FINAL

# Data Gap Analysis Report

## *for the Former Guterl Specialty Steel Corporation*

*Lockport, New York*

Prepared for

**US Army Corps of Engineers**
**Buffalo District**
Contract W912P4-05-D-0001
Delivery Order 0001

Prepared by


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A tyco International Ltd. Company

**December 2005**

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# LIST OF ACRONYMS

| | |
|---|---|
| ABB-ES | ABB Environmental Services, Inc. |
| AEC | Atomic Energy Commission |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| BCG | Biota Concentration Guides |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| COPC | Contaminant of Potential Concern |
| CSM | Conceptual Site Model |
| CX | Center of Expertise (USACE) |
| DGA | Data Gap Analysis |
| DoD | Department of Defense |
| DOE | Department of Energy |
| DQO | Data Quality Objective |
| ESSAP | Environmental Survey and Site Assessment Program (ORISE) |
| EU | Exposure Unit |
| FBDU | Ford, Bacon & Davis Utah, Inc. |
| FS | Feasibility Study |
| FUSRAP | Formerly Utilized Sites Remedial Action Program |
| GM | Geiger-Mueller |
| HEAST | Health Effects Summary Tables (USEPA) |
| HGL | HydroGeoLogic, Inc. |
| HHRA | Human Health Risk Assessment |
| IA | Investigative Area |
| IIWA | Immediate Investigation Work Assignment |
| IRIS | Integrated Risk Information System (USEPA) |
| MARSSIM | Multi-Agency Radiation Survey and Site Investigation Manual |
| MED | Manhattan Engineer District |
| MW | Monitoring Well |
| NCIDA | Niagara County Industrial Development Agency |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| NLO | National Lead of Ohio |
| NPDES | National Pollutant Discharge Elimination System |
| NRC | Nuclear Regulatory Commission |
| NYSDEC | New York State Department of Environmental Conservation |
| ORISE | Oak Ridge Institute for Science and Education |
| ORNL | Oak Ridge National Laboratory |
| OWS | Oil/water separator |
| PA/SI | Preliminary Assessment/Site Inspection |
| PCB | Polychlorinated Biphenyl |
| PPRTV | Provisional Peer-Reviewed Toxicity Value (USEPA) |
| PRG | Preliminary Remediation Goal (USEPA Region 9) |
| PSA | Preliminary Site Assessment |
| RBC | Risk-Based Concentration (USEPA Region 3) |
| RA | Remedial Action |

| | |
|---|---|
| RCRA | Resource Conservation and Recovery Act |
| RD | Remedial Design |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROPC | Radionuclide of Potential Concern |
| SLC | Secure Landfill Contractors, Inc. |
| SOW | Scope of Work |
| STSC | Superfund Technical Support Center |
| SVOC | Semivolatile Organic Compound |
| TAL | Target Analyte List (Inorganics) |
| TCL | Target Compound List (Organics) |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TOC | Total Organic Carbon |
| TPP | Technical Project Planning |
| USACE | United States Army Corps of Engineers |
| USEPA | United States Environmental Protection Agency |
| USRADS | UltraSonic Ranging and Data System |
| VOC | Volatile Organic Compound |
| WL | Working Level (a measure of the potential alpha particles energy per liter of air) |
| XRF | X-ray fluorescence |

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# Executive Summary

The United States Army Corps of Engineers (USACE) is performing a Remedial Investigation (RI)/Feasibility Study (FS) on the Former Guterl Specialty Steel Corporation Site, Ohio Street, Lockport, NY. The RI/FS is being performed in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) under the Formerly Utilized Sites Remedial Action Program (FUSRAP). The US Department of Energy (DOE) determined the site eligible for inclusion into the FUSRAP in a letter dated March 28, 2005.

