	3	2.5	12
F-4	1000	3	162	200	0	3	-.4	0
F-5	1040	3	203	169	1	3	2.5	-24
F-6	940	5	205	181	1	3	2.5	30
F-7	1010	3	213	226	2	4	-.4	-12
F-8	820	4	189	192	2	5	-.4	24
F-9	990	5	204	172	2	4	2.5	18
F-10	940	5	206	185	3	5	-.4	0
F-11	740	4	189	174	3	4	-.4	-12
F-12	1100	8	216	207	2	4	-.4	18
F-13	840	6	186	200	4	4	-.4	12
F-14	890	12	160	175	4	3	2.5	-18
F-15	870	8	207	177	3	3	-.4	0
F-16	820	1	206	193	5	4	-.4	30
B-17	201	Ø	147	162	2	3	2.5	-12
W-18	198	Ø	184	168	0	3	-.4	0
B-19	209	1	181	159	2	3	-.4	24
B-20	221	1	164	170	1	2	2.5	0
B-21	216	1	140	145	0	2	-.4	6
W-22	200	Ø	152	181	4	3	-.4	24
B-23	198	Ø	175	171	2	3	-.4	-12
W-24	218	Ø	168	176	3	3	2.5	-6
W-25	238	Ø	174	161	2	4	-.4	12
W-26	252	1	180	172	4	4	2.5	0
W-27	228	Ø	179	180	5	3	-.4	6

(* all FLOOR readings on diamond plate)

W = Wall Surface
B = Steel Beam
F = Floor Surface

Survey # 02-0140

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg # 2 - 4th. Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
B-28	230	0	163	160	3	2	-.4	6
B-29	216	1	142	148	2	4	-.4	-6
B-30	219	0	170	178	3	3	2.5	-12
B-30 QC	220	1	167	173	3	2	-.4	-24

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg 2 5th FLOOR

Date:	Time:	Location:	Survey Issue Log Number:
5-1-02	1700	Bldg 2	02-0137

RWP Number: NA | Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☑ Other: | Page 1 of 4

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
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21		
22		
23		
24		
25		
26		

Model-19 #115870 8-6-02

	BKG	MDA
Wall & Diamond Plate (Floor)	B⁻ 8	180
	α 3.7	76

Bkgd Readings: 3 micro Rem/hr

Legend:
00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier
00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | □ = Bulk Material Sample

Section 2: Instrument Used

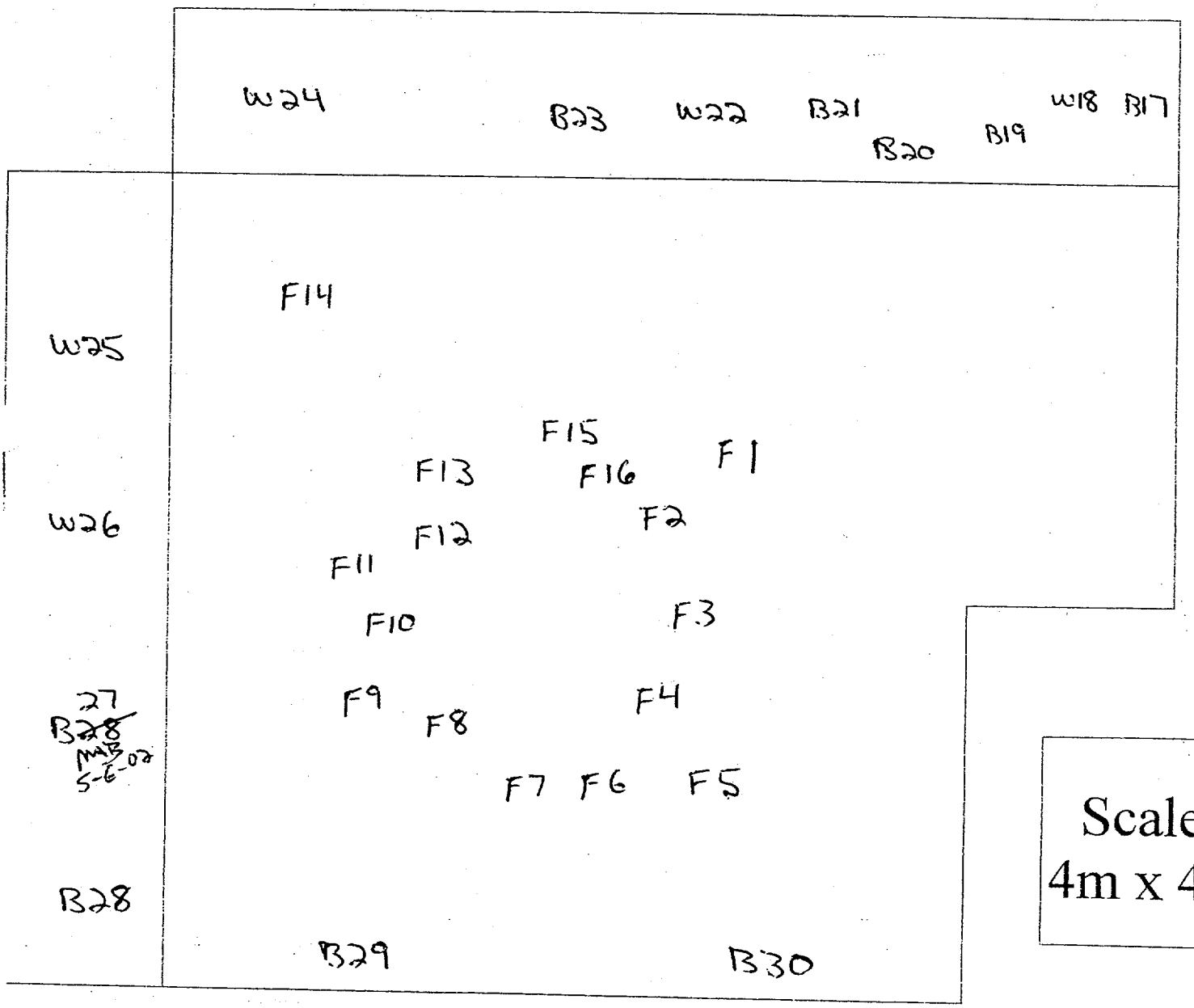
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:		Other	
					B⁻	α	B⁻	BKG α
2350-1/95359	8-6-02	43-37/092503	8-6-02	B⁻ .27 α .207	144	13.9	860	9
2350-1/117566	8-6-02	43-106/133866	8-6-03	B⁻ .248 α .211	B⁻ 482	α 44	B⁻ 160	α 1.2
2360/156371	8-15-02	43-89/164832	8-5-02	B⁻ .088 α .153	See Above			
2929/152202	2-6-03	43-10/156519	2-6-03	B⁻ .165 α .344	B⁻ 152	α 12	B⁻ 47	α .13

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark B Ranesik	☐ Yes ☐ No ☑ Not Required	5-1-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 5-15-02 0930

02-0137

Building 2
5th Floor
North



Scale:
4m x 4m

Interior

W = Wall Surface
B = Steel Beam
F = Floor Surface

Survey #02-0137

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #2 . 5th Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	920	4	164	180	2	3	-.4	30
F-2	940	6	208	221	4	3	-.4	-36
F-3	960	8	222	228	3	3	-.4	36
F-3 QC	N/A	N/A	222	225	5	3	-.4	36
F-4	1020	12	180	174	3	4	-.4	66
F-5	800	7	184	200	2	3	-.4	-12
F-6	980	10	207	206	5	4	-.4	0
F-7	950	6	197	179	3	4	-.4	24
F-8	1030	12	214	198	0	4	-.4	-24
F-9	1000	14	212	224	2	4	-.4	24
F-10	1030	16	227	253	4	5	-.4	42
F-11	930	8	210	201	6	5	-.4	0
F-12	950	12	206	225	1	5	2.5	-6
F-13	800	6	166	190	6	5	-.4	6
F-14	820	4	178	179	1	4	2.5	0
F-15	1000	8	188	183	1	4	-.4	12
F-16	920	6	206	204	5	3	-.4	12
B-17	180	2	141	157	1	3	-.4	-6
W-18	170	4	160	175	1	3	-.4	6
B-19	180	2	181	176	1	3	2.5	-18
B-20	180	2	170	184	1	4	2.5	6
B-21	193	1	173	179	2	3	-.4	-12
W-22	187	1	184	184	4	3	-.4	6
B-23	188	2	135	144	-3	3	-.4	18
W-24	206	1	144	138	1	4	-.4	6
W-25	215	2	161	179	1	4	2.5	-12
W-26	222	2	206	171	Ø	4	2.5	-6

F = Floor Surface
B = Steel Beam
W = Wall Surface

Survey # 02-0137

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 2 - 5th FLOOR

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
B-27	218	2	176	219	3	4	-.4	18
B-28	219	3	176	145	2	4	-.4	18
B-29	230	2	160	123	3	4	-.4	12
B-30	220	1	179	170	1	4	2.5	24

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #2 6TH FLOOR

Date:	Time:	Location:	Survey Issue Log Number:
5-1-02	1700	Bldg 2	02-0136

RWP Number:	Purpose of Survey:	Page
N/A	☐ RWP ☐ Routine Survey ☐ Unconditional Release ☑ Other:	1 of 4

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

	BKG	MDA
wall	β⁻ 8	180
Diamond Plate (floor)	α 3.7	76

Model 19-115870 8-6-02

Bkgd Readings: 3 micro Rem/hr

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | –①– = Large Area Wipe | ☐ = Bulk Material Sample

Section 2: Instrument Used

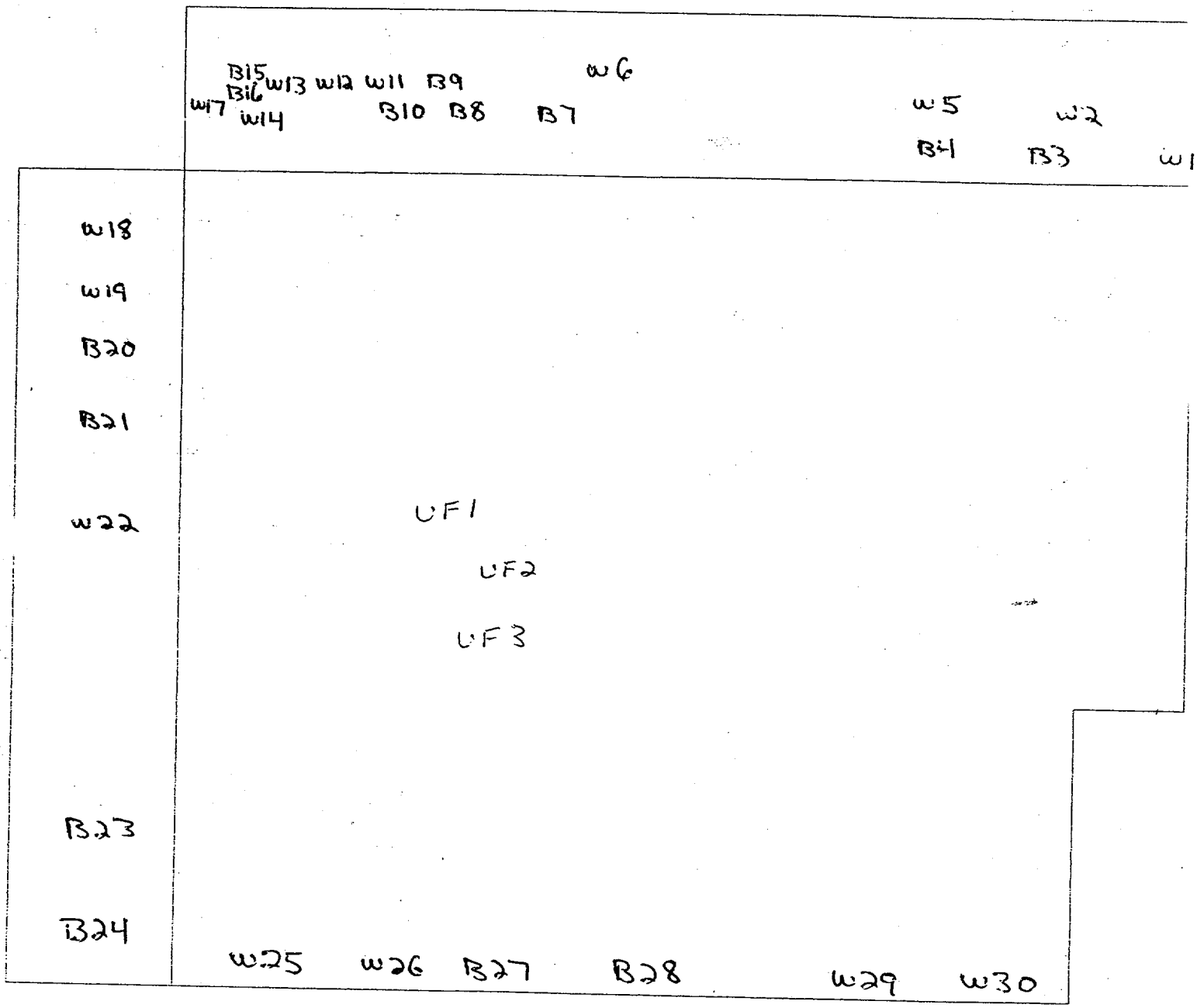
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: β⁻	MDA: α	Other BKG β⁻	Other BKG α
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27 α .207	144	13.9	860	9
2350-1/117566	8-6-02	43-106/133866	8-6-02	β⁻ .248 α .211	482	99	160	1.2
2360/156371	8-15-02	43-89/164832	8-5-02	β⁻ .088 α .153	See Above			
2929/152202	2-6-03	43-10/156519	2-6-03	β⁻ .165 α .344	β⁻ 152	α 12	β⁻ 47	α 13

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blaucak	☐ Yes ☐ No ☑ Not Required	5-1-02 / 1700
Radiation Safety Officer (Print Name & Sign):		**Date and Time:**
Mike McDonald		5-15-02 0930

Building 2
6th Floor
North

02-0136



Interior

UF = Upper Floor
B = Steel Beam
W = Wall Surface

Scale:
4m x 4m

Survey #02-0136

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #2 6th Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W1	1800	2	179	171	3	4	-.4	-12
W2	180	3	174	190	1	4	-.4	0
B-3	160	1	184	163	2	4	2.5	-18
B-4	160	2	185	189	3	4	-.4	0
W5	180	2	196	157	0	4	-.4	12
W6	200	2	172	167	2	3	-.4	42
W7	180	2	194	170	2	3	-.4	6
B8	170	2	172	159	Ø	3	-.4	0
B9	180	1	191	182	1	3	-.4	42
B10	210	2	136	157	2	3	2.5	12
W11	200	1	152	166	1	3	-.4	0
W12	200	1	175	162	2	3	-.4	24
W12 QC	180	2	180	169	1	3	-.4	18
W13	190	4	160	176	1	3	-.4	0
W14	200	2	171	170	Ø	3	2.5	36
B15	210	2	151	168	2	3	-.4	18
B-16	200	1	156	170	3	3	2.5	12
W17	190	2	145	146	2	3	-.4	12
W18	200	1	157	191	1	3	-.4	18
W19	220	1	163	203	2	4	-.4	24
B-20	210	4	168	151	1	4	-.4	18
B-21	200	2	185	199	2	4	2.5	42
W22	190	1	173	180	1	4	2.5	12
B-23	180	1	209	201	1	4	-.4	6
B-24	200	2	158	183	1	4	-.4	6
W25	200	2	178	176	1	3	-.4	0
W26	190	3	172	169	1	4	-.4	6

B = Steel Beam
UF = Upper Floor
W = Wall Surface

Survey # 02-013

Radiological Survey Results - Survey Location Indicator

Survey Area Information:

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
B-27	220	2	157	167	2	4	-.4	0
B-28	260	2	146	150	3	3	2.5	6
W-29	280	1	177	152	1	3	2.5	48
W 30	260	4	205	172	5	3	-.4	24
UF-1	430	2	307	293	3	4	-.4	-12
UF-2	380	2	211	206	4	4	-.4	-6
UF-3	390	3	317	296	6	4	-.4	30

Results of Surface Scans

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

1st Floor Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F2	1440	64	14	3.6
F5	1490	114	11	0.6
F8	1540	164	19	8.6
F9	1750	374	16	5.6
F12	1410	34	14	3.6
F15	1440	64	10	-0.4
F17	1480	104	12	1.6
F19	1580	204	16	5.6
F24	1440	64	12	1.6
F27	1500	124	15	4.6
F31	1490	114	10	-0.4
F33	1600	224	10	-0.4
F36	1480	104	10	-0.4
F39	1610	234	18	7.6
F41	1610	234	12	1.6
F44	1540	164	12	1.6
F45	1580	204	10	-0.4
F49	1680	304	15	4.6
F51	1650	274	14	3.6
F57	1580	204	10	-0.4
F61	1600	224	12	1.6
F63	1610	234	11	0.6
F66	1500	124	10	-0.4
F70	1530	154	9	-1.4
F71	1650	274	9	-1.4
F72	1620	244	12	1.6
F73	1520	144	14	3.6
F74	1500	124	16	5.6
F75	1700	324	16	5.6
F76	1620	244	15	4.6
F77	1600	224	15	4.6

1st floor floor scans performed with Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Floor Monitor Info:
Scan MDA Beta - 182 dpm/detector area
Scan MDA Alpha - 20.6 dpm/detector area
Scan background Beta - 1376 cpm
Scan background Alpha - 10.4 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Results of Surface Scans

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

No elevated scan results were reported.

Direct Measurements (Total Activity)

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

1st Floor Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha [1] (dpm/100cm^2)
F2	319	256	63	78	-15	-163	253	476	-326
F5	329	232	97	78	19	207	282	476	413
F8	297	285	12	78	-66	-717	202	476	-1435
F9	351	253	98	78	20	217	283	476	435
F12	276	215	61	78	-17	-185	251	476	-370
F15	304	232	72	78	-6	-65	261	476	-130
F17	320	261	59	78	-19	-207	249	476	-413
F19	331	241	90	78	12	130	276	476	261
F24	316	248	68	78	-10	-109	257	476	-217
F27	323	223	100	78	22	239	284	476	478
F31	289	269	20	78	-58	-630	211	476	-1261
F33	303	221	82	78	4	43	269	476	87
F36	316	259	57	78	-21	-228	248	476	-457
F39	287	233	54	78	-24	-261	245	476	-522
F41	322	229	93	78	15	163	279	476	326
F44	316	243	73	78	-5	-54	262	476	-109
F45	342	255	87	78	9	98	274	476	196
F49	341	242	99	78	21	228	283	476	457
F51	328	238	90	78	12	130	276	476	261
F57	332	277	55	78	-23	-250	246	476	-500
F61	294	220	74	78	-4	-43	263	476	-87
F63	347	276	71	78	-7	-76	260	476	-152
F66	340	271	69	78	-9	-98	258	476	-196
F70	324	269	55	78	-23	-250	246	476	-500
F71	330	246	84	78	6	65	271	476	130
F72	342	248	94	78	16	174	279	476	348
F73	318	276	42	78	-36	-391	233	476	-783
F74	352	276	76	78	-2	-22	264	476	-43
F75	316	298	18	78	-60	-652	209	476	-1304
F76	346	268	78	78	0	0	266	476	0
F77	358	288	70	78	-8	-87	259	476	-174

1st floor interior floor direct measurements were performed with 2224 No.129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	476	76

Elevated Direct Readings (Total Activity) and Averaging Results
Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

No elevated direct measurements were reported.

Removable Surface Activity Measurements

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

1st Floor Building Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
F2	6	15.9	158	-0.23	1.6	11.6
F5	12	19.8	158	-0.23	1.6	11.6
F8	-6	15.9	158	-0.23	1.6	11.6
F9	18	23.1	158	2.7	5.5	11.6
F12	6	15.9	158	-.23	1.6	11.6
F15	0	10.6	158	-.23	1.6	11.6
F17	24	25.9	158	-.23	1.6	11.6
F19	18	23.1	158	-.23	1.6	11.6
F24	6	15.9	158	-.23	1.6	11.6
F27	18	23.1	158	-.23	1.6	11.6
F31	6	15.9	158	-.23	1.6	11.6
F33	0	10.6	158	-.23	1.6	11.6
F36	-12	19.8	158	2.7	5.5	11.6
F39	6	15.9	158	2.7	5.5	11.6
F41	18	23.1	158	2.7	5.5	11.6
F44	24	25.9	158	-.23	1.6	11.6
F45	6	15.9	158	2.7	5.5	11.6
F49	18	23.1	158	-.23	1.6	11.6
F51	6	15.9	158	2.7	5.5	11.6
F57	12	19.8	158	2.7	5.5	11.6
F61	-12	19.8	158	-.23	1.6	11.6
F63	24	25.9	158	-.23	1.6	11.6
F66	6	15.9	158	2.7	5.5	11.6
F70	12	19.8	158	-.23	1.6	11.6
F71	18	23.1	158	-.23	1.6	11.6
F72	6	15.9	158	-.23	1.6	11.6
F73	6	15.9	158	-.23	1.6	11.6
F74	12	19.8	158	2.7	5.5	11.6
F75	0	10.6	158	2.7	5.5	11.6
F76	-12	19.8	158	-.23	1.6	11.6
F77	-12	19.8	158	-.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

Removable Surface Activity Measurements

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

No elevated removable surface activity was reported.

Exposure Rate Measurements

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

1st Floor Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F2	8	-1
F5	7	-2
F8	7	-2
F9	8	-1
F12	6	-3
F15	6	-3
F17	7	-2
F19	6	-3
F24	6	-3
F27	6	-3
F31	7	-2
F33	6	-3
F36	7	-2
F39	6	-3
F41	6	-3
F44	7	-2
F45	7	-2
F49	6	-3
F51	7	-2
F57	7	-2
F61	7	-2
F63	6	-3
F66	6	-3
F70	6	-3
F71	6	-3
F72	6	-3
F73	8	-1
F74	8	-1
F75	11	2
F76	8	-1
F77	8	-1

Background dose rate: 6-11 uR/hr with Model 19, No.115870

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

Average Total Activity (dpm/100cm^2)

Beta				Alpha			
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
31	-90	254.1	-12.7	31	-180.2	508.3	-25.3

$t_{1-\alpha}$ 1.697

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements

Molycorp - Building 2 Foundation Only Survey Unit (Unaffected Area)

n	$\bar{x}$	s	μ_α
31	-2.1	1.1	-1.8

$t_{1-\alpha}$ 1.697

Guidelines/Conditions Satisfied?

Yes

Results of Surface Scans

Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

2nd Floor Building Main Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm	Instrument #
F1	912	52	14	5	2
F2	930	70	6	-3	2
F3	840	-20	8	-1	2
F4	910	50	14	5	2
F5	970	110	18	9	2
F6	910	50	10	1	2
F7	960	100	12	3	2
F8	1010	150	12	3	2
F9	940	80	7	-2	2
F10	910	50	10	1	2
F11	860	0	12	3	2
F12	790	-70	12	3	2
F13	1030	170	15	6	2
F14	940	80	12	3	2
F15	970	110	12	3	2
F16	950	90	6	-3	2

2nd Floor Control Room Floors

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm	Instrument #
F1	1400	-115	6	-3	1
F2	1500	-15	8	-1	1
F3	1400	-115	10	1	1
F4	1500	-15	5	-4	1
F5	1300	-215	7	-2	1
F6	1580	65	6	-3	1
F7	1360	-155	11	2	1
F8	1680	165	10	1	1
F9	1500	-15	11	2	1
F10	1280	-235	14	5	1
F11	1600	85	3	-6	1
F12	1500	-15	4	-5	1
F13	1600	85	7	-2	1
F14	1400	-115	5	-4	1
F15	1200	-315	9	0	1
F16	1500	-15	8	-1	1

2nd floor floor scans performed with either: #1 - Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 191 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 1515 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

or

#2 - Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 144 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 860 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

3rd Floor Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	890	30	14	5
F2	915	55	5	-4
F3	870	10	7	-2
F4	1050	190	15	6
F5	860	0	10	1
F6	1010	150	9	0
F7	980	120	8	-1
F8	850	-10	12	3
F9	900	40	10	1
F10	860	0	8	-1
F11	840	-20	6	-3
F12	1010	150	7	-2
F13	940	80	9	0
F14	870	10	10	1
F15	950	90	6	-3
F16	845	-15	0	-9

3rd floor floor scans performed with Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 144 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 860 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

4th Floor Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	870	10	5	-4
F2	915	55	4	-5
F3	940	80	4	-5
F4	1000	140	3	-6
F5	1040	180	3	-6
F6	940	80	5	-4
F7	1010	150	3	-6
F8	820	-40	4	-5
F9	990	130	5	-4
F10	940	80	5	-4
F11	740	-120	4	-5
F12	1100	240	8	-1
F13	840	-20	6	-3
F14	890	30	12	3
F15	870	10	8	-1
F16	820	-40	1	-8

4rd floor floor scans performed with Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 144 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 860 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

5th Floor Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	920	60	4	-5
F2	940	80	6	-3
F3	960	100	8	-1
F4	1020	160	12	3
F5	800	-60	7	-2
F6	980	120	10	1
F7	950	90	6	-3
F8	1030	170	12	3
F9	1000	140	14	5
F10	1030	170	16	7
F11	930	70	8	-1
F12	950	90	12	3
F13	800	-60	6	-3
F14	820	-40	4	-5
F15	1000	140	8	-1
F16	920	60	6	-3

5th floor floor scans performed with Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 144 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 860 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

6th Floor Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
UF1	430	-430	2	-7
UF2	380	-480	2	-7
UF3	390	-470	3	-6

6th floor floor scans performed with Ludlum 239-1F (2350-1 No. 95359) with 43-37 No. 92503

Scan MDA Beta - 144 dpm/detector area
Scan MDA Alpha - 19 dpm/detector area
Scan background Beta - 860 cpm
Scan background Alpha - 9 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Results of Surface Scans

Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

1st Floor Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	280	48	2	0.5
W2	340	108	4	2.5
W 3	360	128	3	1.5
W4	290	58	1.6	0.1
W5	380	148	2.4	0.9
W6	300	68	1.4	-0.1
W7	340	108	2.8	1.3
W8	320	88	1.8	0.3
B9	280	48	2.0	0.5
B10	290	58	2.6	1.1
W11	250	18	2	0.5
W12	270	38	4	2.5
W13	290	58	2	0.5
W14	328	96	2	0.5
W15	320	88	2.4	0.9
W16	300	68	4	2.5
W17	330	98	2	0.5
W18	320	88	2	0.5
W19	340	108	2.6	1.1
W20	350	118	2	0.5
W21	320	88	2	0.5

1st Floor Building Exterior (Walls)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	220	-12	1	-0.5
W2	220	-12	1	-0.5
W3	265	33	1.4	-0.1
W4	210	-22	.8	-0.7
W5	200	-32	1	-0.5
W6	300	68	2	0.5
W7	290	58	1	-0.5
W 8	271	39	1.6	0.1
W 9	286	54	.8	-0.7
W10	280	48	1.7	0.2
W16	200	-32	1.6	0.1

1st floor interior and exterior wall scans performed with Ludlum 2350-1 No. 117563 with 43-106 No. 128912

43-106 Info:
Scan MDA Beta - 573 dpm/detector area
Scan MDA Alpha - 55 dpm/detector area
Scan background Beta - 232 cpm
Scan background Alpha - 1.5 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

2nd Floor Building Main Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm	Instrument #
B17	190	30	1.4	0.2	2
B18	200	40	2.6	1.4	2
W19	200	40	3	1.8	2
B20	190	30	2	0.8	2
B21	210	50	2	0.8	2
W22	200	40	1	-0.2	2
B23	220	60	1.4	0.2	2
W24	220	60	1.2	0.0	2
W25	230	70	1.6	0.4	2
B26	240	80	1.8	0.6	2
W27	200	40	2	0.8	2
B28	210	50	1.6	0.4	2
B29	220	60	4	2.8	2
B30	200	40	2.2	1.0	2

2nd Floor Control Room Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm	Instrument #
W17	280	50	2	0.4	1
W18	240	10	2	0.4	1
W19	242	12	3	1.4	1
W20	275	45	1	-0.6	1
W21	249	19	2	0.4	1
W22	274	44	2	0.4	1
W23	250	20	1	-0.6	1
W24	247	17	2	0.4	1
W25	264	34	2	0.4	1
B26	262	32	1	-0.6	1
W27	255	25	1	-0.6	1
W28	284	54	1	-0.6	1
W29	257	27	0	-1.6	1
W30	250	20	1	-0.6	1

W31	237	7	0	-1.6	1
W32	286	56	1	-0.6	1
W33	286	56	1	-0.6	1
W34	282	52	1	-0.6	1
W35	285	55	1	-0.6	1

All 2nd floor interior wall scans performed with either: #1 - Ludlum 2350-1 No. 117014 with 43-106 No. 133866

Scan MDA Beta - 578 dpm/detector area
Scan MDA Alpha - 57 dpm/detector area
Scan background Beta - 230 cpm
Scan background Alpha - 1.6 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

or

#2 - Ludlum 2350-1 No. 117014 with 43-106 No. 133866

Scan MDA Beta - 482 dpm/detector area
Scan MDA Alpha - 36 dpm/detector area
Scan background Beta - 160 cpm
Scan background Alpha - 1.2 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

