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Molycorp

January 7, 2002

Us Nuclear Regulatory Commission
Mr. Tom McLaughlin, Project Mgr.
Decommissioning Branch
Washington, D.C. 20555-0001


Subject: Molycorp, Washington SMB-
1393 Building 39 and 42 final survey
results

Dear Mr. McLaughlin,

Please find enclosed the final survey results for buildings 39 and 42 at Molycorp's Washington, PA facility. Molycorp plans to begin demolition work on these in late March.

If you have any questions concerning this report please call me at the above number.

Sincerely,


George W. Dawes
Facility Superintendent

Xc: file

D. Fauver, RSI (w/o attach)
R. Cherniske (w/o attach)
Bob Maiers, PA DEP (w/o attach)
Craig Gordon, NRC Region 1(w/attach)

Radiological
Final Status Survey Report
Building 39 and 42 (north end)



Molycorp, Inc.
Washington, PA

Performed By:
Radiological Services Inc.
For Molycorp, Inc.

1.0 BACKGROUND INFORMATION

1.1 Introduction

This Final Status Survey Report is submitted to provide a complete record of the radiological status of specific survey areas at the Molycorp, Inc. Washington, PA facility, relative to established guidelines for the license termination. Sufficient data and information is provided to enable an independent re-creation and evaluation at some future date of both the survey activities and the derived results. This Final Status Survey Report has been written in accordance with the guidance provided in NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination".

In November and December 2001, Radiological Services, Inc. (RSI) performed a Final Status survey on a portion of the Molycorp Washington site. Specifically, surveys were performed on the interior and exterior surfaces of Building 39 and Building 42 (north-end).

1.2 Management Approach

The final status survey was conducted in accordance with NUREG/CR 5849, "Manual for Conducting Radiological Surveys in Support of License Termination", Decommissioning Plan for the Washington, PA Facility Part 1 Revision, June 1999. All personnel were trained in the use of RSI radiation protection and final status survey procedures used to support the project. In addition, personnel were trained in the use of specialized equipment such as survey instrumentation, etc. The Decommissioning Plan for the Washington, PA Facility, section 2.2, details the decommissioning organization and responsibilities.

2.0 SITE DESCRIPTION

Molycorp's Washington County facility is located in Southwestern Pennsylvania in Washington County, approximately 35 miles southwest of Pittsburgh. The plant site is located entirely in Canton Township on the outskirts of the City of Washington. The address of the facility is 300 Caldwell Avenue, Washington, Pennsylvania 15301. The Washington County facility covers an area totaling 55 acres. This property includes a 20-acre active facility area and an adjacent 35-acre parcel of undeveloped land.

2.1 Facility Description

Molycorp, Inc.'s Washington, Pennsylvania facility is situated on the outskirts of the City of Washington, PA at 300 Caldwell Avenue in Canton Township. The active site consists of approximately 20 acres that are fenced. The main process buildings are located on the north side of Caldwell Avenue, while employee vehicle parking, equipment and miscellaneous storage areas are located on the south side.

Molybdenum oxide manufacturing was begun in the 1920s, but processing of the material was idled in 1991. The plant also produced ferro-columbium, as well as other ferroalloys, e.g., molybdenum.

2.2 Buildings

Building 39 and Building 42 (north-end) are the only two buildings within the scope of this Final Status Survey. All other buildings and structures will be surveyed at a later time.

2.2.1 Building 39, Maintenance Storage & Warehouse

Building 39 is a 103' long x 40' wide x ~20' high wood frame and wood truss structure with exterior corrugated metal wall and roof panels, and a concrete slab floor. The building runs from east to west and has a large sliding door at either end. Personnel doors are located on the east end of the north wall and the north end of the west wall.

2.2.2 Building 42 (north-end), Storage Warehouse

Building 42 (north-end) is a 121.5' long x 50' wide x ~30' high prefabricated metal structure with a structural steel frame, corrugated exterior metal wall and roof panels and a reinforced concrete floor.

3.0 OPERATING HISTORY

3.1 Licensing and Site Operations

Molycorp, Inc.'s Washington, Pennsylvania facility produced a ferrocolumbium alloy from Brazilian ore (pyroclor) between 1964 and 1970. While the use of pyroclor was commonplace by that time, the particular ore contained thorium, and slight traces of uranium, as an accessory metal. It should be noted that thorium contamination is the major isotope of concern. The thorium was in concentrations that required Molycorp to acquire a Source Materials License (December 19, 1963). The current Source Materials License is SMB-1393 (Docket 4008778). The license operation resulted in the production of thorium bearing slag, some of which was used as fill material over portions of the site.

Currently, much of the slag produced during this operation is relocated in a stabilized, soil-capped, pile on the south side of the southern portion of the site. There is also a smaller pile in the northern portion of the site. Ferro-columbium slag is also mixed with soils at various locations on the site.

The Decommissioning Plan for the Washington, PA Facility, RSI, June 1999, contains additional information on past license amendments and specifics on the operational history of the facility.

3.1.1 Operational Use of Building 39

Building was originally constructed in 1983. Since 1983, this building has been used as an equipment and parts storage area. This building is currently still being used in that capacity.

3.1.2 Operational Use of Building 42

Building was originally constructed in 1989. This building was used to store raw materials to support the Lanthanide metal and alloy production from 1981 to 1987. From 1993 to 1996, this building was leased out. Building 42 currently is used as a stores warehouse.

4.0 DECOMMISSIONING ACTIVITIES

A description of planned decommissioning activities required to complete the site decommissioning and release the site for unrestricted use, including decommissioning objectives, tasks and schedule, is given in the Decommissioning Plan for the Washington, PA Facility, RSI, June 1999. This section will summarize the activities performed to prepare Buildings 39 and 42 for Final Survey.

4.1 Re-Staging of Radioactive Material Packages

The initial task for the current phase of decommissioning was the removal of all packages and equipment from Buildings 39 and the northern end of 42. Although no radioactive materials were located in the two buildings, soil located around and adjacent to the buildings has been determined to have radioactive contamination.

The soil located in the grounds surrounding Building 39 is elevated with radioactive contamination. It was necessary to take shielded and unshielded measurements on the structure during final status surveys to obtain actual beta measurements without interference from the elevated gamma dose rates caused by the contaminated soils. The soil decontamination effort will be handled at a later time and discussed in a separate report.

5.0 FINAL STATUS SURVEY PROCEDURES

This section describes the methods used to demonstrate that radiation and radioactive contamination levels at specific portions of the Molcorp, Inc. Washington, PA facility have been reduced to levels below criteria established for unrestricted use. The basis for governing the conduct of the Final Status Survey was provided by procedure FSP-AP-001, Final Status Survey Design and Implementation. The methods described in that procedure were derived from regulatory guidance, specifically NUREG/CR 5849, Manual for Conducting Radiological Surveys in Support of License Termination, the Decommissioning Plan for the Washington, PA Facility (RSI, June 1999), and the Radiological Health and Safety Plan.

5.1 Initial Area Classifications

The initial classification for the survey areas within the scope of final status survey were based on site characterization data, history of radioactive materials involvement or potential for contamination of the survey area, recommendations by Molycorp, Inc. personnel knowledgeable of the facility conditions, and any applicable survey data such as routine surveillance or surveys conducted to support decommissioning activities. Survey areas were classified as follows:

- Unaffected Survey Areas: These areas have a low potential for radioactive contamination, based on knowledge of site history and previous survey information. Previous remediation precluded a survey area from initially being classified as unaffected.
- Affected Survey Areas: Affected areas are those areas that have potential radioactive contamination (based on site plant operating history) or known radioactive contamination (based on actual radiological surveys).

Buildings 39 and the north-end of Building 42 were classified as unaffected areas. Final status surveys were taken on the top surfaces of floors in Buildings 39 and the north-end of 42. However, due to the impact of contaminated soils on the undersides of concrete floors at the Molycorp, York, PA facility, radiological surveys will be required on the undersides of the building concrete floors prior to release.

5.2 Gridding

Gridding is not required in unaffected survey units and therefore, no gridding was necessary. However, some grid marks were used to bound the areas where scanning was performed up to 2 meters high on the walls.

5.3 Survey Location Designation

In a structural survey area, a survey location is usually represented by a single grid block or the area to be scanned surrounding a survey point. A survey location can contain one or more survey points. Survey locations were clearly identified to provide a method of referencing survey results to survey measurement locations. All data point measurement locations where the detectors were placed on the surface of the building were marked so to be able to perform confirmatory measurements, etc., as needed.

5.4 Final Status Survey Packages

A survey package is a collection of information in a standardized format for controlling and documenting field measurements taken for the Final Status Survey. A survey package was prepared for each survey unit independently and contains, as a minimum, the following:

- Form FSP-AP-001.4, Survey Area Breakdown
- Form FSP-AP-001.1, Radiological Survey Instructions
- Form FSP-AP-001.3, Survey Location Designation, Results and Comments
- Form FSP-AP-001.5, Final Status Survey Map

In addition, the survey packages contain the field data collection results, a copy of the final data converted to the reporting units required to demonstrate regulatory compliance, smear sample reports, a summary report for the survey unit, and any other pertinent data as determined by the project Radiological Engineer. All FSS survey packages prepared for a specific survey unit were reviewed for regulatory and procedural compliance and approved by the project Radiological Engineer prior to implementing the FSS for that specific area.

5.5 Measurement Frequencies

Measurement frequencies, or the physical spacing of samples and measurements, were selected to allow for a concentrated survey effort in those areas most likely to be

contaminated, taking into account the type and size of the survey unit. The *minimum* measurement frequency for each measurement type is described below.

5.5.1 Surface Scans

- Unaffected - β scan a minimum of 10% of the accessible surfaces. Alpha scans were also performed on interior and exterior wall surfaces. 2-square-meters were scanned at each TSC location.

5.5.2 Total Surface Contamination (fixed point) Measurements

- Unaffected - a minimum of 30 survey points or one survey point for each fifty square meters, whichever is greater

5.5.3 Removable Surface Contamination Samples

A smear sample for removable contamination was collected from each location where a TSC measurement was made. These samples were analyzed for alpha and beta-gamma contamination.

5.5.4 Exposure Rate Measurements

- Unaffected - a minimum of one exposure rate measurement for each fifty square meters

5.6 Instrumentation

Radiation detection and measurement instrumentation used for the final status survey was selected to provide both reliable operation and adequate sensitivity to demonstrate attainment of the release criteria. Both field survey instrumentation and analytical laboratory equipment were selected based on: (1) the necessary Minimum Detectable Concentrations (MDC), and (2) stability and reliability under environmental conditions. Instrumentation utilized to perform the final status survey is shown in Table 5-2.

Instruments and detectors used in the final status survey were calibrated by the manufacturer or by qualified vendors using NIST traceable sources. Instrumentation used in the final status survey was operated and maintained in accordance with approved procedures. Instruments used for fixed surface contamination measurements were pre-use response checked each day that they were used for data collection. The bench-top alpha and beta counting system was calibrated using sources traceable to NIST and source checked each day the instrument was used for sample counting.

Uncertainties and MDA values were calculated using equations 8-9 and 5-2 respectively of NUREG/CR 5849. Equation 8-9 was modified to correct units to disintegrations per minute. Uncertainty values were calculated using an average efficiency for the instruments used in the performance of the final status survey. Instrument MDAs were

calculated after calibration and/or field repairs. Count times were selected to ensure that the measurements would be sufficiently sensitive with respect to the release criteria.

Table 5-2, Final Status Survey Instrumentation

| Instrument/ Detector Type | Description | Measurement Types(s) | Det. Eff. | MDA Dpm/100cm ² |
|---------------------------------------|---|--|-------------------------------|---|
| Ludlum 2350-1 Data Logger/ 43-37-1 | 582 cm ² gas flow proportional | Beta scan | 29.42% | 200-600 |
| Ludlum 2360 Data Logger/ 43-89 | 100 cm ² scintillation probe | Alpha/Beta scan Beta surface contamination Alpha surface contamination | β ~13% α ~17% | β -300-600 α -25-75 (achieved w/ 1 min. count) |
| Bicron Micro Rem | Tissue-equivalent organic scintillator | Exposure rates | | |
| Ludlum 2929/ 43-10-1 | Scintillator: Zn (Ag) adhered to plastic scintillation material | Alpha and beta activity on smear samples | | |

5.6.1 Instrument Use Technique

Techniques used in the performance of final status survey measurements were in accordance with section 9 of procedure FSP-AP-001, Final Status Survey Design and Implementation. Operation of the instrumentation used to perform the final status survey was done in accordance with procedures FSP-OP-003, Operation of the Bicron Micro Rem Meter and RPP-OP-105, Operation and calibration of the Ludlum 2929.

5.6.1.1 Surface Scans

Scan surveys were performed for alpha/beta activity in the Rate Meter mode at a rate of 1.5 to 2 inches per second, at a distance of approximately 0.25 inches from the surface. Visual and audible count rates were observed for an increase in activity. Verified areas of elevated activity were physically marked in the field and documented on the survey sheet. Scans were performed over 2-square meters around each TSC measurement location.

5.6.1.2 Total Surface Contamination Surveys

Total surface contamination (TSC) measurements were performed for beta activity at a specific survey location after the scan for that survey location was completed. TSC measurements were obtained as prescribed in the survey instructions and at any areas of elevated activity identified during the scan survey. The measurements were obtained by placing the detector within one-quarter inch of the surface to be surveyed and counted in the Integrate mode for the specified time (normally one minute). All count rate values were recorded on the survey for each area.

5.6.1.3 Removable Surface Contamination Surveys

Removable surface contamination (smear) samples were obtained at each TSC measurement location and were taken over an area of 100 cm². All smears were analyzed for beta and alpha contamination.

5.6.1.4 Exposure Rate Surveys

Exposure rate measurements were taken by placing the detector at one meter from the surface of the location specified in the survey instructions and counted in the Rate Meter mode for the specified time (normally 15-30 seconds). All $\mu\text{R}/\text{hour}$ values were recorded.

5.7 Background/Baseline Levels Identified

Material-Specific background levels were established for each type of instrument used for total surface contamination and exposure rate measurements. Background measurements were collected on surfaces of similar construction as the buildings at the site and having no possibility of being impacted by site operation. 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 instruments that were used for FSS data collection. An average background value was determined for each material surveyed and this value was subtracted from each FSS measurement to determine a net count rate. Background determinations were required for concrete, and a class of materials designated as generic material. The required number of background measurements per material is as follows:

- Concrete - a minimum of 20 measurements
- Cinderblock - a minimum of 20 measurements
- Generic – a minimum of 10 measurements for each type of material surveyed (i.e., wood, insulation, corrugated steel, etc.)

5.7.1 Background in Buildings 39 and 42

The background response of the 100 cm² scintillation detectors used for surface activity measurements in Building 39 included a significant contribution from the gamma radiation "background" in the vicinity. The nominal exposure rate on the Washington site ranged from 5 to well over 30 microR/hour.

A method was devised to improve the accuracy of the detector background response for surface beta activity measurements. For a typical measurement at the Washington site, the major component of the detector background response was the contribution from gammas due to the soil concentrations adjacent to the building. A small contribution to the background response also came from the surface material beneath the detector sensitive area (the window). This component was mostly beta radiation with a minor gamma radiation contribution. A pair of measurements were taken at each survey location in Buildings 39 and 42 during the final status survey. The first measurement was

taken with an aluminum shield placed between the detector face and the surface of the material being measured. The shield was of sufficient thickness (3/16 inch) to completely attenuate the maximum beta energy of the thorium series beta emitters. The shielded measurement provided a good estimate of the background at the measurement location as it shielded the detector from emissions from surface contamination. Next, an unshielded measurement was obtained at the same location of the shielded measurement. The difference between the shielded and unshielded measurement, then was largely due to surface contamination from residual activity contamination and material background. Concrete and generic material surfaces were surveyed at off-site locations where background measurements were taken and found to have some contributing beta activity in the material make-up. These activities were subtracted from the measurements taken for each material type in buildings 39 and 42.