The former Guterl Specialty Steel Corporation FUSRAP site (Guterl Steel site) is located in Lockport, Niagara County, New York, approximately 20 miles northeast of Buffalo, NY. The USACE Statement of Work (SOW) defines the site as an approximately 70-acre site comprised of three general areas, including the 52 acre Allegheny Ludlum Corporation property, the 9-acre landfill area, and the 9-acre excised area (refer to Attachment 2 for the figure showing the SOW defined site boundary). During the Technical Project Planning (TPP) Meeting conducted August 9 and 10, 2005, it was agreed to include additional properties that were at one time held by the Simonds Saw and Steel Company that may have been impacted by Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activity.

From 1910 to 1966, the site was owned and operated by Simonds Saw and Steel Company to manufacture steel and specialty steel alloys used in the production of saws and other tools. In 1948, the New York Operations Office of the AEC negotiated a contract with Simonds. AEC operations continued until December 31, 1956. In 1966, Simonds was acquired by the Wallace-Murray Corporation, which continued to operate the plant as a specialty steel mill until 1978, when Guterl Specialty Steel Corporation acquired the site property (HGL, 2005).

As a first step in the CERCLA process, the USACE completed a Preliminary Assessment / Site Inspection (PA/SI) at the property (USACE, May 2001). The PA/SI recommended that the Guterl Steel site be included in the FUSRAP based on evidence of residual contamination. USACE contracted with Earth Tech April 2005 to perform the first four tasks of a Remedial Investigation / Feasibility Study (RI/FS); that is, conduct historical data review and data gap analysis related to contamination associated with MED/AEC activities at the site. As part of the data review and data gap analysis, a TPP Meeting was held in August 2005 to gather stakeholders and outline project objectives.

This data gap analysis report is a second output of Task 4 of the work performed by Earth Tech under contract to the USACE Buffalo District. Previous reports included Engineering and Design Quality Control Plan (Task 2), Preliminary Identification of ARARs and DQOs (Task 3), and TPP Meeting Minutes (Task 4).

The purpose of this Data Gap Analysis Report (DGAR) is to provide a summary of existing data, including an assessment of the existing data for usability in the RI/FS. The usability assessment consists of determining if the data generated to date is of sufficient quantity and quality for its intended uses. These uses include both the purposes for which the data were originally

generated; and the extent to which these data are also adequate for current and future uses. These current and future uses of the data may include performing a RI and FS; remedial design (RD); and final release of the site. Within these broad programs, data may be used to establish the nature and extent of contamination; fate and transport; human health risk assessments; screening level ecological risk assessment; estimation of quantities and classification (e.g., hazardous or non-hazardous; low level radioactive waste; etc.) of contaminated material of various matrices (soil; groundwater; surface water; building materials); and achievement of cleanup goals (release criteria). The results of this review are presented in this report, the data gaps are identified, and options or recommendations are presented for data that needs to be acquired to fill these gaps.

A total of 10 historical reports published between 1978 and 2005 were reviewed in preparation for this data gap analysis. The reports were produced by or for various governmental agencies including USACE, USDOE, USEPA, US Bankruptcy Court of Western Pennsylvania, and NYSDEC. Data types and intended uses varied by report and included a range of radiological analyses for radioactive materials (isotopic and screening level) and conventional parameters (e.g., volatile organics, metals, PCBs, etc.). Matrices sampled included building interior surfaces and equipment, building exterior areas, air, soils, groundwater, and utility trench contents. The landfill area or the Excised Area were the primary focus of the investigations. The most comprehensive radiological survey was conducted by ORISE (1999) and includes data over the entire area defined by the March 2005 SOW.