3rd Floor Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
B17	230	70	0	-1.2
W18	238	78	0	-1.2
B19	206	46	1	-0.2
B20	210	50	2	0.8
W21	220	60	0	-1.2
B22	219	59	0	-1.2
W23	220	60	1	-0.2
B24	190	30	1	-0.2
W25	188	28	0	-1.2
B26	193	33	0	-1.2
B27	190	30	0	-1.2
L28	210	50	0	-1.2
L29	210	50	1	-0.2
L30	200	40	0	-1.2

All 3rd floor interior wall scans performed with Ludlum 2350-1 No. 117566 with 43-106 No. 133866

Scan MDA Beta -482 dpm/detector area
Scan MDA Alpha - 36 dpm/detector area
Scan background Beta - 160 cpm
Scan background Alpha - 1.2 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

4th Floor Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
B17	201	41	0	-1.2
W18	198	38	0	-1.2
B19	209	49	1	-0.2
B20	221	61	1	-0.2
B21	216	56	1	-0.2
W22	200	40	0	-1.2
B23	198	38	0	-1.2
W24	218	58	0	-1.2
W25	238	78	0	-1.2
W26	252	92	1	-0.2
W27	228	68	0	-1.2
B28	230	70	0	-1.2
B29	216	56	0	-1.2
B30	219	59	0	-1.2

All 4th floor interior wall scans performed with Ludlum 2350-1 No. 117566 with 43-106 No. 133866

Scan MDA Beta -482 dpm/detector area
Scan MDA Alpha - 36 dpm/detector area
Scan background Beta - 160 cpm
Scan background Alpha - 1.2 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

5th Floor Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
B17	180	20	2	0.8
W18	170	10	4	2.8
B19	180	20	2	0.8
B20	180	20	2	0.8
B21	193	33	1	-0.2
W22	187	27	1	-0.2
B23	188	28	2	0.8
W24	206	46	1	-0.2
W25	215	55	2	0.8
W26	222	62	2	0.8
W27	218	58	2	0.8
B28	217	57	3	1.8
B29	230	70	2	0.8
B30	220	60	1	-0.2

All 5th floor interior wall scans performed with Ludlum 2350-1 No. 117566 with 43-106 No. 133866

Scan MDA Beta -482 dpm/detector area
Scan MDA Alpha - 36 dpm/detector area
Scan background Beta - 160 cpm
Scan background Alpha - 1.2 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

6th Floor Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	180	20	2	0.8
W2	180	20	3	1.8
B3	160	0	1	-0.2
B4	160	0	2	0.8
W5	180	20	2	0.8
W6	200	40	2	0.8
W7	180	20	2	0.8
B8	170	10	2	0.8
B9	180	20	1	-0.2
B10	210	50	2	0.8
W11	200	40	1	-0.2
W12	200	40	1	-0.2
W13	190	30	4	2.8
W14	200	40	2	0.8

B15	210	50	2	0.8
B16	200	40	1	-0.2
W17	190	30	2	0.8
W18	200	40	1	-0.2
W19	220	60	1	-0.2
B20	210	50	4	2.8
B21	200	40	2	0.8
W22	190	30	1	-0.2
B23	180	20	1	-0.2
B24	200	40	2	0.8
W25	200	40	2	0.8
W26	190	30	3	1.8
B27	220	60	2	0.8
B28	260	100	2	0.8
W29	280	120	1	-0.2
W30	260	100	4	2.8

All 6th floor interior wall scans performed with Ludlum 2350-1 No. 117566 with 43-106 No. 133866

Scan MDA Beta -482 dpm/detector area
Scan MDA Alpha - 36 dpm/detector area
Scan background Beta - 160 cpm
Scan background Alpha - 1.2 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Elevated Scan Readings

Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

Location (see map)	Alpha Scan net cpm
2nd Floor Building Main Walls (Interior)	
B29	2.8
5th Floor Building Walls (Interior)	
W18	2.8
6th Floor Building Walls (Interior)	
W13	2.8
B20	2.8
W30	2.8

Direct Measurements (Total Activity)

Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

2nd Floor Building Main Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	199	190	9	8	1	11	92	180	23
F2	172	190	-18	8	-26	-295	70	180	-591
F3	188	198	-10	8	-18	-205	31	180	-409
F4	195	189	6	8	-2	-23	83	180	-45
F5	189	178	11	8	3	34	97	180	68
F6	175	179	-4	8	-12	-136	45	180	-273
F7	171	186	-15	8	-23	-261	59	180	-523
F8	195	197	-2	8	-10	-114	55	180	-227
F9	180	212	-32	8	-40	-455	109	180	-909
F10	200	211	-11	8	-19	-216	39	180	-432
F11	165	188	-23	8	-31	-352	86	180	-705
F12	202	173	29	8	21	239	135	180	477
F13	229	199	30	8	22	250	137	180	500
F14	190	178	12	8	4	45	100	180	91
F15	197	225	-28	8	-36	-409	100	180	-818
F16	159	168	-9	8	-17	-193	22	180	-386

2nd floor interior main floor direct measurements were performed with
2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	8	3.7
Floor MDA (dpm/100 cm^2)	180	76

2nd Floor Control Room Floors

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	327	236	91	78	13	141	277	476	283
F2	356	282	74	78	-4	-43	263	476	-87
F3	311	248	63	78	-15	-163	253	476	-326
F4	309	246	63	78	-15	-163	253	476	-326
F5	303	242	61	78	-17	-185	251	476	-370
F6	312	226	86	78	8	87	273	476	174
F7	310	259	51	78	-27	-293	242	476	-587
F8	311	219	92	78	14	152	278	476	304
F9	295	245	50	78	-28	-304	241	476	-609
F10	320	262	58	78	-20	-217	248	476	-435
F11	285	206	79	78	1	11	267	476	22
F12	319	236	83	78	5	54	270	476	109
F13	318	208	110	78	32	348	292	476	696
F14	313	214	99	78	21	228	283	476	457
F15	322	214	108	78	30	326	291	476	652
F16	327	227	100	78	22	239	284	476	478

2nd floor control room floor direct measurements were performed with 2224 No.129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	476	76

3rd Floor Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	188	161	27	8	19	207	132	180	413
F2	168	176	-8	8	-16	-174	0	180	-348
F3	203	187	16	8	8	87	109	180	174
F4	199	167	32	8	24	261	141	180	522
F5	207	179	28	8	20	217	134	180	435
F6	206	176	30	8	22	239	137	180	478
F7	219	210	9	8	1	11	92	180	22
F8	202	183	19	8	11	120	116	180	239
F9	166	200	-34	8	-42	-457	114	180	-913
F10	180	189	-9	8	-17	-185	22	180	-370
F11	174	199	-25	8	-33	-359	92	180	-717
F12	216	180	36	8	28	304	148	180	609
F13	172	188	-16	8	-24	-261	63	180	-522
F14	159	163	-4	8	-12	-130	45	180	-261
F15	209	174	35	8	27	293	146	180	587
F16	206	194	12	8	4	43	100	180	87

3rd floor interior floor direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	8	3.7
Floor MDA (dpm/100 cm^2)	180	76

4th Floor Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	201	172	29	8	21	228	135	180	457
F2	188	183	5	8	-3	-33	80	180	-65

F3	176	187	-11	8	-19	-207	39	180	-413
F4	162	200	-38	8	-46	-500	122	180	-1000
F5	203	169	34	8	26	283	144	180	565
F6	205	181	24	8	16	174	126	180	348
F7	213	226	-13	8	-21	-228	50	180	-457
F8	189	174	15	8	7	76	107	180	152
F9	204	172	32	8	24	261	141	180	522
F10	206	185	21	8	13	141	120	180	283
F11	189	174	15	8	7	76	107	180	152
F12	216	207	9	8	1	11	92	180	22
F13	186	200	-14	8	-22	-239	55	180	-478
F14	160	175	-15	8	-23	-250	59	180	-500
F15	207	177	30	8	22	239	137	180	478
F16	206	193	13	8	5	54	102	180	109

4th floor interior floor direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	8	3.7
Floor MDA (dpm/100 cm^2)	180	76

5th Floor Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	164	180	-16	8	-24	-261	63	180	-522
F2	208	221	-13	8	-21	-228	50	180	-457
F3	222	228	-6	8	-14	-152	31	180	-304
F4	180	174	6	8	-2	-22	83	180	-43
F5	184	200	-16	8	-24	-261	63	180	-522
F6	207	206	1	8	-7	-76	67	180	-152
F7	197	179	18	8	10	109	114	180	217
F8	214	198	16	8	8	87	109	180	174
F9	212	224	-12	8	-20	-217	45	180	-435
F10	227	253	-26	8	-34	-370	94	180	-739
F11	210	201	9	8	1	11	92	180	22

F12	206	225	-19	8	-27	-293	74	180	-587
F13	166	190	-24	8	-32	-348	89	180	-696
F14	178	179	-1	8	-9	-98	59	180	-196
F15	188	183	5	8	-3	-33	80	180	-65
F16	206	204	2	8	-6	-65	70	180	-130

5th floor interior floor direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	8	3.7
Floor MDA (dpm/100 cm^2)	180	76

6th Floor Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
UF1	307	293	14	8	6	68	104	180	136
UF2	211	206	5	8	-3	-34	80	180	-68
UF3	317	296	21	8	13	148	120	180	295

6th floor interior floor direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	8	3.7
Floor MDA (dpm/100 cm^2)	180	76

Direct Measurements (Total Activity)

Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

1st Floor Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W1	282	212	70	49	21	228	232	383	457
W2	301	239	62	49	13	141	224	383	283
W 3	321	247	74	49	25	272	236	383	543
W4	251	200	51	49	2	22	213	383	43
W5	288	241	47	49	-2	-22	209	383	-43
W6	273	195	78	78	0	0	266	476	0
W7	275	236	39	78	-39	-424	230	476	-848
W8	290	220	70	78	-8	-87	259	476	-174
B9	186	194	-8	8	-16	-174	0	172	-348
B10	173	166	7	8	-1	-11	83	172	-22
W11	189	179	10	8	2	22	90	172	43
W12	189	181	8	8	0	0	85	172	0
W13	196	167	29	8	21	228	130	172	457
W14	203	181	22	8	14	152	117	172	304
W15	313	236	77	49	28	304	239	172	609
W16	286	225	61	49	12	130	223	172	261
W17	294	268	26	49	-23	-250	185	172	-500
W18	303	279	24	49	-25	-272	182	172	-543
W19	433	451	-18	49	-67	-728	119	172	-1457
W20	301	231	70	49	21	228	232	172	457
W21	298	248	50	49	1	11	212	172	22

1st floor interior wall direct measurements were performed with 2224 No.129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Cement Wall Background (cpm)	78	2.4
Cinderblock Wall Background (cpm)	49	3.7
Metal Wall Background (cpm)	8	3.7
Cement Wall MDA (dpm/100 cm^2)	476	64
Cinderblock Wall MDA (dpm/100 cm^2)	383	76
Metal Wall MDA (dpm/100 cm^2)	172	76

1st Floor Building Exterior (Walls)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W1	210	178	32	8	24	261	135	172	522
W2	211	209	2	8	-6	-65	67	172	-130
W3	254	222	32	8	24	261	135	172	522
W4	158	199	-41	8	-49	-533	122	172	-1065
W5	190	179	11	8	3	33	93	172	65
W6	307	250	57	49	8	87	219	383	174
W7	284	232	52	49	3	33	214	383	65
W 8	249	202	47	49	-2	-22	209	383	-43
W 9	291	225	66	49	17	185	228	383	370
W10	300	228	72	49	23	250	234	383	500
W16	205	212	-7	8	-15	-163	21	172	-326

1st floor exterior wall direct measurements were performed with 2224 No.129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Cement Wall Background (cpm)	78	2.4
Cinderblock Wall Background (cpm)	49	3.7
Metal Wall Background (cpm)	8	3.7
Cement Wall MDA (dpm/100 cm^2)	476	64
Cinderblock Wall MDA (dpm/100 cm^2)	383	76
Metal Wall MDA (dpm/100 cm^2)	172	76

2nd Floor Building Main Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
B17	151	173	-22	8	-30	-326	83	180	-652
B18	177	167	10	8	2	22	94	180	43

W19	163	159	4	8	-4	-43	77	180	-87
B20	180	154	26	8	18	196	130	180	391
B21	173	162	11	8	3	33	97	180	65
W22	162	165	-3	8	-11	-120	50	180	-239
B23	137	143	-6	8	-14	-152	31	180	-304
W24	157	145	12	8	4	43	100	180	87
W25	169	180	-11	8	-19	-207	39	180	-413
B26	195	178	17	8	9	98	111	180	196
W27	156	195	-39	8	-47	-511	124	180	-1022
B28	152	147	5	8	-3	-33	80	180	-65
B29	128	125	3	8	-5	-54	74	180	-109
B30	164	152	12	8	4	43	100	180	87

2nd floor interior main walls direct measurements were performed with
2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm^2)	180	76

2nd Floor Control Room Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W17	200	159	41	8	33	359	149	172	717
W18	225	186	39	8	31	337	146	172	674
W19	238	218	20	8	12	130	113	172	261
W20	196	190	6	8	-2	-22	80	172	-43
W21	191	176	15	8	7	76	102	172	152
W22	188	227	-39	8	-47	-511	119	172	-1022
W23	196	188	8	8	0	0	85	172	0
W24	170	179	-9	8	-17	-185	21	172	-370
W25	185	189	-4	8	-12	-130	43	172	-261
B26	202	220	-18	8	-26	-283	67	172	-565
W27	197	202	-5	8	-13	-141	37	172	-283
W28	224	216	8	8	0	0	85	172	0
W29	183	181	2	8	-6	-65	67	172	-130

W30	194	194	0	8	-8	-87	60	172	-174
W31	187	173	14	8	6	65	100	172	130
W32	242	221	21	8	13	141	115	172	283
W33	224	227	-3	8	-11	-120	48	172	-239
W34	223	216	7	8	-1	-11	83	172	-22
W35	189	208	-19	8	-27	-293	71	172	-587

2nd floor interior control room walls direct measurements were performed with 2224-1 No.129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm^2)	172	76

3rd Floor Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
B17	148	150	-2	8	-10	-109	55	180	-217
W18	165	144	21	8	13	141	120	180	283
B19	155	157	-2	8	-10	-109	55	180	-217
B20	132	161	-29	8	-37	-402	102	180	-804
W21	178	152	26	8	18	196	130	180	391
B22	159	142	17	8	9	98	111	180	196
W23	176	159	17	8	9	98	111	180	196
B24	153	146	7	8	-1	-11	86	180	-22
W25	128	145	-17	8	-25	-272	67	180	-543
B26	173	156	17	8	9	98	111	180	196
B27	143	149	-6	8	-14	-152	31	180	-304
L28	190	176	14	8	6	65	104	180	130
L29	169	197	-28	8	-36	-391	100	180	-783
L30	184	191	-7	8	-15	-163	22	180	-326

3rd floor interior wall direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153

Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

4th Floor Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
B17	147	162	-15	8	-23	-250	59	180	-500
W-18	184	168	16	8	8	87	109	180	174
B-19	181	159	22	8	14	152	122	180	304
B-20	164	170	-6	8	-14	-152	31	180	-304
B-21	140	145	-5	8	-13	-141	39	180	-283
W-22	152	181	-29	8	-37	-402	102	180	-804
B-23	175	171	4	8	-4	-43	77	180	-87
W-24	168	176	-8	8	-16	-174	0	180	-348
W-25	174	161	13	8	5	54	102	180	109
W-26	180	172	8	8	0	0	89	180	0
W-27	179	180	-1	8	-9	-98	59	180	-196
B-28	163	160	3	8	-5	-54	74	180	-109
B-29	170	178	-8	8	-16	-174	0	180	-348
B30	170	178	-8	8	-16	-174	0	180	-348

4th floor interior wall direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

5th Floor Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
B17	141	157	-16	8	-24	-261	63	180	-522

W-18	160	175	-15	8	-23	-250	59	180	-500
B-19	181	176	5	8	-3	-33	80	180	-65
B-20	170	184	-14	8	-22	-239	55	180	-478
B-21	173	179	-6	8	-14	-152	31	180	-304
W-22	184	184	0	8	-8	-87	63	180	-174
B-23	135	144	-9	8	-17	-185	22	180	-370
W-24	144	138	6	8	-2	-22	83	180	-43
W-25	161	179	-18	8	-26	-283	70	180	-565
W-26	206	171	35	8	27	293	146	180	587
W-27	176	219	-43	8	-51	-554	132	180	-1109
B-28	176	145	31	8	23	250	139	180	500
B-29	160	123	37	8	29	315	149	180	630
B-30	179	170	9	8	1	11	92	180	22

5th floor interior wall direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

6th Floor Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W1	179	171	8	8	0	0	89	180	0
W-2	174	190	-16	8	-24	-261	63	180	-522
B-3	184	163	21	8	13	141	120	180	283
B-4	185	189	-4	8	-12	-130	45	180	-261
W-5	196	157	39	8	31	337	153	180	674
W-6	172	167	5	8	-3	-33	80	180	-65
W-7	194	170	24	8	16	174	126	180	348
B-8	172	159	13	8	5	54	102	180	109
B-9	191	182	9	8	1	11	92	180	22
B-10	136	157	-21	8	-29	-315	80	180	-630
W-11	152	166	-14	8	-22	-239	55	180	-478
W-12	175	162	13	8	5	54	102	180	109

W-13	160	176	-16	8	-24	-261	63	180	-522
W-14	171	170	1	8	-7	-76	67	180	-152
B-15	151	168	-17	8	-25	-272	67	180	-543
B-16	156	170	-14	8	-22	-239	55	180	-478
W-17	145	146	-1	8	-9	-98	59	180	-196
W-18	157	191	-34	8	-42	-457	114	180	-913
W-19	163	203	-40	8	-48	-522	126	180	-1043
B-20	168	151	17	8	9	98	111	180	196
B-21	185	199	-14	8	-22	-239	55	180	-478
W-22	173	280	-107	8	-115	-1250	222	180	-2500
B-23	209	201	8	8	0	0	89	180	0
B-24	158	183	-25	8	-33	-359	92	180	-717
W-25	178	176	2	8	-6	-65	70	180	-130
W-26	172	169	3	8	-5	-54	74	180	-109
B-27	157	167	-10	8	-18	-196	31	180	-391
B-28	146	150	-4	8	-12	-130	45	180	-261
W-29	177	152	25	8	17	185	128	180	370
W-30	205	172	33	8	25	272	143	180	543

6th floor interior wall direct measurements were performed with 2360 No.156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

Elevated Direct Readings (Total Activity) and Averaging Results
Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

No elevated direct measurements were reported.

Removable Surface Activity Measurements
Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

2nd Floor Building Main Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
F1	-6	15.9	158	-.23	1.6	11.6
F2	0	10.6	158	-.23	1.6	11.6
F3	-12	19.8	158	-.23	1.6	11.6
F4	-18	23.1	158	2.7	5.5	11.6
F5	6	15.9	158	2.7	5.5	11.6
F6	-6	15.9	158	-.23	1.6	11.6
F7	18	23.1	158	-.23	1.6	11.6
F8	0	10.6	158	2.7	5.5	11.6
F9	-12	19.8	158	-.23	1.6	11.6
F10	24	25.9	158	-.23	1.6	11.6
F11	12	19.8	158	2.7	5.5	11.6
F12	0	10.6	158	-.23	1.6	11.6
F13	24	25.9	158	-.23	1.6	11.6
F14	30	28.5	158	-.23	1.6	11.6
F15	12	19.8	158	-.23	1.6	11.6
F16	-18	23.1	158	-.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

2nd Floor Control Room Floors

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
F1	18	23.1	158	-.23	1.6	11.6
F2	-12	19.8	158	-.23	1.6	11.6
F3	0	10.6	158	2.7	5.5	11.6
F4	6	15.9	158	-.23	1.6	11.6
F5	-6	15.9	158	2.7	5.5	11.6
F6	0	10.6	158	-.23	1.6	11.6
F7	-12	19.8	158	2.7	5.5	11.6
F8	6	15.9	158	-.23	1.6	11.6
F9	24	25.9	158	-.23	1.6	11.6
F10	12	19.8	158	-.23	1.6	11.6
F11	0	10.6	158	-.23	1.6	11.6
F12	6	15.9	158	2.7	5.5	11.6
F13	18	23.1	158	2.7	5.5	11.6
F14	12	19.8	158	-.23	1.6	11.6

F15	0	10.6	158	-.23	1.6	11.6
F16	30	28.5	158	-.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

3rd Floor Building Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
F1	6	15.8	152	-.4	2.1	12
F2	0	10.5	152	2.5	5.3	12
F3	24	25.9	152	-.4	2.1	12
F4	79	44.2	152	-.4	2.1	12
F5	0	10.5	152	2.5	5.3	12
F6	6	15.8	152	-.4	2.1	12
F7	-12	19.7	152	-.4	2.1	12
F8	12	19.7	152	2.5	5.3	12
F9	-6	15.8	152	-.4	2.1	12
F10	6	15.8	152	2.5	5.3	12
F11	0	10.5	152	-.4	2.1	12
F12	12	19.7	152	-.4	2.1	12
F13	-6	15.8	152	-.4	2.1	12
F14	6	15.8	152	-.4	2.1	12
F15	-18	23.0	152	-.4	2.1	12
F16	18	23.0	152	2.5	5.3	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.18
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

4th Floor Building Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
F1	0	10.5	152	-.4	2.1	12
F2	6	15.8	152	-.4	2.1	12
F3	12	19.7	152	2.5	5.3	12
F4	0	10.5	152	-.4	2.1	12
F5	-24	25.9	152	2.5	5.3	12

F6	30	28.4	152	2.5	5.3	12
F7	-12	19.7	152	-.4	2.1	12
F8	24	25.9	152	-.4	2.1	12
F9	18	23.0	152	2.5	5.3	12
F10	0	10.5	152	-.4	2.1	12
F11	-12	19.7	152	-.4	2.1	12
F12	18	23.0	152	-.4	2.1	12
F13	12	19.7	152	-.4	2.1	12
F14	-18	23.0	152	2.5	5.3	12
F15	0	10.5	152	-.4	2.1	12
F16	30	28.4	152	.4	2.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.13
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

5th Floor Building Floor

Location (see map)	Removable Beta ($dpm/100cm^2$)	Uncertainty 95% CL	MDA	Removable Alpha ($dpm/100cm^2$)	Uncertainty 95% CL	MDA
F1	30	28.4	152	-.4	2.1	12
F2	-36	30.8	152	-.4	2.1	12
F3	36	30.8	152	-.4	2.1	12
F4	66	40.6	152	-.4	2.1	12
F5	-12	19.7	152	-.4	2.1	12
F6	0	10.5	152	-.4	2.1	12
F7	24	25.9	152	-.4	2.1	12
F8	-24	25.9	152	-.4	2.1	12
F9	-24	25.9	152	-.4	2.1	12
F10	42	33.0	152	-.4	2.1	12
F11	0	10.5	152	-.4	2.1	12
F12	-6	15.8	152	2.5	5.3	12
F13	6	15.8	152	-.4	2.1	12
F14	-6	15.8	152	2.5	5.3	12
F15	12	19.7	152	-.4	2.1	12
F16	12	19.7	152	-.4	2.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.13
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

6th Floor Building Floor

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
UF1	-12	19.7	152	-.4	2.1	12
UF2	-6	15.8	152	-.4	2.1	12
UF3	-30	28.4	152	-.4	2.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.13
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

Removable Surface Activity Measurements

Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

1st Floor Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
W1	6	15.9	158	-.23	1.6	11.6
W2	30	28.5	158	2.7	5.5	11.6
W 3	0	10.6	158	-.23	1.6	11.6
W4	-12	19.8	158	-.23	1.6	11.6
W5	36	30.8	158	2.7	5.5	11.6
W6	6	15.9	158	-.23	1.6	11.6
W7	-18	23.1	158	2.7	5.5	11.6
W8	0	10.6	158	-.23	1.6	11.6
B9	30	28.5	158	-.23	1.6	11.6
B10	6	15.9	158	-.23	1.6	11.6
W11	24	25.9	158	-.23	1.6	11.6
W12	0	10.6	158	-.23	1.6	11.6
W13	-18	23.1	158	-.23	1.6	11.6
W14	30	28.5	158	-.23	1.6	11.6
W15	-6	15.9	158	2.7	5.5	11.6
W16	24	25.9	158	-.23	1.6	11.6
W17	6	15.9	158	-.23	1.6	11.6
W18	-12	19.8	158	-.23	1.6	11.6
W19	0	10.6	158	2.7	5.5	11.6
W20	-12	19.8	158	-.23	1.6	11.6
W21	18	23.1	158	-.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

1st Floor Building Exterior (Walls)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
W1	0	10.6	158	-.23	1.6	11.6
W2	6	15.9	158	-.23	1.6	11.6
W3	-6	15.9	158	2.7	5.5	11.6
W4	12	19.8	158	-.23	1.6	11.6
W5	6	15.9	158	-.23	1.6	11.6
W6	-18	23.1	158	2.7	5.5	11.6
W7	6	15.9	158	-.23	1.6	11.6
W 8	-12	19.8	158	-.23	1.6	11.6
W 9	6	15.9	158	-.23	1.6	11.6

W10	0	10.6	158	2.7	5.5	11.6
W16	-6	15.9	158	2.7	5.5	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

2nd Floor Building Main Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
B17	0	10.6	158	2.7	5.5	11.6
B18	-12	19.8	158	-.23	1.6	11.6
W19	12	19.8	158	-.23	1.6	11.6
B20	-6	15.9	158	-.23	1.6	11.6
B21	-6	15.9	158	2.7	5.5	11.6
W22	12	19.8	158	-.23	1.6	11.6
B23	24	25.9	158	-.23	1.6	11.6
W24	18	23.1	158	-.23	1.6	11.6
W25	0	10.6	158	-.23	1.6	11.6
B26	6	15.9	158	-.23	1.6	11.6
W27	0	10.6	158	-.23	1.6	11.6
B28	6	15.9	158	-.23	1.6	11.6
B29	18	23.1	158	-.23	1.6	11.6
B30	-6	15.9	158	-.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

2nd Floor Control Room Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
W17	6	15.9	158	-.23	1.6	11.6
W18	12	19.8	158	-.23	1.6	11.6
W19	30	28.5	158	-.23	1.6	11.6
W20	12	19.8	158	-.23	1.6	11.6
W21	30	28.5	158	2.7	5.5	11.6
W22	0	10.6	158	-.23	1.6	11.6
W23	6	15.9	158	-.23	1.6	11.6

W24	24	25.9	158	2.7	5.5	11.6
W25	12	19.8	158	-.23	1.6	11.6
B26	6	15.9	158	-.23	1.6	11.6
W27	0	10.6	158	-.23	1.6	11.6
W28	-12	19.8	158	-.23	1.6	11.6
W29	24	25.9	158	-.23	1.6	11.6
W30	0	10.6	158	-.23	1.6	11.6
W31	18	23.1	158	-.23	1.6	11.6
W32	0	10.6	158	-.23	1.6	11.6
W33	6	15.9	158	2.7	5.5	11.6
W34	0	10.6	158	-.23	1.6	11.6
W35	-6	15.9	158	2.7	5.5	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

3rd Floor Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
B17	24	25.9	152	-.4	2.1	12
W18	0	10.5	152	-.4	2.1	12
B19	6	15.8	152	-.4	2.1	12
B20	30	28.4	152	2.5	5.3	12
W21	6	15.8	152	-.4	2.1	12
B22	-24	25.9	152	-.4	2.1	12
W23	6	15.8	152	-.4	2.1	12
B24	-12	19.7	152	-.4	2.1	12
W25	0	10.5	152	-.4	2.1	12
B26	-6	15.8	152	-.4	2.1	12
B27	6	15.8	152	2.5	5.3	12
L28	-6	15.8	152	-.4	2.1	12
L29	-18	23.0	152	-.4	2.1	12
L30	6	15.8	152	-.4	2.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.18
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

4th Floor Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
B17	-12	19.7	152	2.5	5.3	12
W-18	0	10.5	152	-.4	2.1	12
B-19	24	25.9	152	-.4	2.1	12
B-20	0	10.5	152	2.5	5.3	12
B-21	6	15.8	152	-.4	2.1	12
W-22	24	25.9	152	-.4	2.1	12
B-23	-12	19.7	152	-.4	2.1	12
W-24	-6	15.8	152	2.5	5.3	12
W-25	12	19.7	152	-.4	2.1	12
W-26	0	10.5	152	2.5	5.3	12
W-27	6	15.8	152	-.4	2.1	12
B-28	-6	15.8	152	-.4	2.1	12
B-29	-12	19.7	152	2.5	5.3	12
B30	-12	19.7	152	2.5	5.3	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.18
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

5th Floor Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
B17	-6	15.8	152	-.4	2.1	12
W-18	6	15.8	152	-.4	2.1	12
B-19	-18	23.0	152	2.5	5.3	12
B-20	6	15.8	152	2.5	5.3	12
B-21	18	23.0	152	-.4	2.1	12
W-22	6	15.8	152	-.4	2.1	12
B-23	18	23.0	152	-.4	2.1	12
W-24	6	15.8	152	-.4	2.1	12
W-25	-12	19.7	152	2.5	5.3	12
W-26	-6	15.8	152	2.5	5.3	12
W-27	18	23.0	152	-.4	2.1	12
B-28	18	23.0	152	-.4	2.1	12
B-29	12	19.7	152	-.4	2.1	12
B-30	24	25.9	152	2.5	5.3	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.18
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

6th Floor Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm^2)	Uncertainty 95% CL	MDA
W1	-12	19.7	152	-.4	2.1	12
W-2	0	10.5	152	-.4	2.1	12
B-3	-18	23.0	152	2.5	5.3	12
B-4	0	10.5	152	-.4	2.1	12
W-5	12	19.7	152	-.4	2.1	12
W-6	42	33.0	152	-.4	2.1	12
W-7	6	15.8	152	-.4	2.1	12
B-8	0	10.5	152	-.4	2.1	12
B-9	42	33.0	152	-.4	2.1	12
B-10	12	19.7	152	2.5	5.3	12
W-11	0	10.5	152	-.4	2.1	12
W-12	24	25.9	152	-.4	2.1	12
W-13	0	10.5	152	-.4	2.1	12
W-14	36	30.8	152	2.5	5.3	12
B-15	18	23.0	152	-.4	2.1	12
B-16	12	19.7	152	2.5	5.3	12
W-17	12	19.7	152	-.4	2.1	12
W-18	18	23.0	152	-.4	2.1	12
W-19	24	25.9	152	-.4	2.1	12
B-20	18	23.0	152	-.4	2.1	12
B-21	42	33.0	152	2.5	5.3	12
W-22	12	19.7	152	2.5	5.3	12
B-23	-6	15.8	152	-.4	2.1	12
B-24	6	15.8	152	-.4	2.1	12
W-25	0	10.5	152	-.4	2.1	12
W-26	6	15.8	152	-.4	2.1	12
B-27	0	10.5	152	-.4	2.1	12
B-28	6	15.8	152	2.5	5.3	12
W-29	48	35.0	152	2.5	5.3	12
W-30	24	25.9	152	-.4	2.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	47	0.18
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	152	12

Removable Surface Activity Measurements

Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

No elevated removable surface activity was reported.