5.7.2 Background Anomalies in Buildings 39 and 42

While performing the final status survey on Buildings 39 and 42, numerous surface activity measurements exceeded the release criteria. This was due to unusually high background radiation in the area of the Buildings. The high background was caused by thorium in the surrounding soil.

5.7.2.1 Floor and Lower Walls

While performing the final status survey of the lower walls in Buildings 39 and 42, numerous total surface contamination measurements taken along the walls initially exceeded the release criteria. According to characterization data, the soil outside of Buildings 39 and 42 contain high concentrations of thorium. These measurements were taken on corrugated metal that is prevalent on the interior and exterior walls throughout Buildings 39 and 42. In each instance, a shielded and unshielded measurement was taken. In every instance, the data obtained from the resurvey was well below the release criteria.

5.7.2.2 Gamma scans of Building Roof-tops

Gamma measurement surveys taken on the roof were not performed due to the inability to safely access the roofs of the buildings.

5.8 Major Contaminants Identified

The major contaminants at the Molycorp, Inc. Washington, PA site are natural thorium and natural uranium.

5.9 Guideline Established

All final status survey measurements were compared to the values in FC 83-23, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material. The criteria for natural thorium are more conservative than natural uranium and were applied at the site. In addition, an exposure rate criterion of 5 uR/hr was applied.

The unrestricted use criteria for the buildings and structures are shown in Table 5-3 below.

Table 5-3
Guideline Values (values above background)

| Measurement Type | Average | Maximum |
|---------------------------------|------------------------------|------------------------------|
| Total Surface Contamination | 1000 dpm/100 cm ² | 3000 dpm/100 cm ² |
| Removable Surface Contamination | | 200 dpm/100 cm ² |
| Exposure Rate | 5 µrem/hr | 10 µrem/hr |

5.9.1 Maximum Guideline Values

Individual measurement values were checked to determine if any were above the maximum guideline values in Table 5-3. The maximum guideline values were established for total surface contamination, removable surface contamination and exposure rate measurements.

The maximum guideline value for:

- A total surface contamination measurement is the maximum net dpm allowed in any 100 cm² area.
- A removable surface contamination measurement is the maximum net dpm allowed in any 100 cm² area,
- An exposure rate measurement is the maximum µR per hour above background allowed for any single measurement.

5.9.2 Average Guideline Values

FC83-23 allows for individual measurements to be screened against guideline values (sometimes referred to as the average guideline value). Areas of elevated activity between one and three times the guideline value could be tested to assure that the average surface activity level within a contiguous 1 m² area containing the elevated area is less than the guideline value. Since all final status survey data are below the average guideline values, this test was not performed.

6.0 SURVEY FINDINGS

This section provides the methods for evaluating all final radiological survey data. Detailed Data Reports for each survey unit is provided in Appendix A. Field data

collection forms and other information from the individual survey packages, as discussed in section 5.4 are provided in Appendix B.

The results for removable contamination indicate that the removable beta activity was always higher than the removable alpha activity. There was essentially no alpha contamination identified during the final status survey. Therefore, for demonstrating compliance with the unrestricted use criteria, Appendix A summarizes the results for removable beta contamination only. The removable alpha contamination counting results are provided in Appendix B.

6.1 Techniques for Reducing/Evaluating Data

All final status survey data was converted to the correct reporting units to demonstrate compliance with license termination requirements. The formulas used in the conversion process are provided in Appendix C.

There were a few exposure rate measurements that exceeded the maximum value of 10 $\mu\text{R/hr}$ above background. These elevated results are believed to be attributable to contamination in the soil surrounding buildings 39 since there was essentially no surface contamination above background identified on the building surfaces. To confirm that the elevated exposure rates were due to soil contamination, a portion of wall was removed from building 39 and taken to a low background area for resurvey. The highest gamma dose rate location was MWB39-UG-15. The one-square meter of wall containing location code MWB30-UG-15 was removed from building 39. During final status surveys this location code had a gamma dose rate of 30 $\mu\text{R/hr}$. The wall section was resurveyed in a low background area with no findings above the background of 7 $\mu\text{R/hr}$. This survey verifies that the elevated exposure rates are due to the soils surrounding the building and not from the building materials or any activity located on the building itself.

The impact of having elevated gamma dose rates was evident in the surface measurements as well. Although shielded and unshielded measurements were taken, the higher count rates caused by the gamma constituent in the soil created a larger degree of fluctuation between counts.

6.2 Comparison of Findings with Guideline Values and Conditions

The final status survey data was evaluated to ensure that the unrestricted use criteria were satisfied at the 95% confidence level in accordance with NUREG/CR 5849. The data are summarized in Appendix A. All survey results are well below the unrestricted use criteria and are essentially indistinguishable from background.

The average beta surface contamination levels in Buildings 39 and 42 were 16 dpm/100 cm^2 and 42 dpm/100 cm^2 , respectively. The upper 95% confidence levels were 116 and 164 dpm/100 cm^2 . These results are not likely to be statistically different from background levels. Removable contamination results were all less than MDA. The average exposure rates were 5.7 and -0.4 $\mu\text{R/hr}$ for Buildings 39 and 42, respectively, with 95% upper confidence levels of 6.7 and 0.2 $\mu\text{R/hr}$.

7.0 SUMMARY

The final status surveys for Buildings 39 and 42 were performed in accordance with NUREG/CR 5849 and the Decommissioning Plan for the Washington, PA Facility. Results of the final status survey demonstrate that the residual contamination in all Building 39 and 42 survey units is below the unrestricted use criteria at the 95% confidence level and confirm that the buildings are suitable for unrestricted use.

REFERENCES

- 1) Draft NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination
- 2) Decommissioning Plan for the York, PA Facility, Revision 1, RSI, June 30, 1999
- 3) Policy and Guidance Directive FC83-23, Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for By-Products, Sources or Special Nuclear Materials
- 4) Final Survey report for Decommissioning of the Molycorp, Inc. York, PA Facility, IT Corporation, May 1997
- 5) USNRC Materials License No. SMB-1408, Amendment 9
- 6) Molycorp, Inc., Radiological Health and Safety Plan
- 7) FSP-AP-001, Final status Survey Design and Implementation
- 8) FSP-OP-002, FSS Data Processing and Reporting
- 9) FSP-OP-003, Operation and Use of the Bicorn Electra Plus
- 10) FSP-OP-005, Survey Area Turnover and Control
- 11) RPP-IP-001, Operation of the Bicorn Micro Rem Meter
- 12) RPP-OP-105, Operation and calibration of the Ludlum 2929



Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| Survey Area Name: | Building 42 | Survey Area Category: | Structure |
|-----------------------|--|-----------------------------|---|
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior (MWB42-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | Perform a scan of 10% of the interior and exterior surfaces of the building floors and up to 2 meters on the walls. Alpha/beta scans to be performed on the walls. Beta scans are to be performed on floor surfaces. Scan a minimum of 4m ² around each TSC location designated on map MWB42-01-02. Scan survey will be performed at 1 inch per second. Note the location of any alarms on the survey map. |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect alpha/beta TSC measurements at locations indicated on survey area map MWB42-01-02. Unshielded measurements will be collected for beta at each location. |
| RSC smears | Ludlum 2929 | 1 minute | Collect a smear at the location of each TSC measurement. Smears will be analyzed for both alpha and beta contamination. |
| Gamma ER | Micro Rem | N/A | Collect exposure rate measurements at each TSC measurement indicated on survey area map MWB42-01-02. ER measurements will be collected one meter from the surface. |
| All | Various | Various | Repeat a minimum of 5% of all measurement types collected. Record the number of the repeat measurements on the attached Survey Location Designator. |

Prepared By: Craig E. Miller Date: 11/9/01



Radiological Services, Inc.

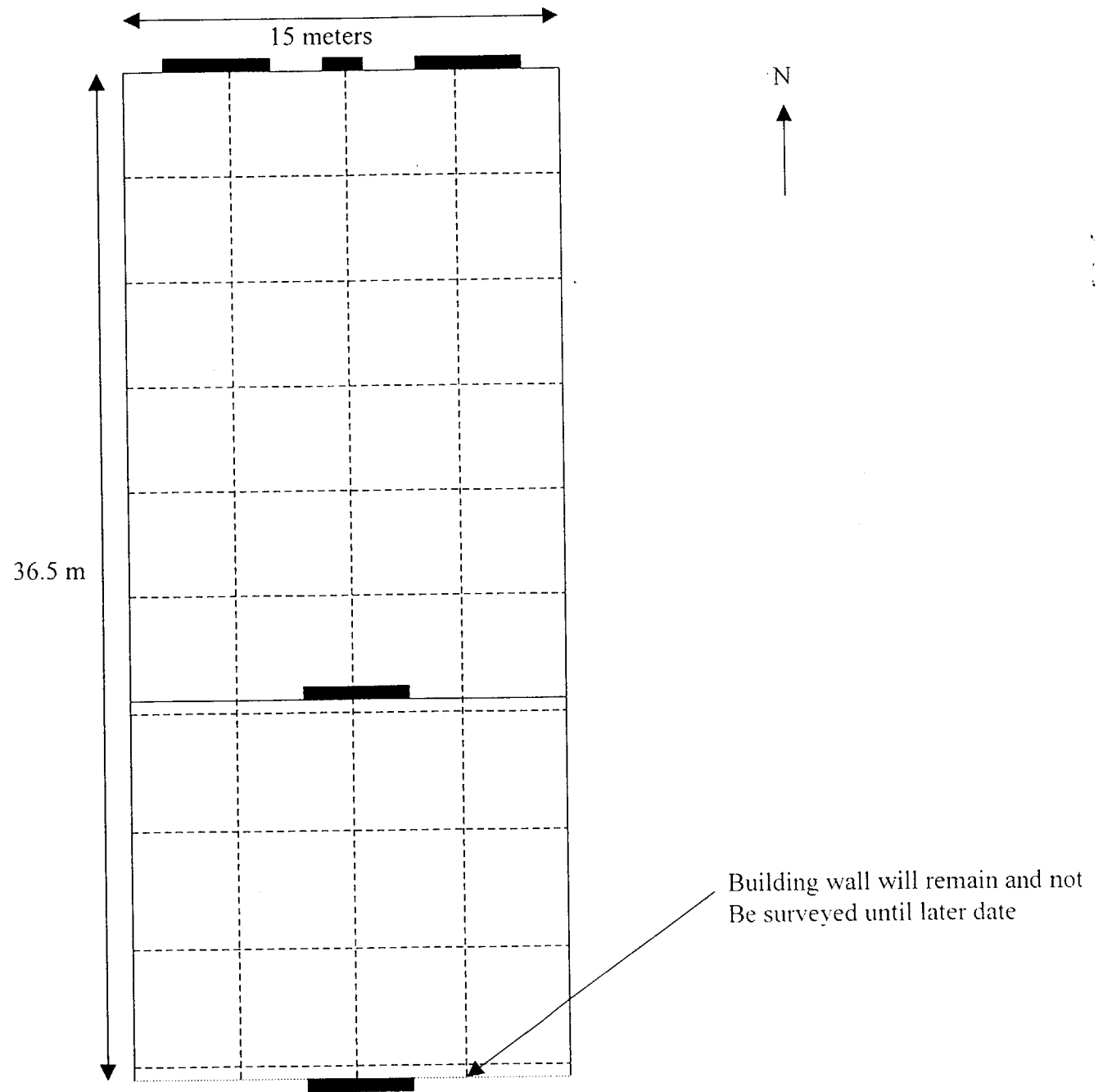
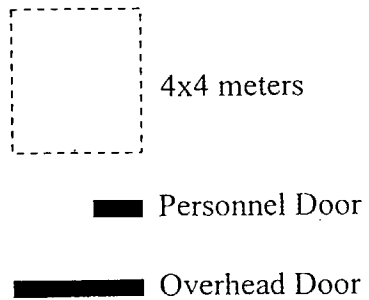
SURVEY AREA BREAKDOWN FORM

| Survey Area Name | | Building 42 | | | | Classification | | Unaffected | |
|----------------------|----------------|-------------------------------------|-----------------|---------------|-------------------------------|------------------|----------|------------|-----|
| Survey Area Location | | Molycorp Washington, PA | | | | Category | | Structure | |
| Survey Unit | | | Survey Material | | | Survey Locations | | | |
| Description | Classification | Area (m ²) | Description | Location Code | Survey Area (m ²) | TSC β | TSC α | ER | RSC |
| Interior | Unaffected | 891.5 x 10% (90 m ²) | Concrete | MWB39-UC | (547.5) 55 | 14 | 14 | 14 | 14 |
| | | | Generic | MWB39-UG | (344) 35 | 9 | 9 | 9 | 9 |
| Exterior | Unaffected | 176 x 10% (18 m ²) | Generic | MWB39-UG | (176) 18 | 5 | 5 | 5 | 5 |
| QC Interior | Unaffected | 108 x 5% (5.4 m ²) | Generic | MWB39-UC | 8 | 2 | 2 | 2 | 2 |
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Prepared By: Craig E. Miller Date: 11/9/01

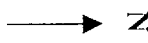
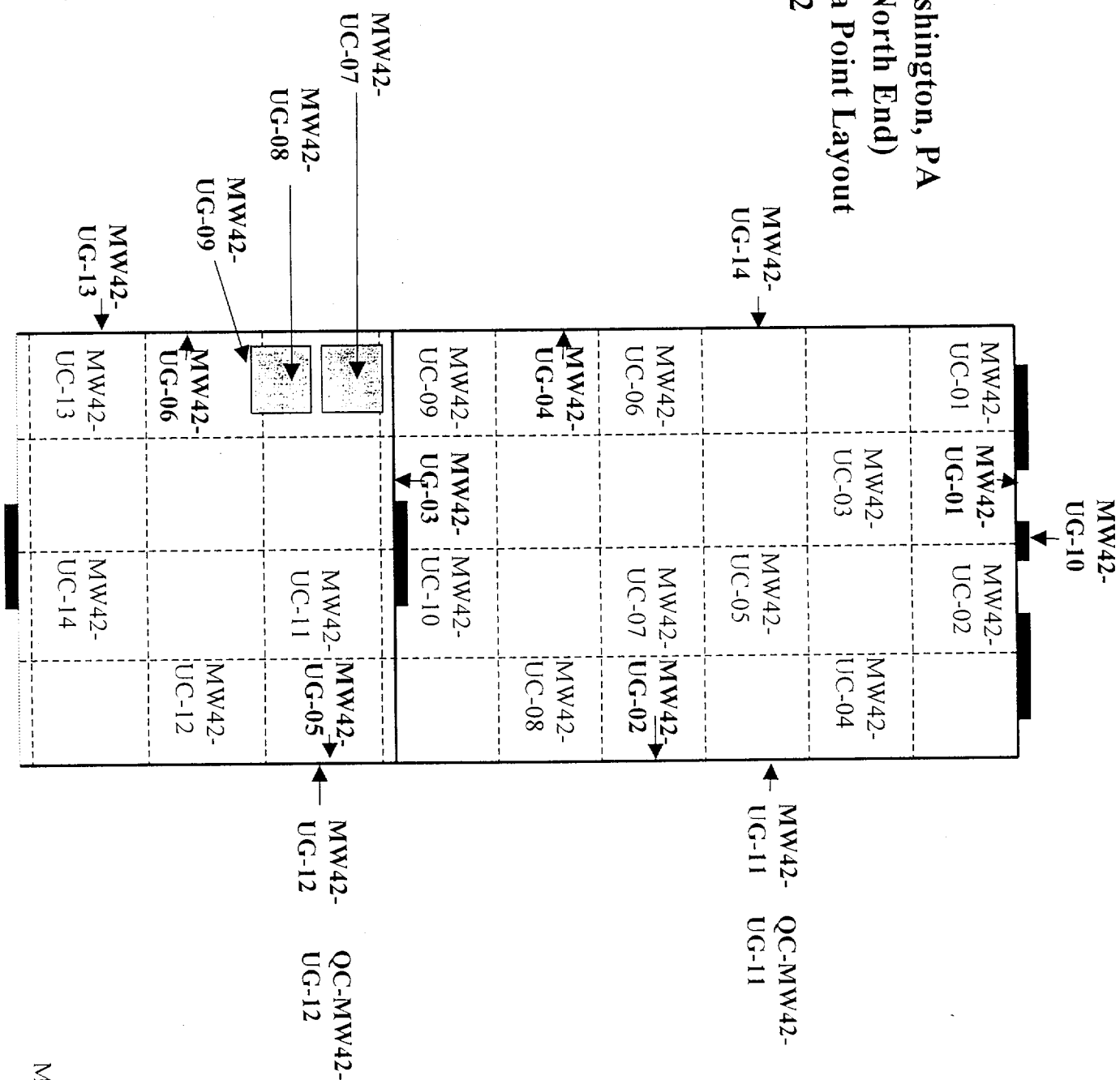