The media to be evaluated as part of this data gap analysis were defined by the March 2005 SOW and include building surfaces, soil, groundwater, and surface water/sediment. To manage the data gap analysis, Earth Tech generated a conceptual site model (CSM) that included consideration of the project physical setting as well as steel mill and MED/AEC related activity. The CSM included an evaluation of contaminants (i.e., radionuclides) of potential concern (ROPCs) for the project; the preliminary list of ROPCs was also discussed at the TPP Meeting. The ROPCs for the Guterl Steel site were determined to be uranium (U-238, U-235, and U-234) and thorium (Th-232). Following development of the CSM, Earth Tech developed eight investigative areas (IAs) to address the evaluation of data gaps using logical, manageable components of the site; the basic areas were first discussed during the TPP Meeting. The IAs evaluated in this report include:

| | |
|---|---|
| IA01 | Excised area – Building Surfaces and Interiors |
| IA02 | Excised Area – Building Exterior Areas |
| IA03 | Landfill Area |
| IA04 | NCIDA property (Allegheny Ludlum operations area, not including Excised Area or landfill) |
| IA05 | Railroad Right-of-Way north of site proper |
| IA06 | Off-site Northeast properties |
| IA07 | Groundwater |
| IA08 | Site Utilities (Sewers and drains) |

Evaluation of "building surfaces" is included in IA01. Evaluation of soil is included in IA01 through IA06. Evaluation of groundwater is included in IA07. Evaluation of surface water and sediment is included in IA05 (environmentally derived) and IA08 (related to the potential for impact to).

The data gap analysis identified documented, or in some cases a strong probability for, MED/AEC (i.e., FUSRAP-eligible) radioactive material contamination within each of the IAs except for IA06. Earth Tech recommends IA06 be withdrawn from further consideration under this investigation (properties are not contiguous to the site and were sold prior to MED/AEC activities).

Data gaps were identified for each of the IAs except for IA06. Recommendations for additional data collection to fill the data gaps and develop data of sufficient quality and quantity to meet the project objectives are presented in detail for each IA, and are summarized in Table 5-1. In addition, general data gaps (i.e., information not specific to one or two individual areas) were also identified.

Data gaps were assessed for each investigative area, and are summarized below:

## DATA GAPS

**IA01**. Sampling in most of IA01 was not based on a formal grid and may not provide sufficient density of coverage to meet the current project objectives. Screening levels used by ORISE were higher than those considered currently (see Section 2.6). Reporting limits for isotopic analyses are generally adequate (i.e., are sensitive enough to meet the provisional proposed screening levels). The ORISE data indicate that radioactivity is not 'removable' and therefore decontamination of structures is not likely to be feasible. Building 1 was not surveyed adequately due to safety considerations, and the flooded condition of the basement. The survey of Building 5 was described as 'minimum' due to structural concerns and accumulated debris. No residual contamination (based on screening) was reported by ORISE in Buildings 5 and 35; however, no samples were collected in these buildings. Buildings 2, 3, 6, and 8 (initially Class 3) were re-surveyed as Class 1; coverage seems adequate, but only Buildings 6 and 8 were surveyed on a grid (again only site-specific). Not all the floor plates were removed, therefore contamination under the plates needs to be assessed in many areas. Information on the extent of the survey in the northern part of Building 24 (24N), currently used for storage by Allegheny Ludlum, is lacking; and, no sub-surface (subfloor) samples were collected from 24N.

**IA02**. The Excised Area was surveyed using a site-specific grid but the grid used was not tied to the New York Plane Coordinate System. The extent of MED/AEC contamination (horizontal and vertical) was roughly established; although the sample density may not be sufficient for full delineation of impacted (contaminated) area. Some contamination found was associated with firebrick and pieces of radioactive metal.

**IA03**. This area is a NYSDEC inactive hazardous waste site, and as such NYSDEC has conducted several studies of this area. The chemical (non-radioactive) sampling and analytical data are adequate. Samples in the southern part of the landfill, from the marshy area, were also collected and analyzed by NYSDEC; these samples were reported as 'surface water' and 'sediment' samples. Surficial radiological data includes isotopic analyses of soils and are adequate except in the northeast corner of the landfill. Subsurface data in this area are inadequate, as MED/AEC material initially deposited in the northeast corner may have been moved (and buried) as a result of later activities (landfilling, mining, and covering). NYSDEC excavated test pits and conducted borings in areas outside of the northeast corner, but samples were only screened for radioactive contaminants (not sent for analysis). Subsurface radioactive material data are inadequate, as ORISE subsurface data (boreholes) were obtained only from locations with evidence of surficial contamination.