Exposure Rate Measurements

Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

2nd Floor Building Main Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	2	-2
F2	3	-1
F3	3	-1
F4	2	-2
F5	4	0
F6	4	0
F7	4	0
F8	4	0
F9	5	1
F10	5	1
F11	5	1
F12	4	0
F13	6	2
F14	6	2
F15	4	0
F16	4	0

Background dose rate: 2-6 uR/hr with Model 19, No.115870

2nd Floor Control Room Floors

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	5	0
F2	5	0
F3	6	1
F4	6	1
F5	6	1
F6	6	1
F7	6	1
F8	6	1
F9	6	1
F10	6	1
F11	5	0
F12	5	0
F13	5	0
F14	5	0
F15	5	0
F16	5	0

Background dose rate: 5 uR/hr with Model 19, No.115870

3rd Floor Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	4	1
F2	3	0
F3	3	0
F4	3	0
F5	3	0
F6	3	0
F7	4	1
F8	5	2
F9	4	1
F10	4	1
F11	4	1
F12	5	2
F13	6	3
F14	5	2
F15	4	1
F16	4	1

Background dose rate: 2-4 uR/hr with Model 19, No.115870

4th Floor Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	2	-1
F2	3	0
F3	3	0
F4	3	0
F5	3	0
F6	3	0
F7	4	1
F8	4	1
F9	4	1
F10	5	2
F11	4	1
F12	4	1
F13	4	1
F14	3	0
F15	3	0
F16	4	1

Background dose rate: 3 uR/hr with Model 19, No.115870

5th Floor Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	3	0
F2	3	0
F3	3	0
F4	4	1
F5	3	0
F6	4	1
F7	4	1
F8	4	1
F9	4	1
F10	5	2
F11	5	2
F12	5	2
F13	5	2
F14	4	1
F15	4	1
F16	3	0

Background dose rate: 3 uR/hr with Model 19, No.115870

6th Floor Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
UF1	4	1
UF2	4	1
UF3	4	1

Background dose rate: 3 uR/hr with Model 19, No.115870

Exposure Rate Measurements

Molycorp Building 2 Survey Unit Excluding Foundation (Unaffected Area)

1st Floor Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	8	-1
W2	8	-1
W 3	7	-2
W4	8	-1
W5	8	-1
W6	6	-3
W7	7	-2
W8	6	-3
B9	6	-3
B10	6	-3
W11	6	-3
W12	6	-3
W13	8	-1
W14	9	0
W15	8	-1
W16	8	-1
W17	11	2
W18	10	1
W19	8	-1
W20	8	-1
W21	8	-1

Background dose rate: 6-11 uR/hr with Model 19, No.115870

1st Floor Building Exterior (Walls)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	8	-1
W2	8	-1
W3	6	-3
W4	6	-3
W5	8	-1
W6	9	0
W7	8	-1
W 8	9	0
W 9	9	0
W10	6	-3
W16	6	-3

Background dose rate: 6-11 uR/hr with Model 19, No.115870

2nd Floor Building Main Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
B17	2	-2
B18	3	-1
W19	3	-1
B20	4	0
B21	3	-1
W22	3	-1
B23	3	-1
W24	3	-1
W25	4	0
B26	4	0
W27	3	-1
B28	3	-1
B29	2	-2
B30	2	-2

Background dose rate: 2-6 uR/hr with Model 19, No.115870

2nd Floor Control Room Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W17	5	0
W18	5	0
W19	6	1
W20	6	1
W21	6	1
W22	6	1
W23	6	1
W24	6	1
W25	6	1
B26	5	0
W27	5	0
W28	5	0
W29	5	0
W30	5	0
W31	5	0
W32	5	0
W33	5	0
W34	5	0
W35	5	0

Background dose rate: 5 uR/hr with Model 19, No.115870

3rd Floor Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
B17	3	0
W18	3	0
B19	2	-1
B20	2	-1
W21	2	-1
B22	3	0
W23	2	-1
B24	3	0
W25	2	-1
B26	3	0
B27	4	1
L28	4	1
L29	4	1
L30	3	0

Background dose rate: 2-4 uR/hr with Model 19, No.115870

4th Floor Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
B17	3	0
W-18	3	0
B-19	3	0
B-20	2	-1
B-21	2	-1
W-22	3	0
B-23	3	0
W-24	3	0
W-25	4	1
W-26	4	1
W-27	3	0
B-28	2	-1
B-29	3	0
B30	3	0

Background dose rate: 3 uR/hr with Model 19, No.115870

5th Floor Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
B17	3	0
W-18	3	0
B-19	3	0
B-20	4	1
B-21	3	0
W-22	3	0
B-23	3	0
W-24	4	1
W-25	4	1
W-26	4	1
W-27	4	1
B-28	4	1
B-29	4	1
B-30	4	1

Background dose rate: 3 uR/hr with Model 19, No.115870

6th Floor Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	4	1
W-2	4	1
B-3	4	1
B-4	4	1
W-5	4	1
W-6	3	0
W-7	3	0
B-8	3	0
B-9	3	0
B-10	3	0
W-11	3	0
W-12	3	0
W-13	3	0
W-14	3	0
B-15	3	0
B-16	3	0
W-17	3	0
W-18	3	0
W-19	4	1
B-20	4	1
B-21	4	1
W-22	4	1
B-23	4	1

B-24	4	1
W-25	3	0
W-26	4	1
B-27	4	1
B-28	3	0
W-29	3	0
W-30	3	0

Background dose rate: 3 uR/hr with Model 19, No.115870

Summary of Building Surface Direct Reading (Total Activity) Results

Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

Average Total Activity (dpm/100cm^2)

Beta				Alpha			
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
220	-57	227.3	-31.9	220	-114.5	454.6	-63.8

$t_{1-\alpha}$ 1.654

Guidelines/Conditions Satisfied ?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements
Molycorp - Building 2 Survey Unit Excluding Foundation (Unaffected Area)

n	$\bar{x}$	s	μ_α
220	0.1	1.1	0.2

$t_{1-\alpha}$ 1.654

Guidelines/Conditions Satisfied?
Yes

Appendix B

Building 2W Data Package

Molycorp Washington, PA

Building 2W Data Package

This data package contains final status survey information for Building 2W, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

No anomalies were reported during the survey of Building 2W. Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities.

Results from the final status survey of Building 2W provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 2W is suitable for unrestricted use.

DDO-138 Radiation Protection Survey Report | Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg # 2W Interior/Exterior WALLS & Interior Floor

Date:	Time:	Location:	Survey Issue Log Number
5/15/02	1600	Bldg 2W	02-0215

RWP Number: N/A

Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☑ Other:

Page 1 of 1

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Concrete BKG: B⁻ 78, MDA ~~46~~ 476; α 2.4, MDA 64

Walls BKG: B⁻ 8, MDA 140; α 3.7, MDA 71

Model 19 #115870 8-6-02

Bkgd Readings: 6-9 micro Rem/hr

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ⓘ = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | –D– = Large Area Wipe | = Bulk Material Sample

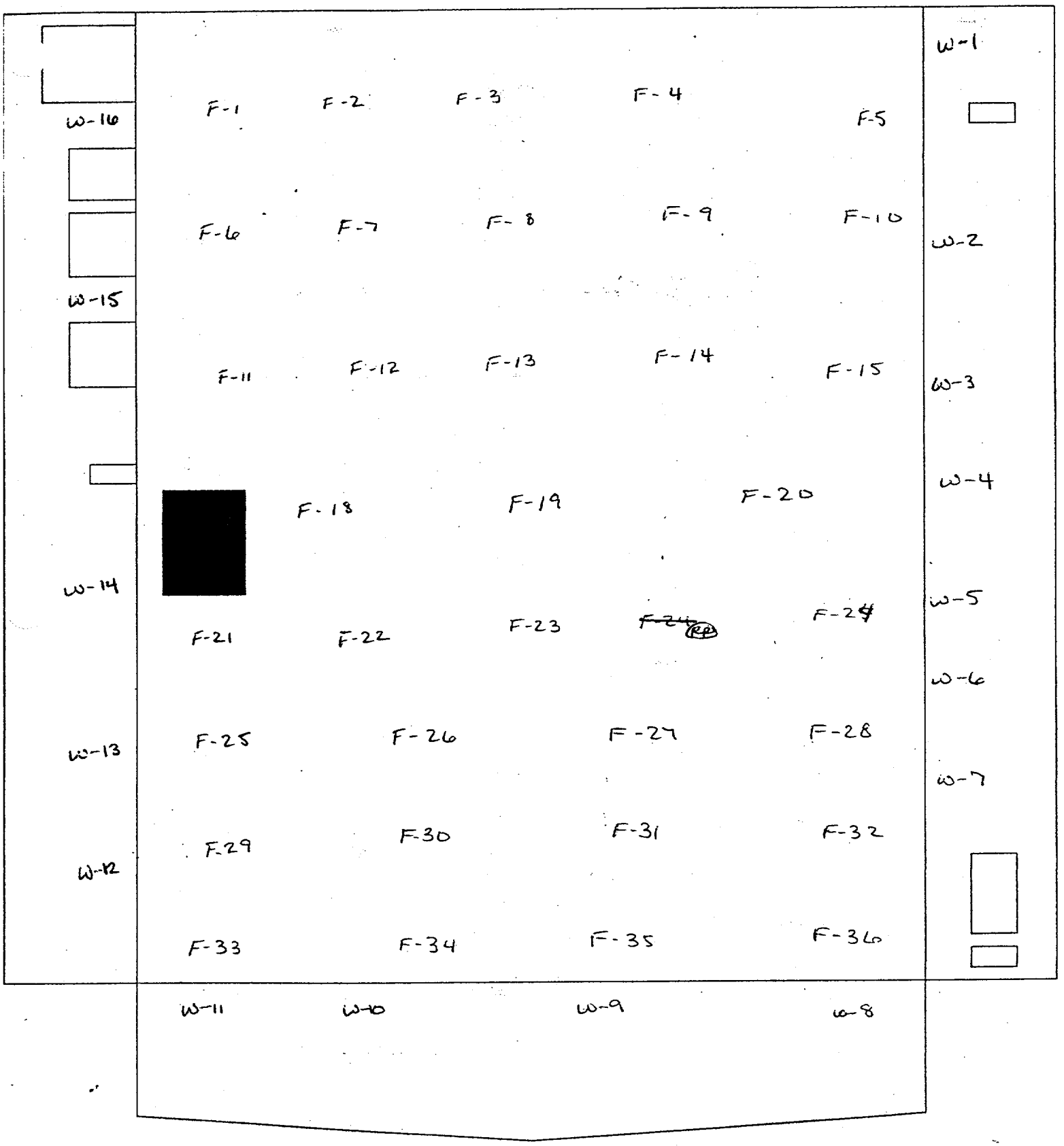
Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: B⁻	MDA: α	Other B⁻	Other BKG	Other α
2350-1 / 117566	8-6-02	43-106 / 133866	8-6-02	B⁻ .248 α .211	581	60	233		1.8
2929 / 152202	2-6-03	43-10 / 156519	2-6-03	.165 .344	151	12	45		.2
2350 / 95359	8-6-02	43-37 / 092503	8-6-02	.27 .207	188	16	1460		6
2224 / 129463	8-6-02	43-89 / 169230	8-6-02	.092 .154	476	64	78		2.4
2360 / 164680	7-9-02	43-89 / 118544	8-6-02	.113 .164	140	71	8		3.7

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded: ☐ Yes ☐ No ☐ Not Required	Date and Time:
Mark Blumrick		5/15/02 1600
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 5-16-02 0800

Building 2W
North

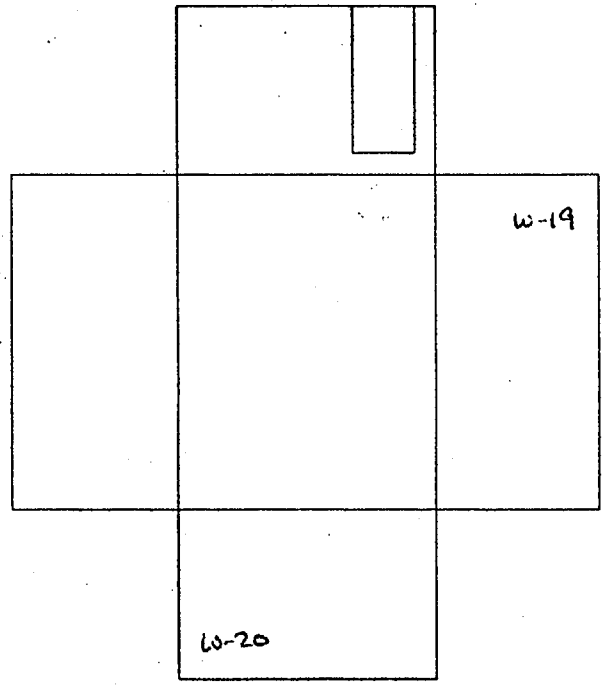


Interior

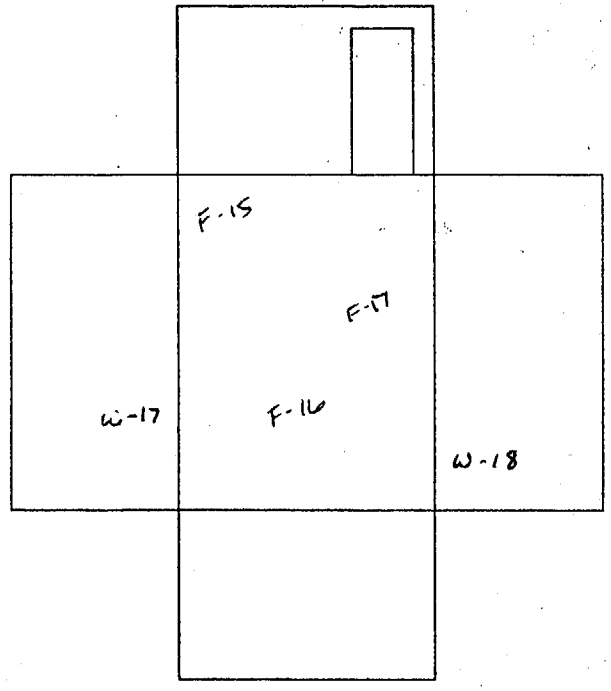
Scale:
4m x 4m

Survey # 02-021
Pg. 206

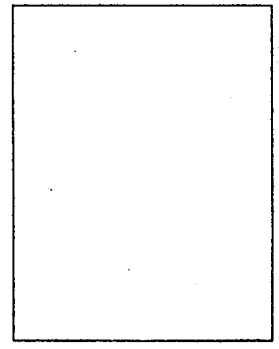
Building ∠W
Interior Room
North



Room
Exterior



Room
Interior



Room
Ceiling

Scale:
4m x 4m

Survey #02-021
Pg. 3 of 8

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 2W Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	2224-1/129463	8-6-02	43-89/169230	8-6-02				

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1460	12	320	257	1	8	2.3	-12
F-2	1440	8	314	273	2	8	-.6	18
F-3	1420	10	325	268	2	8	-.6	0
F-4	1800	14	306	233	6	8	-.6	24
F-5	1510	11	301	265	3	8	2.3	-12
F-5QC		8	289	273	3	8	-.6	-6
F-6	1540	8	298	264	4	7	-.6	0
F-7	1480	8	334	272	5	7	2.3	30
F-8	1510	14	279	280	0	8	-.6	18
F-9	1600	10	317	268	3	7	-.6	-12
F-10	1590	12	327	243	5	7	-.6	24
F-11	1580	9	289	272	2	7	-.6	18
F-12	1620	8	319	231	1	8	2.3	36
F-13	1650	10	280	256	3	8	-.6	0
F-14	1640	11	290	259	2	9	-.6	18
F-15	1690	15	345	288	3	9	-.6	12
F-16	1710	13	358	269	2	8	-.6	24
F-17	1680	16	340	242	3	8	2.6	-12
F-18	1640	9	318	230	3	8	2.3	0
F-19	1740	8	338	249	4	8	-.6	-18
F-20	1710	8	331	270	5	9	-.6	36
F-21	1750	10	333	239	0	9	-.6	-12
F-22	1810	9	321	272	2	9	2.3	30
F-23	1760	10	338	268	7	7	-.6	0
F-24	1740	10	316	274	3	7	-.6	-6
F-25	1790	14	346	258	2	7	-.6	24
F-26	1840	13	342	279	7	6	2.3	12

Eff β^- .092
α .154

Survey # 02-0215

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 2W Floor

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	2224-1/129463	8-6-02	43-89/169230	8-6-02				

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-27	1700	10	365	289	1	8	-.6	-6
F-28	1750	7	334	247	3	7	2.3	18
F-29	1810	6	345	253	4	7	-.6	-12
F-30	1800	12	313	236	4	6	-.6	0
F-31	1840	8	339	244	8	6	-.6	6
F-32	1880	8	337	252	5	9	2.3	24
F-33	1790	5	315	267	4	8	-.6	6
F-34	1810	14	318	240	4	6	-.6	0
F-35	1850	11	301	271	3	9	2.3	12
F-36	1820	12	317	256	6	8	-.6	-12

Eff. β .092
α .154

Screen # 02-0215

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg. 2W ITERIOR WALLS

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
	2360/164680	7/9/02	4389/118544	8-6-02	—	—	—	—

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1			193	195	0	9	-.6	6
W-2	260	4	202	191	4	8	-.6	-18
W-3			208	206	2	8	2.3	12
* W-4			203	213	0	8	-.6	24
W-5			184	192	0	8	-.6	0
W-6			204	232	0	7	-.6	6
* W-7	250	2	229	238	5	7	2.3	18
W-8			194	207	2	7	-.6	-12
W-9			211	212	1	7	-.6	30
W-10	240	2	189	203	0	6	-.6	0
W-11			195	222	1	6	-.6	-18
W-12			212	193	4	6	-.6	24
W-13			181	184	1	6	2.3	-12
W-14	240	2.6	145	188	1	7	-.6	0
W-14Qc	230	3.0	148	194	1	7	-.6	-6
W-15			147	191	1	6	-.6	12
W-16	200	1.4	175	215	2	6	2.3	24
W-17			176	171	1	7	-.6	12
W-18			163	170	3	7	-.6	6
W-19			205	180	2	7	2.3	18
W-20			190	182	2	8	-.6	-6

2360 → EFF. β^- .113
α .164

Survey # 02-0215

* Penlin

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 2W Exterior WALLS

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data	2360/164680	7-9-02	43-09/118544	8-6-02	—	—	—	—

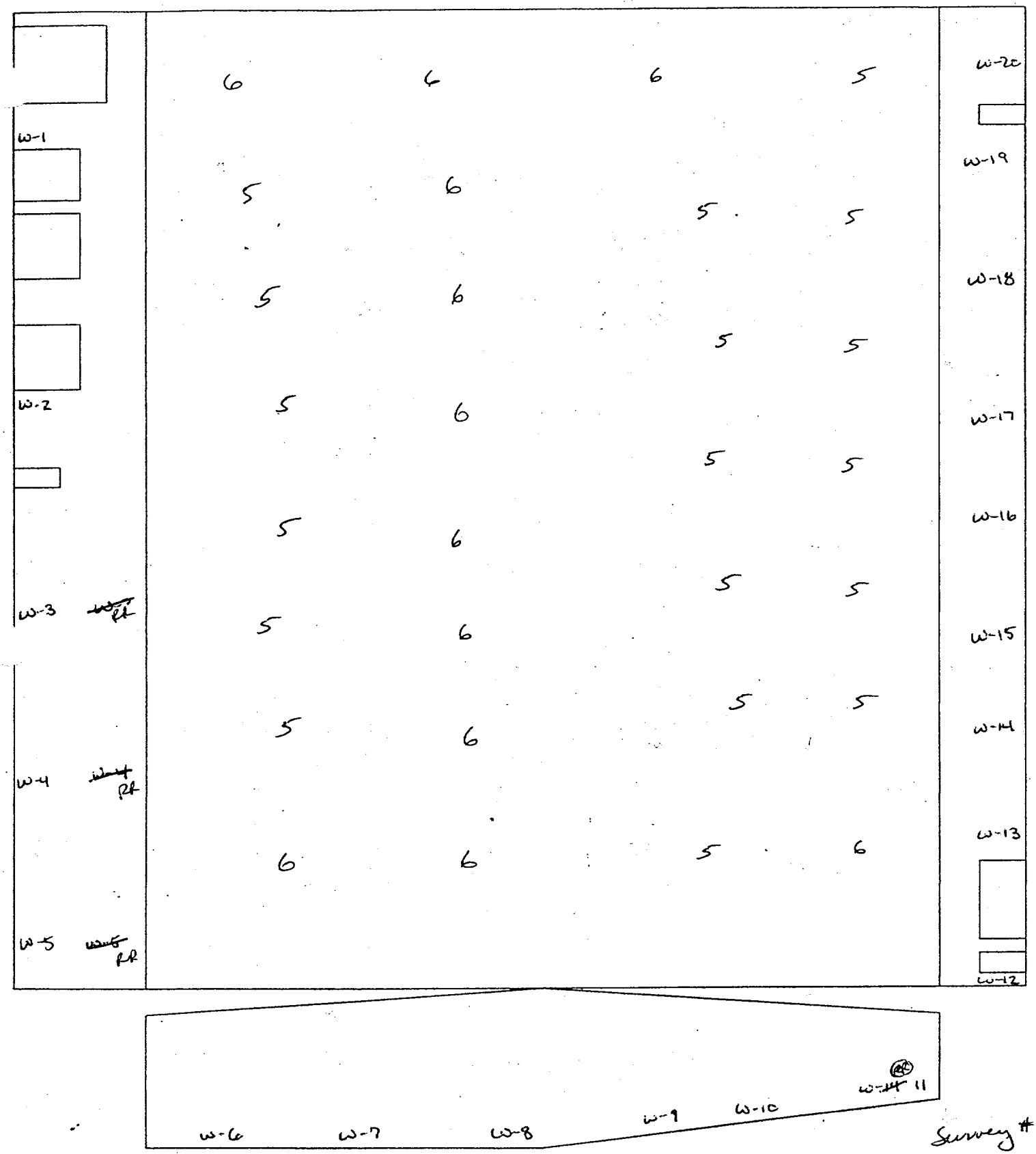
	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	230	1.7	205	193	10	9	-.6	6
W-2			204	175	12	8	-.6	-12
W-3	240	2.6	201	194	7	8	-.6	0
W-4			211	191	5	7	-.6	18
W-5	230	2	212	188	10	7	2.3	-6
W-6			217	184	7	8	-.6	24
W-7			225	189	6	8	-.6	-18
W-8	260	2.8	202	176	3	7	-.6	-6
W-9			202	211	2	8	2.3	30
W-10			194	210	3	8	-.6	36
W-11			217	183	4	8	-.6	-12
W-12			164	186	1	8	-.6	0
W-13	280	2	203	193	2	8	-.6	12
W-14			218	180	5	8	2.3	18
W-15			227	191	5	8	-.6	0
W-16	240	4	188	170	3	7	-.6	24
W-16QC			192	184	1	7	-.6	18
W-17	260	2	180	191	1	7	-.6	-12
W-18			212	200	5	7	2.3	0
W-19			178	207	6	7	-.6	6
W-20	280	3.2	173	209	2	7	2.3	30

EFF B⁻ .113
α .164

Survey # 02-0215

Building 2W
North



Exterior

Scale:
4m x 4m

Model 19
#66610
5/01/03
micro Realtors

Survey #
02-0215

Pg. 8 of 8

Results of Surface Scans

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	1460	0	12	6
F2	1440	-20	8	2
F3	1420	-40	10	4
F4	1800	340	14	8
F5	1510	50	11	5
F6	1540	80	8	2
F7	1480	20	8	2
F8	1510	50	18	12
F9	1600	140	10	4
F10	1590	130	12	6
F11	1580	120	9	3
F12	1620	160	8	2
F13	1650	190	10	4
F14	1640	180	11	5
F15	1690	230	15	9
F16	1710	250	13	7
F17	1680	220	16	10
F18	1640	180	9	3
F19	1740	280	8	2
F20	1710	250	8	2
F21	1750	290	10	4
F22	1810	350	9	3
F23	1760	300	10	4
F24	1740	280	10	4
F25	1790	330	14	8
F26	1840	380	13	7
F27	1700	240	10	4
F28	1750	290	7	1
F29	1810	350	6	0
F30	1800	340	12	6
F31	1840	380	8	2
F32	1880	420	8	2
F33	1790	330	5	-1
F34	1810	350	14	8
F35	1850	390	11	5
F36	1820	360	12	6

All floor scans performed with Ludlum 239-1F (2350-1 No.95359) with 43-37 No. 92503

Floor Monitor Info:
Scan MDA Beta - 188 dpm/detector area
Scan MDA Alpha - 16 dpm/detector area
Scan background Beta - 1460 cpm
Scan background Alpha - 6 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Elevated Scan Readings

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

No elevated scan results were reported.

Direct Measurements (Total Activity)

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
F1	320	257	63	78	-15	-163	253	476	-326
F2	314	273	41	78	-37	-402	232	476	-804
F3	325	268	57	78	-21	-228	248	476	-457
F4	306	233	73	78	-5	-54	262	476	-109
F5	301	265	36	78	-42	-457	227	476	-913
F6	298	264	34	78	-44	-478	225	476	-957
F7	334	272	62	78	-16	-174	252	476	-348
F8	279	280	-1	78	-79	-859	187	476	-1717
F9	317	268	49	78	-29	-315	240	476	-630
F10	327	243	84	78	6	65	271	476	130
F11	289	272	17	78	-61	-663	208	476	-1326
F12	319	231	88	78	10	109	274	476	217
F13	280	256	24	78	-54	-587	215	476	-1174
F14	290	259	31	78	-47	-511	222	476	-1022
F15	345	288	57	78	-21	-228	248	476	-457
F16	358	269	89	78	11	120	275	476	239
F17	340	242	98	78	20	217	283	476	435
F18	318	230	88	78	10	109	274	476	217
F19	338	249	89	78	11	120	275	476	239
F20	331	270	61	78	-17	-185	251	476	-370
F21	333	239	94	78	16	174	279	476	348
F22	321	272	49	78	-29	-315	240	476	-630
F23	338	268	70	78	-8	-87	259	476	-174
F24	316	274	42	78	-36	-391	233	476	-783
F25	346	258	88	78	10	109	274	476	217
F26	342	279	63	78	-15	-163	253	476	-326
F27	365	289	76	78	-2	-22	264	476	-43
F28	334	247	87	78	9	98	274	476	196
F29	345	253	92	78	14	152	278	476	304
F30	313	236	77	78	-1	-11	265	476	-22
F31	339	244	95	78	17	185	280	476	370
F32	337	252	85	78	7	76	272	476	152

F33	315	267	48	78	-30	-326	239	476	-652
F34	318	240	78	78	0	0	266	476	0
F35	301	271	30	78	-48	-522	221	476	-1043
F36	317	256	61	78	-17	-185	251	476	-370

Building interior floor direct measurements were performed with 2224-1 No. 129463 and 43-89 No. 169230

	Beta	Alpha
Efficiency	0.092	0.154
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm^2)	476	64

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Elevated Direct Measurements (Total Activity) and Averaging Results
Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

No elevated direct measurements were reported.