Washington, PA
Building 42
Overview





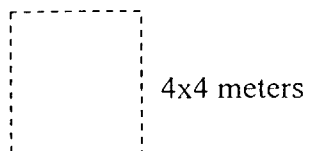
Molycorp Washington, PA
Building 42 (North End)
Grid and Data Point Layout
MW B42-01-02



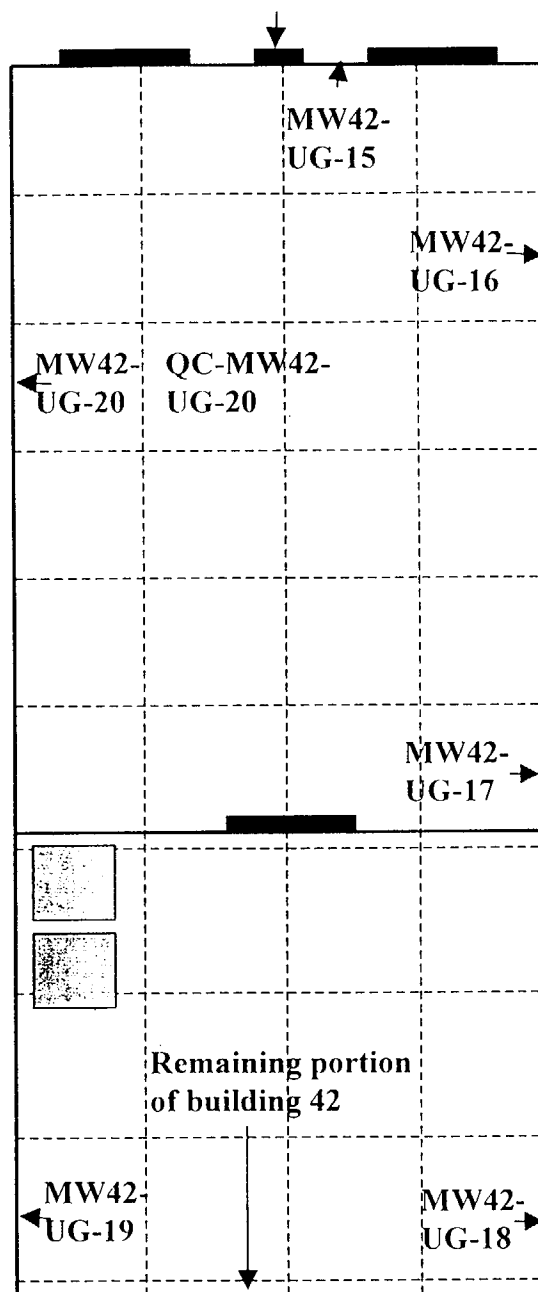
Map not to scale



**Molycorp Washington, PA
Building 42 (North End)
Data Point Layout
MWB42-01-03**



4x4 meters



Map not to scale



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

Survey Area Name: Building 42 (MWB42)

Survey Unit Name: MWB42-01 (Interior)

| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
|--------------------|------------------|--------|-------------|-----|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | | | | | 134735 | 6/9/02 | 149471 | 6/9/02 |
| 141303 | 11/2/02 | 151059 | 11/2/02 | NA | NA | 56 | 521 | |
| A396E | 4/2/02 | NA | NA | NA | NA | NA | NA | |

| Performed By: | Print Name: | | Sign Name: | | Date: |
|---------------|---------------|--|-----------------------|--|---------|
| | Dave Riley | | <i>David J. Riley</i> | | 11/9/01 |
| | Howard Nordby | | <i>Howard Nordby</i> | | 11/9/01 |

| Location Number MWB42- | β Scan (cpm) | α Scan (cpm) | β TSC _{unsh} (cpm) | α (cpm) | ER (μ R/hr) | Smears |
|---------------------------|--------------------------|---------------------------|---|-------------------|---------------------|--------|
| UC-01 | 570 | NA | 354 | 2 | 7 | Y |
| UC-02 | 550 | NA | 348 | 4 | 10 | Y |
| UC-03 | 560 | NA | 361 | 6 | 10 | Y |
| UC-04 | 520 | NA | 312 | 2 | 11 | Y |
| UC-05 | 420 | NA | 282 | 5 | 9 | Y |
| UC-06 | 650 | NA | 332 | 6 | 10 | Y |
| UC-07 | 610 | NA | 335 | 2 | 10 | Y |
| UC-08 | 620 | NA | 343 | 7 | 8 | Y |
| UC-09 | 550 | NA | 327 | 7 | 9 | Y |
| UC-10 | 520 | NA | 305 | 3 | 8 | Y |
| UC-11 | 640 | NA | 303 | 3 | 9 | Y |
| UC-12 | 530 | NA | 302 | 8 | 9 | Y |
| UC-13 | 600 | NA | 273 | 7 | 7 | Y |
| UC-14 | 630 | NA | 274 | 6 | 7 | Y |
| NA | NA | NA | NA | NA | NA | NA |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Prepared by: Craig E. Miller Date: 11/9/01*Craig E. Miller*



Survey Area Name: Building 42 (MWB42)

Survey Unit Name: MWB42-01 (Interior)

| | | | |
|---------------|----------------------|-----------------------------|-----------------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | <u>Dave Riley</u> | <u><i>Dave Riley</i></u> | <u>11/12/01</u> |
| | <u>Howard Nordby</u> | <u><i>Howard Nordby</i></u> | <u>11/12/01</u> |
| | <u> </u> | <u> </u> | <u> </u> |

Prepared by: Craig E. Miller Date: 11/9/01

Reviewed by
Gis E. M. L.



Survey Area Name: Building 42 (MWB42)
Survey Unit Name: MWB42-01 (Exterior)

| Instrument Data | Instrument SN 147303 | CDD | Probe SN 151059 | CDD | Scan MDA | | TSC MDA | |
|-----------------|--|---------|--|---------|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | 141303 145478 | 11/2/02 | 151059 150798 | 11/2/02 | 146 | 1532 | 62 | 536 |
| | A396E | 4/2/02 | NA | NA | NA | NA | NA | NA |
| | | | | | | | | |
| | | | | | | | | |

| | | | |
|------------------|---------------|----------------------|----------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Dave Riley | <i>Dave J. Riley</i> | 11/12/01 |
| | Howard Nordby | <i>Howard Nordby</i> | 11/12/01 |
| | | | |

[illegible]

Prepared by: Craig E. Miller Date: 11/9/01

Revised by:
G. E. Miller

WASH.

| DDO-138 Radiation Protection Survey Report | | | | | | Site: MolyCorp / York, PA | | |
|---|--|--|--|-----------------|--|---------------------------------|-----------------------------|------------------------------|
| Section 1: Survey Information | | | | | | | | |
| Date: 11-15-01 | | Time: 1155 | | Location: MWB42 | | Survey Issue Log Number: 01-308 | | |
| RWP Number: N/A | | Purpose of Survey: <input type="checkbox"/> RWP <input type="checkbox"/> Routine Survey <input type="checkbox"/> Unconditional Release <input checked="" type="checkbox"/> Other: | | | | Page 2 of 3 | | |
| Survey Title MWB42- | | | | | | Smear Number | Beta dpm/100cm ² | Alpha dpm/100cm ² |
| | | | | | | 1 | <MDA | <MDA |
| <div style="display: flex; justify-content: space-between;"><div><div>① UCO1</div><div>② UCO2</div><div>③ UCO3</div><div>④ UCO4</div><div>⑤ UCO5</div><div>⑥ UCO6</div><div>⑦ UCO7</div></div><div><div>⑧ UCO8</div><div>⑨ UCO9</div><div>⑩ UC10</div><div>⑪ UC11</div><div>⑫ UC12</div><div>⑬ UC13</div><div>⑭ UC14</div></div></div> <div style="margin-top: 20px; text-align: center;">EFF. = .344α .314β BKG α β .2 60 LLD α β 4.5 29</div> | | | | | | 2 | | |
| | | | | | | 3 | | |
| | | | | | | 4 | | |
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| | | | | | | 11 | | |
| | | | | | | 12 | | |
| | | | | | | 13 | ↓ | ↓ |
| | | | | | | 14 | <MDA | <MDA |
| | | | | | | 15 | N A | |
| | | | | | | 16 | | |
| | | | | | | 17 | | |
| | | | | | | 18 | | |
| | | | | | | 19 | | |
| | | | | | | 20 | | |
| | | | | | | 21 | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |



Bicron Micro-Rem

Routine Performance and Background Data Form

Source ID #: 5441 Mean Source Value: 110 $\mu\text{g}/\text{HR}$ Mean - 20% Value 88 $\mu\text{g}/\text{HR}$ Mean + 20% Value 132 $\mu\text{g}/\text{HR}$

[illegible]

Bicron Micro-Rem

Routine Performance and Background Data Form

Source ID #: 51411 Mean Source Value: 80 m/hr Mean - 20% Value 64 m/hr Mean + 20% Value 96 m/hr

Radiological Services, Inc.

Daily Instrumentation Operational Check Sheet

| | | | | |
|------------|--------------|---------------------------|------------------------|------------------------|
| Source ID# | <u>54415</u> | Mean Source | Mean | Mean |
| | | Count Rate: <u>1921.2</u> | +2σ Value: <u>2001</u> | -2σ Value: <u>1840</u> |
| | | | Mean | Mean |
| | | Sigma Value: <u>40.2</u> | +3σ Value: <u>2041</u> | -3σ Value: <u>1800</u> |

[illegible]

Molycorp Washington PA site source checks

Source Checks

Ludlum 2350-1 #31094 and 43-37-1 #31197

| Measurement Number | Source Counts |
|-----------------------|------------------|
| 1 | 11/6/01 2010.0 |
| 2 | 11/6/01 1919.0 |
| 3 | 11/6/01 1948.0 |
| 4 | 11/6/01 1889.0 |
| 5 | 11/6/01 1949.0 |
| 6 | 11/6/01 1865.0 |
| 7 | 11/6/01 1944.0 |
| 8 | 11/6/01 1933.0 |
| 9 | 11/6/01 1875.0 |
| 10 | 11/6/01 1864.0 |
| 11 | 11/6/01 1862.0 |
| 12 | 11/6/01 1938.0 |
| 13 | 11/6/01 1907.0 |
| 14 | 11/6/01 1916.0 |
| 15 | 11/6/01 1950.0 |
| 16 | 11/6/01 1964.0 |
| 17 | 11/6/01 1870.0 |
| 18 | 11/6/01 1961.0 |
| 19 | 11/6/01 1934.0 |
| 20 | 11/6/01 1926.0 |

Average 1921.2

Standard
Deviation 40.204216
(+3) standard deviations 2041.8126
(-3) standard deviations 1800.5874
(+2) standard deviations 2001.6084
(-2) standard deviations 1840.7916

nb = 0.0479597

nb = ((t97.5% x stdev)/(0.2 x average))²

Radiological Services, Inc.
Daily Instrumentation Operational Check Sheet

Instrument: 2929 167846
Cal Due: 11-19-02

Probe: 43-10 171938
Cal Due: 11-19-02

Source ID# 54415 Mean Source Count Rate: 3674
B- Sigma Value: 59

| | | | |
|------------|-------------|------------|-------------|
| Mean | | Mean | |
| +2σ Value: | <u>3793</u> | -2σ Value: | <u>3555</u> |
| Mean | | Mean | |
| +3σ Value: | <u>3852</u> | -3σ Value: | <u>3496</u> |

[illegible]

JASH.

| DDO-138 Radiation Protection Survey Report | | | | Site: Molycorp / York, PA | |
|--|---------------|--|-----------------------|--------------------------------|-----------------------------|
| Section 1: Survey Information | | | | | |
| Date: 11-15-01 | | Time: 1220 | | Location: MWB42 | |
| Survey Issue Log Number: 01-308 | | | | | |
| RWP Number: N/A | | Purpose of Survey: <input type="checkbox"/> RWP <input type="checkbox"/> Routine Survey <input type="checkbox"/> Unconditional Release <input checked="" type="checkbox"/> Other: | | Page 3 of 3 | |
| Survey Title | | | | Smear Number | Beta dpm/100cm ² |
| MWB42 - | | | | Alpha dpm/100cm ² | |
| ① UG01 ⑨ UG09 | | | | 1 | <MDA |
| ② UG02 ⑩ UG10 | | | | 2 | |
| ③ UG03 ⑪ UG11 | | | | 3 | |
| ④ UG04 ⑫ UG12 | | | | 4 | |
| ⑤ UG05 ⑬ UG13 | | | | 5 | |
| ⑥ UG06 ⑭ UG14 | | | | 6 | |
| ⑦ UG07 ⑮ QC-UG11 | | | | 7 | |
| ⑧ UG08 ⑯ QC-UG12 | | | | 8 | |
| | | | | 9 | |
| | | | | 10 | |
| | | | | 11 | |
| | | | | 12 | |
| | | | | 13 | |
| | | | | 14 | |
| | | | | 15 | |
| | | | | 16 | <MDA |
| | | | | 17 | |
| | | | | 18 | |
| | | | | 19 | A |
| | | | | 20 | N |
| | | | | 21 | |
| | | | | 22 | |
| | | | | 23 | |
| | | | | 24 | |
| <div style="text-align: right;">α β BKG .2 60 LLD 4.5 29</div> <div>EFF. = .344α .314β</div> | | | | | |
| 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 β C = mRem/h beta contact --①-- = Large Area Wipe □ = Bulk Material Sample | | | | | |
| Section 2: Instruments Used | | | | | |
| Instrument Name: | Model Number: | Serial/ID Number: | Calibration Due Date: | α / β MDA: | |
| Ludlum | 2929/43-10-1 | 167842/171328 | 11-24-01 | 13/91 DPM/100cm ² | |
| N/A | N/A | N/A | N/A | N/A | |
| Section 3: Review and Approval | | | | | |
| Survey Performed By (Sign): <i>SLong</i> | | Area Posted and/or Barricaded: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required | | Date and Time: 11-15-01 / 1240 | |
| Radiation Safety Officer (Print Name & Sign): <i>SLong / SLong</i> | | | | Date and Time: 11-15-01 / 1240 | |

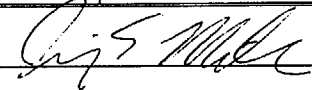




Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| | | | |
|-----------------------|--|-----------------------------|---|
| Survey Area Name: | Building 42 | Survey Area Category: | Structure |
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior/Exterior (MWB42-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | Perform an alpha and beta scan around 2-square meter of each TSC location MWB42-UG15 through UG20. |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect additional shielded and unshielded beta TSC data points MWB42-UG15 through UG20. |
| RSC smears | Ludlum 2929 | 1 minute | Collect a smear at each TSC location MWB42-UG15 through UG20. |
| Gamma ER | Micro Rem | N/A | Collect a gamma exposure rate measurement at each TSC location MWB42-UG15 through UG20 at one meter from the surface. |
| All | Various | Various | NA |

Prepared By:  Date: 11/16/01



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

[illegible]

