

SUMMARY REPORT

LARGE AREA SCAN SURVEYS

OF RF-3, RF-6, RF-6 ADDITION,

AND MAIN EXTRUSION PLANT CEMENT PADS

December, 2002

TABLE OF CONTENTS

	<u>Page No.</u>
1.0 EXECUTIVE SUMMARY	1
2.0 OBJECTIVES	2
3.0 METHODOLOGY	2
4.0 SURVEY RESULTS	3
5.0 CONCLUSIONS	4

1.0 EXECUTIVE SUMMARY

This report provides a summary of the large area surface scan surveys of the RF-3, RF-6, RF-6 Addition, and Main Extrusion Plant cement pads. These surveys were performed using the Ludlum Model 239-1F Floor Monitor interfaced with a Trimble Pro XR™, Global Positioning System (GPS). The survey results were electronically recorded using a Trimble TSC1™ data logger. The electronic data was extracted using Pathfinder™ software, and Geographic Information System (GIS) data plotting was performed using Surfer™, Version 8.0, software.

The survey results indicate that the majority of the cement pads contain contamination levels above the guideline levels for unrestricted release (i.e., >5,000 dpm/100 cm²). Some surface areas (e.g., portion of RF-6, HP Office, Break Room, Stack Room, and Switch Gear Room) may be candidates for unrestricted release. However, all building floors were painted and/or sealed during the operation of the site, and contamination may be sealed within the surface coating. Therefore, these surfaces would have to be evaluated for the effects of the coating on attenuation of the measured surface radioactivity prior to unrestricted release.

It is important to note that scan surveys **ONLY** measure surface contamination. Core borings and process knowledge indicates that subsurface contamination may be present in some pad areas with levels of surface contamination below the release criteria. Areas containing known subsurface contamination include locations where clean cement/fill was applied over high levels of contamination. These areas include the Main Extrusion Plant Press Pit, and trenches in the RF-6 Building. Attachment 1 Areas Known to Contain Clean Fill, provides the locations where clean cement/fill was applied.

Any plan to release pads for unrestricted use should address known sources of subsurface contamination and the cracks and floor joints within the pads. These areas require further investigation to determine whether they meet the free-release criteria. A second concern is that surface scans do not measure contamination which may have migrated into cracks and floor joints.

Additionally, the attached survey (Attachment 2) does not satisfy the Data Quality Objectives for a Final Radiological Status Survey. If the pad were to be released for unrestricted use, they will require additional follow-up measurements as delineated by RDP-ESH-007, Decommissioning Plan for the RMI Titanium Company Extrusion Plant Ashtabula, Ohio. Additional survey requirements included in the Decommissioning Plan that are not documented by the attached survey include:

Follow-up surveys to evaluate maximum contamination levels per 100 cm² surface area.

- Average contamination levels per 100 cm² averaged over a 1 m² surface area.
- Static Measurements
- Smear Measurements
- Dose Rate Measurements (recorded at 1 meter above the surface)

2.0 OBJECTIVES

Pad surveys were performed to characterize surface contamination levels on cement pads slated for remediation. Approximately 100% of the accessible pad surfaces were scanned for beta contamination using the Ludlum Model 239-1F Floor Monitor.

Data Quality Objectives (DQOs)

The DQOs for the pad surveys were derived from ODH License for Radioactive Material No. 11900040004, Condition 20. Unrestricted Release Criteria. These DQOs include the following:

- **Average Contamination** ≤5,000 dpm/100 cm² (i.e., based on guideline level)
- **Maximum Contamination** ≤15,000 dpm/100 cm² (i.e., based on 3 times guideline level)

3.0 METHODOLOGY

Survey measurements were performed according to procedure RDP-HP-60.052, Operating the Ludlum Model 239-1F Floor Monitor, and the Health Physics Survey Plan enclosed within OWR #E03018. Survey results were GIS data plotted (see Attachment 2). The GIS plotted data does not include inaccessible surfaces (see Attachment 3) and a large portion of the RF-6 pad where GPS base station reception was not able to be obtained.

Background Measurements

Background was measured by 1 minute readings collected while scanning an unaffected cement surface adjacent to the pads. These background measurements were sufficiently low to detect the DQO of 5,000 dpm/100 cm² (i.e., assuming a detection limit of 1½ times background).

Data Processing

Electronically recorded position data was differentially corrected by the Trimble™ GPS. This electronic data was extracted using Pathfinder™ software. Data processing was performed using an Excel™ spreadsheet to subtract background and convert net counts per minute (net cpm) to dpm/100 cm².