Removable Surface Activity Measurements

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
F1	-12	19.6	151	2.3	5.1	12
F2	18	22.9	151	-0.6	2.6	12
F3	0	10.3	151	-0.6	2.6	12
F4	24	25.8	151	-0.6	2.6	12
F5	-12	19.6	151	2.3	5.1	12
F6	0	10.3	151	-0.6	2.6	12
F7	30	28.4	151	2.3	5.1	12
F8	18	22.9	151	-0.6	2.6	12
F9	-12	19.6	151	-0.6	2.6	12
F10	24	25.8	151	-0.6	2.6	12
F11	18	22.9	151	-0.6	2.6	12
F12	36	30.7	151	2.3	5.1	12
F13	0	10.3	151	-0.6	2.6	12
F14	18	22.9	151	-0.6	2.6	12
F15	12	19.6	151	-0.6	2.6	12
F16	24	25.8	151	-0.6	2.6	12
F17	-12	19.6	151	-0.6	2.6	12
F18	0	10.3	151	2.3	5.1	12
F19	-18	22.9	151	-0.6	2.6	12
F20	36	30.7	151	-0.6	2.6	12
F21	-12	19.6	151	-0.6	2.6	12
F22	30	28.4	151	2.3	5.1	12
F23	0	10.3	151	-0.6	2.6	12
F24	-6	15.7	151	-0.6	2.6	12
F25	24	25.8	151	-0.6	2.6	12
F26	12	19.6	151	2.3	5.1	12
F27	-6	15.7	151	-0.6	2.6	12
F28	18	22.9	151	2.3	5.1	12
F29	-12	19.6	151	-0.6	2.6	12
F30	0	10.3	151	-0.6	2.6	12
F31	6	15.7	151	-0.6	2.6	12
F32	24	25.8	151	2.3	5.1	12
F33	6	15.7	151	-0.6	2.6	12
F34	0	10.3	151	-0.6	2.6	12
F35	12	19.6	151	2.3	5.1	12
F36	-12	19.6	151	-0.6	2.6	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	45	0.2
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	151	12

Elevated Removable Surface Activity Measurements

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	8	0
F2	8	0
F3	8	0
F4	8	0
F5	8	0
F6	7	-1
F7	7	-1
F8	6	-2
F9	7	-1
F10	7	-1
F11	7	-1
F12	8	0
F13	8	0
F14	9	1
F15	9	1
F16	8	0
F17	8	0
F18	8	0
F19	8	0
F20	9	1
F21	9	1
F22	9	1
F23	7	-1
F24	7	-1
F25	7	-1
F26	6	-2
F27	8	0
F28	7	-1
F29	7	-1
F30	6	-2
F31	6	-2
F32	9	1
F33	8	0
F34	6	-2
F35	9	1
F36	8	0

Background dose rate: 6-9 uR/hr with Model 19, No. 115870

Summary of Building Surface Direct Reading (Total Activity) Results

Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

	Beta				Alpha		
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
36	-161	275.9	-83.2	36	-322	551.9	-166.4

$t_{1-\alpha}$ 1.690

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements
Molycorp - Building 2W Foundation Only Survey Unit (Affected Area)

Including all building interior and exterior measurements (uR/hr)

n	$\bar{x}$	s	μ_α
36	-0.4	1.0	-0.1

$t_{1-\alpha}$ 1.690

Guidelines/Conditions Satisfied?
Yes

Results of Surface Scans

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1				
W2	260	27	4	2.2
W3				
W4				
W5				
W6				
W7	250	17	2	0.2
W8				
W9				
W10	240	7	2	0.2
W11				
W12				
W13				
W14	240	7	2.6	0.8
W15				
W16	200	-33	1.4	-0.4
W17				
W18				
W19				
W20				

All interior wall scans performed with Ludlum 2350-1 No.117566
with 43-106 No. 133866

Scan MDA Beta - 581 dpm/detector area
Scan MDA Alpha - 60 dpm/detector area
Scan background Beta - 233 cpm
Scan background Alpha - 1.8 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Results of Surface Scans

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Exterior (Walls)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	230	-3	1.4	-0.4
W2				
W3	240	7	2.6	0.8
W4				
W5	230	-3	2	0.2
W6				
W7				
W8	260	27	2.8	1
W9				
W10				
W11				
W12				
W13	280	47	2	0.2
W14				
W15				
W16	240	7	4	2.2
W17	260	27	2	0.2
W18				
W19				
W20	280	47	3.2	1.4

All exterior wall scans performed with Ludlum 2350-1 No.117566
with 43-106 No. 133866

Scan MDA Beta - 581 dpm/detector area
Scan MDA Alpha - 60 dpm/detector area
Scan background Beta - 233 cpm
Scan background Alpha - 1.8 cpm
Detector Eff. Beta - .248
Detector Eff. Alpha - .211

Elevated Scan Readings

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

No elevated scan results were reported.

Results of Surface Scans

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W1	193	195	-2	8	-10	-88	42	140	-177
W2	202	191	11	8	3	27	76	140	53
W3	208	206	2	8	-6	-53	55	140	-106
W4	203	213	-10	8	-18	-159	25	140	-319
W5	184	192	-8	8	-16	-142	0	140	-283
W6	204	232	-28	8	-36	-319	78	140	-637
W7	229	238	-9	8	-17	-150	17	140	-301
W8	194	207	-13	8	-21	-186	39	140	-372
W9	211	212	-1	8	-9	-80	46	140	-159
W10	189	203	-14	8	-22	-195	42	140	-389
W11	195	222	-27	8	-35	-310	76	140	-619
W12	212	193	19	8	11	97	90	140	195
W13	181	184	-3	8	-11	-97	39	140	-195
W14	145	188	-43	8	-51	-451	103	140	-903
W15	147	191	-44	8	-52	-460	104	140	-920
W16	175	215	-40	8	-48	-425	98	140	-850
W17	176	171	5	8	-3	-27	63	140	-53
W18	163	170	-7	8	-15	-133	17	140	-265
W19	205	180	25	8	17	150	100	140	301
W20	190	182	8	8	0	0	69	140	0

Building interior floor direct measurements were performed with 2360 No. 164680 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.113	0.164
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm^2)	140	71

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Results of Surface Scans

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Exterior (Walls)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W1	205	193	12	8	4	35	78	140	71
W2	204	175	29	8	21	186	106	140	372
W3	201	194	7	8	-1	-9	67	140	-18
W4	211	191	20	8	12	106	92	140	212
W5	212	188	24	8	16	142	98	140	283
W6	217	184	33	8	25	221	111	140	442
W7	225	189	36	8	28	248	115	140	496
W8	202	176	26	8	18	159	101	140	319
W9	202	211	-9	8	-17	-150	17	140	-301
W10	194	210	-16	8	-24	-212	49	140	-425
W11	217	183	34	8	26	230	112	140	460
W12	164	186	-22	8	-30	-265	65	140	-531
W13	203	193	10	8	2	18	74	140	35
W14	218	180	38	8	30	265	118	140	531
W15	227	191	36	8	28	248	115	140	496
W16	188	170	18	8	10	88	88	140	177
W17	180	191	-11	8	-19	-168	30	140	-336
W18	212	200	12	8	4	35	78	140	71
W19	178	207	-29	8	-37	-327	79	140	-655
W20	173	209	-36	8	-44	-389	92	140	-779

Building exterior floor direct measurements were performed with 2360 No. 164680 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.113	0.164
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm^2)	140	71

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Elevated Direct Measurements (Total Activity) and Averaging Results
Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

No elevated direct measurements were reported.

Removable Surface Activity Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
W1	6	15.7	151	-0.6	2.6	12
W2	-18	22.9	151	-0.6	2.6	12
W3	12	19.6	151	2.3	5.1	12
W4	24	25.8	151	-0.6	2.6	12
W5	0	10.3	151	-0.6	2.6	12
W6	6	15.7	151	-0.6	2.6	12
W7	18	22.9	151	2.3	5.1	12
W8	-12	19.6	151	-0.6	2.6	12
W9	30	28.4	151	-0.6	2.6	12
W10	0	10.3	151	-0.6	2.6	12
W11	-18	22.9	151	-0.6	2.6	12
W12	24	25.8	151	-0.6	2.6	12
W13	-12	19.6	151	2.3	5.1	12
W14	0	10.3	151	-0.6	2.6	12
W15	12	19.6	151	-0.6	2.6	12
W16	24	25.8	151	2.3	5.1	12
W17	12	19.6	151	-0.6	2.6	12
W18	6	15.7	151	-0.6	2.6	12
W19	18	22.9	151	2.3	5.1	12
W20	-6	15.7	151	-0.6	2.6	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	45	0.2
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	151	12

Removable Surface Activity Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Exterior (Walls)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
W1	6	15.7	151	-0.6	2.6	12
W2	-12	19.6	151	-0.6	2.6	12
W3	0	10.3	151	-0.6	2.6	12
W4	18	22.9	151	-0.6	2.6	12
W5	-6	15.7	151	2.3	5.1	12
W6	24	25.8	151	-0.6	2.6	12
W7	-18	22.9	151	-0.6	2.6	12
W8	-6	15.7	151	-0.6	2.6	12
W9	30	28.4	151	2.3	5.1	12
W10	36	30.7	151	-0.6	2.6	12
W11	-12	19.6	151	-0.6	2.6	12
W12	0	10.3	151	-0.6	2.6	12
W13	12	19.6	151	-0.6	2.6	12
W14	18	22.9	151	2.3	5.1	12
W15	0	10.3	151	-0.6	2.6	12
W16	24	25.8	151	-0.6	2.6	12
W17	-12	19.6	151	-0.6	2.6	12
W18	0	10.3	151	2.3	5.1	12
W19	6	15.7	151	-0.6	2.6	12
W20	30	28.4	151	2.3	5.1	12

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	45	0.2
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	151	12

Elevated Removable Surface Activity Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	9	2
W2	8	1
W3	8	1
W4	8	1
W5	8	1
W6	7	0
W7	7	0
W8	7	0
W9	7	0
W10	6	-1
W11	6	-1
W12	6	-1
W13	6	-1
W14	7	0
W15	6	-1
W16	6	-1
W17	7	0
W18	7	0
W19	7	0
W20	8	1

Background dose rate: 6-9 uR/hr with Model 19, No. 115870

Exposure Rate Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Exterior (Walls)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	9	2
W2	8	1
W3	8	1
W4	7	0
W5	7	0
W6	8	1
W7	8	1
W8	7	0
W9	8	1
W10	8	1
W11	8	1
W12	8	1
W13	8	1
W14	8	1
W15	8	1
W16	7	0
W17	7	0
W18	7	0
W19	7	0
W20	7	0

Background dose rate: 6-9 uR/hr with Model 19, No. 115870

Exposure Rate Measurements
Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Building Roof

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
Roof	6	-1
Roof	6	-1
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	5	-2
Roof	5	-2
Roof	6	-1
Roof	6	-1

Background dose rate: 6-9 uR/hr with Model 19, No. 66610

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Beta				Alpha			
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
40	-63	207.1	-8.4	40	-127	414.2	-16.7

$t_{1-\alpha}$ 1.684

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements

Molycorp - Building 2W Survey Unit Excluding Foundation (Unaffected Area)

Including all building interior and exterior measurements (uR/hr)

n	$\bar{x}$	s	μ_α
70	-0.5	1.2	-0.3

$t_{1-\alpha}$ 1.670

Guidelines/Conditions Satisfied?

Yes

Appendix C

Building 2 Train Bay Data Package

Molycorp Washington, PA

Building 2 Train Bay Data Package

This data package contains final status survey information for Building 2 Train Bay, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

During the final status survey of Building 2 Train Bay, elevated levels of activity were detected on the floor of the train bay. The Train Bay floor was reclassified as an affected area and surveyed as such.

Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities of Building 2 Train Bay.

Results from the final status survey of Building 2 Train Bay provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 2 Train Bay is suitable for unrestricted use.

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #2 Loading Dock

Date:	Time:	Location:	Survey Issue Log Number:
5-13-02	0930	BLDG Loading DOCK	02-0184

RWP Number:	Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:	Page 1 of 4

Survey Title: AFFECTED FLOOR

BKGDS FOR static Readings

	α	β-γ
Floor	2.4	78
Wall	3.7	8

2360/164680 used for static reading's 1-21 on FLOOR MDA = β⁻ 387 α 60

2360/156371 USED FOR STATICS 22-40 And for static's on WALL'S 1-5

MDA = β⁻ 180 α 76 WALL

MDA = β⁻ 498 α ~~+12~~ 65 FLOOR

Model 19 # 115870 CAL DUE: 8-6-02

Bkgd Readings: 5-6 μR/hr EFF% N/A

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | □ = Bulk Material Sample

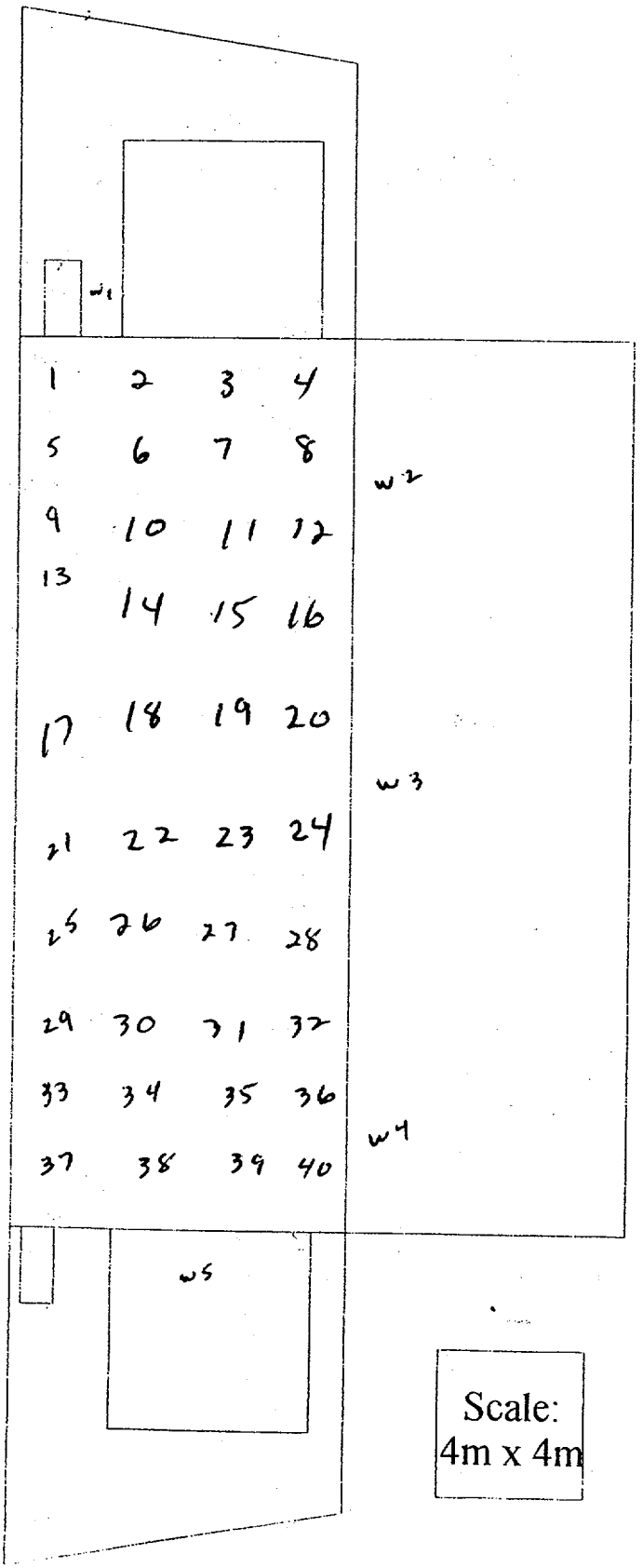
Section 2: Instrument Used

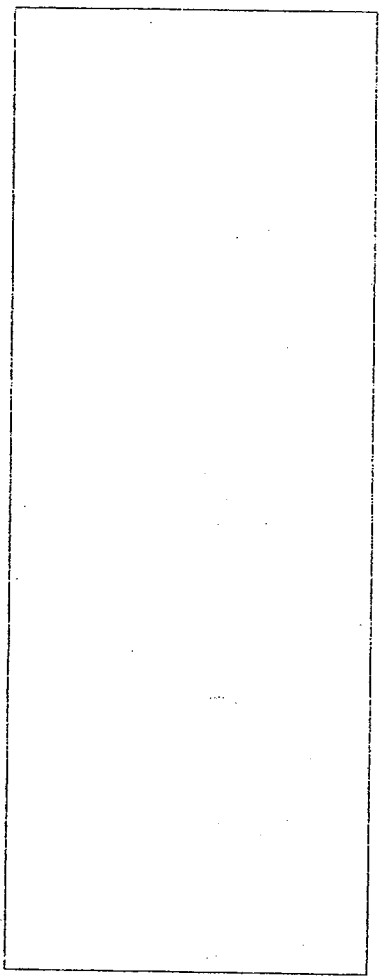
Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA:	Other β⁻ Pkgd α
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27/.307	β⁻ 151/23	1360/13
2350-1/117563	8-12-02	43-10G/128912	8-6-02	β⁻ .251/.212	β⁻ 557/44	β⁻ 219/1
2360/164680	7-9-02	43-89/118544	8-6-02	β⁻ .113/.164	See	above
2929/152202	2-6-03	43-10/150519	2-6-03	β⁻ .165/.344	158/11.6	48/.08
2360/156371	8-15-02	43-89/164832	8-5-02	β⁻ .088/.153 α	See	Above

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded: ☐ Yes ☒ No ☐ Not Required	Date and Time: 5-13-02 0930
Radiation Safety Officer (Print Name & Sign): Mike McDonald		Date and Time: 5-15-02 0930

Loading Dock
North





Loading Dock
Ceiling

Scale:
4m x 4m

Interior

Survey #
02-0184

Radiological Survey Results - Survey Location Indicator

02-0184

Survey Area Information: Bldg #2 - Loading Dock

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1310	10	261	255	5	5	-.23	6
F-2	1360	11	253	211	3	5	-.23	-6
F-3	1450	12	305	254	2	5	-.23	-6
F-4	1490	11	263	233	1	5	2.7	18
F-5	1340	8	227	220	4	4	2.7	-12
F-6	1470	10	318	238	8	6	-.23	6
F-7	1610	14	333	261	6	6	-.23	24
F-8	1490	10	276	227	3	6	-.23	30
* F-9	800	6	198	188	1	6	8.4	30
* F-10	1200	6	165	173	1	6	2.7	-6
* F-11	1050	8	178	164	7	5	2.7	12
F-12	1410	12	262	207	4	5	-.23	0
F-13	1200	10	307	225	2	6	-.23	-12
F-14	1280	5	260	207	4	5	6	42
F-14 QC			335	221	2	6	2.7	72
F-15	1630	8	2548	357	92	6	2.7	48
F-16	1300	9	327	254	3	5	-.23	12
* F-17	1100	13	184	172	1	5	2.7	0
* F-18	920	6	146	168	6	5	-.23	-6
* F-19	950	8	190	118	13	6	-.23	6
F-20	1250	9	292	213	6	5	-.23	91
F-21	1390	10	313	218	7	6	2.7	72
F-22	1420	11	294	286	3	6	6	12
F-23	1580	13	327	277	5	6	6	-12
F-24	1460	12	333	230	5	5	8	6
* F-25	830	5	222	215	7	5	-.23	18
F-26	1310	8	319	253	3	5	-.23	36

* Diamond Plate Steel

Radiological Survey Results - Survey Location Indicator

02-0184

Survey Area Information: Bldg #2 - Loading Dock

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-27	1580	9	208	175	1	5	-.23	48
F-28	1620	11	311	230	3	4	-.23	12
F-29	1530	10	350	234	4	4	2.7	12
F-30	1470	8	346	270	2	5	6	18
F-31	1580	10	353	281	6	5	6	6
F-32	1470	12	340	265	8	6	8	-6
F-33	1320	7	339	249	1	6	2.7	-6
F-34	1590	10	293	244	4	6	2.7	72
F-35	1640	11	317	242	4	6	-.23	109
F-36	1600	12	318	254	4	5	-.23	91
F-37	1420	8	326	246	3	5	-.23	18
F-38	1480	9	318	251	4	6	8	48
F-39	1560	10	315	240	2	7	8	6
F-40	1340	9	298	253	2	6	-.23	6
						[illegible]		
W-1	221	1	185	210	1	5	-.23	24
W-2	210	1	188	209	2	6	2.7	67
W-2 QC	—	—	200	212	0	6	2.7	48
W-3	259	2	224	212	4	5	2.7	12
W-4	255	1	232	239	2	7	-.23	6
W-5	280	1	240	215	2	5	6	55

Results of Surface Scans

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
F1	1310	-50	10	-3
F2	1360	0	11	-2
F3	1450	90	12	-1
F4	1490	130	11	-2
F5	1340	-20	8	-5
F6	1470	110	10	-3
F7	1610	250	14	1
F8	1490	130	10	-3
F9	800	-560	6	-7
F10	1200	-160	6	-7
F11	1050	-310	8	-5
F12	1410	50	12	-1
F13	1200	-160	10	-3
F14	1280	-80	5	-8
F15	1630	270	8	-5
F16	1300	-60	9	-4
F17	1100	-260	13	0
F18	920	-440	6	-7
F19	950	-410	8	-5
F20	1250	-110	9	-4
F21	1390	30	10	-3
F22	1420	60	11	-2
F23	1580	220	13	0
F24	1460	100	12	-1
F25	830	-530	5	-8
F26	1310	-50	8	-5
F27	1580	220	9	-4
F28	1620	260	11	-2
F29	1530	170	10	-3
F30	1470	110	8	-5
F31	1580	220	10	-3
F32	1470	110	12	-1
F33	1320	-40	7	-6
F34	1590	230	10	-3
F35	1640	280	11	-2
F36	1600	240	12	-1
F37	1420	60	8	-5
F38	1480	120	9	-4
F39	1560	200	10	-3
F40	1340	-20	9	-4

All floor scans performed with Ludlum 239-1F (2350-1 No.95359) with 43-37 No. 92503

Floor Monitor Info:
Scan MDA Beta - 181 dpm/detector area
Scan MDA Alpha - 23 dpm/detector area
Scan background Beta - 1360 cpm
Scan background Alpha - 13 cpm
Detector Eff. Beta - .27
Detector Eff. Alpha - .207

Elevated Scan Readings

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

No elevated scan results were reported.

Direct Measurements (Total Activity)

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)	Instrument #
F1	261	235	26	78	-52	-460	217	387	-920	1
F2	253	211	42	78	-36	-319	233	387	-637	1
F3	305	254	51	78	-27	-239	242	387	-478	1
F4	263	233	30	78	-48	-425	221	387	-850	1
F5	227	220	7	78	-71	-628	196	387	-1257	1
F6	318	238	80	78	2	18	268	387	35	1
F7	333	261	72	78	-6	-53	261	387	-106	1
F8	276	227	49	78	-29	-257	240	387	-513	1
F9	198	188	10	78	-68	-602	200	387	-1204	1
F10	165	173	-8	78	-86	-761	178	387	-1522	1
F11	178	164	14	78	-64	-566	204	387	-1133	1
F12	262	207	55	78	-23	-204	246	387	-407	1
F13	307	225	82	78	4	35	269	387	71	1
F14	260	207	53	78	-25	-221	244	387	-442	1
F15	2548	357	2191	78	2113	18699	1015	387	37398	1
F16	327	254	73	78	-5	-44	262	387	-88	1
F17	184	172	12	78	-66	-584	202	387	-1168	1
F18	146	168	-22	78	-100	-885	159	387	-1770	1
F19	190	118	72	78	-6	-53	261	387	-106	1
F20	292	213	79	78	1	9	267	387	18	1
F21	313	218	95	78	17	150	280	387	301	1
F22	294	286	8	78	-70	-795	207	498	-1591	2
F23	327	277	50	78	-28	-318	252	498	-636	2
F24	333	230	103	78	25	284	300	498	568	2
F25	222	215	7	78	-71	-807	205	498	-1614	2
F26	319	253	66	78	-12	-136	267	498	-273	2
F27	208	175	33	78	-45	-511	235	498	-1023	2
F28	311	236	75	78	-3	-34	275	498	-68	2
F29	350	234	116	78	38	432	310	498	864	2
F30	346	270	76	78	-2	-23	276	498	-45	2
F31	353	281	72	78	-6	-68	273	498	-136	2
F32	340	265	75	78	-3	-34	275	498	-68	2

F33	339	249	90	78	12	136	289	498	273	2
F34	293	244	49	78	-29	-330	251	498	-659	2
F35	317	242	75	78	-3	-34	275	498	-68	2
F36	318	254	64	78	-14	-159	265	498	-318	2
F37	326	246	80	78	2	23	280	498	45	2
F38	318	251	67	78	-11	-125	268	498	-250	2
F39	315	240	75	78	-3	-34	275	498	-68	2
F40	298	253	45	78	-33	-375	247	498	-750	2

Building interior floor direct measurements were performed with either: #1 - 2360 No. 164680 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.113	0.164
Floor Background (cpm)	78	2.4
Floor MDA (dpm/100 cm2)	387	60

or

#2 - 2360 No. 156371 and 43-89 No. 164832

	Beta	Alpha
Efficiency	0.088	0.153
Floor Background (cpm)	78	3.7
Floor MDA (dpm/100 cm2)	498	65

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Elevated Direct Measurements (Total Activity) and Averaging Results

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Building Floor (Interior)

Location	Direct Beta (dpm/100cm^2)	Direct Alpha (dpm/100cm^2)	Over Area (cm^2)	Exceeds Limits		Averaged Value (over 1 m^2)	Within Limits? Yes/No
				Maximum	Average		
F15	18699	37398				Marked for removal/remediation	

Removable Surface Activity Measurements

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
F1	6	15.9	158	-0.23	1.6	11.6
F2	-6	15.9	158	-0.23	1.6	11.6
F3	-6	15.9	158	-0.23	1.6	11.6
F4	18	23.1	158	2.7	5.5	11.6
F5	-12	19.8	158	2.7	5.5	11.6
F6	6	15.9	158	-0.23	1.6	11.6
F7	24	25.9	158	-0.23	1.6	11.6
F8	30	28.5	158	-0.23	1.6	11.6
F9	30	28.5	158	8.4	9.7	11.6
F10	-6	15.9	158	2.7	5.5	11.6
F11	12	19.8	158	2.7	5.5	11.6
F12	0	10.6	158	-0.23	1.6	11.6
F13	-12	19.8	158	-0.23	1.6	11.6
F14	42	33.0	158	6	8.2	11.6
F15	48	35.1	158	2.7	5.5	11.6
F16	12	19.8	158	-0.23	1.6	11.6
F17	0	10.6	158	2.7	5.5	11.6
F18	-6	15.9	158	-0.23	1.6	11.6
F19	6	15.9	158	-0.23	1.6	11.6
F20	91	47.2	158	-0.23	1.6	11.6
F21	72	42.3	158	2.7	5.5	11.6
F22	12	19.8	158	6	8.2	11.6
F23	-12	19.8	158	6	8.2	11.6
F24	6	15.9	158	8	9.5	11.6
F25	18	23.1	158	-0.23	1.6	11.6
F26	36	30.8	158	-0.23	1.6	11.6
F27	48	35.1	158	-0.23	1.6	11.6
F28	12	19.8	158	-0.23	1.6	11.6
F29	12	19.8	158	2.7	5.5	11.6
F30	18	23.1	158	6	8.2	11.6
F31	6	15.9	158	6	8.2	11.6
F32	-6	15.9	158	8	9.5	11.6
F33	-6	15.9	158	2.7	5.5	11.6
F34	72	42.3	158	2.7	5.5	11.6
F35	109	51.5	158	-0.23	1.6	11.6
F36	91	47.2	158	-0.23	1.6	11.6
F37	18	23.1	158	-0.23	1.6	11.6
F38	48	35.1	158	8	9.5	11.6
F39	6	15.9	158	8	9.5	11.6
F40	6	15.9	158	-0.23	1.6	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

Elevated Removable Surface Activity Measurements

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Building Floor

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
F1	5	0
F2	5	0
F3	5	0
F4	5	0
F5	4	-1
F6	6	1
F7	6	1
F8	6	1
F9	6	1
F10	6	1
F11	5	0
F12	5	0
F13	6	1
F14	5	0
F15	6	1
F16	5	0
F17	5	0
F18	5	0
F19	6	1
F20	5	0
F21	6	1
F22	6	1
F23	6	1
F24	5	0
F25	5	0
F26	5	0
F27	5	0
F28	4	-1
F29	4	-1
F30	5	0
F31	5	0
F32	6	1
F33	6	1
F34	6	1
F35	6	1
F36	5	0
F37	5	0
F38	6	1
F39	7	2
F40	6	1

Background dose rate: 5-6 uR/hr with Model 19, No. 115870

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

Including all building interior and exterior measurements

	Beta				Alpha		
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
39	-231	311.9	-146.6	39	-461	623.7	-293.2

$t_{1-\alpha}$ 1.684

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements

Molycorp - Building 2 Train Bay Foundation Only Survey Unit (Affected Area)

n	$\bar{x}$	s	μ_α
40	0.4	0.7	0.6

$t_{1-\alpha}$ 1.684

Guidelines/Conditions Satisfied?

Yes

Results of Surface Scans

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Walls (Interior)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W1	221	2	1	0
W2	210	-9	1	0
W3	259	40	2	1
W4	255	36	1	0
W5	280	61	1	0

All interior wall scans performed with Ludlum 2350-1 No.117563
with 43-106 No. 128912

Scan MDA Beta - 557 dpm/detector area
Scan MDA Alpha - 44 dpm/detector area
Scan background Beta - 219 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

Results of Surface Scans

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Exterior (Walls and Roof)

Location (see map)	Beta Scan gross cpm	Beta Scan net cpm	Alpha Scan gross cpm	Alpha Scan net cpm
W11	210	-9	1	0
W12	220	1	1	0
W13	240	21	2.2	1.2
W14	240	21	1.8	0.8
W15	210	-9	2.9	1.9

Exterior wall scans performed with Ludlum 2350-1 No.117563 with 43-106 No. 128912

Scan MDA Beta - 557 dpm/detector area
Scan MDA Alpha - 44 dpm/detector area
Scan background Beta - 219 cpm
Scan background Alpha - 1 cpm
Detector Eff. Beta - .251
Detector Eff. Alpha - .212

Elevated Scan Readings

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

No elevated scan results were reported.