Prepared by: Craig Miller Date: 11/18/01

| DDO-138 Radiation Protection Survey Report | | | | Site: Molycorp / York, PA | |
|---|---------------|--|-----------------------|---------------------------------|--------------------------------|
| Section 1: Survey Information | | | | | |
| Date: 11-26-01 | | Time: 1400 | | Location: Bldg. 42 | |
| Survey Issue Log Number: 01-315 | | | | | |
| RWP Number: N/A | | Purpose of Survey: <input type="checkbox"/> RWP <input type="checkbox"/> Routine Survey <input type="checkbox"/> Unconditional Release <input checked="" type="checkbox"/> Other: | | Page 2 of 2 | |
| Survey Title | | | | Smear Number | Beta dpm/100cm ² |
| MWB 42- ① UG-15 ② UG-16 ③ UG-17 ④ UG-18 ⑤ UG-19 ⑥ UG-20 ⑦ QC-UG-20 BKG α .04 BKG B-50.0 EFF. α 0.362 EFF. B-0.309 | | | | Alpha dpm/100cm ² | |
| | | | | | |
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| 24 | | | | | |
| 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: Instruments Used | | | | | |
| Instrument Name: | Model Number: | Serial/ID Number: | Calibration Due Date: | MDA: | |
| Ludlum | 2929 | 61549 | 8-20-02 | α 14 B-86 | |
| Ludlum | 43-10 | 024319 | 8-20-02 | N/A | |
| Section 3: Review and Approval | | | | | |
| Survey Performed By (Sign): <i>SLong</i> | | Area Posted and/or Barricaded: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required | | Date and Time: 11-26-01 / 1420 | |
| Radiation Safety Officer (Print Name & Sign): <i>SLong / SLong</i> | | | | Date and Time: 11-26-01 / 1420 | |





Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| | | | |
|-----------------------|--|-----------------------------|---|
| Survey Area Name: | Building 42 | Survey Area Category: | Structure |
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior (MWB42-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | NA |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect shielded and unshielded beta TSC measurements at locations previously indicated on survey area map MWB42-01-02. |
| RSC smears | Ludlum 2929 | 1 minute | NA |
| Gamma ER | Micro Rem | N/A | NA |
| All | Various | Various | NA |

Prepared By:

Date: 12/5/01

FROM : CRAIG MILLER

FAX NO. : 7574558435

Dec. 04 2001 12:31PM P2



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

| | | | | | | | | |
|--|-----------------------------|---------|----------|---------|------------|---------|---------------|---------|
| Survey Area Name: Building 42 (MWB42) | | | | | | | | |
| Survey Unit Name: MWB42-01 (Interior Shielded and Unshielded Floors) | | | | | | | | |
| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
| | | | | | α | β | α | β |
| | 141303 | 11/2/02 | 151059 | 11/2/02 | NA | NA | N/A | 475 |
| | N/A | | | | | | | N/A |
| Performed By: | | | | | | | | N/A |
| | | | | | | | | |
| | Print Name: Dennis Whitlock | | | | Sign Name: | | Date: 12/5/01 | |

| Location Number MWB42- | β TSC _{unsh} (cpm) | β TSC _{sh} (cpm) | β TSC (ncpm) | β TSC (dpm) |
|---------------------------|---|---------------------------------------|--------------------------|-------------------------|
| UC-01 | 289 | 192 | 97 | 722 |
| UC-02 | 318 | 230 | 88 | 655 |
| UC-03 | 350 | 256 | 94 | 699 |
| UC-04 | 322 | 224 | 98 | 729 |
| UC-05 | 274 | 208 | 66 | 491 |
| UC-06 | 326 | 241 | 85 | 632 |
| UC-07 | 357 | 250 | 107 | 796 |
| UC-08 | 362 | 232 | 130 | 967 |
| UC-09 | 313 | 230 | 83 | 618 |
| UC-10 | 307 | 220 | 87 | 647 |
| UC-11 | 310 | 239 | 71 | 528 |
| UC-12 | 300 | 220 | 80 | 595 |
| UC-13 | 313 | 224 | 89 | 662 |
| UC-14 | 290 | 223 | 67 | 499 |
| | | | | |
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Prepared by:

Date: 12-05-01

FROM : CRAIG MILLER

FAX NO. : 7574558435

Dec. 04 2001 12:31PM P3



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

| | | | | | | | | | | |
|---|---|---------------------------------------|--------------------------|-------------------------|------------------------|---------|----------|---------|--|--|
| Survey Area Name: Building 42 (MWB42) | | | | | | | | | | |
| Survey Unit Name: MWB42-01 (Interior Shielded and Unshielded Walls) | | | | | | | | | | |
| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | | | |
| | 141303 | 11/2/02 | 151059 | 11/2/02 | α | β | α | β | | |
| | | | | | NA | NA | N/A | 425 | | |
| | N/A | | | | | | | N/A | | |
| Performed By: | Print Name: | | | | Sign Name: | | Date: | | | |
| | Dennis Whitlock | | | | <i>Dennis Whitlock</i> | | 12/5/01 | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Location Number MWB42- | β TSC _{unsh} (cpm) | β TSC _{sh} (cpm) | β TSC (ncpm) | β TSC (dpm) | | | | | | |
| UG-01 | 238 | 208 | 30 | 223 | | | | | | |
| UG-02 | 247 | 225 | 22 | 164 | | | | | | |
| UG-03 | 187 | 175 | 12 | 89 | | | | | | |
| UG-04 | 204 | 212 | -8 | -60 | | | | | | |
| UG-05 | 219 | 204 | 15 | 112 | | | | | | |
| UG-06 | 193 | 175 | 18 | 134 | | | | | | |
| UG-07 | 174 | 156 | 18 | 134 | | | | | | |
| UG-08 | 210 | 195 | 15 | 112 | | | | | | |
| UG-09 | 255 | 159 | 96 | 714 | | | | | | |
| UG-15 | 198 | 207 | -9 | -67 | | | | | | |
| UG-16 | 236 | 243 | -7 | -52 | | | | | | |
| UG-17 | 251 | 246 | 5 | 37 | | | | | | |
| UG-18 | 199 | 190 | 9 | 67 | | | | | | |
| UG-19 | 207 | 215 | -8 | -60 | | | | | | |
| UG-20 | 244 | 219 | 25 | 186 | | | | | | |
| QC-UG-20 | 254 | 285 | -31 | -231 | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Prepared by: *Craig Miller* Date: 12-05-01

FROM : CRAIG MILLER

FAX NO. : 7574558435

Dec. 04 2001 12:32PM P4



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

[illegible]

Prepared by: Chris Miller Date: 12-05-01



Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| Survey Area Name: | Building 39 | Survey Area Category: | Structure |
|-----------------------|--|-----------------------------|---|
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior (MWB39-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | Perform a scan of 10% of the interior and exterior surfaces of the building floors and up to 2 meters on the walls. Alpha/beta scans to be performed on the walls. Beta scans are to be performed on floor surfaces. Scan a minimum of 4m ² around each TSC location designated on map MWB39-01-02. Scan survey will be performed at 1 inch per second. Note the location of any alarms on the survey map. |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect alpha/beta TSC measurements at locations indicated on survey area map MWB39-01-02. Unshielded measurements will be collected for beta at each location. |
| RSC smears | Ludlum 2929 | 1 minute | Collect a smear at the location of each TSC measurement. Smears will be analyzed for both alpha and beta contamination. |
| Gamma ER | Micro Rem | N/A | Collect exposure rate measurements at each TSC measurement indicated on survey area map MWB39-01-02. ER measurements will be collected one meter from the surface. |
| All | Various | Various | Repeat a minimum of 5% of all measurement types collected. Record the number of the repeat measurements on the attached Survey Location Designator. |

Prepared By:

Date:

11-7-01



Radiological Services, Inc.

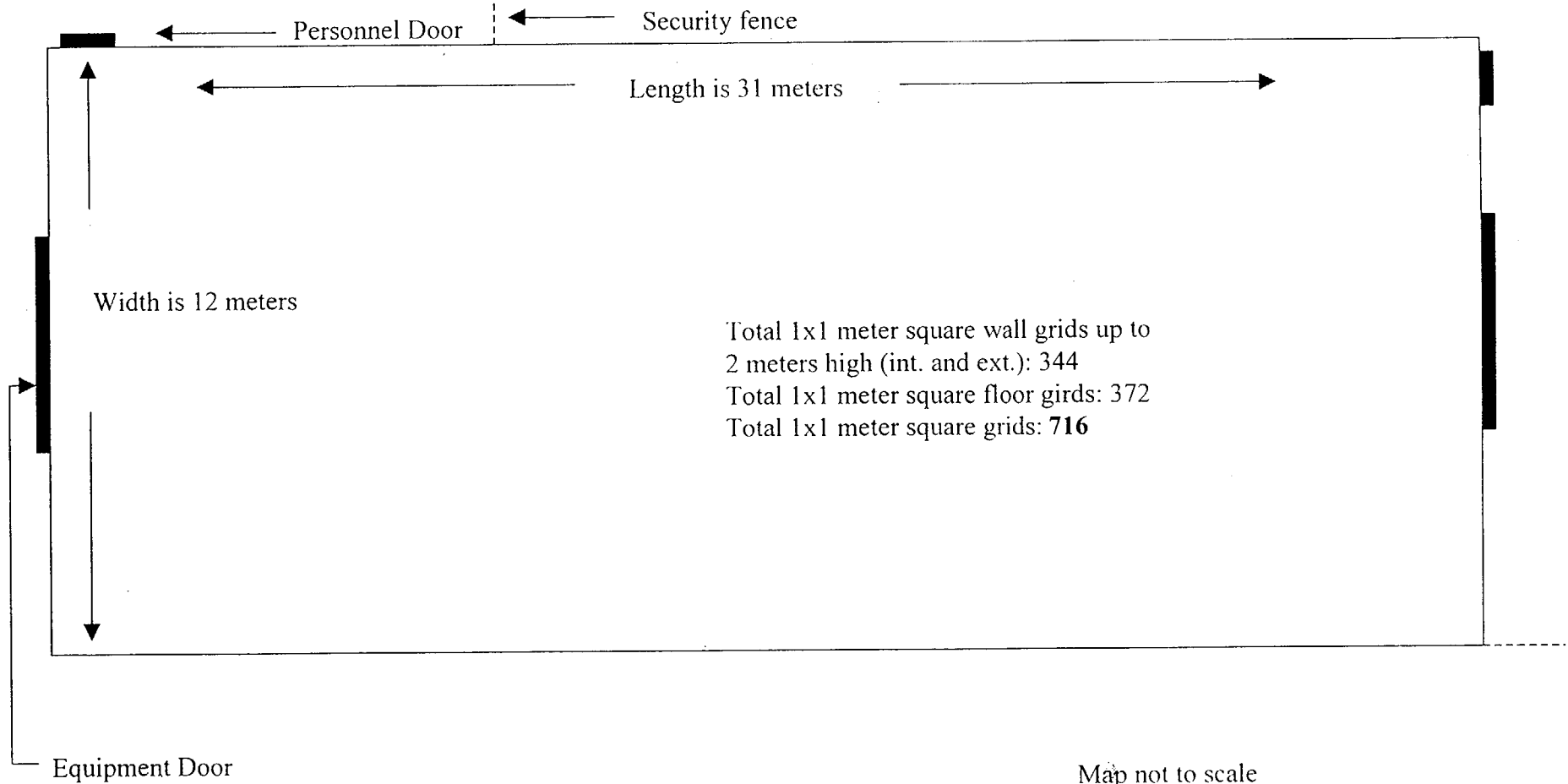
SURVEY AREA BREAKDOWN FORM

| Survey Area Name | | Building 39 | | Classification | | Unaffected | | | |
|----------------------|----------------|-----------------------------------|-----------------|----------------|-------------------------------|------------------|-------|----|-----|
| Survey Area Location | | Molycorp Washington, PA | | Category | | Structure | | | |
| Survey Unit | | | Survey Material | | | Survey Locations | | | |
| Description | Classification | Area (m ²) | Description | Location Code | Survey Area (m ²) | TSC β | TSC α | ER | RSC |
| Interior | Unaffected | 544 x 10% (55 m ²) | Concrete | MWB39BUC | 38 | 10 | 10 | 10 | 10 |
| | | | Generic | MWB39BUG | 18 | 5 | 5 | 5 | 5 |
| Exterior | Unaffected | 172 x 10% (18 m ²) | Generic | MWB39AUG | 18 | 5 | 5 | 5 | 5 |
| QC Interior | Unaffected | 73 x 5% (4 m ²) | Concrete | MWB39BUC | 4 | 1 | 1 | 1 | 1 |
| | | | | | | | | | |
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Prepared By: Craig E. Miller Date: 11/8/01



Molycorp Washington, PA Building 39 Overview

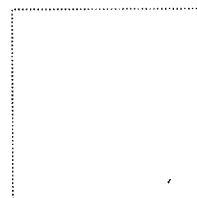
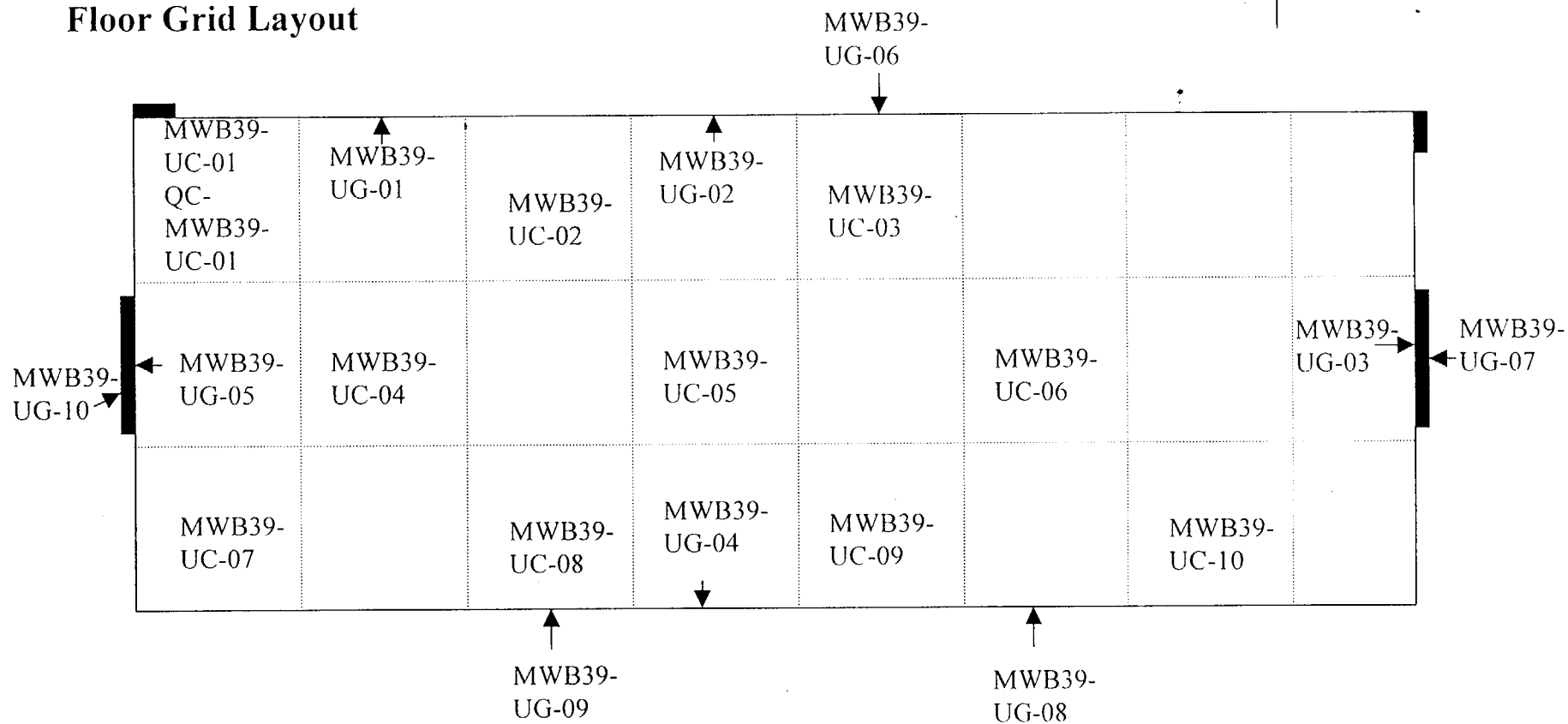