**IA04**. Surficial radioactive material data coverage is insufficient in some parts of the NCIDA area. Subsurface data are inadequate, as subsurface data (boreholes) were obtained only from locations with evidence of surficial contamination. The interior of Buildings 14 and 37 (in the Class 3 area) were not surveyed, although history and exterior screening suggest MED/AEC contamination unlikely. No screening or sampling data were located for the current office building (part of which was formerly used as a laboratory). No subsurface data were found for IA04, either within the buildings, or in the exterior areas.

**IA05**. No data were found for this area, although there may be some screening information available (NYSDEC, 1999). Anecdotal evidence of thoriated metal in this area has been reported. It is reported (e.g., in HGL 2005; and also at the TPP) that there have been NYSDEC surveys in this area; however, these reports have not yet been made available to Earth Tech for review.

**IA06**. There were no analytical data or radioactive material survey data located for Tracts K, L, and M, which are not contiguous to the rest of the site; and are not in an area (e.g., railroad right-of-way) likely to have been affected by the manufacturing, processing, storage, or transportation of MED/AEC materials at the Guterl Steel site. The historical record is considered adequate to characterize this IA with regard to potential MED/AEC impacts. Based on the historical information reviewed, it is recommended that this IA be removed from further consideration.

**IA07**. Only limited data is available from monitoring wells; and there is no current ongoing sampling program. Monitoring wells are present only in the landfill and Excised Areas. The data are not current, and radioactive material data are very limited. The existing monitoring well network is not adequate. As many as three of the four landfill wells may need to be replaced, due to inadequacies in their initial construction.

**IA08.** Very limited data exists relative to the sewers, drains, and trenches. Subsurface utilities have not been located; only sporadic data from drains and trenches. Utility drawings have recently been made available to Earth Tech, but the accuracy and completeness will need to be field verified. Five trenches (in Buildings 3 and 8) and an oil-water separator were sampled by ORISE (1999).

**Other Data Gaps.** Most sample locations from previous work (e.g., ORISE, ORNL) cannot be accurately located, as sample locations or grids were not surveyed. NYSDEC sampling events, and monitoring well locations, are surveyed. A baseline assessment of building conditions to determine minimum requirements for building preparation to allow for execution of the investigative activities has not been conducted. Only a limited amount of background radioactive material data was located for this report. As radioactive material criteria are normally based on exceedances of naturally-occurring background for a given site or area, accurate delineation of impacted areas cannot be performed without adequate data to establish background radiation levels. Summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) were discussed at the Technical Project Planning Meeting but were not made available to USACE in time for this data gap analysis. NYSDEC (2000) notes that a surface water sample was collected from a sewer line in Building 3 (within the Excised Area) and submitted for radioactive material analysis, but the results were not included in the IIWA Report. Assessment of supporting documentation related to previous reports (especially ORISE, 1999) is an important aspect of evaluating the acceptability of the related data.

## Data Acquisition Recommendations

In order to address the data gaps identified above, Earth Tech recommends the following data acquisition:

**IA01**. Building 1 - resolve safe access issues; resurvey Work Room as Class 1; conduct initial survey of flooded basement as Class 3. Building 6 - survey under floor plates, additional soil sampling needed. Building 8 - additional survey optional; existing data may be sufficient to delineate impacted areas to within ±5 m. Building 5 - resurvey as Class 3 area. Building 24 (North) - resurvey as Class 3 area; conduct limited subsurface sampling (coring) to evaluate possible sub-floor contamination. Buildings 2, 3, and 4/9 – existing data appear adequate, subject to general confirmation. General - existing data for equipment and structures above 2 m are inadequate; a more comprehensive survey is needed. In addition to the building-specific recommendations, confirmation re-sampling at 5 to 10 percent of ORISE frequency is recommended. Document gamma exposure measurement locations and add measurements and samples to evaluate new (current) screening values.