Direct Measurements (Total Activity)

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Walls (Interior)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm2)	Uncertainty 95% CL	MDA (dpm/100cm2)	Direct Alpha (1) (dpm/100cm2)
W1	185	210	-25	8	-33	-375	92	180	-750
W2	188	209	-21	8	-29	-330	80	180	-659
W3	224	212	12	8	4	45	100	180	91
W4	232	239	-7	8	-15	-170	22	180	-341
W5	240	215	25	8	17	193	128	180	386

All building interior wall direct measurements were performed with 2360 No. 156371 and 43-89 No. 164832

	Beta	Alpha
Wall Efficiency	0.088	0.153
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Direct Measurements (Total Activity)

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Exterior (Walls)

Location (see map)	Unshield Beta cpm	Shield Beta cpm	Gross Beta cpm	Bkgd cpm	Net cpm	Direct Beta (dpm/100cm^2)	Uncertainty 95% CL	MDA (dpm/100cm^2)	Direct Alpha (1) (dpm/100cm^2)
W11	187	196	-9	8	-17	-150	17	180	-301
W12	205	215	-10	8	-18	-159	25	180	-319
W13	244	207	37	8	29	257	116	180	513
W14	220	192	28	8	20	177	104	180	354
W15	204	215	-11	8	-19	-168	30	180	-336

All building exterior wall direct measurements were performed with 2360 No. 164680 and 43-89 No. 118544

	Beta	Alpha
Wall Efficiency	0.113	0.164
Wall Background (cpm)	8	3.7
Wall MDA (dpm/100 cm2)	180	76

(1) - A beta to alpha ratio factoring (1:2, beta to alpha) was used to provide a more accurate alpha activity determination then sampling.

Elevated Direct Measurements (Total Activity) a

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

No elevated direct measurements were reported.

Removable Surface Activity Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Walls (Interior)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
W1	24	25.9	158	-0.23	1.6	11.6
W2	67	40.9	158	2.7	5.5	11.6
W3	12	19.8	158	2.7	5.5	11.6
W4	6	15.9	158	-0.23	1.6	11.6
W5	55	37.3	158	6	8.2	11.6

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

Removable Surface Activity Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Exterior (Walls)

Location (see map)	Removable Beta (dpm/100cm2)	Uncertainty 95% CL	MDA	Removable Alpha (dpm/100cm2)	Uncertainty 95% CL	MDA
F40	18	22.9	152	-0.3	1.8	12
W11	18			-0.23		
W12	-18			-0.23		
W13	24			-0.23		
W14	30			-0.23		
W15	-12			-0.23		

Ludlum 2929 No. 152202 with 43-10 No. 156519 Info:

	Beta	Alpha
Background (cpm)	48	0.08
Bkgd ct. time	60	60
Sample ct. time	1	1
Efficiency	0.165	0.344
MDA	158	11.6

Elevated Removable Surface Activity Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

No elevated removable surface activity was reported above limits.

Exposure Rate Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Walls (Interior)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W1	5	0
W2	6	1
W3	5	0
W4	7	2
W5	5	0

Background dose rate: 5-6 uR/hr with Model 19, No. 115870

Exposure Rate Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Building Exterior (Walls)

Location (see map)	Exposure Rate (uR/hr)	Net Exp Rate (uR/hr)
W11	6	1
W12	6	1
W13	6	1
W14	5	0
W15	5	0

Background dose rate: 5-6 uR/hr with Model 19, No. 115870

Summary of Building Surface Direct Reading (Total Activity) Results
Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

Including all building interior and exterior measurements

	Beta				Alpha		
n	$\bar{x}$	s	μ_α	n	$\bar{x}$	s	μ_α
10	-68	222.3	59.3	10	-136	444.6	118.7

$t_{1-\alpha}$ 1.812

Guidelines/Conditions Satisfied?

Beta	Alpha
Yes	Yes

Summary of Exposure Rate Measurements

Molycorp - Building 2 Train Bay Survey Unit Excluding Foundation (Affected Area)

n	$\bar{x}$	s	μ_α
10	0.6	0.7	1.0

$t_{1-\alpha}$ 1.812

Guidelines/Conditions Satisfied?

Yes

Appendix D

Building 19 Data Package

Molycorp Washington, PA

Building 19 Data Package

This data package contains final status survey information for Building 19, Molycorp, Washington, PA site.

Field data collection forms, survey report forms, statistical test results, and comparisons to release limits are provided.

Summary

No anomalies were reported during the survey of Building 19. Elevated levels of background radiation, from soil radioactivity, continued to be a presence during survey activities.

Results from the final status survey of Building 19 provides evidence that release criteria have been met, demonstrates that residual radioactivity is below the unrestricted use criteria, and confirms that Building 19 is suitable for unrestricted use.

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #19 - 2nd Floor

Date:	Time:	Location:	Survey Issue Log Number:
5-8-02	1700	Bldg 19-2nd Floor	02-0181

RWP Number:	Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:	Page 1 of 41

Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

2224-1

	Bkgd α	Bkgd β⁻	MDA α	MDA β⁻
Floor	2.4	78	64	476
Wall	3.7	8	76	172
Block	3.7	49	~~78~~ MB 76	383

Model 19 #115870 8-6-02

Bkgd Readings: 9-13 micro Rem/hr

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | —①— = Large Area Wipe | □ = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: β⁻	MDA: α	Other Bkgd β⁻	Other Bkgd α
2350-1/117563	8-12-02	43-106/128912	8-6-02	β⁻ .251 / α .212	666	40	313	.8
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27 / α .207	190	20	1496	9.4
2929/152202	2-6-03	43-10-1/156519	2-6-03	β⁻ .165 / α .344	~~246~~ 130	~~1.08~~ 1.8	46	.08
2224-1/129463	8-6-02	43-89/169230	8-6-02	β⁻ .092 / α .154	See above			

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded: ☐ Yes ☐ No ☒ Not Required	Date and Time:
Mark Blaucoat		5-9-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald		**Date and Time:** 5-16-02 0800

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 19 2nd Floor (Floors)

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
* F-1	2000	12	520	363	6	13	-.2	0
* F-2	1980	16	497	369	1	12	-.2	6
* F-3	2020	10	462	361	3	12	-.2	0
* F-4	2060	8	458	341	2	12	-.2	12
F-5	1620	12	348	321	0	10	-.2	-30
F-6	1640	14	386	313	4	9	-.2	42
F-7	1900	8	399	319	3	9	-.2	30
F-8	2000	16	418	317	1	8	-.2	-24
F-9	1640	6	336	283	6	9	-.2	-30
F-10	1660	8	356	297	0	10	5.6	-18
F-11	1680	6	398	304	1	10	-.2	-36
F-12	1700	8	352	297	2	9	-.2	-12
F-13	1680	6	379	321	1	9	-.2	-42
F-14	1720	10	351	304	4	9	-.2	-24
F-14QC	—	—	360	313	3	9	-.2	-6
F-15	1680	8	380	301	2	9	-.2	-60
F-16	1720	16	402	299	1	10	-.2	-78
F-17	1740	12	384	304	3	11	-.2	54
F-18	1710	6	345	277	1	10	5.6	-18
F-19	1780	8	382	321	7	10	2.6	60
F-20	1740	16	362	336	1	10	-.2	-30
F-21	1670	11.4	352	298	4	9	-.2	-30
F-22	1660	14.6	331	273	1	9	-.2	36
F-23	1640	6.2	334	307	5	9	-.2	-12
F-24	1620	12	322	303	1	9	-.2	66
F-25	1650	4.2	355	332	1	9	-.2	-18
F-26	1720	6.8	338	323	3	9	-.2	24

* ON TILE FLOOR

Survey #
02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 19 2nd Floor ~~wall~~ (Floor) MB

Instrument Data	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA

Performed By:	Print Name	Signature	Date

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	β
F-27	1690	10	375	288	0	9	-.2	48
F-28	1720	12	288	305	2	9	-.2	0
F-29	1800	14	269	276	2	10	-.2	12
MB * F-30	1680	8	400	294	1	9	-.2	18

~~* Cinder Block~~ MB

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 19 2nd Floor Walls

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-1	440	5	400	388	1	12	-.2	12
W-2	540	6	412	343	0	12	-.2	18
W-3	380	7	309	277	2	12	-.2	-30
W-4	360	7	263	270	0	11	-.2	18
W-5	350	7	271	278	3	10	-.2	24
W-6	340	4	286	265	2	9	2.6	54
W-7	340	2	233	272	1	9	-.2	0
W-7 QC	-	-	225	266	1	9	-.2	6
W-8	360	1	304	274	0	10	-.2	-30
W-9	310	1	258	248	0	10	-.2	66
W-10	320	1	298	297	0	10	-.2	-42
W-11	310	2	300	325	1	9	-.2	18
W-12	320	1	289	252	2	9	-.2	-12
W-13	340	0	293	286	0	11	2.6	12
W-14	330	1	283	258	1	10	-.2	48
W-15	300	0	266	263	3	9	-.2	-30
W-16	260	1	281	262	1	10	-.2	30
W-17	300	1	245	266	2	10	-.2	54
W-18	280	1	276	242	1	8	-.2	-12
W-19	270	2	274	268	2	11	-.2	60
W-20	280	4.2	320	287	1	11	-.2	12
W-21	290	2.6	255	268	1	10	5.6	6
W-22	270	2.8	290	278	0	10	-.2	24
W-23	300	4	240	248	2	10	-.2	42
W-24	280	1	237	270	3	10	-.2	-18
W-25	280	2	270	262	0	10	-.2	12
W-26	300	2.4	282	280	2	9	-.2	16

* Cinder Block

Survey #
02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #19 2nd Floor Walls

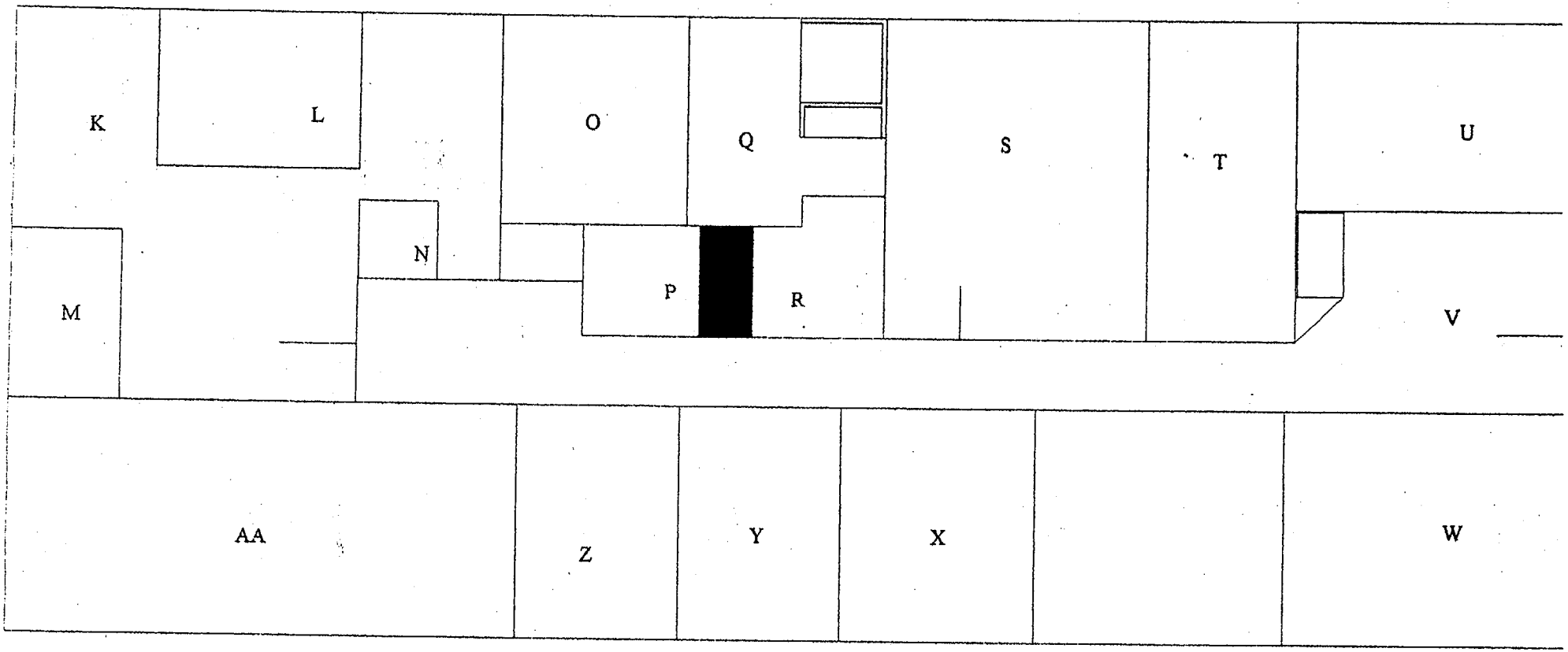
	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W 27	280	2.8	286	248	2	9	-.2	-12
W 28	280	1.7	259	298	1	10	-.2	24
W 29	340	4.2	270	264	0	10	2.6	-6
* W 30	420	4	350	273	4	11	-.2	-30