Washington, PA
Building 39
Floor Grid Layout

MAP MWB39-01-02

N



Denotes 4x4 meters square

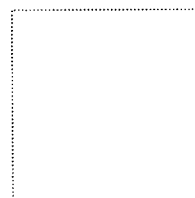
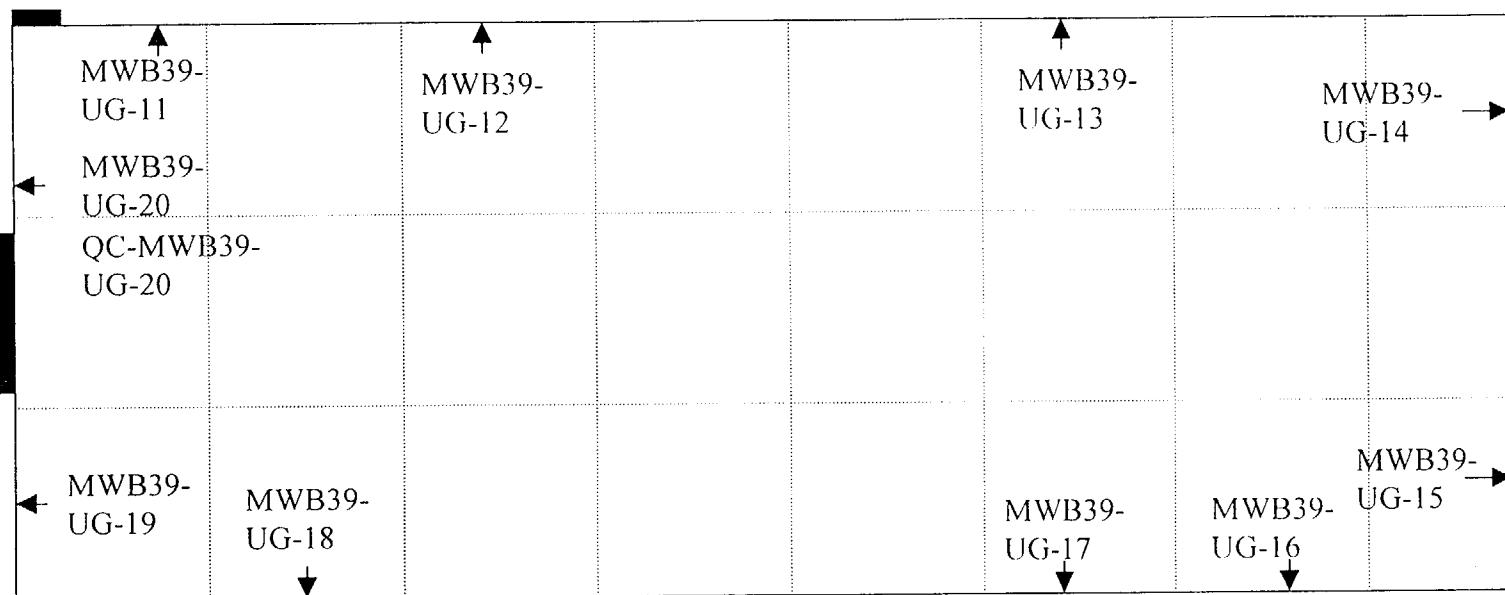
Map not to sale



Washington, PA
Building 39
Floor Grid Layout

MAP MWB39-01-03

N



Denotes 4x4 meters square

Map not to sale



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

Survey Area Name: Building 39 (MWB39)

Survey Unit Name: MWB39-01 (Interior)

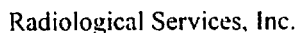
| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
|-----------------|---------------|---------|----------|---------|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | 134735 | 6/9/02 | 149471 | 6/9/02 | NA | 191 | NA | NA |
| | 141303 | 11/2/02 | 151059 | 11/2/02 | 126 | 1689 | 51 | 498 |
| | A396E | 4/2/02 | NA | NA | NA | NA | NA | NA |

| | | | |
|---------------|-------------|-----------------------|---------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Dave Riley | <i>David J. Riley</i> | 11/8/01 |
| | | | |

| Location Number | β Scan (cpm) | α Scan (cpm) | β TSC _{unsh} (cpm) | α (cpm) | ER (μ R/hr) | Smears |
|-----------------|--------------------|---------------------|-----------------------------------|----------------|------------------|--------|
| UC-01 | 736 | NA | 360 | 4 | 13 | Y |
| UC-02 | 789 | NA | 330 | 7 | 13 | Y |
| UC-03 | 773 | NA | 304 | 8 | 12 | Y |
| UC-04 | 847 | NA | 351 | 5 | 13 | Y |
| UC-05 | 942 | NA | 315 | 6 | 13 | Y |
| UC-06 | 896 | NA | 387 | 4 | 14 | Y |
| UC-07 | 816 | NA | 330 | 7 | 14 | Y |
| UC-08 | 835 | NA | 311 | 4 | 14 | Y |
| UC-09 | 1250 | NA | 414 | 8 | 16 | Y |
| UC-10 | 810 | NA | 335 | 4 | 15 | Y |
| (QC)UC-01 | 750 | NA | 348 | 3 | 13 | Y |
| NA | NA | NA | NA | NA | NA | NA |
| | | | | | | |
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Prepared by: *David E. Mills* Date: *11/8/01*

Reviewed By: *David E. Mills*

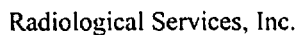


Survey Area Name: Building 39 (MWB39)
Survey Unit Name: MWB39-01 (Interior)

| | | | |
|------------------|---------------|----------------------|---------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Howard Nordby | <i>Howard Nordby</i> | 11/8/01 |
| | | | |
| | | | |

Prepared by: C. E. Miller Date: 11/8/01

Page 1 of 1



Survey Area Name: Building 39 (MWB39)
Survey Unit Name: MWB39-01 (Exterior)

| | | | |
|------------------|---------------|---------------|---------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Howard Nordby | Howard Nordby | 11/9/01 |
| | | | |
| | | | |

Prepared by: **Craig Miller** Date: **11/9/01**

Page 1 of 1

WASH.

DDO-138 Radiation Protection Survey Report

Site: MolyCorp / York, PA

Section 1: Survey Information

| | | | |
|-----------------|--|-----------------|---------------------------------|
| Date: 11-15-01 | Time: 1140 | Location: MWB39 | Survey Issue Log Number: 01-308 |
| RWP Number: N/A | Purpose of Survey: <input type="checkbox"/> RWP <input type="checkbox"/> Routine Survey <input type="checkbox"/> Unconditional Release <input checked="" type="checkbox"/> Other: | | Page 1 of 3 |

| Survey Title | | Smear Number | Beta dpm/100cm ² | Alpha dpm/100cm ² |
|--------------|-----------|--------------|-----------------------------|------------------------------|
| ① MWB39-UC01 | ⑬ UG03 | 1 | <MDA | <MDA |
| ② UC02 | ⑭ UG04 | 2 | | |
| ③ UC03 | ⑮ UG05 | 3 | | |
| ④ UC04 | ⑯ UG06 | 4 | | |
| ⑤ UC05 | ⑰ UG07 | 5 | | |
| ⑥ UC06 | ⑱ UG08 | 6 | | |
| ⑦ UC07 | ⑲ UG09 | 7 | | |
| ⑧ UC08 | ⑳ UG10 | 8 | | |
| ⑨ UC09 | ㉑ QC-UC01 | 9 | | |
| ⑩ UC10 | | 10 | | |
| ⑪ UG01 | | 11 | | |
| ⑫ UG02 | | 12 | | |
| | | 13 | | |
| | | 14 | | |
| | | 15 | | |
| | | 16 | | |
| | | 17 | | |
| | | 18 | | |
| | | 19 | | |
| | | 20 | | |
| | | 21 | <MDA | <MDA |
| | | 22 | | A |
| | | 23 | N | |
| | | 24 | | |

α β
 BKG .2 60
 LLD 4.5 29

Eff. = .344 α .314 β

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

Section 2: Instruments Used

| Instrument Name: | Model Number: | Serial/ID Number: | Calibration Due Date: | α / β MDA: |
|------------------|----------------|-------------------|-----------------------|--------------------------------|
| Ludlum | 2929 / 43-10-1 | 167842 / 171328 | 11-24-01 | 13 / 91 DPM/100CM ² |
| N/A | N/A | N/A | N/A | N/A |

Section 3: Review and Approval

| | | |
|--|---|--------------------------------|
| Survey Performed By (Sign): <i>S Long</i> | Area Posted and/or Barricaded: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required | Date and Time: 11-15-01 / 1155 |
| Radiation Safety Officer (Print Name & Sign): <i>S Long / S Long</i> | | Date and Time: 11-15-01 / 1155 |





Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| Survey Area Name: | Building 39 | Survey Area Category: | Structure |
|-----------------------|--|-----------------------------|---|
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior/Exterior (MWB39-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | Perform alpha/beta scans over 2-square meters around each additional TSC data point. |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect a shielded and unshielded beta TSC measurements at each of the previously designated locations indicated on survey area map MWB39-01-02. Take additional data points from UG11 through UG20 and a QC at UG20. |
| RSC smears | Ludlum 2929 | 1 minute | Take a smear at each of the additional data point TSC locations UG11-UG20. |
| Gamma ER | Micro Rem | N/A | Perform a gamma exposure rate measurement one meter from the surface of each data point location UG11-UG20. |
| All | Various | Various | NA |

Prepared By:

Date:

11/15/01



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

Survey Area Name: Building 39 (MWB39)

Survey Unit Name: MWB39-01 (Interior)

| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
|-----------------|---------------|---------|----------|---------|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | NA | NA | NA | NA | NA | NA | NA | NA |
| | 141303 | 11/2/02 | 151059 | 11/2/02 | 103 | 1596 | 45 | 472 |
| | A394E | 4/2/02 | NA | NA | NA | NA | NA | NA |

| | | | |
|---------------|-----------------|------------------------|----------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Dennis Whitlock | <i>Dennis Whitlock</i> | 11-19-01 |
| | | | |

| Location Number | β Scan (cpm) | α Scan (cpm) | β TSC _{unsh} (cpm) | α (cpm) | ER (μ R/hr) | Smears |
|-----------------|--------------------|---------------------|-----------------------------------|----------------|------------------|--------|
| UG-11 | 380 | 2 | 330 | 7 | 16 | Y |
| UG-12 | 360 | 0 | 304 | 7 | 14 | Y |
| UG-13 | 386 | 1 | 300 | 3 | 14 | Y |
| UG-14 | 280 | 0 | 245 | 3 | 15 | Y |
| UG-15 | 600 | 2 | 452 | 10 | 30 | Y |
| UG-16 | 446 | 4 | 371 | 19 | 17 | Y |
| UG-17 | 440 | 4 | 350 | 7 | 18 | Y |
| UG-18 | 400 | 1 | 346 | 8 | 17 | Y |
| UG-19 | 500 | 2 | 392 | 5 | 16 | Y |
| UG-20 | 400 | 1 | 262 | 6 | 15 | Y |
| QC-UG-20 | 400 | 1 | 305 | 2 | 15 | Y |
| | | | | | | |
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Prepared by: Craig Miller Date: 11/16/01

| DDO-138 Radiation Protection Survey Report | | | | Site: MolyCorp / York, PA | | |
|---|---------------|--|-----------------------|---------------------------------|--------------------------------|------|
| Section 1: Survey Information | | | | | | |
| Date: 11-26-01 | | Time: 1430 | | Location: Bldg. 39 | | |
| RWP Number: N/A | | Purpose of Survey: <input type="checkbox"/> RWP <input type="checkbox"/> Routine Survey <input type="checkbox"/> Unconditional Release <input checked="" type="checkbox"/> Other: | | Survey Issue Log Number: 01-315 | | |
| | | | | Page 1 of 2 | | |
| Survey Title | | | | Smear Number | Beta dpm/100cm ² | |
| MWB 39 - ① UG-11 ② UG-12 ③ UG-13 ④ UG-14 ⑤ UG-15 ⑥ UG-16 ⑦ UG-17 ⑧ UG-18 ⑨ UG-19 ⑩ UG-20 ⑪ QC-UG-20 BKG: α 0.4 BKG: B ⁻ 50 EFF: α 0.362 EFF: B ⁻ 0.309 | | | | Alpha dpm/100cm ² | | |
| | | | | | | |
| | | | | 1 | <MDA | <MDA |
| | | | | 2 | <MDA | <MDA |
| | | | | 3 | <MDA | <MDA |
| | | | | 4 | <MDA | <MDA |
| | | | | 5 | <MDA | <MDA |
| | | | | 6 | <MDA | <MDA |
| | | | | 7 | <MDA | <MDA |
| | | | | 8 | <MDA | <MDA |
| | | | | 9 | <MDA | <MDA |
| | | | | 10 | <MDA | <MDA |
| | | | | 11 | <MDA | <MDA |
| | | | | 12 | | |
| | | | | 13 | | |
| | | | | 14 | | |
| | | | | 15 | | |
| | | | | 16 | | A |
| | | | | 17 | | |
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| | | | | 19 | | |
| | | | | 20 | | |
| | | | | 21 | | |
| | | | | 22 | | |
| 23 | | | | | | |
| 24 | | | | | | |
| 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 β C = mRem/h beta contact --①-- = Large Area Wipe □ = Bulk Material Sample | | | | | | |
| Section 2: Instruments Used | | | | | | |
| Instrument Name: | Model Number: | Serial/ID Number: | Calibration Due Date: | MDA: | | |
| Lublum | 2929 | 61549 | 8-20-02 | α 14 / B ⁻ 86 | | |
| Lublum | 43-10 | 024319 | 8-20-02 | N/A | | |
| Section 3: Review and Approval | | | | | | |
| Survey Performed By (Sign): S Long | | Area Posted and/or Barricaded: <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Not Required | | Date and Time: 11-26-01/1445 | | |
| Radiation Safety Officer (Print Name & Sign): S Long / S Long | | | | Date and Time: 11-26-01/1445 | | |



Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| Survey Area Name: | Building 39 | Survey Area Category: | Structure |
|-----------------------|--|-----------------------------|--|
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior (MWB39-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | NA |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect a shielded and unshielded beta TSC measurements at each of the previously designated locations indicated on survey area map MWB39-01-02. |
| RSC smears | Ludlum 2929 | 1 minute | NA |
| Gamma ER | Micro Rem | N/A | NA |
| All | Various | Various | NA |

Prepared By:

Date:

12-5-01

FROM : CRAIG MILLER

FAX NO. : 7574558435

Dec. 04 2001 12:33PM P6

RSI

Radiological Services, Inc.