A conversion factor of 0.5208 dpm/100 cm²/net cpm was used to convert net cpm to dpm/100 cm². This conversion factor was derived by:

$$\mathbf{0.5208\ dpm/100\ cm^2/ net\ cpm} = 434\ cm^2/100\ cm^2 * 0.12\ dpm/net\ cpm$$

Where:

434 cm² = Active area for Floor Monitor probe

100 cm² = Area used for reporting surface contamination

0.12 dpm/net cpm = Floor Monitor beta detection efficiency (base on Tc-99)

Geographic Imaging System (GIS) Mapping

Surfer™, Version 8.0 software was used to perform GIS data plotting. A map was created to plot the survey results (dpm/100 cm²) for each 1 second measurement (see Attachment 2).

4.0 SURVEY RESULTS

Electronic Data Logging

GPS base station reception was not able to be maintained for a portion of the RF-6 pad survey area. The area without GPS reception was enclosed by Intermodal containers stacked two containers high. Large metallic objects reflect GPS signals, and are believed to be the cause for not maintaining the necessary base station reception. This resulted in a large area without electronically recorded survey results. However, the survey results for this area were manually recorded. The survey results indicate that the southern portion of this area is below the 5,000 dpm/100 cm² DQO, and that the results along the northern portion of the area are >5,000 dpm/100 cm². These survey results are consistent with the process knowledge based on past use of this area. Therefore, for planning purposes, the electronic survey results east and west of the area without electronic data may be extrapolated to represent the area without GIS plotted results.

Inaccessible Surfaces

Some portions of the pads were not accessible for survey. These inaccessible areas include:

- Areas where trenches were covered with iron plates in the Main Extrusion Plant,
- Stormwater tanks that are located on the Main Extrusion Plant,
- An area where there was a gravel pile near the Truckbay,
- Areas where Intermodals were located on RF-6 Pad,
- Areas where portions of the RF-6 Pad were underwater, and
- Areas where portions of the RF-6 pad had broken cement.

Attachment 3, Unaccessible Surfaces, identifies the locations of the inaccessible surfaces on the GIS data plot.

Global Positioning System (GPS) Accuracy

GIS mapping for the cement pad surveys indicate that there was a positioning error for differentially corrected data of up to approximately 15 feet. This positioning error was identified when the GIS data plots fell outside the boundary of buildings, resulting in overlap between electronic data files. Positioning corrections were manually applied to the raw data to compensate for this error. However the degree of error at times would vary during the course of a survey so that manual corrections could not entirely correct for the positioning error.

The reported accuracy of the Trimble Pro XR™ GPS is less than 3 feet. Trimble has been notified, via Precision Laser Instrument, of the positioning error and the problem is being investigated and could not be resolved by the time of this report. The investigation is continuing and will hopefully be corrected for future surveys.

Positioning errors account for what appears to be gaps between GIS plots of electronic data files. However, approximately 100% of the accessible surfaces for the pads were surveyed. Therefore, positioning error only affects the presentation of the GIS plotted data, and does not affect the overall data quality or the statistics for the measured data.

5.0 CONCLUSIONS

Approximately 100% of accessible pad surfaces were surveyed which provided approximately 31,000 one second measurements. This electronic data was plotted using GIS software depicting the results for the pad surveys (i.e., with the exception of a portion of the RF-6 pad). The highest level of contamination measured was 1,918,000 dpm/100 cm².

GIS data plots for the surveys show the majority of the pads contain surface contamination above the guideline levels for unrestricted release (i.e., >5,000 dpm/100 cm² DQO). However, surveys for some pads did not measure surface radioactivity above site guideline levels. These pads include:

- Southeast portion of RF-6 pad,
- Former HP Office Area, Break Room,
- Former Stack Room, Switch Gear and Compressor Rooms.

However, all of these candidate areas were painted and/or sealed during the operation of the site, and contamination may be sealed within the surface coating. Therefore, these areas would require additional evaluation to determine the effect of surface coatings prior to determining they area acceptable for unrestricted release.

It is also important to note that scan surveys ONLY measure surface contamination. Core borings and process knowledge indicates that subsurface contamination may be present in some pad areas

with levels of surface contamination below the release criteria. For example, some portions of the Main Extrusion Plant and the RF-6 building contain locations known to have subsurface contamination beneath clean surface grout (see Attachment 1).