* Cinder Block

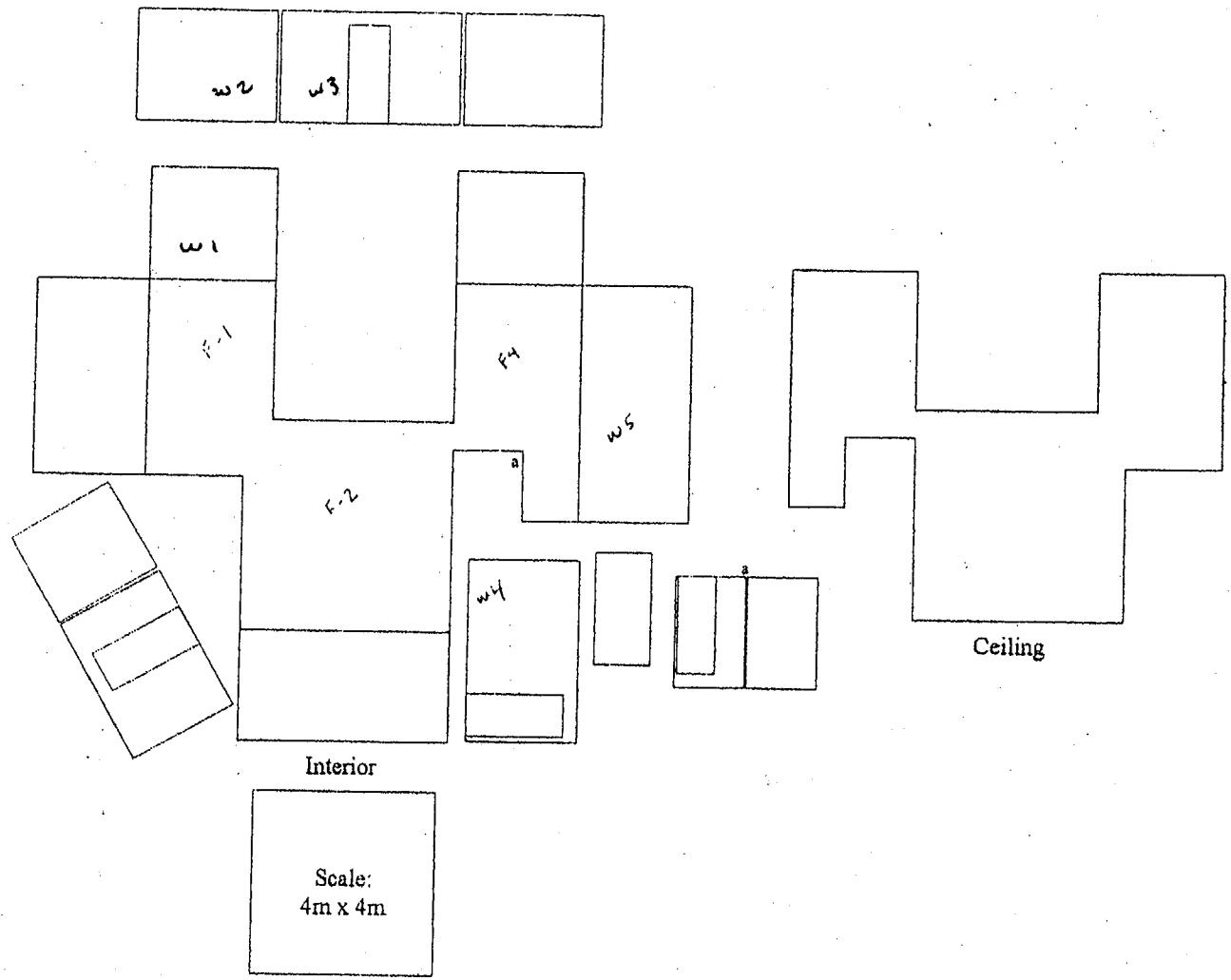
Building 19 Legend



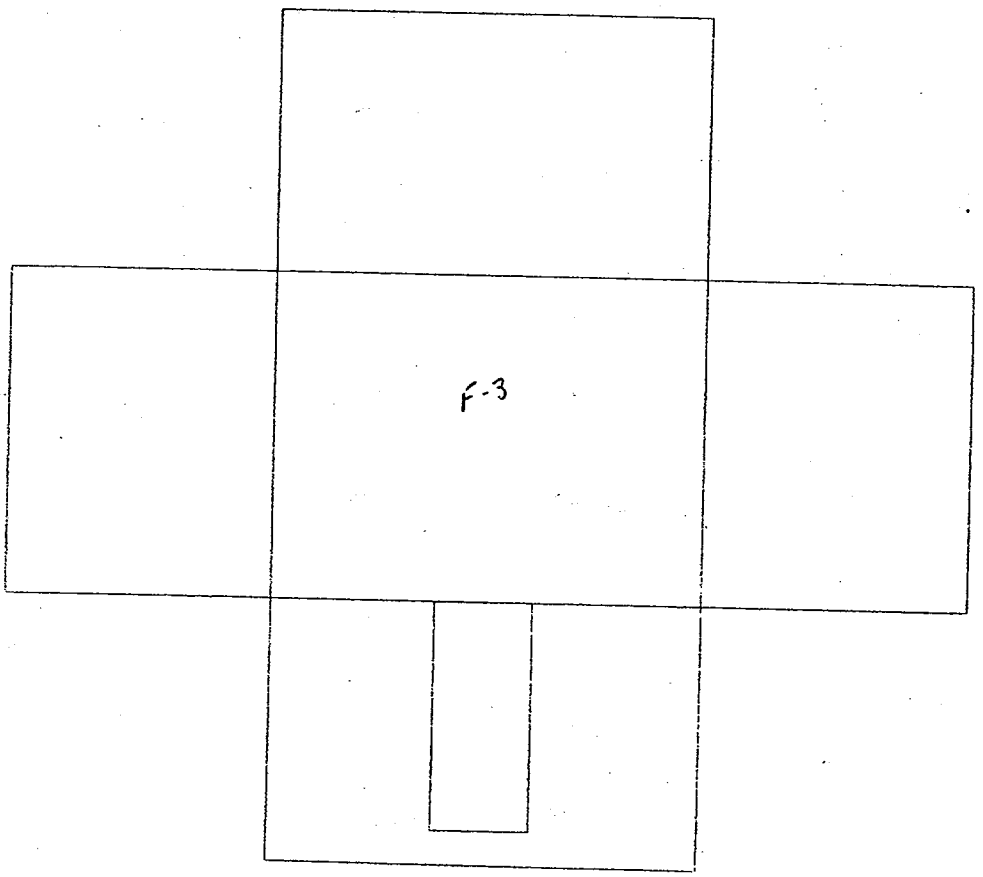
Surrey # 02-0181

Page 7 of 41

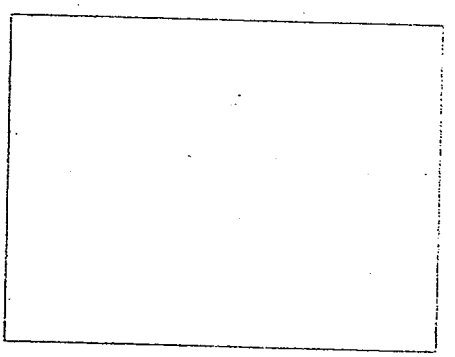
Building 19
North
Room K



Building 19
North
Room L



Interior

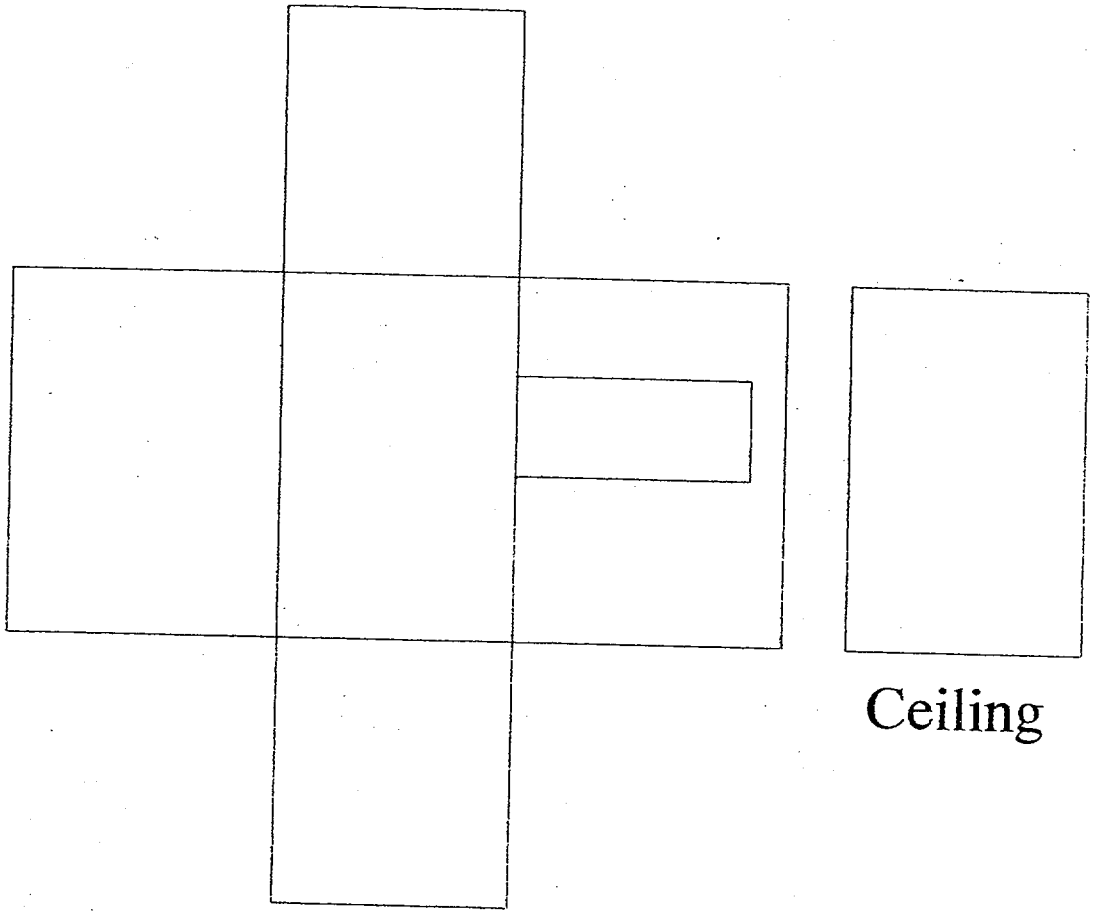


Ceiling

Scale:
4m x 4m

Survey # 02-0181

Building 19
North
Room M



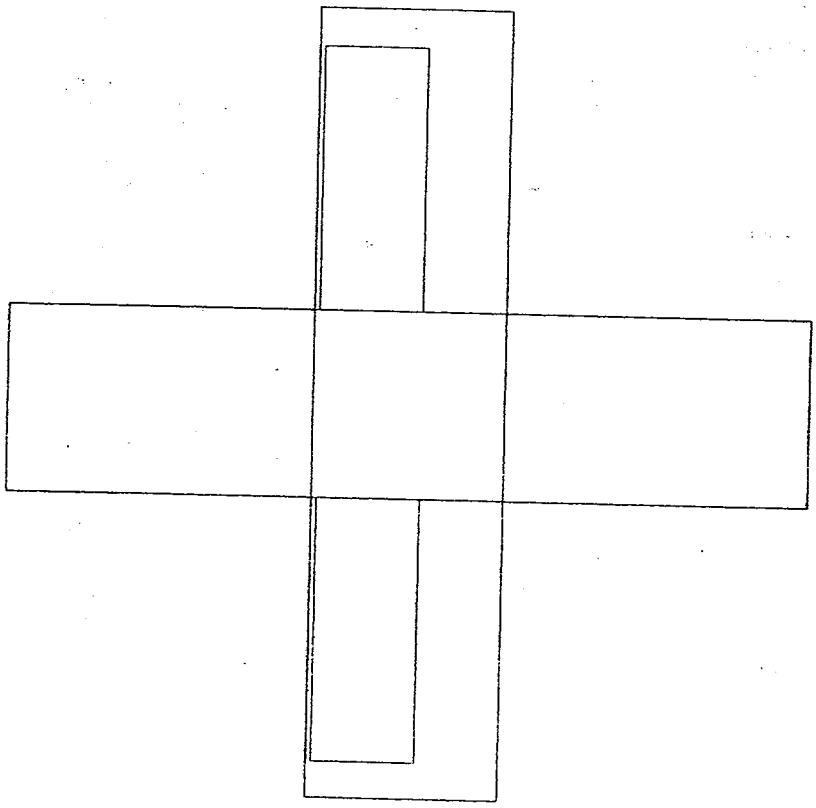
Ceiling

Interior

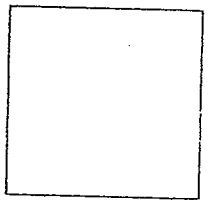
Scale:
4m x 4m

Survey # 02-0181

Building 19
North
Room N



Interior

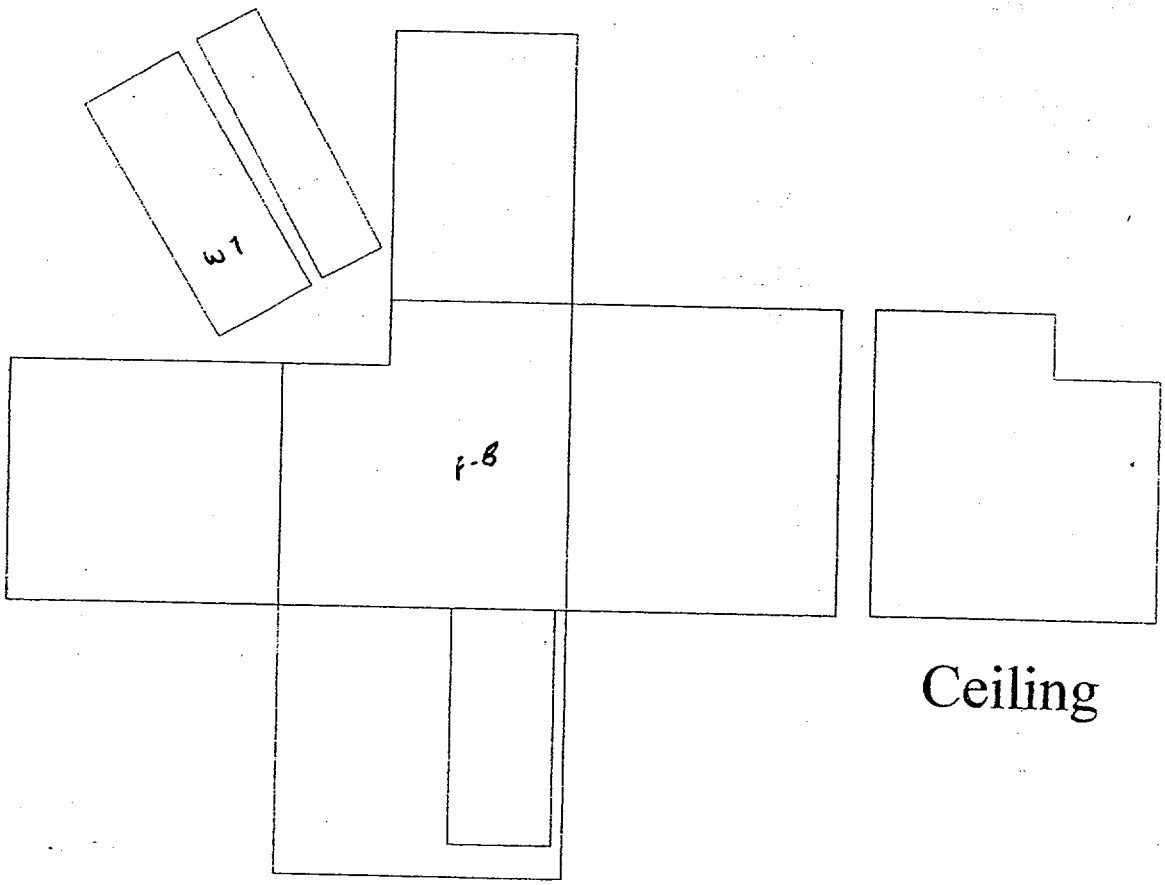


Ceiling

Scale:
4m x 4m

Survey # 02-0181

Building 19
North
Room R



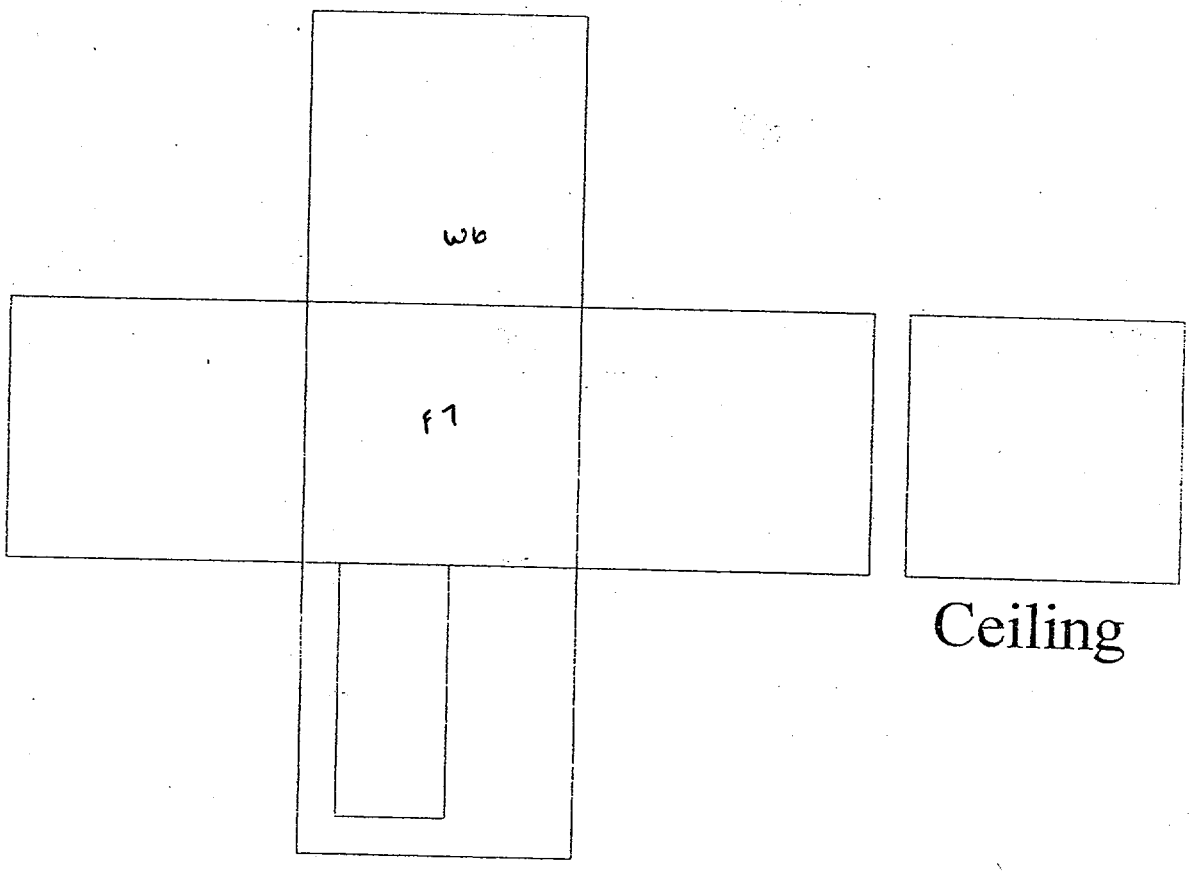
Ceiling

Interior

Scale:
4m x 4m

Survey #02-0181

Building 19
North
Room P

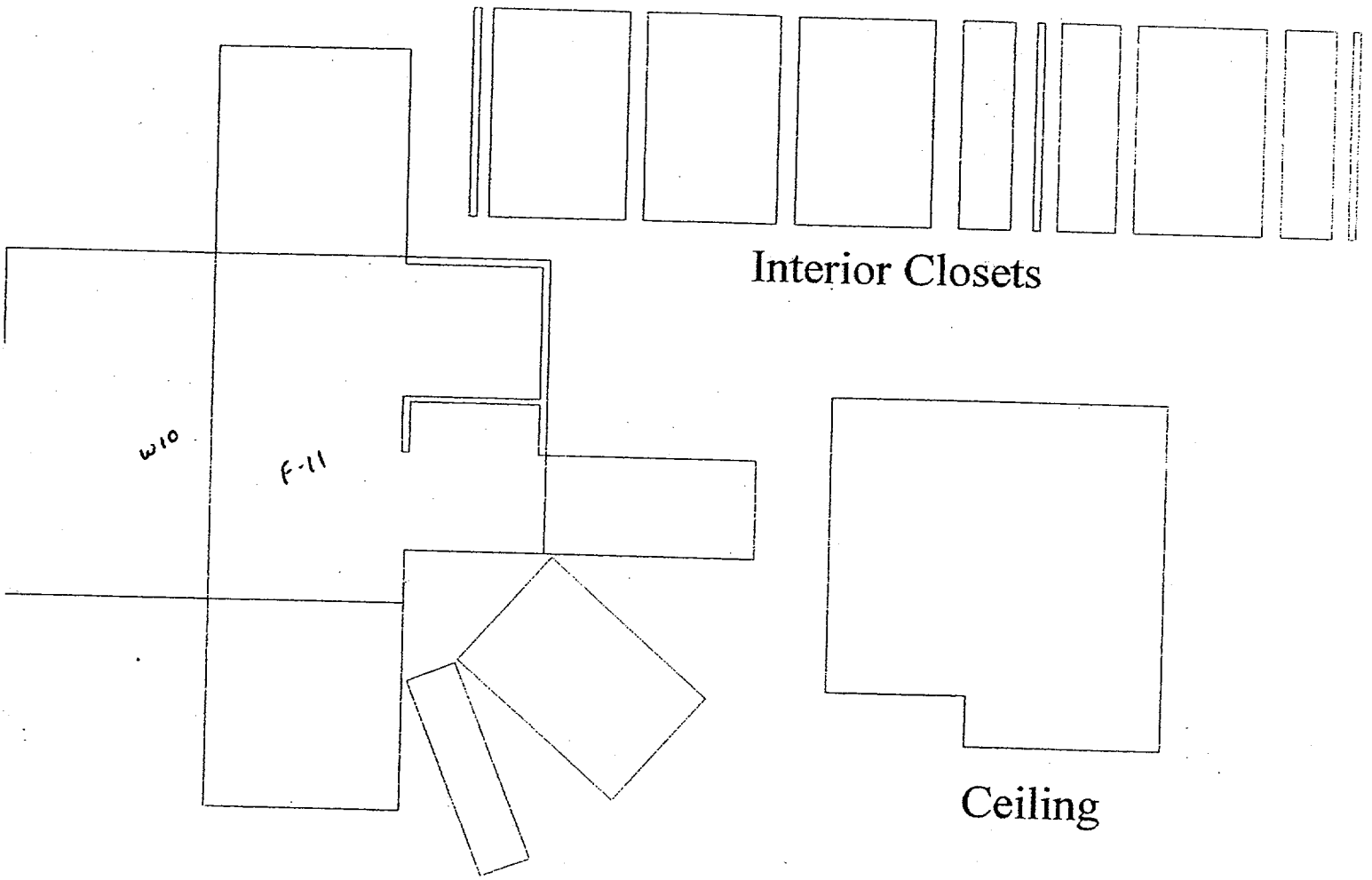


Ceiling

Interior

Scale:
4m x 4m

Building 19
North
Room Q



Interior Closets

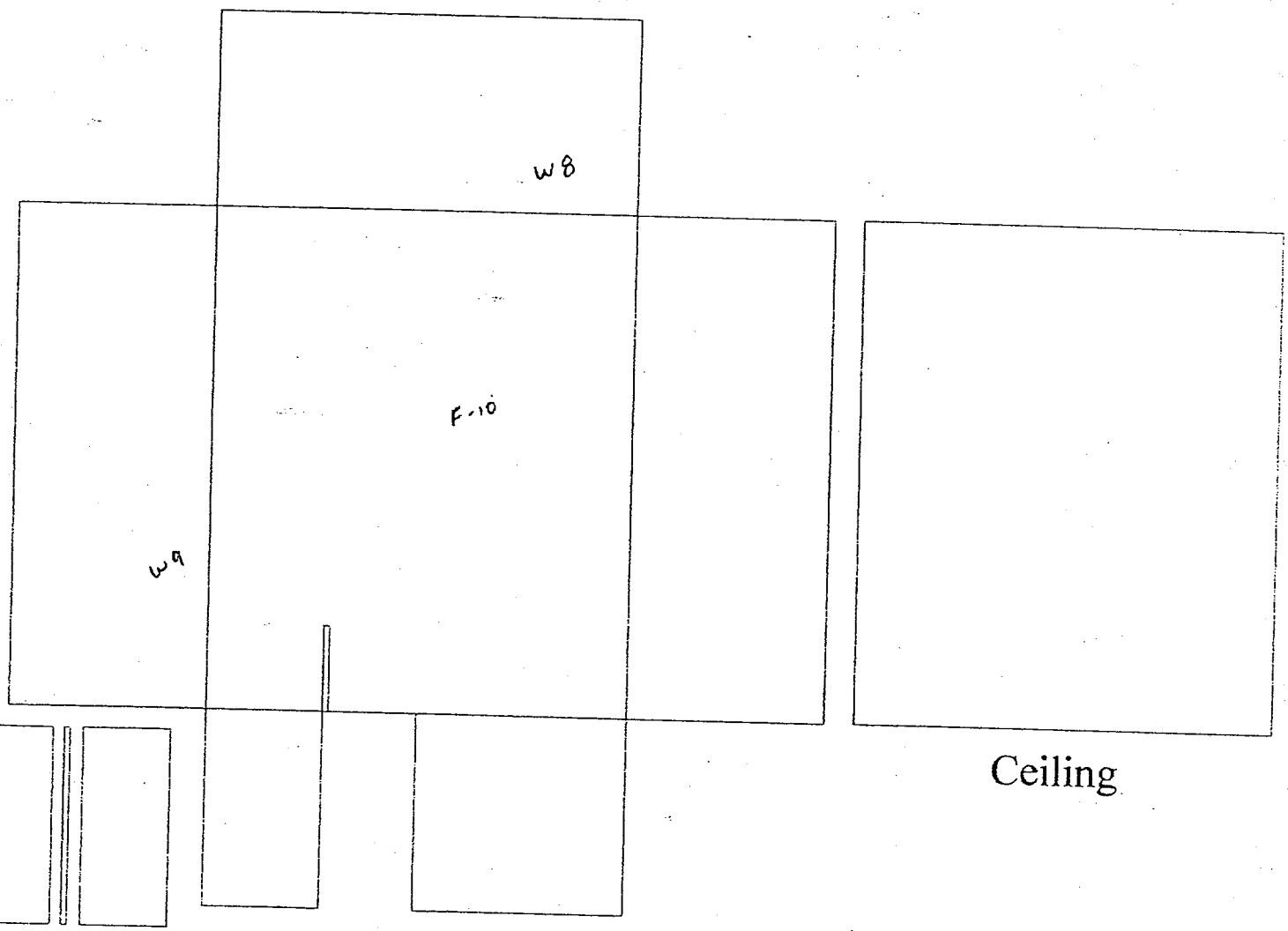
Ceiling

Interior

Scale:
4m x 4m

Survey #
02-0181

Building 19
North
Room S



Ceiling

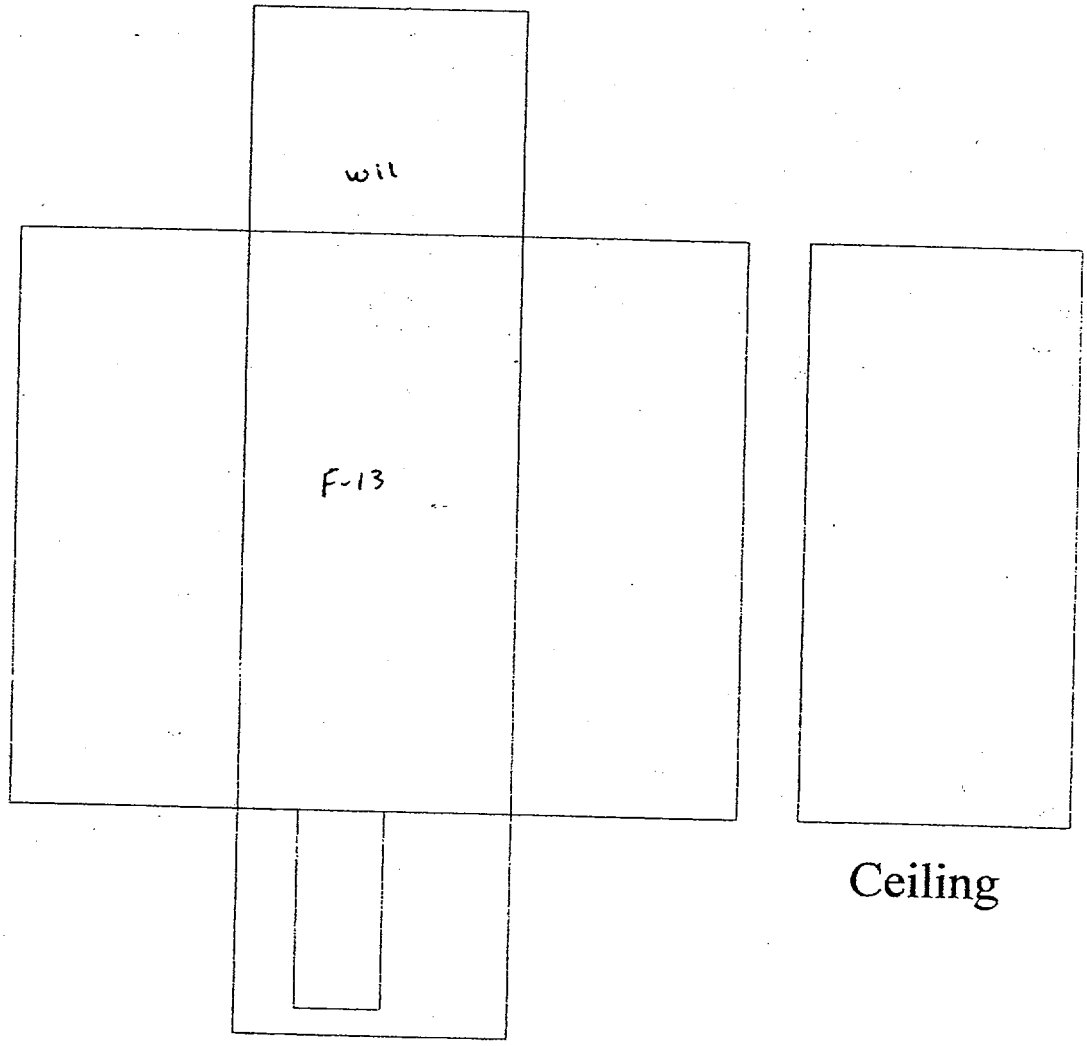
Interior Wall

Interior

Scale:
4m x 4m

Summary # 02-0181

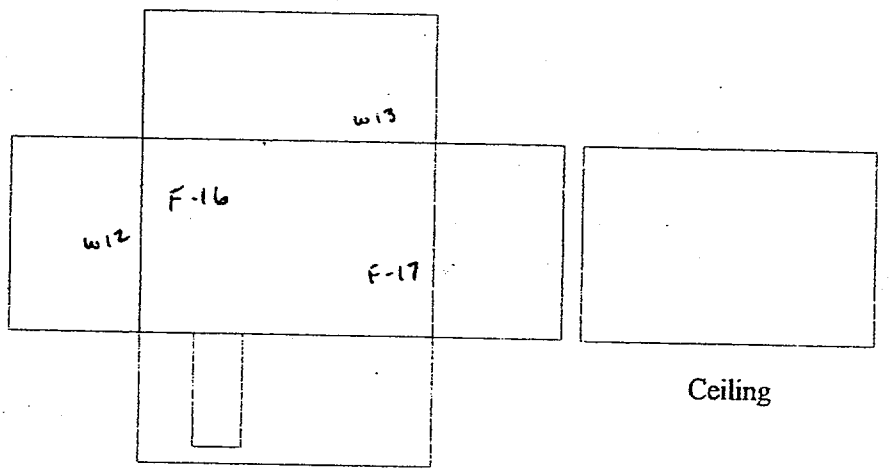
Building 19
North
Room T



Scale:
4m x 4m

Summary 02-0181

Building 19
North
Room U



Ceiling

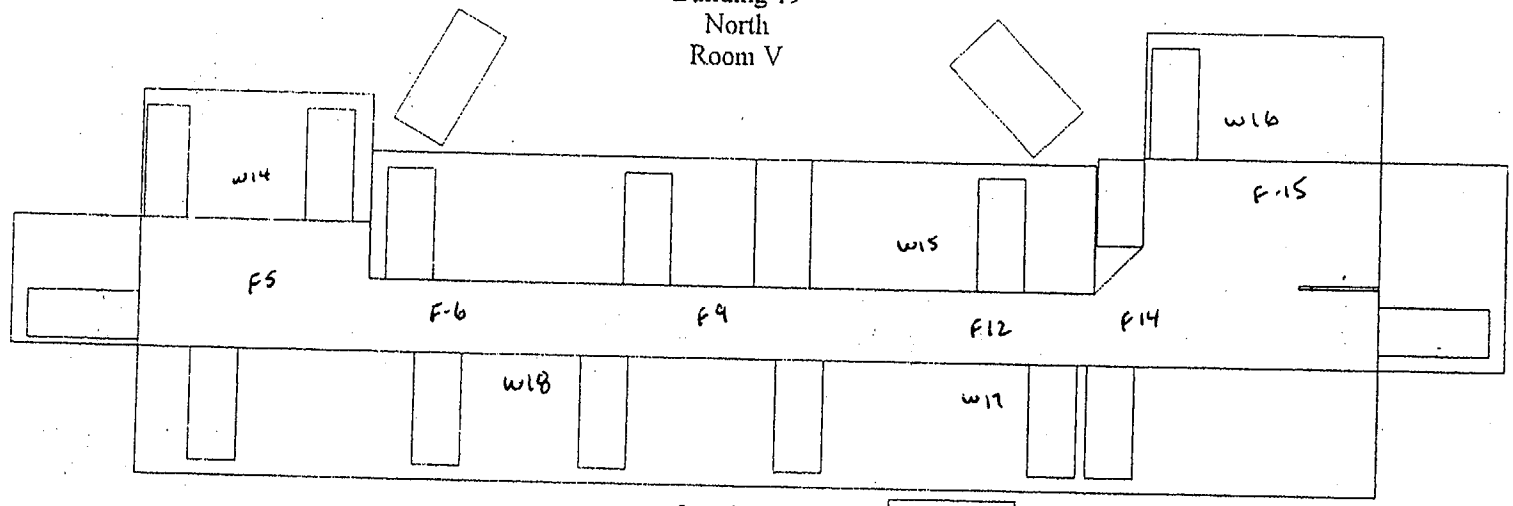
Interior

Scale:
4m x 4m

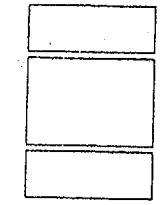
Sunny # 02-018

Survey #
02-0181

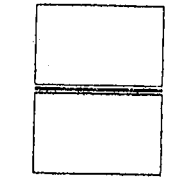
Building 19
North
Room V



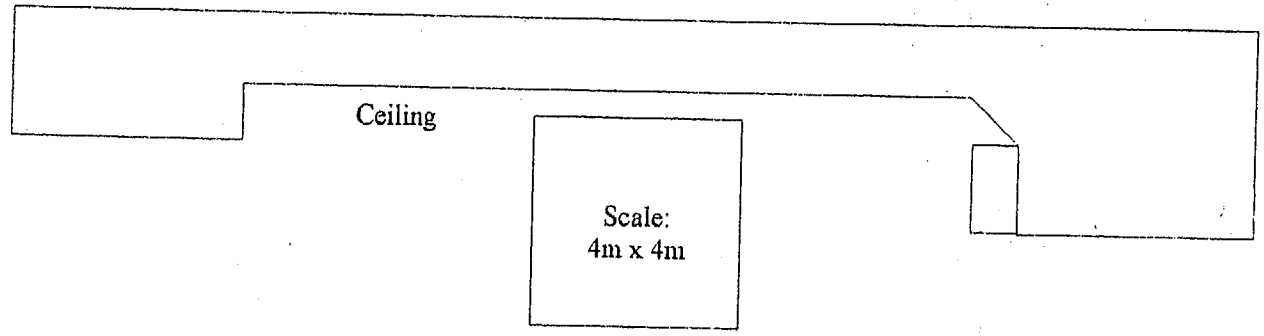
Interior



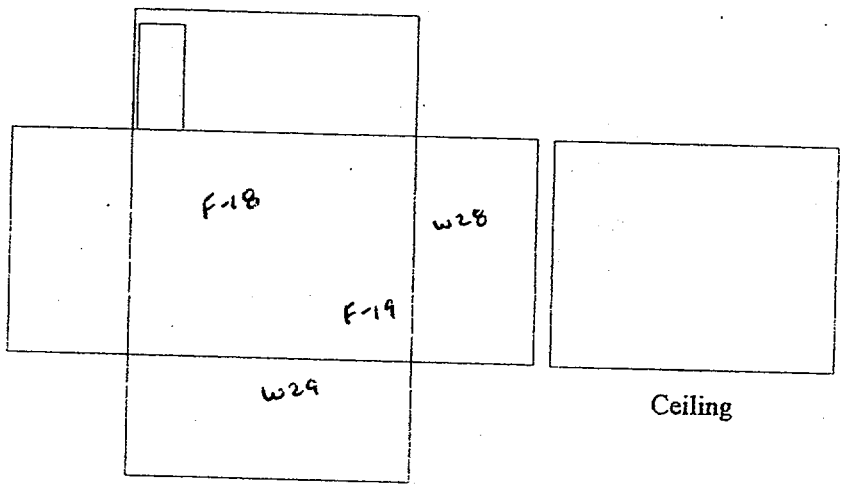
Interior Closet



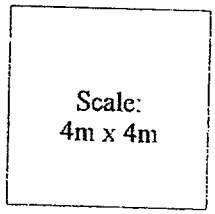
Interior Wall



Building 19
North
Room W

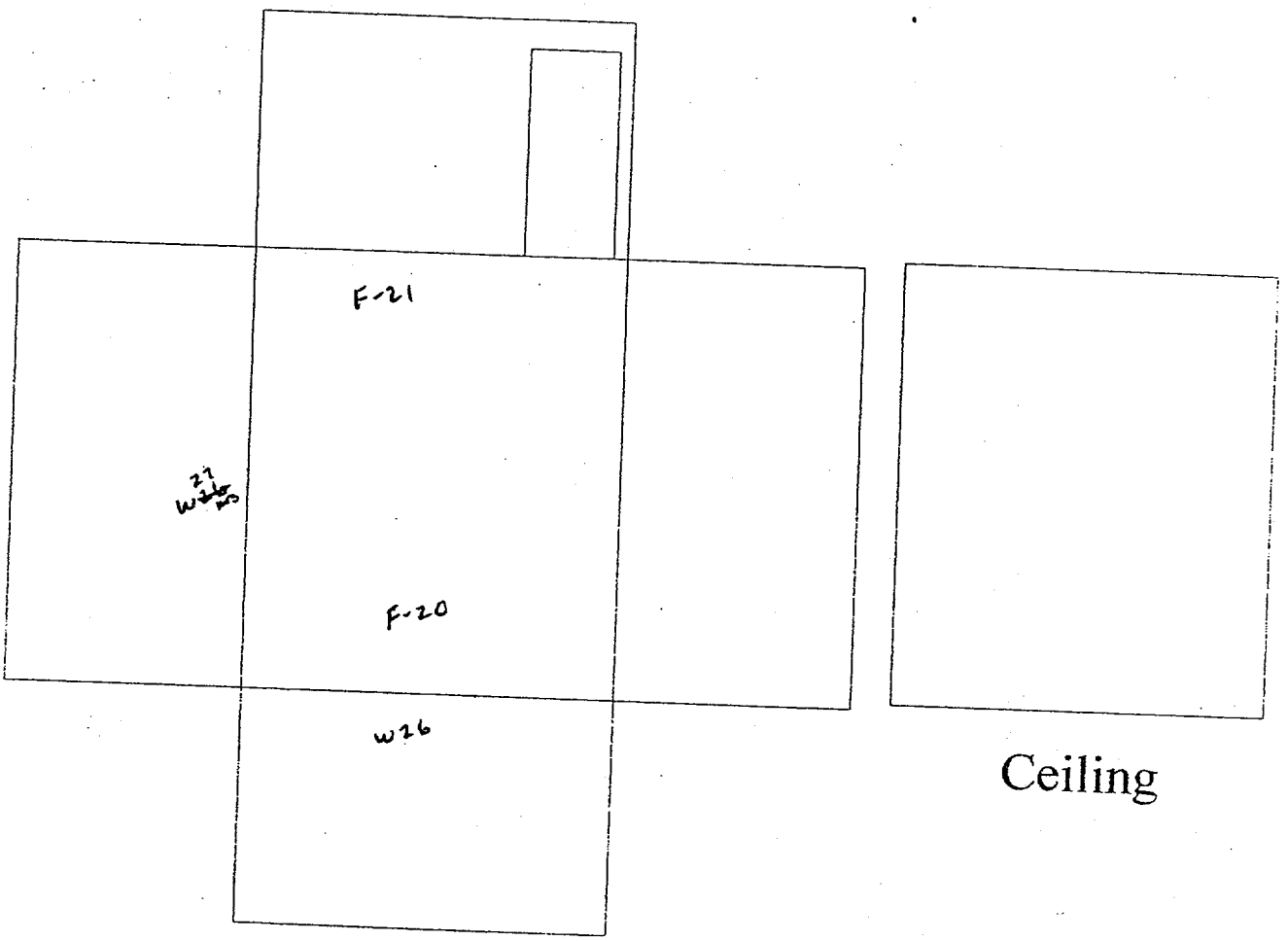


Interior



Survey # 02-0181

Building 19
North
Room X



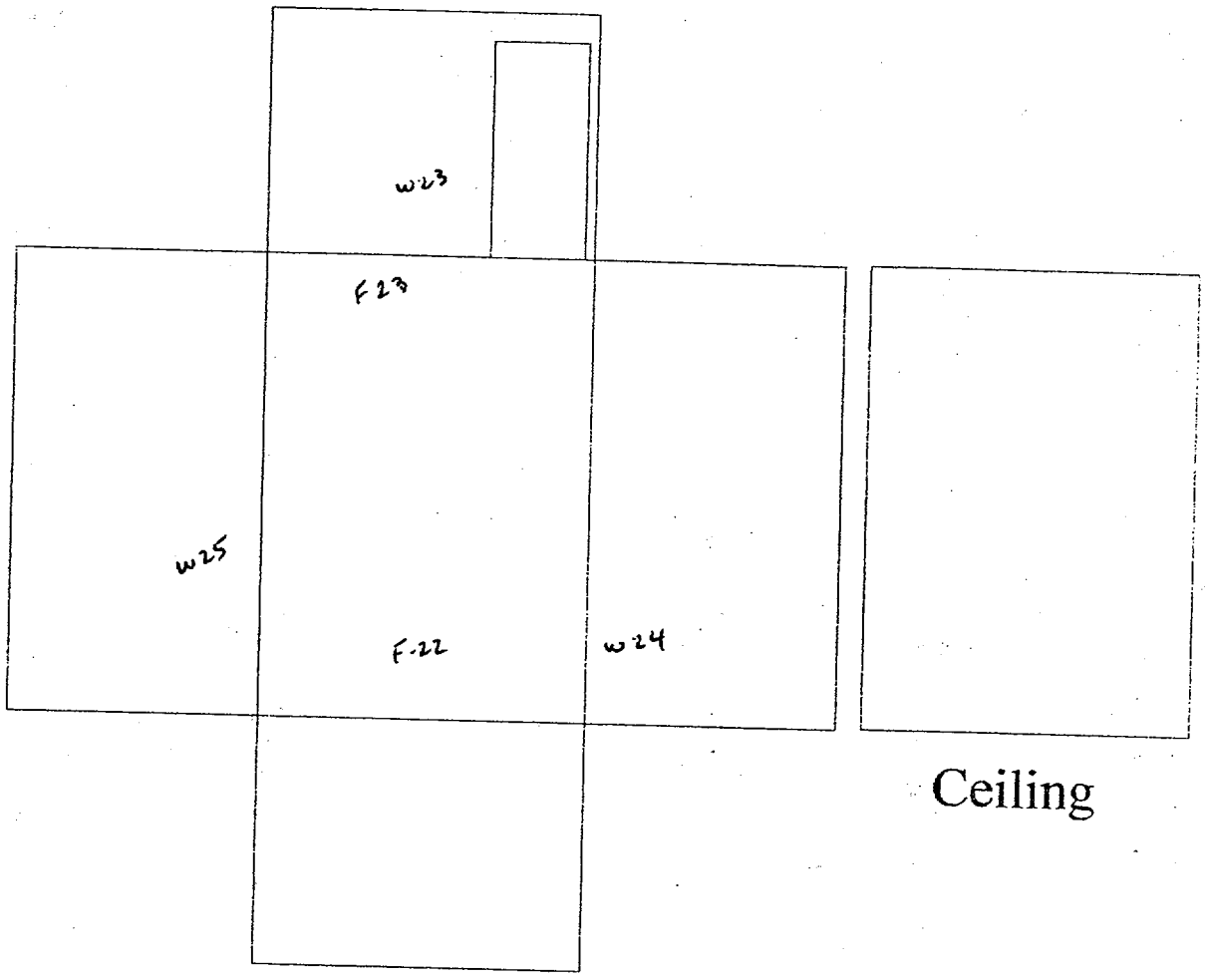
Ceiling

Interior

Scale:
4m x 4m

Survey # 02-0181

Building 19
North
Room Y



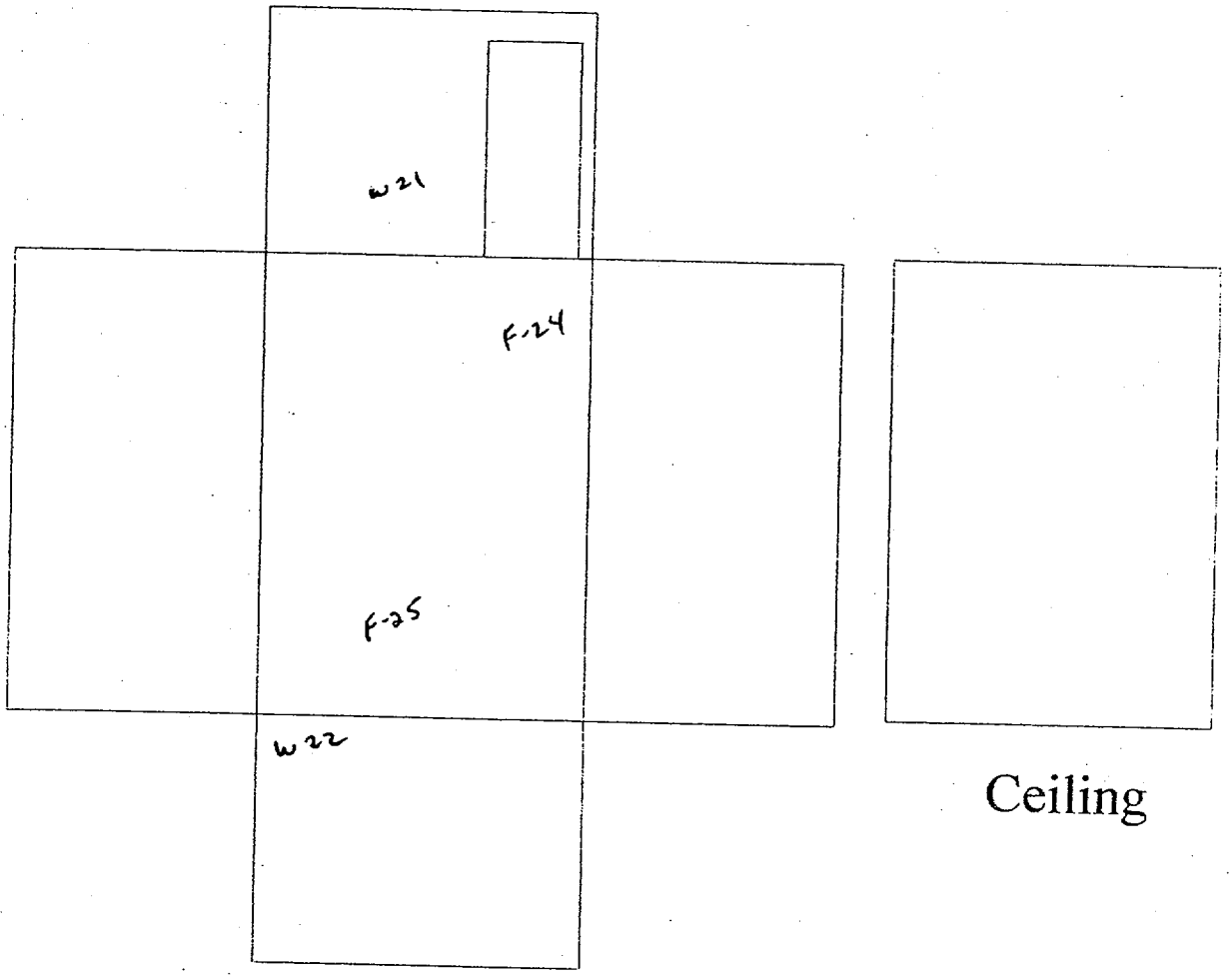
Ceiling

Interior

Scale:
4m x 4m

Sunny # 02-0181

Building 19
North
Room Z



Ceiling

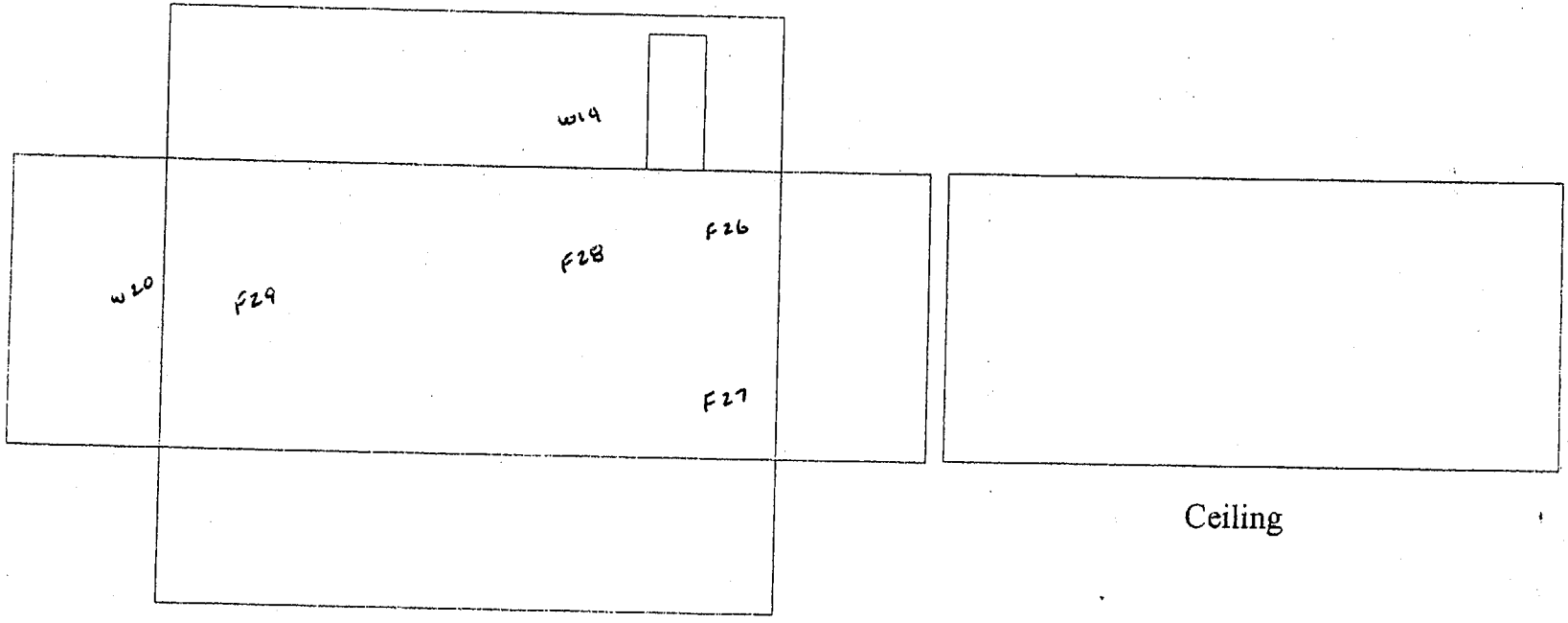
Interior

Scale:
4m x 4m

Survey #
02-0181

Survey #
02-0181

Building 19
North
Room AA



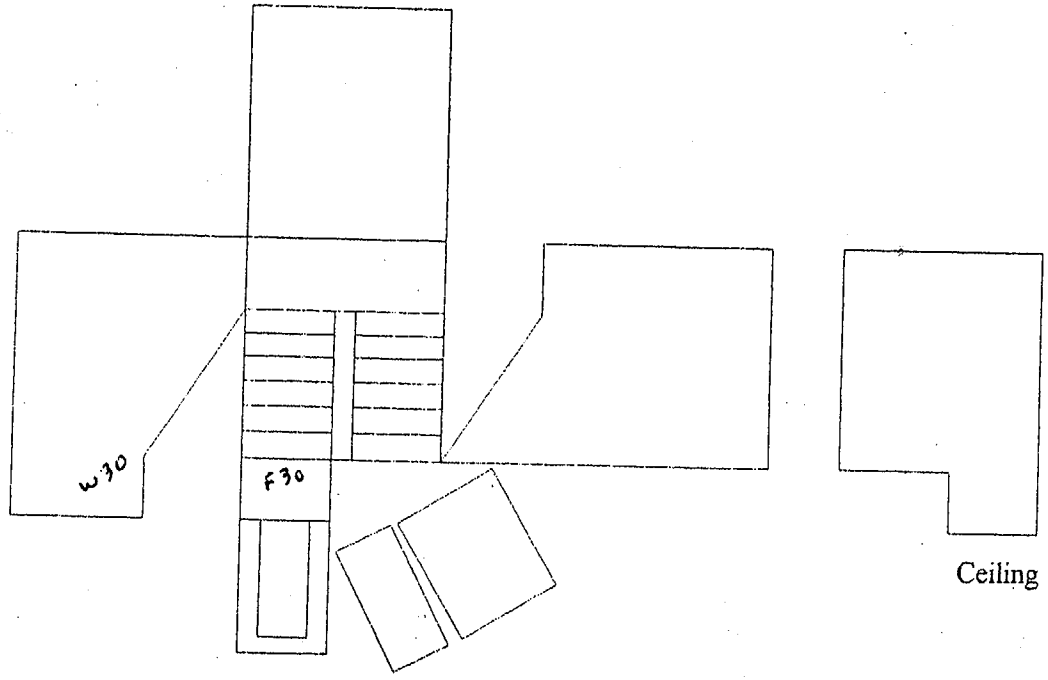
Ceiling

Interior

Scale:
4m x 4m

Survey # 02-0181

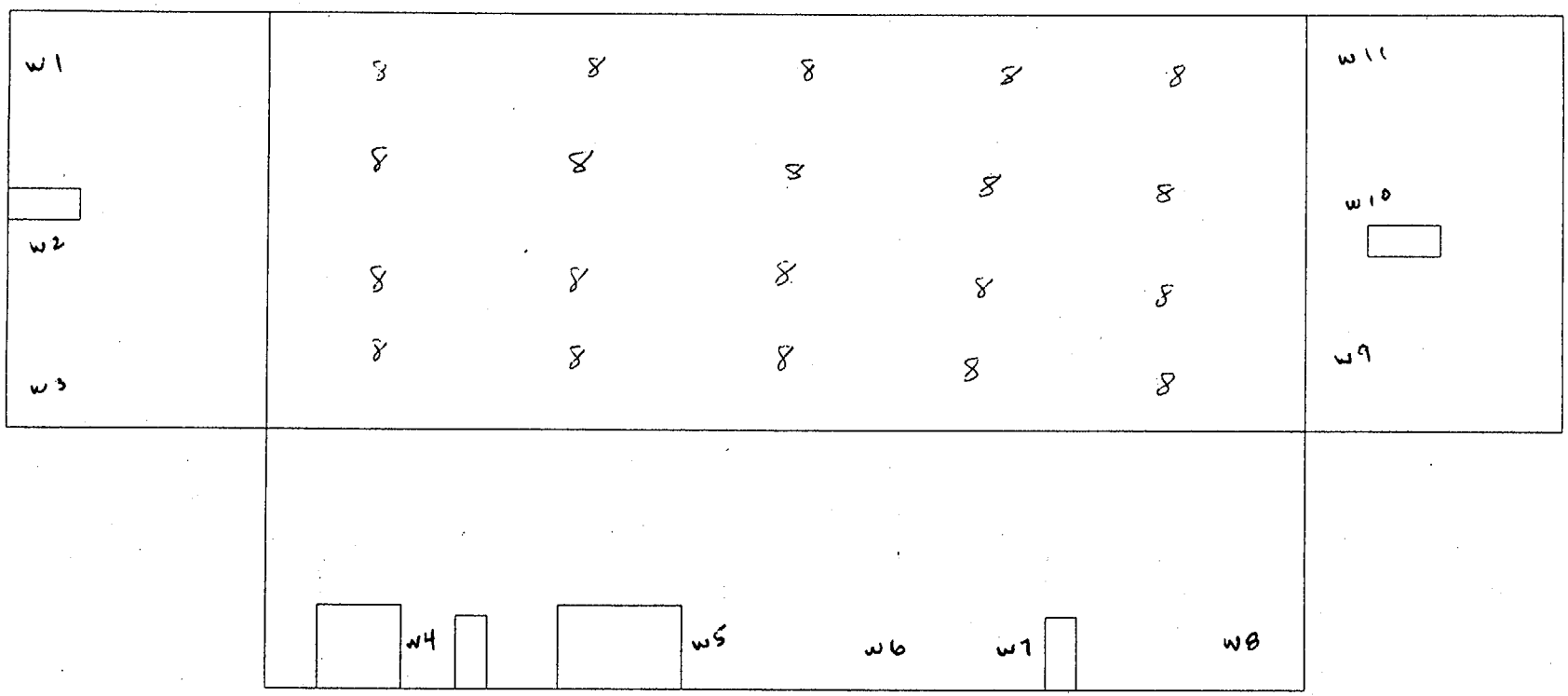
Building 19
North
Room O



Scale:
4m x 4m

Survey #02-0181

Building 19
North



Exterior

Scale:
4m x 4m

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg 19 Exterior Walls

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
1			382	316	5	12	2.6	6
2	440	2	379	318	2	13	-.2	12
3			376	304	2	13	-.2	18
4			360	281	5	12	-.2	-6
4QC			356	286	4	12	-.2	0
5			345	296	2	11	2.6	6
6	400	4.6	369	332	5	12	-.2	-12
7			355	316	7	12	-.2	18
8			379	319	1	12	-.2	-6
9	420	3.8	357	310	3	12	-.2	12
10			403	329	2	12	-.2	6
11	410	2	410	355	3	13	2.6	0

all Cinder Block

Survey # 02-0181

RPP-OP-019

	DDO-138 Radiation Protection Survey Report	Site: Molycorp / Washington, PA

Section 1: Survey Information Bldg #19 - 1st Floor

Date:	Time:	Location:	Survey Issue Log Number:
5-8-02	1700	Bldg 19 1ST Floor	02-0181

RWP Number: N/A

Purpose of Survey: ☐ RWP ☐ Routine Survey ☐ Unconditional Release ☐ Other:

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Survey Title: UNAFFECTED

Smear Number	Beta dpm/100cm²	Alpha dpm/100cm²
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		
26		

2224-1

	BKgd α	BKgd β⁻	MDA α	MDA β⁻
Floor	2.4	78	64	476
Wall	3.7	8	76	172
Block	3.7	49	76	383

Model 19 115870 8-6-02

Bkgd Readings: 10-15 micro rem/hr

Legend:

00 = mRem/h gamma | 00 C = mRem/h gamma contact | ① = Smear Location | ▽ = Air Sample Location | -X-X-X- = Rope, Boundary, or Barrier

00 β = mRem/h beta | 00 βC = mRem/h beta contact | --①-- = Large Area Wipe | □ = Bulk Material Sample