SURVEY POINT DESIGNATOR

Survey Area Name: Building 39 (MWB39)

Survey Unit Name: MWB39-01 (Floor Shielded and Unshielded Walls)

| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
|-----------------|---------------|---------|----------|---------|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | 141303 | 11/2/02 | 151069 | 11/2/02 | NA | NA | N/A | 528 |
| | N/A | | | | | | | N/A |
| | N/A | | | | | | | N/A |

| | | | |
|---------------|-----------------|------------------------|---------|
| Performed By: | Print Name: | Sign Name: | Date: |
| | Dennis Whitlock | <i>Dennis Whitlock</i> | 12/5/01 |
| | | | |

| Location Number MWB39- | β TSC _{unsh} (cpm) | β TSC _{sh} (cpm) | β TSC (ncpm) | β TSC (dpm) |
|---------------------------|---|---------------------------------------|--------------------------|-------------------------|
| UC-01 | 315 | 235 | 80 | 595 |
| QC-UC-01 | 340 | 241 | 99 | 737 |
| UC-02 | 336 | 247 | 89 | 662 |
| UC-03 | 347 | 234 | 113 | 841 |
| UC-04 | 348 | 298 | 50 | 372 |
| UC-05 | 328 | 237 | 91 | 677 |
| UC-06 | 348 | 262 | 86 | 640 |
| UC-07 | 278 | 224 | 54 | 402 |
| UC-08 | 317 | 229 | 88 | 655 |
| UC-09 | 354 | 300 | 54 | 402 |
| UC-10 | 341 | 260 | 81 | 603 |
| | | | | |
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Prepared by:

Craig Miller

Date:

12-5-01

CRAIG MILLER

FAX NO. : 7574558435

Dec. 04 2001 12:32PM P5



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

Survey Area Name: Building 39 (MWB39)

Survey Unit Name: MWB39-01 (Interior Shielded and Unshielded Walls)

| Instrument Data | Instrument SN | CDD | Probe SN | CDD | Scan MDA | | TSC MDA | |
|-----------------|---------------|---------|----------|---------|----------|---------|----------|---------|
| | | | | | α | β | α | β |
| | 141303 | 11/2/02 | 151059 | 11/2/02 | NA | NA | N/A | 466 |
| | N/A | | | | | | | N/A |
| | N/A | | | | | | | N/A |

| Performed By: | Print Name: | Sign Name: | Date: |
|---------------|-----------------|------------|---------|
| | Dennis Whitlock | | 12/5/01 |
| | | | |

| Location Number MWB39- | β TSC _{unsh} (cpm) | β TSC _{sh} (cpm) | β TSC (ncpm) | β TSC (dpm) |
|---------------------------|---|---------------------------------------|--------------------------|-------------------------|
| UG-01 | 295 | 300 | -5 | -37 |
| UG-02 | 298 | 271 | 27 | 201 |
| UG-03 | 296 | 297 | -1 | -7 |
| UG-04 | 412 | 387 | 25 | 186 |
| UG-05 | 312 | 295 | 17 | 126 |
| UG-11 | 295 | 289 | 6 | 45 |
| UG-12 | 292 | 285 | 7 | 52 |
| UG-13 | 294 | 307 | -13 | -97 |
| UG-14 | 224 | 223 | 1 | 7 |
| UG-15 | 463 | 440 | 23 | 171 |
| UG-16 | 346 | 345 | 1 | 7 |
| UG-17 | 320 | 319 | 1 | 7 |
| UG-18 | 352 | 331 | 21 | 156 |
| UG-19 | 362 | 358 | 4 | 30 |
| UG-20 | 283 | 256 | 27 | 201 |
| QC-UG-20 | 271 | 246 | 25 | 186 |
| | | | | |
| | | | | |

Prepared by:

Date:

12-5-01

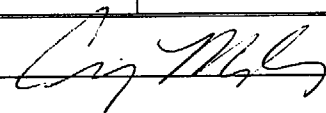


Radiological Services, Inc.

FINAL STATUS SURVEY GENERAL INSTRUCTIONS

| Survey Area Name: | Building 39 | Survey Area Category: | Structure |
|-----------------------|--|-----------------------------|---|
| Survey Area Location: | Molycorp, Washington, PA | Survey Unit Classification: | Unaffected |
| Survey Unit Name: | Interior (MWB39-01) | | |
| Survey Instructions | | | |
| Measurement Type | Instrument & Detector | Count Time | Instructions/Remarks |
| Alpha/Beta Scan | Ludlum 2360/43-89 or Ludlum 2350/43-37-1 | N/A | NA |
| Alpha/Beta TSC | Ludlum 2360/43-89 | 1 minute | Collect shielded and unshielded beta TSC measurement on MWB39-UG-15 after that section of wall containing the data point location has been removed and taken to a low background area. |
| RSC smears | Ludlum 2929 | 1 minute | NA |
| Gamma ER | Micro Rem | N/A | Collect exposure rate measurements at MWB39-UG-15 once the wall section has been removed and taken to a low background area. ER measurement will be collected one meter from the surface. |
| All | Various | Various | NA |

Prepared By:



Date:

12/18/01



Radiological Services, Inc.

SURVEY POINT DESIGNATOR

[illegible]

Prepared by: Craig Miller Date: 12/18/01

Radiological Services, Inc.
Daily Instrumentation Operational Check Sheet

Instrument: 2360 141303
Cal Due: 11-2-02

Probe: 43-89 151059
Cal Due: 11-2-02

Source ID# 5 4415 Mean Source
Count Rate: 1393
B⁻ Sigma Value: 37

| | | | |
|------------|-------------|------------|-------------|
| Mean | | Mean | |
| +2σ Value: | <u>1468</u> | -2σ Value: | <u>1318</u> |
| Mean | | Mean | |
| +3σ Value: | <u>1505</u> | -3σ Value: | <u>1505</u> |

[illegible]

Radiological Services, Inc.

Daily Instrumentation Operational Check Sheet

Instrument: 2360 141303
Cal Due: 11-2-02

Probe: 43-89 151059
Cal Due: 11-2-02

Source ID# 54413
α

Mean Source
Count Rate: 175.8

Sigma Value: 13

| | | | |
|------------|------------|------------|------------|
| Mean | | Mean | |
| +2σ Value: | <u>202</u> | -2σ Value: | <u>150</u> |
| Mean | | Mean | |
| +3σ Value: | <u>214</u> | -3σ Value: | <u>137</u> |

[illegible]

INSTRUMENT: 2360 #141303
 DETECTOR: 43-89 #151059
 SOURCE ID: TH-230 #S4413
 OPERATING VOLTAGE: 725V

ALPHA EFF. = .1749

DATE: 11/05/01

Chi² and Sigma Calculator

| <i>n</i> | Counts | $(n - n_{avg})^2$ |
|----------|--------|-------------------|
| 1 | 156 | 392.04 |
| 2 | 152 | 566.44 |
| 3 | 182 | 38.44 |
| 4 | 151 | 615.04 |
| 5 | 160 | 249.64 |
| 6 | 177 | 1.44 |
| 7 | 172 | 14.44 |
| 8 | 183 | 51.84 |
| 9 | 176 | 0.04 |
| 10 | 184 | 67.24 |
| 11 | 182 | 38.44 |
| 12 | 179 | 10.24 |
| 13 | 190 | 201.64 |
| 14 | 198 | 492.84 |
| 15 | 186 | 104.04 |
| 16 | 187 | 125.44 |
| 17 | 167 | 77.44 |
| 18 | 170 | 33.64 |
| 19 | 182 | 38.44 |
| 20 | 182 | 38.44 |

 $n_{avg} = 175.8$ $\Sigma(n - n_{avg})^2 = 3157.2$ $\chi^2 = 17.95904$ $\sigma = 12.89063$ $n_{avg} + 2\sigma = 201.5813$ $n_{avg} - 2\sigma = 150.0187$ $n_{avg} + 3\sigma = 214.4719$ $n_{avg} - 3\sigma = 137.1281$

INSTRUMENT: 2360 #141303
 DETECTOR: 43-89 #151059
 SOURCE ID: TC-99 #S4415
 OPERATING VOLTAGE: 725V

BETA EFF. = .1344

DATE: 11/05/01

Chi² and Sigma Calculator

| <i>n</i> | Counts | $(n - n_{avg})^2$ |
|----------|--------|-------------------|
| 1 | 1436 | 1836.122 |
| 2 | 1384 | 83.7225 |
| 3 | 1367 | 683.8225 |
| 4 | 1363 | 909.0225 |
| 5 | 1397 | 14.8225 |
| 6 | 1388 | 26.5225 |
| 7 | 1395 | 3.4225 |
| 8 | 1376 | 294.1225 |
| 9 | 1345 | 2318.423 |
| 10 | 1338 | 3041.523 |
| 11 | 1341 | 2719.623 |
| 12 | 1450 | 3231.922 |
| 13 | 1411 | 318.6225 |
| 14 | 1390 | 9.9225 |
| 15 | 1372 | 447.3225 |
| 16 | 1389 | 17.2225 |
| 17 | 1437 | 1922.822 |
| 18 | 1486 | 8621.122 |
| 19 | 1401 | 61.6225 |
| 20 | 1397 | 14.8225 |

$$n_{avg} = 1393.15 \quad \Sigma(n - n_{avg})^2 = 26576.55$$

$$X^2 = 19.07659$$

$$\sigma = 37.40008$$

$$n_{avg} + 2\sigma = 1467.95$$

$$n_{avg} - 2\sigma = 1318.35$$

$$n_{avg} + 3\sigma = 1505.35$$

$$n_{avg} - 3\sigma = 1280.95$$

Radiological Services, Inc.

Daily Instrumentation Operational Check Sheet

| | | | | | | | |
|------------|------------------------|---------------|-------------|------------|-------------|------------|-------------|
| Source ID# | <u>54415</u> | Mean Source | | Mean | | Mean | |
| | | Count Rate: | <u>1401</u> | +2σ Value: | <u>1485</u> | +2σ Value: | <u>1317</u> |
| | <u>. B⁻</u> | Sigma Value:: | <u>42</u> | Mean | | Mean | |
| | | | | +3σ Value: | <u>1527</u> | -3σ Value: | <u>1275</u> |

[illegible]

SENT
Back
to
~~SECRET~~
SEC
11-12-01

Radiological Services, Inc.

Daily Instrumentation Operational Check Sheet

| | | | | | |
|-------------|----------------|----------------------------|--------------|--------------------|---------------|
| Instrument: | <u>2360</u> | <u>145478</u> | Probe: | <u>43-89</u> | <u>156748</u> |
| Cal Due: | <u>11-2-02</u> | | Cal Due: | <u>11-2-02</u> | |
| Source ID# | <u>54413</u> | Mean Source Count Rate: | <u>175.8</u> | Mean +2σ Value: | <u>199</u> |
| | <u>α</u> | Sigma Value:: | <u>11.5</u> | Mean +3σ Value: | <u>210</u> |
| | | | | Mean -2σ Value: | <u>153</u> |
| | | | | Mean -3σ Value: | <u>141</u> |

[illegible]

SENT
Back
to
SEC
11-12-01

INSTRUMENT:2360 #145478
 DETECTOR:43-89 #156748
 SOURCE ID: TC-99 #S4415
 OPERATING VOLTAGE: 700V

BETA EFF.= .1255

DATE:11/05/01

Chi² and Sigma Calculator

| <i>n</i> | Counts | $(n-n_{avg})^2$ |
|----------|--------|-----------------|
| 1 | 1431 | 882.09 |
| 2 | 1401 | 0.09 |
| 3 | 1433 | 1004.89 |
| 4 | 1425 | 561.69 |
| 5 | 1322 | 6288.49 |
| 6 | 1357 | 1962.49 |
| 7 | 1330 | 5083.69 |
| 8 | 1439 | 1421.29 |
| 9 | 1399 | 5.29 |
| 10 | 1450 | 2371.69 |
| 11 | 1415 | 187.69 |
| 12 | 1409 | 59.29 |
| 13 | 1434 | 1069.29 |
| 14 | 1442 | 1656.49 |
| 15 | 1374 | 745.29 |
| 16 | 1407 | 32.49 |
| 17 | 1397 | 18.49 |
| 18 | 1353 | 2332.89 |
| 19 | 1341 | 3636.09 |
| 20 | 1467 | 4316.49 |

 $n_{avg} = 1401.3$ $\Sigma(n-n_{avg})^2 = 33636.2$
 $\chi^2 = 24.00357$
 $\sigma = 42.07525$
 $n_{avg} + 2\sigma$ 1485.45
 $n_{avg} - 2\sigma$ 1317.15
 $n_{avg} + 3\sigma$ 1527.526
 $n_{avg} - 3\sigma$ 1275.074

INSTRUMENT:2360 #145478
 DETECTOR:43-89 #156748
 SOURCE ID: TH-230 #S4413
 OPERATING VOLTAGE: 700V

ALPHA EFF.= .1744

DATE:11/05/01

Chi² and Sigma Calculator

| <i>n</i> | Counts | $(n-n_{avg})^2$ |
|----------|--------|-----------------|
| 1 | 195 | 368.64 |
| 2 | 179 | 10.24 |
| 3 | 178 | 4.84 |
| 4 | 171 | 23.04 |
| 5 | 185 | 84.64 |
| 6 | 180 | 17.64 |
| 7 | 160 | 249.64 |
| 8 | 170 | 33.64 |
| 9 | 175 | 0.64 |
| 10 | 157 | 353.44 |
| 11 | 174 | 3.24 |
| 12 | 159 | 282.24 |
| 13 | 186 | 104.04 |
| 14 | 183 | 51.84 |
| 15 | 187 | 125.44 |
| 16 | 177 | 1.44 |
| 17 | 190 | 201.64 |
| 18 | 186 | 104.04 |
| 19 | 170 | 33.64 |
| 20 | 154 | 475.24 |

$$n_{avg} = 175.8 \quad \Sigma(n-n_{avg})^2 = 2529.2$$

$$X^2 = 14.3868$$

$$\sigma = 11.53758$$

$$n_{avg} + 2\sigma = 198.8752$$

$$n_{avg} - 2\sigma = 152.7248$$

$$n_{avg} + 3\sigma = 210.4127$$

$$n_{avg} - 3\sigma = 141.1873$$

Washington, PA
 Paved Concrete Background Survey
 Ludlum 2360 ser: 145478
 43-89 ser: 156748

| | | Beta | Alpha |
|---------|---------|-------|-------|
| Date | 11/7/01 | 242 | 1 |
| | | 246 | 0 |
| | | 256 | 1 |
| | | 249 | 4 |
| | | 254 | 1 |
| | | 223 | 2 |
| | | 212 | 6 |
| | | 232 | 2 |
| | | 200 | 3 |
| | | 218 | 3 |
| | | 267 | 3 |
| | | 287 | 2 |
| | | 301 | 3 |
| | | 230 | 2 |
| | | 255 | 1 |
| | | 229 | 0 |
| | | 244 | 0 |
| | | 265 | 4 |
| | | 305 | 1 |
| | | 231 | 1 |
| Total | | 4946 | 40 |
| Average | | 247.3 | 2 |

Technician: H. Nordby *H. Nordby*
 Reviewed By: C. Miller *C. Miller*

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger
 Detector: 43-89 Alpha/Beta #145478/156748
 CAL Date: 11-2-02

B - 12.55 %
 A - 17.44 %

Material Surveyed: CONCRETE

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|------------------------------|-----------------------------------|---------------|--------------|
| 242 | 1 | 205 | 1 | 37 |
| 246 | 0 | 217 | 0 | 24 |
| 256 | 1 | 208 | 1 | 48 |
| 249 | 4 | 206 | 4 | 43 |
| 254 | 1 | 186 | 1 | 68 |
| 223 | 2 | 218 218 ¹¹⁷ | 2 | 5 |
| 212 | 6 5 ^{Hu} | 190 | 6 | 22 |
| 232 | 2 | 194 | 2 | 38 |
| 200 | 3 | 195 | 3 | 5 |
| 218 | 3 | 190 | 3 | 28 |
| 267 | 3 | 188 | 3 | 79 |
| 287 | 2 | 251 | 2 | 36 |
| 301 | 3 | 251 | 3 | 50 |
| 230 | 2 | 253 | 2 | -23 |
| 255 | 1 | 225 | 1 | 30 |
| 229 | 0 | 206 | 0 | 23 |
| 244 | 0 | 198 | 0 | 46 |
| 265 | 4 | 225 | 4 | 40 |
| 305 | 1 | 249 | 1 | 56 |
| 231 | 1 | 212 | 1 | 19 |
| 247.3 | 2 | 213.35 | 2 | 33.95 |

Technician: Howard Nordby

Signature: Howard Nordby

Date: 11/7/01

Reviewed By: Cy E. M. L.