**IA02**. Correlate previous local sample grid coordinates to the NY Plane Coordinate system. Conduct random re-sampling of surface and subsurface locations to confirm ORISE data. Collect gamma readings at 1 m above sample grid nodes.

**IA03**. Evaluate potential subsurface contamination in area used for fill (excludes the marshy area) using direct-push sampling and on-site screening. Additional intrusive investigation (test pits) may be useful in the northeast corner (where MED/AEC contamination, specifically thorium, has been identified). Wetland delineation may be needed if MED/AEC material is found in the southern part of the landfill.

**IA04**. Conduct direct-push sampling and on-site screening for subsurface throughout Class 1 and Class 2 Areas (may need to add limited subsurface sampling in Class 3 areas), on systematic surveyed grid. Screen current office building (use Class 3 criteria to establish program); consider including Buildings 14 and 37 also. In addition, conduct limited sub-floor sampling (coring) in these buildings. Obtain and evaluate NYSDEC (1999) and EPA (1996) when available.

**IA05**. Acquire the NYSDEC (1999) screening data. Subsequent to review of NYSDEC data, design and conduct a screening investigation, focused on, but not limited to, areas with evidence of historical disturbance. The need for sampling, if any, should be determined after screening. Private owner (Lombardi) disturbance of soils at boundary is a complicating factor.

**IA06**. Based on the historical information reviewed there is no evidence of MED/AEC related use, and it is recommended that this IA be removed from further consideration. No data acquisition is recommended.

**IA07** Evaluate the condition of the existing monitoring wells. Replace as needed (may include three of the four landfill wells) and install additional overburden and bedrock wells to obtain an adequate network for hydraulic and chemical monitoring. Conduct two rounds of sampling (focused on radioactive contaminants).

**IA08.** Follow up attempts to acquire utility drawings. Evaluate various techniques (geophysical and others) to locate sewer lines, drains, and trenches. Sample residuals (water and solids remaining in lines, basins, lift stations, separators, etc.) and materials of which sewers/drains are constructed.

**Data Acquisition to Fill Other Data Gaps Identified.** Evaluate the safety and stability of the existing building structures to allow for investigative activities to determine minimum requirements for building preparation to allow for execution of the investigative activities. It is recommended that a sufficient number of background samples be collected from appropriate locations and analyzed for ROPCs as part of any future investigations. A formal survey of the site (horizontal and vertical) should be conducted and any sample grids or biased sample locations be tied into a recognized coordinate system (e.g., New York Plane Coordinate System). Establishment of a simplified master site grid with a tie to the recognized system is recommended. Summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) which were not yet available to USACE for this data gap analysis should be requested and reviewed prior to making final decisions with respect to sampling and analysis plan scoping. Obtain data from a surface water sample collected by NYSDEC personnel from a sewer line in Building 3 (within the Excised Area) and submitted for radioactive material analysis. Conduct, or coordinate with other agencies to conduct, wetland delineation in the area of the landfill and an updated drinking water well survey near the site. Earth Tech recommends that USACE request supporting documentation for the 1999 ORISE report as an important aspect of evaluating the acceptability of the related data.

# 1. Introduction and Objectives

In accordance with United States Army Corps of Engineers (USACE), Buffalo District contract number W912P4-05-D-0001, delivery order number 0001, Earth Tech has prepared this draft *Data Gap Analysis Report* (DGAR) for the former Guterl Specialty Steel Corporation site (Guterl Steel site), as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP), in accordance with Task 4 of the March 2005 delivery order Scope of Work (SOW; USACE, 2005A).

The strategy for the Guterl Steel site, as directed by Congress and specified by USACE, is to address all Manhattan Engineer District (MED) and Atomic Energy Commission (AEC)-related waste at the site (and adjacent properties, if necessary). The strategy will follow the process defined in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The criteria in CERCLA (USEPA, 1988) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (USEPA, 1990) will be used for site evaluation and remedy.