Section 2: Instrument Used

Instrument Model/SN:	Cal Due Date:	Probe Model/SN:	Cal Due Date:	Detector Eff.: (cpm/dpm)	MDA: β⁻ / α	Other: Bkgd β⁻ / α
2350-1/117563	8-12-02	43-106/128912	8-6-02	β⁻ .251 / α .242	~~1700 / 53~~	346 / 1.4
2350-1/95359	8-6-02	43-37/092503	8-6-02	β⁻ .27 / α .209	β⁻ 204 / α 20	1740 / 10
2929/152202	2-6-03	43-10-1/156519	2-6-03	β⁻ .165 / α .344	151 / 12	46 / .08
2224-1/129463	8-6-02	43-89/169230	8-6-02	β⁻ .092 / α .154	See Above	

Section 3: Review and Approval

Survey Performed By (Sign):	Area Posted and/or Barricaded:	Date and Time:
Mark Blamenk	☐ Yes ☐ No ☐ Not Required	5-9-02 / 1700
Radiation Safety Officer (Print Name & Sign): Mike McDonald		**Date and Time:** 5-16-02 0800

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: BLDG 19 1ST FLOOR

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-1	1740	8	391	309	2	13	2.6	-30
F-2	1740	10	396	307	1	13	-0.2	36
F-3	1750	8	371	325	4	12	-0.2	42
F-4	1800	11	386	326	0	13	-0.2	18
F-5	1890	10	387	316	2	13	-0.2	24
F-6	1740	12	377	315	6	13	-0.2	6
F-7			402	324	2	13	-0.2	-24
F-8	1780	8	381	322	1	13	-0.2	54
F-9	1740	6	392	318	2	13	-0.2	-24
F-10			405	367	2	13	8.6	-18
F-11			362	336	1	13	-0.2	-6
F-12	1720		357	313	1	13	-0.2	48
F-13			365	324	2	13	-0.2	12
F-14	1650	8	396	367	4	12	-0.2	42
F-15			382	321	3	12	-0.2	66
F-15QC			396	330	2	12	-0.2	24
F-16	1630	6	381	314	2	12	-0.2	60
F-17			400	335	4	12	-0.2	-24
F-18			368	302	4	12	-0.2	12
F-19	1720	10	380	307	3	12	5.6	6
F-20			373	313	4	12	-0.2	30
F-21	1610	11	367	321	2	11	-0.2	-36
F-22			351	343	1	11	-0.2	12
F-23	1720	12	363	339	2	12	-0.2	6
F-24			360	342	1	11	-0.2	42
F-25			338	334	0	12	-0.2	-6
F-26			371	290	3	12	-0.2	42

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: BLDG 19 1ST FLOOR

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
F-27			368	337	7	13	2.6	18
F-28	1820	12	366	316	4	13	-0.2	-12
F-29			379	308	3	12	-0.2	6
F-30			374	268	2	13	-0.2	36

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #19 - 1st Floor - Walls

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

	Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
*	W-1	500	4	427	408	1	14	2.6	54
*	W-2	459	3	361	288	1	13	-.2	12
*	W-3	490	4	370	327	0	14	-.2	-30
*	W-4	470	6	355	316	1	14	-.2	6
*	W-5	430	2	318	321	1	14	-.2	48
*	W-6	490	7	373	320	1	13	-.2	24
*	W-7	470	5	354	308	0	13	-.2	-6
*	W-8	450	6	332	313	1	13	-.2	-12
*	W-8 QC	—	—	340	318	0	13	-.2	42
*	W-9	450	6	360	317	1	13	-.2	-18
*	W-10	460	7	325	295	1	13	-.2	36
	W-11	380	2	328	312	1	14	2.6	30
*	W-12	470	6	336	287	3	14	-.2	6
	W-13	346	2	305	266	1	14	-.2	24
	W-14	350	1	278	261	1	14	-.2	24
*	W-15	400	1	312	316	0	13	-.2	12
*	W-16	370	2	347	295	1	14	-.2	18
*	W-17	434	2	359	312	2	14	-.2	36
*	W-18	407	2	340	301	1	13	-.2	-12
*	W-19	355	1	303	279	0	13	-.2	-6
	W-20	320	1	280	302	2	13	-.2	24
*	W-21	420	2	337	287	1	13	-.2	-12
*	W-22	470	3	341	298	2	13	5.6	30
*	W-23	500	4	342	297	2	12	-.2	-18
*	W-24	400	3	370	291	1	12	-.2	-24
*	W-25	500	4	354	310	1	12	2.6	6
	W-26	370	2	316	312	1	12	-.2	36

* Cinder Block

Survey # 02-0181

Radiological Survey Results - Survey Location Indicator

Survey Area Information: Bldg #19 1st Floor - Walls

	Instrument Model/SN	Cal Due	Probe Model/SN	Cal Due	α Scan MDA	β Scan MDA	α Static MDA	β Static MDA
Instrument Data								

	Print Name	Signature	Date
Performed By:			

Location	β Scan (cpm)	α Scan (cpm)	β Static (unsh) (cpm)	β Static (sh) (cpm)	α Static (cpm)	ER (μrem/hr)	Smears (dpm/100 cm²) α	Smears (dpm/100 cm²) β
W-27	420	2	342	294	2	12	-.2	-6
W-28	440	2	336	289	3	12	-.2	30
W-29	460	3	360	292	2	13	-.2	48
W-30	440	2	326	310	1	12	-.2	18

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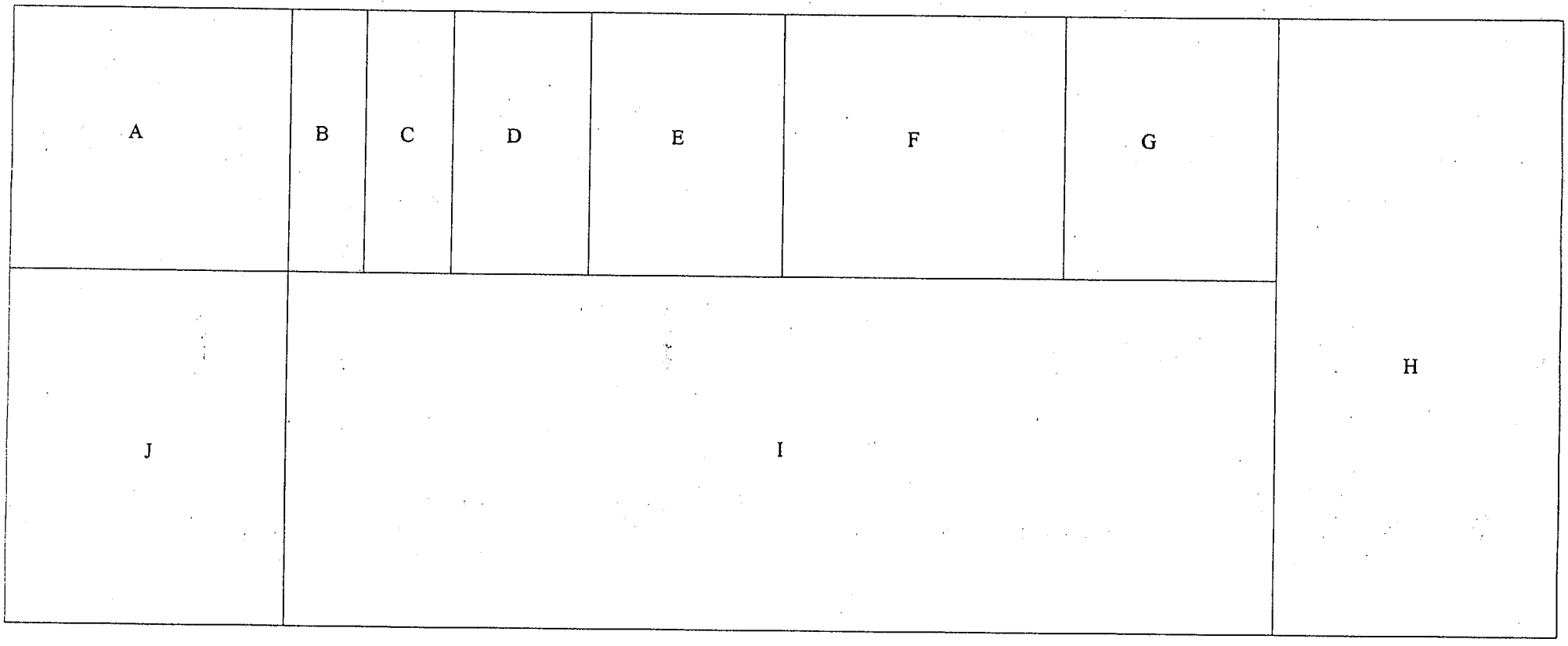
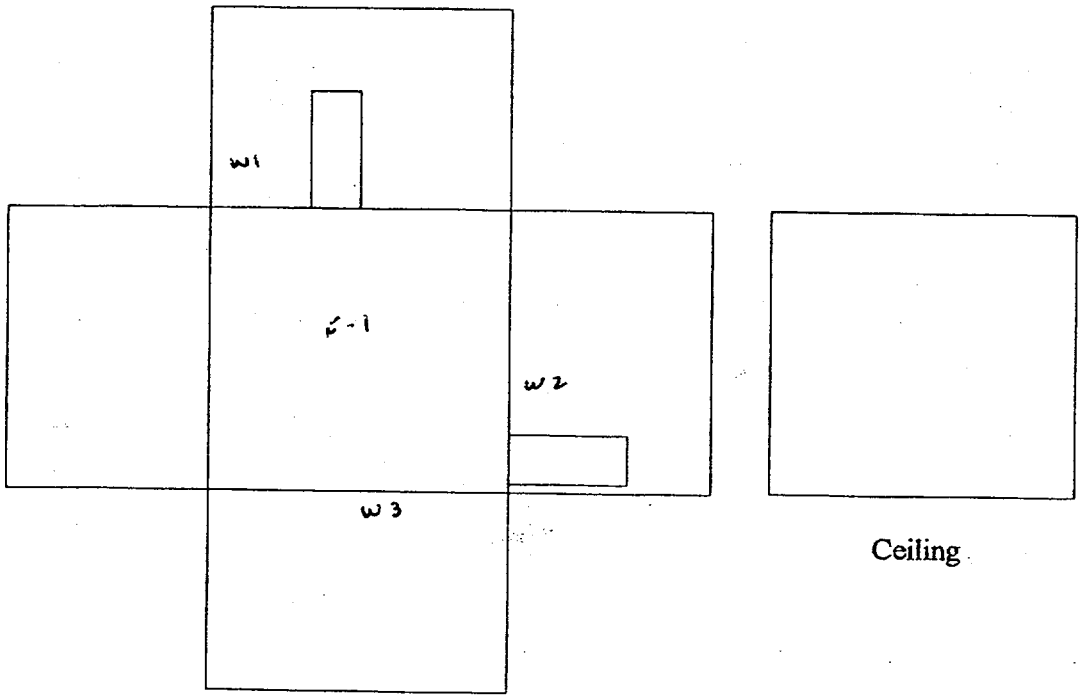
Building 19
North
Lower Level