Washington, PA
Cinder Block Background Survey
Ludlum 2360 ser: 145478
43-89 ser: 156748

| | | Beta | Alpha |
|---------|---------|-------|-------|
| Date | 11/7/01 | 334 | 0 |
| | | 299 | 3 |
| | | 343 | 0 |
| | | 425 | 2 |
| | | 432 | 6 |
| | | 254 | 8 |
| | | 283 | 5 |
| | | 293 | 3 |
| | | 254 | 2 |
| | | 302 | 0 |
| | | 213 | 4 |
| | | 203 | 0 |
| | | 257 | 3 |
| | | 250 | 4 |
| | | 270 | 7 |
| | | 235 | 3 |
| | | 253 | 4 |
| | | 268 | 3 |
| | | 257 | 2 |
| | | 261 | 2 |
| Total | | 5686 | 61 |
| Average | | 284.3 | 3.05 |

Technician:

H. Nordby

H. Nordby

Reviewed By:

C. Miller

C. Miller

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger
 Detector: 43-89 Alpha/Beta

145-478
 156-748

11-2-02

CAL Date: ~~11/7/01~~ 11/7/02
 hr

B⁻ 12.55%
 a 17.44%

Material Surveyed: Bleck

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|-----------|---------------------------------------|---------------|------------------------|
| 334 | 0 | 285 | 0 | 49 |
| 299 | 3 | 275 | 3 | 24 |
| 343 | 0 | 306 | 0 | 37 |
| 425 | 2 | 296 ^{hr 11/7} 296 | 2 | 129 |
| 432 | 6 | 355 | 6 | 77 |
| 254 | 8 | 215 | 8 | 39 |
| 283 | 5 | 255 | 5 | 28 |
| 293 | 3 | 264 | 3 | 29 |
| 254 | 2 | 228 | 2 | 26 |
| 302 | 0 | 315 | 0 | -13 |
| 213 | 4 | 185 | 4 | 28 |
| 203 | 0 | 172 | 0 | 31 |
| 257 | 3 | 286 | 3 | -29 |
| 250 | 4 | 224 | 4 | 26 |
| 270 | 7 | 252 | 7 | 18 |
| 235 | 3 | 276 | 3 | -41 |
| 253 | 4 | 296 | 4 | -43 |
| 268 | 3 | 268 | 3 | 0 |
| 257 | 2 | 284 | 2 | -27 |
| 261 | 2 | 252 | 2 | ^{hr 11/7} 109 |
| 284.3 | 3.05 | 364.45 | 3.05 | 19.4 |

Technician: Howard Nardby

Signature: Howard Nardby

Date: 11/7/01

Reviewed By:

[Signature]

Washington, PA
Metal Background Survey
Ludlum 2360 ser: 145478
43-89 ser: 156748

| | | | |
|---------|---------|-------|-------|
| Date | 11/7/01 | Beta | Alpha |
| | | 156 | 3 |
| | | 118 | 4 |
| | | 150 | 3 |
| | | 141 | 4 |
| | | 142 | 1 |
| | | 159 | 8 |
| | | 164 | 5 |
| | | 152 | 3 |
| | | 135 | 6 |
| | | 149 | 1 |
| | | 159 | 1 |
| | | 166 | 4 |
| | | 157 | 3 |
| | | 183 | 4 |
| | | 166 | 5 |
| | | 152 | 1 |
| | | 176 | 8 |
| | | 182 | 3 |
| | | 162 | 6 |
| | | 179 | 2 |
| Total | | 3148 | 75 |
| Average | | 157.4 | 3.75 |

Technician:

H. Nordby *H. Nordby*

Reviewed By:

C. Miller *C. Miller*

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger 145478
 Detector: 43-89 Alpha/Beta 156748
 Date: 11-2-02 β - 12.55%
 α 17.44%

Material Surveyed: METAL

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|-----------|-------------------------------------|---------------|--------------|
| 156 | 3 | 115 | 3 | 41 |
| 118 | 4 | 142 | 4 | -24 |
| 150 | 3 | 130 | 3 | 20 |
| 141 | 4 | 137 | 4 | 4 |
| 142 | 1 | 169 | 1 | -27 |
| 159 | 8 | 169 | 8 | -10 |
| 164 | 5 | 167 | 5 | -3 |
| 152 | 3 | 184 | 3 | -32 |
| 135 | 6 | 164 ¹⁴ 164 ¹⁴ | 6 | -29 |
| 149 | 1 | 157 | 1 | -8 |
| 159 | 1 | 151 | 1 | 8 |
| 166 | 4 | 189 | 4 | -23 |
| 157 | 3 | 162 | 3 | -5 |
| 183 | 4 | 194 | 4 | -11 |
| 166 | 5 | 210 | 5 | -44 |
| 152 | 1 | 155 | 1 | -3 |
| 176 | 8 | 261 | 8 | -85 |
| 182 | 3 | 230 | 3 | -48 |
| 162 | 6 | 290 | 6 | -128 |
| 179 | 2 | 251 | 2 | -72 |
| 157.4 | 3.75 | 181.35 | 3.75 | -23.95 |

Technician: HOWARD NORDBY

Signature: Howard Nordby

Date: 11/7/01

Reviewed By: C. E. M.

Washington, PA
 Wood Background Survey
 Ludlum 2360 ser: 145478
 43-89 ser: 156748

| | | Beta | Alpha |
|---------|---------|-------|-------|
| Date | 11/7/01 | 154 | 2 |
| | | 195 | 1 |
| | | 206 | 1 |
| | | 277 | 8 |
| | | 156 | 2 |
| | | 173 | 3 |
| | | 162 | 1 |
| | | 135 | 1 |
| | | 205 | 3 |
| | | 149 | 1 |
| | | 159 | 0 |
| | | 161 | 4 |
| | | 177 | 0 |
| | | 157 | 1 |
| | | 145 | 1 |
| | | 173 | 0 |
| | | 194 | 1 |
| | | 200 | 0 |
| | | 191 | 0 |
| | | 185 | 1 |
| Total | | 3554 | 31 |
| Average | | 177.7 | 1.55 |

Technician: H. Nordby *H. Nordby*

Reviewed By: C. Miller *C. Miller*

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger 145478 11-2-02
 Detector: 43-89 Alpha/Beta 156718
 Date: ~~11/7/01~~ 11/2/02

B⁻ 12.55 %
 A 17.44 %

Material Surveyed: wood

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|--|-----------|-------------------|---------------|-------------------------------------|
| 154 | 2 | 149 | 2 | 5 |
| 195 | 1 | 187 | 1 | 8 |
| 206 | 1 | 190 | 1 | 16 |
| 277 | 8 | 198 | 8 | 79 |
| 156 | 2 | 160 | 2 | -41 |
| 173 | 3 | 171 | 3 | 2 |
| 162 | 1 | 188 | 1 | -26 |
| 135 | 1 | 182 | 1 | -47 |
| ¹⁴ _{11/7} 19205 | 3 | 195 | 3 | 10 |
| 149 | 1 | 190 | 1 | -41 |
| 159 | 0 | 174 | 0 | -15 |
| 161 | 4 | 167 | 4 | -6 |
| 177 | 0 | 186 | 0 | -9 |
| 157 | 1 | 182 | 1 | -25 |
| 145 | 1 | 177 | 1 | -32 |
| 173 | 0 | 167 | 0 | 6 |
| 194 | 1 | 175 | 1 | 19 |
| 200 | 0 | 188 | 0 | 12 |
| 191 | 0 | 176 | 0 | 15 |
| 185 | 1 | 172 | 1 | 13 |
| 176 | 5.15 | 264.2 | 5.15 | ¹⁴ _{11/7} -1 |

Technician: Howard Neebby

Signature: Howard Neebby

Date: 11/2/01

Reviewed By: [Signature]

Molycorp Washington PA site background assessment
Poured Concrete Surfaces

Ludlum 2350-1 serial number: 134735

43-89 serial number: PR-149171

| Measurement Number | | unshielded Beta cpm |
|-----------------------|---------|------------------------|
| 1 | 11/7/01 | 429.0 |
| 2 | 11/7/01 | 498.0 |
| 3 | 11/7/01 | 515.0 |
| 4 | 11/7/01 | 433.0 |
| 5 | 11/7/01 | 453.0 |
| 6 | 11/7/01 | 406.0 |
| 7 | 11/7/01 | 375.0 |
| 8 | 11/7/01 | 431.0 |
| 9 | 11/7/01 | 435.0 |
| 10 | 11/7/01 | 431.0 |
| 11 | 11/7/01 | 414.0 |
| 12 | 11/7/01 | 467.0 |
| 13 | 11/7/01 | 444.0 |
| 14 | 11/7/01 | 431.0 |
| 15 | 11/7/01 | 395.0 |
| 16 | 11/7/01 | 435.0 |
| 17 | 11/7/01 | 445.0 |
| 18 | 11/7/01 | 426.0 |
| 19 | 11/7/01 | 419.0 |
| 20 | 11/7/01 | 454.0 |

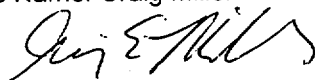
Average cpm 436.8

Standard
Deviation 31.706881

nb = 0.5770591

$$nb = ((t97.55\% \times stdev)/(0.2 \times average))^2$$

Surveyors Name: Craig Miller



Molycorp Washington PA site background assessment
Generic Surfaces

Ludlum 2350-1 serial number: 134735

43-89 serial number: PR-149171

| Measurement Number | | unshielded Beta cpm |
|-----------------------|---------|------------------------|
| 1 | 11/7/01 | 302.0 |
| 2 | 11/7/01 | 298.0 |
| 3 | 11/7/01 | 313.0 |
| 4 | 11/7/01 | 314.0 |
| 5 | 11/7/01 | 311.0 |
| 6 | 11/7/01 | 282.0 |
| 7 | 11/7/01 | 299.0 |
| 8 | 11/7/01 | 331.0 |
| 9 | 11/7/01 | 298.0 |
| 10 | 11/7/01 | 326.0 |
| 11 | 11/7/01 | 321.0 |
| 12 | 11/7/01 | 332.0 |
| 13 | 11/7/01 | 330.0 |
| 14 | 11/7/01 | 307.0 |
| 15 | 11/7/01 | 317.0 |
| 16 | 11/7/01 | 328.0 |
| 17 | 11/7/01 | 324.0 |
| 18 | 11/7/01 | 359.0 |
| 19 | 11/7/01 | 324.0 |
| 20 | 11/7/01 | 344.0 |

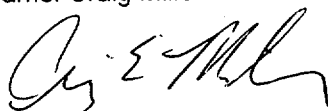
Average cpm 318.0

Standard
Deviation 17.823698

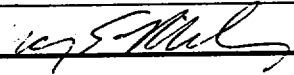
nb = 0.3440486

$nb = ((197.55\% \times stdev)/(0.2 \times average))^2$

Surveyors Name: Craig Miller



BACKGROUND ASSESSMENT DATA SHEET

| | | | |
|--|------|-----------------------|---------|
| Location: MolyCorp Washington PA | | Instruments | |
| Material Type: Concrete | | Detector: Ludlum 2360 | |
| Prepared By: Craig Miller | | Probe: 43-89 | |
| Date: 12/18/01 | | | |
| Survey Instructions: Collect a total of 20 shielded and 20 unshielded TSC measurements on poured concrete surfaces. The measurements will be collected on concrete structures that are not located on the Molycorp site and have not been impacted by Molycorp operations. Record measurement results on the attached form. Count time for the measurements will be 1 minute. | | | |
| Approved By:  | | Date: 12/18/01 | |
| Notes/Remarks: | | | |
| | | | |
| Survey Data | | Instrument Data | |
| Surveyed By: | Type | Serial # | Cal Due |
| Date/Time: | | | |
| Reviewed By: | | | |
| Date/Time: | | | |
| Background Criteria: $n_b =$ _____ Sat: _____ Unsat: _____ | | | |
| Reevaluated Background Criteria: $n_b =$ _____ Sat: _____ Unsat: _____ | | | |

BACKGROUND ASSESSMENT DATA SHEET

| | | | |
|---|--|-------------------------|---------------|
| Location: MolyCorp Washington PA | | Instruments | |
| Material Type: Concrete | | Detector: Ludlum 2380 | |
| Prepared By: Craig Miller | | Probe: 43-89 | |
| Date: 12/18/01 | | | |
| <p>Survey Instructions: Collect a total of 20 shielded and 20 unshielded TSC measurements on poured concrete surfaces. The measurements will be collected on concrete structures that are not located on the MolyCorp site and have not been impacted by MolyCorp operations. Record measurement results on the attached form. Count time for the measurements will be 1 minute.</p> | | | |
| Approved By: | | Date: | |
| <p>Notes/Remarks:</p> <p>READINGS TAKEN @ CANTON V.F.C. STATION 52-1 CANTON TOWNSHIP PA.</p> | | | |
| Survey Data | | Instrument Data | |
| Surveyed By: <i>DENNIS WHITLOCK</i> | | Type | Serial # |
| Date/Time: <i>12-19-01 1030</i> | | <i>2929</i> | <i>141303</i> |
| Reviewed By: <i>[Signature]</i> | | <i>43-89</i> | <i>151059</i> |
| Date/Time: <i>12/19/01 1400</i> | | | |
| Background Criteria: $n_b =$ _____ | | Sat: _____ Unsat: _____ | |
| Reevaluated Background Criteria: $n_b =$ _____ | | Sat: _____ Unsat: _____ | |

Washington, PA
 Concrete Background Survey
 Ludlum 2360 ser: 141301
 43-89 ser: 151059

Date 12/19/01

| | | Beta | | |
|---------|--|--------|----------|------|
| | | Unshld | Shielded | Net |
| | | 395 | 288 | 107 |
| | | 353 | 295 | 58 |
| | | 327 | 320 | 7 |
| | | 340 | 301 | 39 |
| | | 313 | 285 | 28 |
| | | 362 | 268 | 94 |
| | | 346 | 265 | 81 |
| | | 380 | 242 | 138 |
| | | 303 | 251 | 52 |
| | | 323 | 229 | 94 |
| | | 345 | 243 | 102 |
| | | 340 | 241 | 99 |
| | | 326 | 262 | 64 |
| | | 331 | 224 | 107 |
| | | 329 | 237 | 88 |
| | | 316 | 236 | 80 |
| | | 328 | 228 | 100 |
| | | 326 | 270 | 56 |
| | | 299 | 215 | 84 |
| | | 361 | 276 | 85 |
| Total | | 6743 | 5176 | 1563 |
| Average | | 337 | 259 | 78 |

Technician:

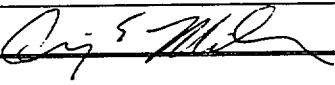
D. Whitlock



Reviewed By:

C. Miller

BACKGROUND ASSESSMENT DATA SHEET

| | | | |
|---|-----------------------|-----------------|---------|
| Location: MolyCorp Washington PA | Instruments | | |
| Material Type: Generic | Detector: Ludlum 2360 | | |
| Prepared By: Craig Miller | Probe: 43-89 | | |
| Date: 12/18/01 | | | |
| <p>Survey Instructions: Collect a total of 20 shielded and 20 unshielded TSC measurements generic material surfaces (i.e., wood, sheet metal, etc.). The measurements will be collected on generic materials that are not located on the Molycorp site and have not been impacted by Molycorp operations. Record measurement results on the attached form. Count time for the measurements will be 1 minute.</p> | | | |
| Approved By:  | | Date: 12/18/01 | |
| <p>Notes/Remarks:</p> | | | |
| Survey Data | | Instrument Data | |
| Surveyed By: | Type | Serial # | Cal Due |
| Date/Time: | | | |
| Reviewed By: | | | |
| Date/Time: | | | |
| Background Criteria: n_b = _____ Sat: _____ Unsat: _____ | | | |
| Reevaluated Background Criteria: n_b = _____ Sat: _____ Unsat: _____ | | | |

BACKGROUND ASSESSMENT DATA SHEET

| | | | |
|---|--------------|-------------------------|----------------|
| Location: MolyCorp Washington PA | | Instruments | |
| Material Type: Generic | | Detector: Ludium 2360 | |
| Prepared By: Craig Miller | | Probe: 43-89 | |
| Date: 12/18/01 | | | |
| <p>Survey Instructions: Collect a total of 20 shielded and 20 unshielded TSC measurements generic material surfaces (i.e., wood, sheet metal, etc.). The measurements will be collected on generic materials that are not located on the Molycorp site and have not been impacted by Molycorp operations. Record measurement results on the attached form. Count time for the measurements will be 1 minute.</p> | | | |
| Approved By: <i>Craig E. Miller</i> | | Date: <i>12/19/01</i> | |
| <p>Notes/Remarks:</p> <p><i>Readings Taken @ CANTON V.F.C. STATION 52-1</i> <i>CANTON Township</i> <i>PA.</i></p> | | | |
| Survey Data | | Instrument Data | |
| Surveyed By: <i>DENNIS WHITLOCK</i> | Type | Serial # | Cal Due |
| Date/Time: <i>12-19-01 0930</i> | <i>2929</i> | <i>141303</i> | <i>11-2-02</i> |
| Reviewed By: <i>Craig E. Miller</i> | <i>43-89</i> | <i>151059</i> | <i>11-2-02</i> |
| Date/Time: <i>12-19-01 1400</i> | | | |
| Background Criteria: $n_b =$ _____ | | Sat: _____ Unsat: _____ | |
| Reevaluated Background Criteria: $n_b =$ _____ | | Sat: _____ Unsat: _____ | |