## 1.1 Purpose and Scope

The purpose of this Data Gap Analysis Report is to provide a summary of existing data, including an assessment of the existing data for usability. The usability assessment consists of determining if the data generated to date is of sufficient quantity and quality for its intended uses. These uses include both the purposes for which the data were originally generated; and the extent to which these data are also adequate for current and future uses. These current and future uses of the data may include performing a remedial investigation (RI), feasibility study (FS); remedial design (RD), and remedial action (RA); and final release of the site. Within these broad programs, data may be used to establish the nature and extent of contamination; fate and transport; human health risk assessments; screening level ecological risk assessment; estimation of quantities and classification (e.g., hazardous or non-hazardous; low level radioactive waste; etc.) of contaminated material of various matrices (soil; groundwater; surface water; building materials); and achievement of cleanup goals (release criteria). After this review is completed and presented in this report, the data gaps will be identified, and options or recommendations will be presented for data that needs to be acquired to fill these gaps.

## 1.2 Guterl Steel Site Location and Background

### 1.2.1 Site Location

The Former Guterl Specialty Steel Corporation FUSRAP site (Guterl Steel site) is located in Lockport, Niagara County, New York, approximately 20 miles northeast of Buffalo, NY. As defined by USACE Buffalo District Scope of Work (SOW), Data Review, Data Gap Analysis, Acquisition of Field Data, and Remedial Investigation for the Former Guterl Specialty Steel Corporation, (USACE, 2005a), the site was defined as "an approximately 70-acre site" comprised of three general areas, including the 52-acre Allegheny Ludlum Corporation property, the 9-acre landfill area, and the 9-acre excised area (see Figure 2 in Attachment 2 for the SOW-defined site boundary). However, during the Technical Project Planning (TPP) Meeting conducted August 9 and 10, 2005, it was agreed to include additional properties that were at one time held by the Simonds Saw and Steel Company that may have been impacted by MED/AEC activity. (The Simonds Saw and Steel Company (Simonds), a predecessor to Guterl Specialty Steel Corporation and operator of the facility during MED/AEC activity, appears in several historical report titles.)

Figure 1, Site Location Plan, presents the TPP-defined site boundaries including additional properties north and northeast of the SOW-defined boundaries. Pursuant to the TPP Meeting, it was agreed to include the additional properties in the background records search and data gap analysis until individual tracts could be eliminated based on acquisition of data that would justify withdrawing the property from further consideration. Figure 2 presents the study area with the landfill area and Excised Area highlighted.

### 1.2.2 Background

Earth Tech reviewed the site operational history using available documents as part of this data gap analysis. A detailed operational history for the Guterl Steel site, including MED/AEC operations, is presented in a background research report prepared for USACE by others (HGL, 2005). The following paragraphs summarize the operational history of the Guterl Steel site.

From 1910 to 1966, the site was owned and operated by Simonds Saw and Steel Company to manufacture steel and specialty steel alloys (high-alloy) used in the production of saws and other tools. During World War I and World War II, normal plant operations were suspended, and the plant produced armor plating for the US Government under various contracts (HGL, 2005).

In 1948, the New York Operations Office of the AEC negotiated a contract with Simonds. AEC operations continued until December 31, 1956. During the time between 1948 and 1952 documents indicated that Simonds processed as much as 600,000 pounds of natural uranium (i.e., processed uranium steel without enrichment supplied as metal ingots) and the plant annually conducted approximately 312 rolling turns of metal, which would process between 15,000 and 20,000 pounds of uranium ingots each. In 1953, 1954, 1955, and 1956, there was production of 29, 56, 58, and 22 turns of metal, respectively. Each turn processed between 15,000 and 20,000 pounds of uranium ingot. According to prior reports, some of the later lots contained enriched uranium and depleted uranium (refer to additional discussion related to this topic in Section 2.4 and 2.5). It is also reported that during this time period, Simonds processed 30,000 to 40,000 pounds of thorium for National Lead of Ohio (NLO) and the AEC (HGL, 2005).