Additionally it is important to realize that cracks, expansion joints and seams may allow contamination to penetrate beneath the surface of the cement. This had been demonstrated during a past Geoprobe™ project where sub-pad contamination was measured in core samples collected at the location of RF-6 Building expansion seams.

This subsurface contamination should be considered in plans to remediate these pads.

Attachments:

Attachment 1: Areas Known to Contain Clean Fill

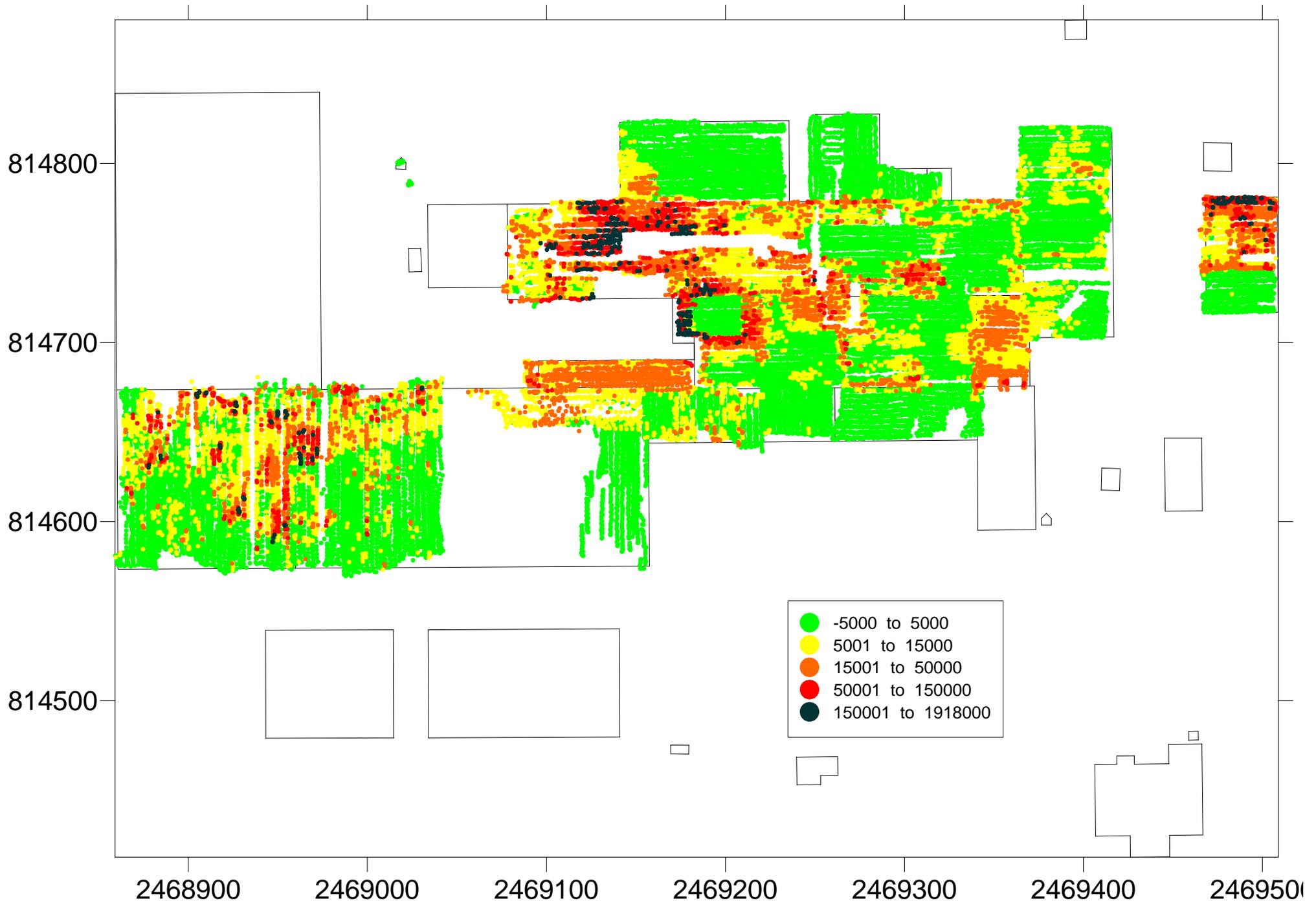
Attachment 2: GIS Plotted Survey Results for Pad Surveys

Attachment 3: Locations of Inaccessible Surfaces for Pad Surveys

Areas Known to Contain Clean Fill



Pad Surveys (dpm/100 cm2)



Unaccessible Surfaces

Location of Background Readings