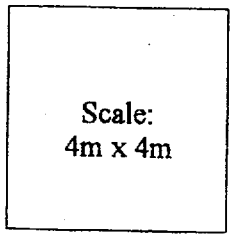


Building 19
North
Room A



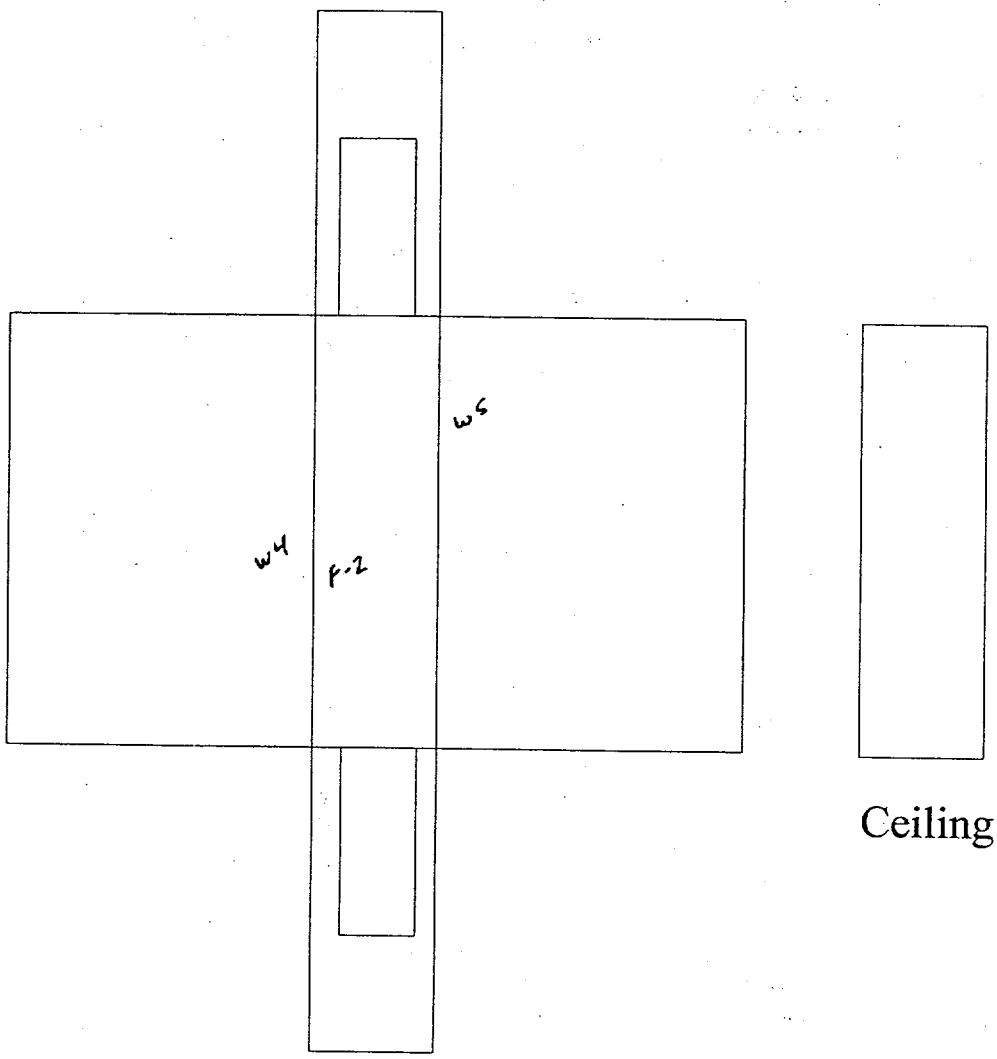
Interior

Ceiling



Survey #
02-0181

Building 19
North
Room B



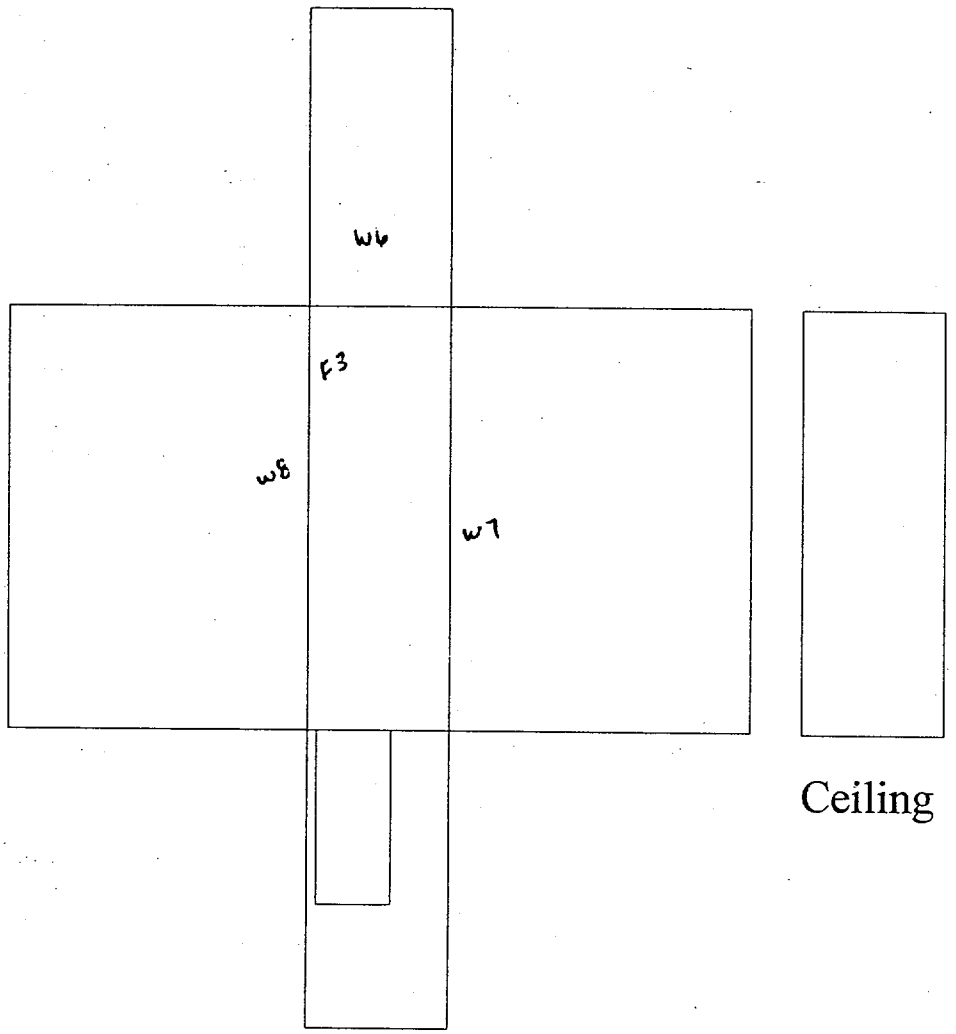
Ceiling

Interior

Scale:
4m x 4m

Sunny #
02-0181

Building 19
North
Room C



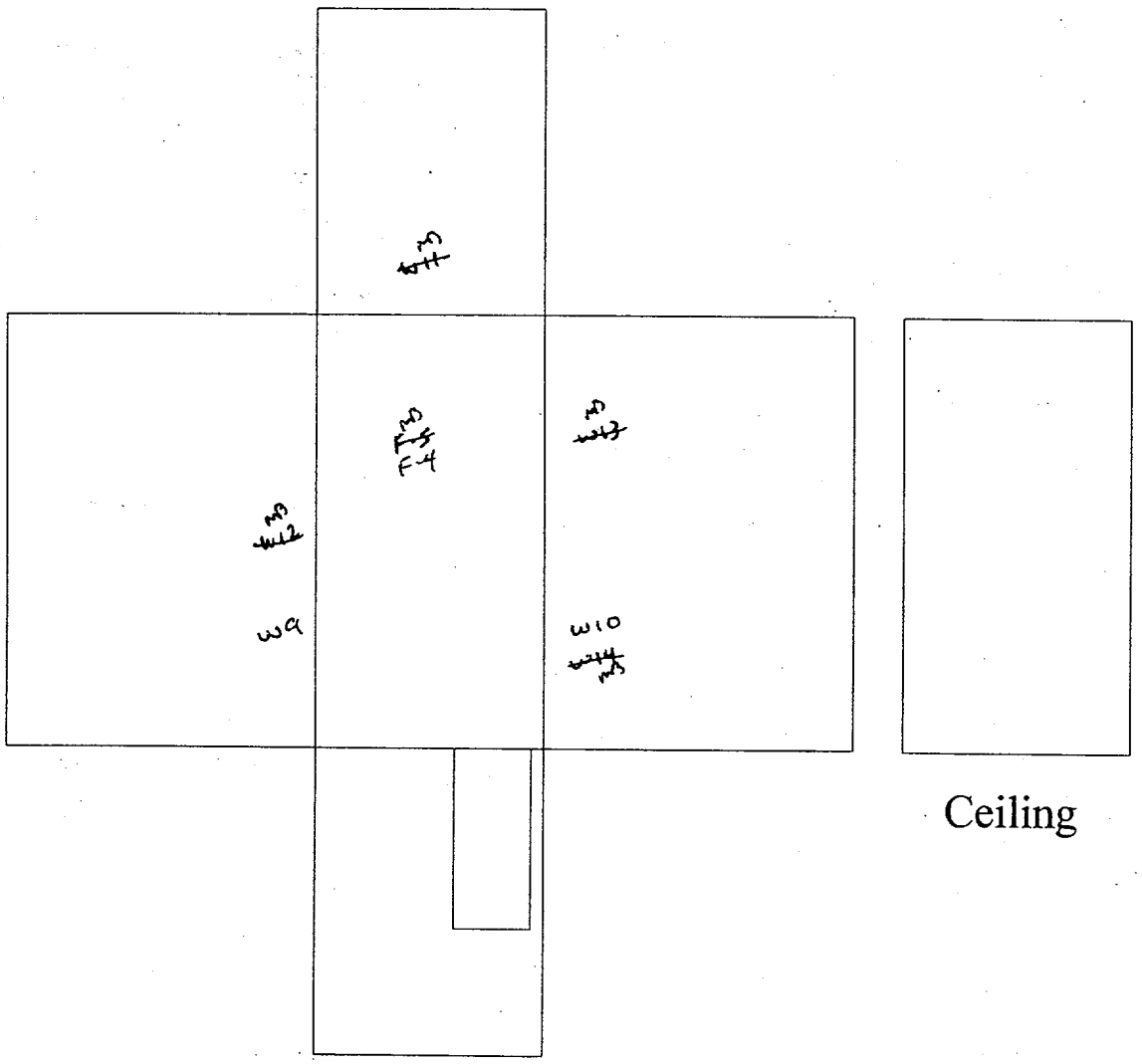
Ceiling

Interior

Scale:
4m x 4m

Survey #
02-0181

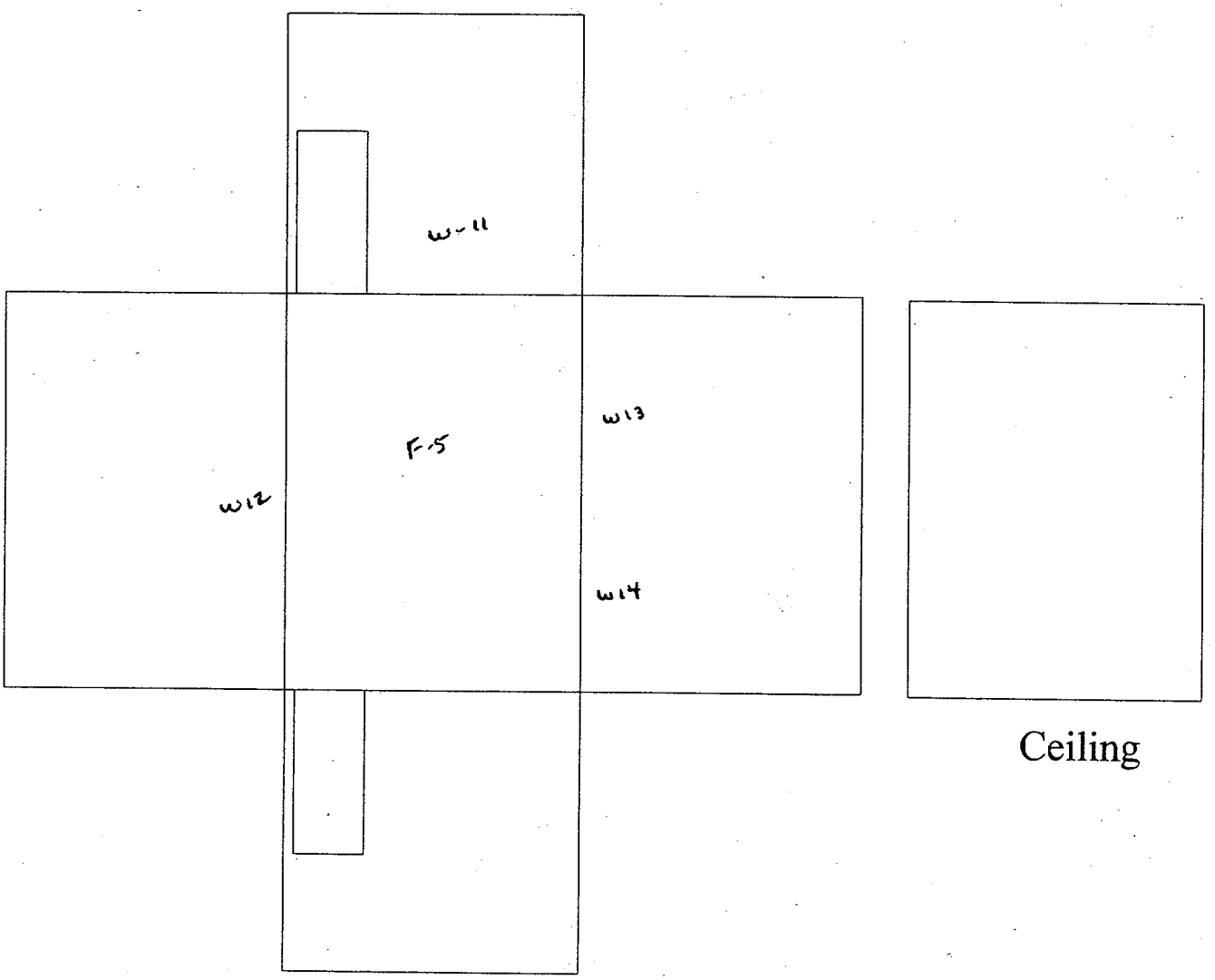
Building 19
North
Room D



Scale:
4m x 4m

Survey #
02-0181

Building 19
North
Room E



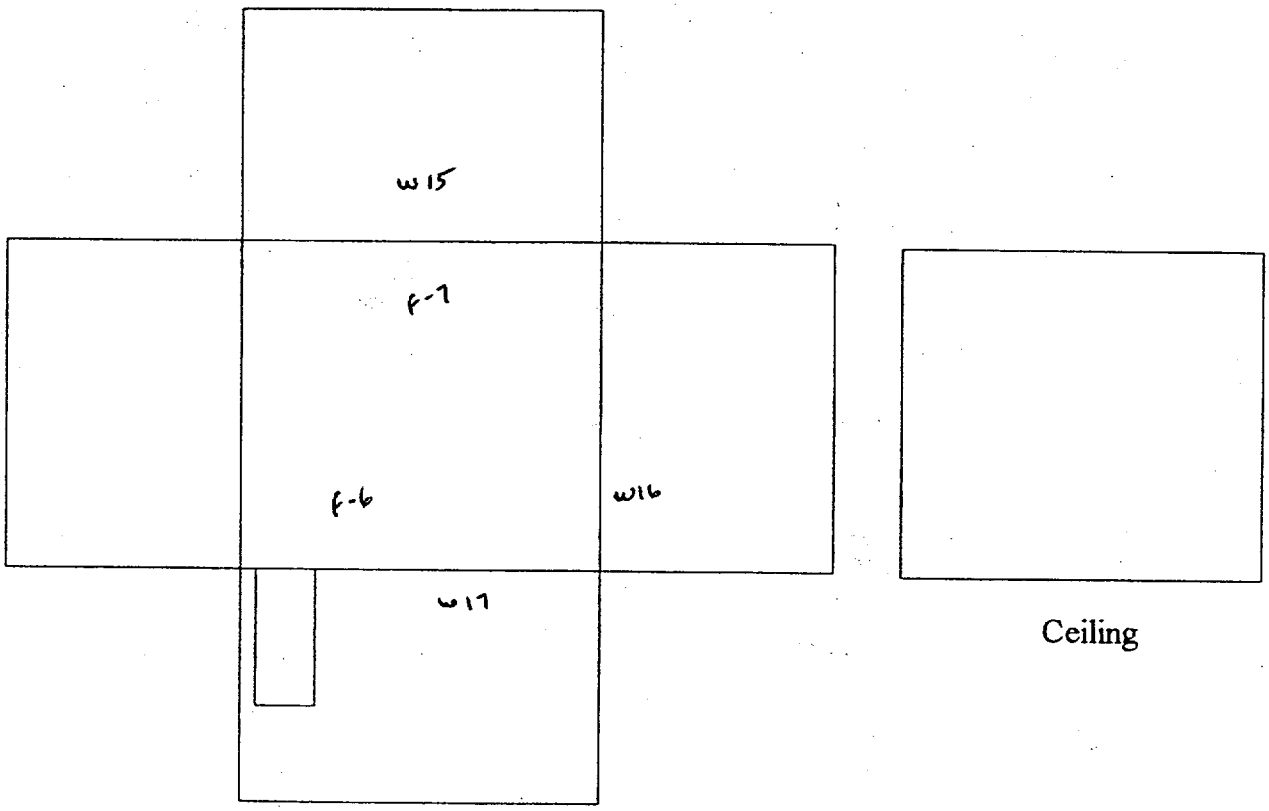
Ceiling

Interior

Scale:
4m x 4m

Sunnyside
02-0181

Building 19
North
Room F



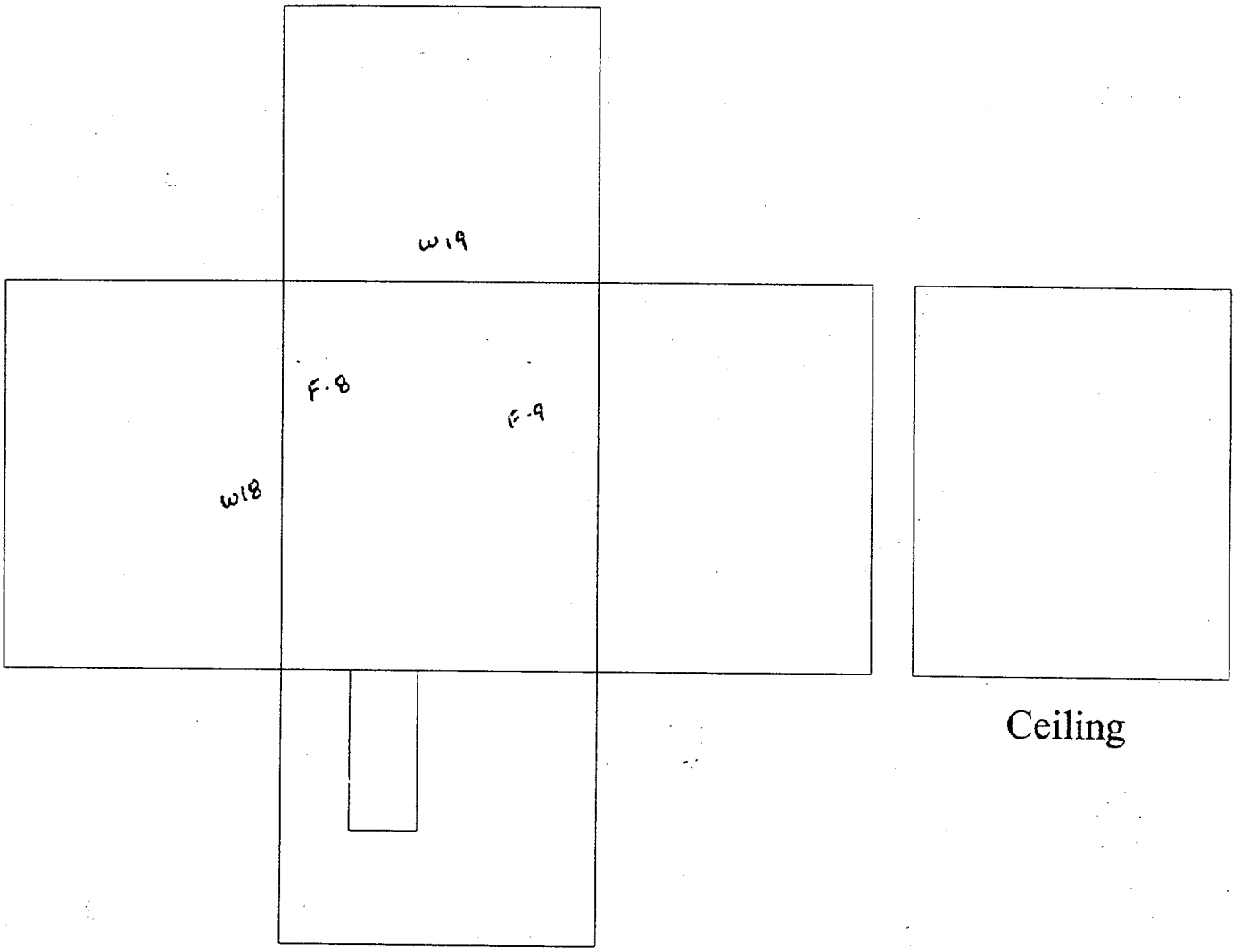
Ceiling

Interior

Scale:
4m x 4m

Survey #
02-0181

Building 19
North
Room G



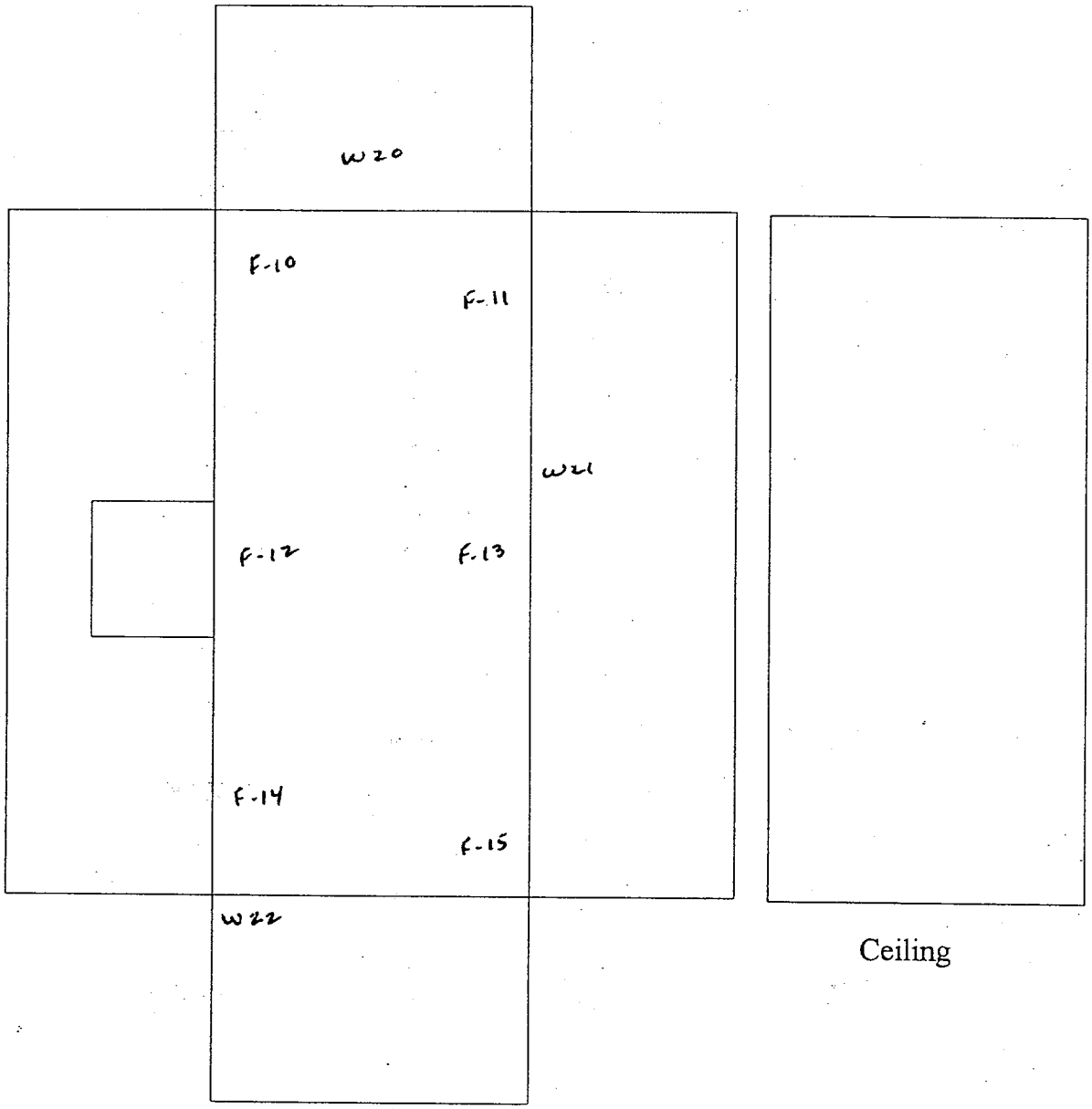
Ceiling

Interior

Scale:
4m x 4m

Survey #
02-0181

Building 19
North
Room H



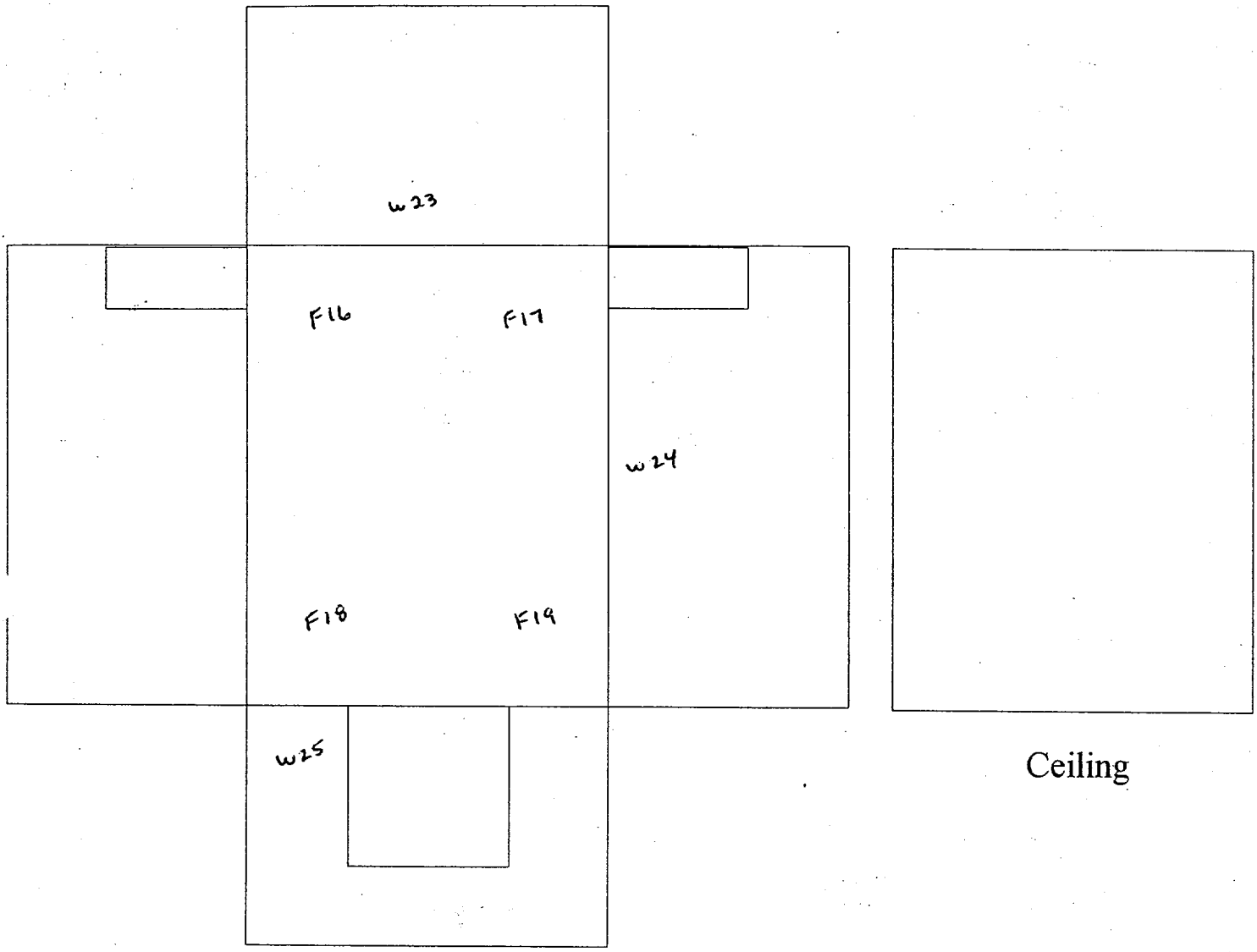
Ceiling

Interior

Scale:
4m x 4m

Survey #
02-0181

Building 19
North
Room J



Ceiling

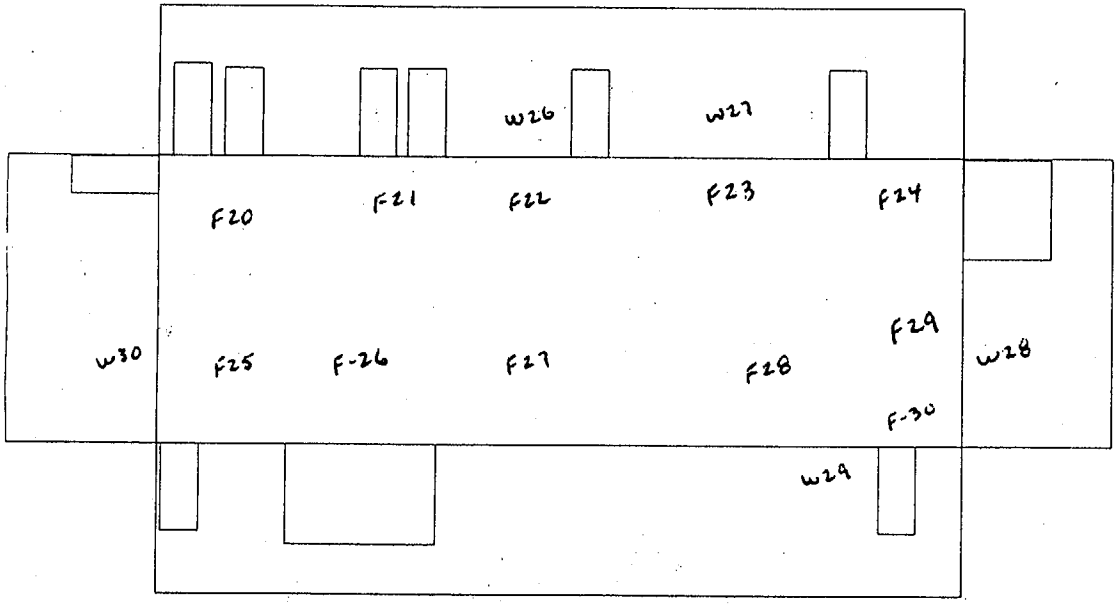
Interior

Scale:
4m x 4m

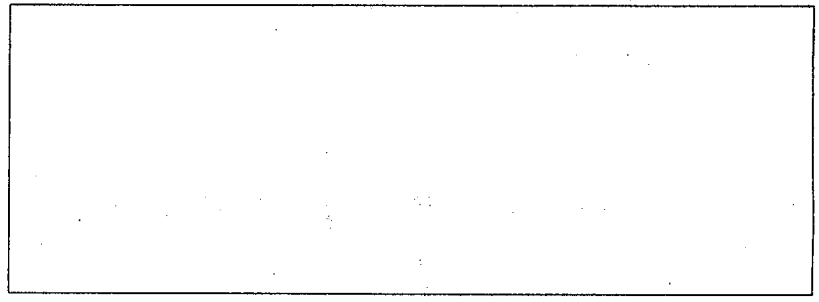
Survey # 02-0181

Survey # 02-0181

Building 19
North
Room I



Interior



Ceiling

Scale:
4m x 4m