Washington, PA
 Generic Background Survey
 Ludlum 2360 ser: 141301
 43-89 ser: 151059

Date 12/19/01

| Beta | | |
|---------|----------|------|
| Unshld | Shielded | Net |
| 218 | 209 | 9 |
| 242 | 202 | 0 |
| 216 | 194 | 22 |
| 193 | 179 | 14 |
| 190 | 190 | 0 |
| 194 | 202 | -8 |
| 185 | 178 | 7 |
| 207 | 193 | 14 |
| 190 | 175 | 15 |
| 189 | 181 | 8 |
| 211 | 190 | 21 |
| 193 | 172 | 21 |
| 200 | 171 | 29 |
| 182 | 186 | -4 |
| 195 | 209 | -14 |
| 176 | 179 | -3 |
| 191 | 179 | 12 |
| 202 | 188 | 14 |
| 198 | 194 | 4 |
| 177 | 181 | -4 |
| Total | 3909 | 3752 |
| Average | 195 | 187 |

Technician:

D. Whitlock

Reviewed By:

C. Miller

D. Whitlock
C. Miller

Washington, PA
Paved Concrete Background Survey
Ludlum 2360 ser: 1413043 *cm*
43-89 ser: 151059

| | | Beta | Alpha |
|---------|---------|--------|-------|
| Date | 11/6/01 | 287 | 4 |
| | | 293 | 3 |
| | | 319 | 5 |
| | | 219 | 2 |
| | | 280 | 1 |
| | | 288 | 5 |
| | | 265 | 3 |
| | | 232 | 2 |
| | | 203 | 4 |
| | | 224 | 3 |
| | | 287 | 5 |
| | | 292 | 2 |
| | | 296 | 0 |
| | | 286 | 2 |
| | | 225 | 0 |
| | | 308 | 4 |
| | | 282 | 3 |
| | | 277 | 3 |
| | | 290 | 3 |
| | | 276 | 2 |
| Total | | 5429 | 56 |
| Average | | 271.45 | 2.8 |

Technician:

D. Riley *Daniel J. Riley*

Reviewed By:

C. Miller *C. Miller*

2

141303 11-02-02
151059

Site: Washington, PA
Manufacturer: Ludlum
Model Number: 2360 Data Logger
Detector: 43-89 Alpha/Beta
Date:

Material Surveyed: Concrete

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|------------------------|--------------|----------------------|------------------|-----------------|
| 287 | 4 | 258 | 4 | 29 |
| 293 | 3 | 247 | 3 | 46 |
| 319 | 5 | 284 | 5 | 35 |
| 219 | 2 | 260 | 2 | -41 |
| 280 | 1 | 272 | 1 | 8 |
| 288 | 5 | 324 | 5 | -36 |
| 265 | 3 | 333 | 3 | -68 |
| 232 | 2 | 297 | 2 | -65 |
| 203 | 4 | 271 | 4 | -68 |
| 224 | 3 | 288 | 3 | -64 |
| 287 | 5 | 344 | 5 | -57 |
| 292 | 2 | 335 | 2 | -43 |
| 296 | 0 | 334 | 0 | -38 |
| 286 | 2 | 306 | 2 | -20 |
| 225 | 0 | 265 | 0 | -40 |
| 308 | 4 | 299 | 4 | 9 |
| 282 | 3 | 314 | 3 | -32 |
| 277 | 3 | 286 | 3 | -9 |
| 290 | 3 | 241 | 3 | 49 |
| 276 | 2 | 294 | 2 | -18 |
| | | | 2.8 | -21.15 |

Technician: Dave Riley

Signature: Dave J. Riley

Date: 11-6-01

Reviewed By: C. E. Miller

Washington, PA
 Cinder Block Background Survey
 Ludlum 2360 ser: 1413043 cm
 43-89 ser: 151059

| | | Beta | Alpha |
|---------|---------|-------|-------|
| Date | 11/6/01 | 393 | 1 |
| | | 335 | 24 |
| | | 325 | 3 |
| | | 444 | 9 |
| | | 404 | 3 |
| | | 297 | 3 |
| | | 329 | 4 |
| | | 225 | 7 |
| | | 267 | 4 |
| | | 301 | 4 |
| | | 233 | 3 |
| | | 236 | 0 |
| | | 237 | 0 |
| | | 231 | 6 |
| | | 266 | 3 |
| | | 280 | 2 |
| | | 310 | 3 |
| | | 272 | 3 |
| | | 307 | 5 |
| | | 218 | 0 |
| Total | | 5910 | 87 |
| Average | | 295.5 | 4.35 |

Technician:

D. Riley

D. Riley

Reviewed By:

C. Miller

C. Miller

171303 11-02-02
 151099
 13.44
 10.090

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger
 Detector: 43-89 Alpha/Beta
 Date:
 Serial #:
 Serial #:

Material Surveyed: Block

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|-----------|-------------------|---------------|--------------|
| 393 | 1 | 371 | 1 | 22 |
| 335 | 24 | 336 | 24 | -1 |
| 325 | 3 | 322 | | 3 |
| 444 | 7 | 371 | 7 | 51 |
| 404 | 3 | 473 | 3 | 111 |
| 297 | 3 | 370 | 3 | -43 |
| 329 | 4 | 347 | 4 | -18 |
| 225 | 7 | 240 | 7 | -15 |
| 267 | 4 | 376 | 4 | -9 |
| 301 | 4 | 371 | 4 | -56 |
| 233 | 3 | 309 | 3 | -76 |
| 236 | 0 | 256 | | -20 |
| 237 | 0 | 256 | | 1 |
| 231 | 6 | 247 | 6 | -18 |
| 266 | 3 | 273 | 3 | -12 |
| 280 | 2 | 295 | 2 | -15 |
| 310 | 3 | 270 | 3 | 40 |
| 272 | 3 | 373 | 3 | -35 |
| 307 | 5 | 269 | 5 | 38 |
| 218 | 0 | 265 | | -47 |
| 295.5 | | | 4.35 | -5.1 |

AV

Technician: Dave Riley
 Signature: *[Signature]*
 Date: 11-6-01
 Reviewed By: *[Signature]*

Washington, PA
Metal Background Survey
Ludlum 2360 ser: 1413043
43-89 ser: 151059

| | | Beta | Alpha |
|---------|---------|-------|-------|
| Date | 11/6/01 | 154 | 1 |
| | | 170 | 2 |
| | | 168 | 1 |
| | | 154 | 1 |
| | | 200 | 10 |
| | | 189 | 9 |
| | | 207 | 3 |
| | | 174 | 7 |
| | | 199 | 6 |
| | | 203 | 5 |
| | | 169 | 3 |
| | | 184 | 2 |
| | | 145 | 3 |
| | | 208 | 4 |
| | | 211 | 5 |
| | | 210 | 1 |
| | | 165 | 4 |
| | | 196 | 4 |
| | | 192 | 0 |
| | | 180 | 3 |
| Total | | 3678 | 74 |
| Average | | 183.9 | 3.7 |

Technician:

D. Riley

Reviewed By:

C. Miller

141303

151059

11-02-02

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger
 Detector: 43-89 Alpha/Beta
 Date:

Material Surveyed: metal

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|-----------|-------------------|---------------|--------------|
| 154 | 1 | 204 | 1 | -50 |
| 170 | 2 | 199 | 2 | -29 |
| 165 | 1 | 201 | 1 | -33 |
| 154 | 1 | 207 | 1 | -53 |
| 200 | 10 | 171 | 10 | -29 |
| 189 | 9 | 247 | 9 | -58 |
| 207 | 3 | 266 | 3 | -59 |
| 174 | 7 | 217 | 7 | -43 |
| 199 | 6 | 245 | 6 | -46 |
| 203 | 5 | 257 | 5 | -54 |
| 169 | 3 | 206 | 3 | -37 |
| 184 | 2 | 242 | 2 | -58 |
| 145 | 3 | 193 | 3 | -48 |
| 208 | 4 | 252 | 4 | -44 |
| 211 | 5 | 252 | 5 | -41 |
| 210 | 1 | 263 | 5 | -53 |
| 165 | 4 | 203 | 4 | -38 |
| 196 | 4 | 234 | 4 | -38 |
| 192 | 0 | 201 | 0 | -9 |
| 180 | 3 | 212 | 3 | -32 |
| | | | 3.9 | -37.6 |

Technician: Dave Riley

Signature: David J. Riley

Date: 11-6-01

Reviewed By: [Signature]

Washington, PA

Wood Background Survey

Ludlum 2360 ser: 1413013 ~~145478~~

43-89 ser: 151059

| | | Beta | Alpha |
|---------|---------|--------|-------|
| Date | 11/6/01 | 216 | 1 |
| | | 193 | 3 |
| | | 171 | 1 |
| | | 176 | 0 |
| | | 226 | 2 |
| | | 171 | 4 |
| | | 205 | 4 |
| | | 155 | 1 |
| | | 175 | 0 |
| | | 160 | 2 |
| | | 159 | 0 |
| | | 162 | 1 |
| | | 202 | 4 |
| | | 223 | 0 |
| | | 193 | 2 |
| | | 145 | 1 |
| | | 238 | 5 |
| | | 211 | 1 |
| | | 233 | 0 |
| | | 203 | 1 |
| Total | | 3817 | 33 |
| Average | | 190.85 | 1.65 |

Technician:

D. Riley *D. Riley*

Reviewed By:

C. Miller *C. Miller*

Site: Washington, PA
 Manufacturer: Ludlum
 Model Number: 2360 Data Logger Serial #: 141303 11-02-02
 Detector: 43-89 Alpha/Beta Serial #: 151059
 Date:

Material Surveyed: wood

| Unshielded Beta CPM | Alpha CPM | Shielded Beta CPM | Net Alpha CPM | Net Beta CPM |
|---------------------|-----------|-------------------|---------------|--------------|
| 216 | 1 | 219 | 1 | 3 |
| 193 | 3 | 195 | 3 | 2 |
| 171 | 1 | 164 | 1 | 7 |
| 176 | 0 | 192 | 0 | 16 |
| 226 | 2 | 223 | 2 | 2 |
| 171 | 4 | 253 | 4 | 82 |
| 205 | 4 | 301 | 4 | 96 |
| 155 | 1 | 251 | 1 | 96 |
| 175 | 0 | 252 | 0 | 89 |
| 160 | 2 | 242 | 2 | 82 |
| 159 | 0 | 265 | 0 | 106 |
| 162 | 1 | 198 | 1 | 36 |
| 202 | 4 | 240 | 4 | 38 |
| 223 | 0 | 227 | 0 | 17 |
| 193 | 2 | 219 | 2 | 11 |
| 145 | 1 | 211 | 1 | 66 |
| 238 | 5 | 242 | 5 | 4 |
| 211 | 1 | 216 | 1 | 5 |
| 233 | 0 | 233 | 0 | 5 |
| 203 | 1 | 208 | 1 | 5 |
| | | | 1.65 | 4195 |

Technician: Dave Riley

Signature: David J. Riley

Date: 11-6-01

Reviewed By: C. E. Miller

RADIOLOGICAL SERVICES, INC.

Chain of Custody Record

Chain of Custody Record

| | | | | |
|------------------------------|-----|-------------|--|----------------|
| Navy Corp L.P. Chatterjee | R/A | Seal Number | Corn L.L.B. M.W.D.Y.Z-01 | (Sheet 167) |
|------------------------------|-----|-------------|--|----------------|

•e Type

| Number | Sampling Location | Date | Time | Collected By | Remarks (including container and related information) |
|--------|-------------------|---------|------|--------------|---|
| MWB4Z | Bldg 42 | 11/9/01 | 1400 | S. Kelly | Count for gross alpha beta |
| UC01 | | | | | |
| UC02 | | | | | |
| UC03 | | | | | |
| UC04 | | | | | |
| UC05 | | | | | |
| UC06 | | | | | |
| UC07 | | | | | |
| UC08 | | | | | |
| UC09 | | | | | |
| UC10 | | | | | |
| UC11 | | | | | |
| UC12 | | | | | |
| UC13 | | | | | |
| UC14 | | | | | |
| | | | | | N.A. |

Ready Log (Name, Date, Time)

| | | |
|-------------------------|-------|--------------|
| Field: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Transport: Accepted by | _____ | Relinquished |
| Laboratory: Accepted by | _____ | Relinquished |



RADIOLOGICAL SERVICES, INC.

Chain of Custody Record

Site: MolyCorp
Washington, PA Seal Number MWB42-01 (Sheet 2 of 2)
Sample Type Wipes

| Sample Number | Sampling Location | Date | Time | Collected By | Remarks (including container and related information) |
|---------------|-------------------|----------|------|--------------|---|
| MWB42- | | | | | |
| UG01 | Bldg 42 | 11-12-02 | 1430 | Noroby | Count for gross |
| UG02 | | | | | alpha beta |
| UG03 | | | | | |
| UG04 | | | | | |
| UG05 | | | | | |
| UG06 | | | | | |
| UG07 | | | | | |
| UG08 | | | | | |
| UG09 | | | | | |
| UG10 | | | | | |
| UG11 | | | | | |
| UG12 | | | | | |
| UG13 | | | | | |
| UG14 | | | | | |
| QC-UG11 | | | | | |
| QC-UG12 | | | | | |
| NA | | | | | |
| | | | | | |
| | | | | | |

Chain of Custody Log (Name, Date, Time)

| | | | |
|------------------------|------------------------------|--------------|--|
| Field: Accepted by | <u>C. J. Mills</u> | Relinquished | |
| Transport: Accepted by | <u>S. Long 11-15-01/1120</u> | Relinquished | |
| Transport: Accepted by | | Relinquished | |
| Transport: Accepted by | | Relinquished | |
| Transport: Accepted by | | Relinquished | |
| Transport: Accepted by | | Relinquished | |
| Transport: Accepted by | | Relinquished | |
| Laboratory: Accepted | | Relinquished | |



RADIOLOGICAL SERVICES, INC.

Chain of Custody Record

Site: Molybdenum Washington PA Seal Number MWB39-01
 Sample Type Wipes

| Sample Number | Sampling Location | Date | Time | Collected By | Remarks (including container and related information) |
|---------------|-------------------|---------|------|--------------|---|
| MWB39- | | | | | |
| UC01 | Bldg 39 | 11/8/01 | 1430 | Nordby/Kiley | Count for gross alpha |
| UC02 | | | | | beta |
| UC03 | | | | | |
| UC04 | | | | | |
| UC05 | | | | | |
| UC06 | | | | | |
| UC07 | | | | | |
| UC08 | | | | | |
| UC09 | | | | | |
| UC10 | | | | | |
| UG01 | | | | | |
| UG02 | | | | | |
| UG03 | | | | | |
| UG04 | | | | | |
| UG05 | | | | | |
| UG06 | | | | | |
| UG07 | | | | | |
| UG08 | | | | | |
| UG09 | | | | | |
| UG10 | | | | | |
| QC-UC01 | | | | | |

Chain of Custody Log (Name, Date, Time)

| | | | |
|----------------------------|-----------------------------------|--------------|--|
| (1) Field: Accepted by | <u>[Signature]</u> | Relinquished | |
| (2) Transport: Accepted by | <u>[Signature]</u> 11-15-01 11:30 | Relinquished | |
| (3) Transport: Accepted by | | Relinquished | |
| (4) Transport: Accepted by | | Relinquished | |
| (5) Transport: Accepted by | | Relinquished | |
| (6) Transport: Accepted by | | Relinquished | |
| (7) Transport: Accepted by | | Relinquished | |
| (8) Laboratory: Accepted | | Relinquished | |