In 1966, Simonds was acquired by the Wallace-Murray Corporation, which continued to operate the plant as a specialty steel mill until 1978, when Guterl Specialty Steel Corporation acquired the site property (HGL, 2005).

In 1982, Guterl filed for Chapter 11 bankruptcy protection in the US Bankruptcy Court for the Western District of Pennsylvania. This was changed to a Chapter 7 bankruptcy in 1990. In 1984, using industrial development bonds received through the Niagara County Industrial Development Agency, Allegheny Corporation purchased Guterl's assets at an auction (HGL, 2005).

According to US Bankruptcy Court documents, "on information and belief, at the time, Allegheny (Allegheny Ludlum) was shown certain documents and learned from counsel for the EDA (US Economic Development Association), William Ogden, that the Site contained radioactive contamination. On information and belief, the United States EDA had certain documents in its possession that reflected the significant radiological contamination at the Site. Allegheny refused to close" (HGL, 2005).

As a result of the documents and information received from Mr. Ogden, Allegheny Ludlum agreed to close the deal, but only after the "contaminated" area was removed from the sale. This portion of the property, approximately 9 acres of land, became known as the "Excised Area." Allegheny Ludlum also excluded a portion of Guterl's assets from the sale, including equipment utilized during AEC-related operations at the site (HGL, 2005).

The Guterl site is currently being operated by Allegheny Ludlum, which occupies the portion of the Guterl steel site that is not part of the landfill or Excised Area (HGL, 2005).

### 1.2.3 Introduction of Identification of Contaminants of Potential Concern

Based on an extensive review of the information available to Earth Tech, the contaminants of potential concern (COPCs) identified for the site under the FUSRAP program are limited to uranium (U-238, U-235, and U-234) and thorium (Th-232). It is Earth Tech's opinion that there is adequate basis for this determination, and that there are no data gaps with regard to the identification of FUSRAP-eligible COPCs. This discussion is expanded upon in Section 2.4 and Section 2.5.

No evidence has been located that plutonium or other radioactive materials were processed at the site; and levels of radium detected in other investigations are consistent with background or naturally-occurring levels of radioactive materials typically associated with steel mill operations.

It is important to note that the site has an operational history dating from 1910 to the present. The MED/AEC activity was conducted by Simonds Saw and Steel Company during the period 1948 to 1956. Therefore, activities associated with the manufacture of steel and steel products were conducted by prior and subsequent owners of the Guterl Steel site. Section 2.2 of this report presents a Conceptual Site Model that incorporates pertinent MED/AEC logistics and operations for the Guterl Steel Site. Activities that occurred prior to and after the MED/AEC period of work could have an effect on contaminant pathways (e.g., utilities) and or transport (e.g., general filling and site development).

## 1.3 Project-Specific Data Quality Objectives

The goal of this project is to generate data of known and sufficient quality and quantity, with quantitation levels low enough to meet pertinent standards, ARARs and remediation goals, with the long-term objective being the selection of a protective remedy that satisfies CERCLA. To achieve this, it is necessary to obtain data that is sufficient to determine nature and extent, risk, and fate and transport of contaminants in a remedial investigation, conducted utilizing CERCLA guidance (USEPA, 1988). A secondary objective of this data collection may be to produce data sufficient to develop an adequate volume estimate of contaminated media, as well as to assist in the development of project cost estimates, to support the feasibility study. The data may also be used to identify appropriate disposal facilities for wastes generated during site investigation activities and during remedial action.

A preliminary identification of DQOs and ARARs is presented in the report *Preliminary Identification of Data Quality Objectives and Applicable, Relevant, and Appropriate Requirements, Former Guterl Specialty Steel Corporation FUSRAP Site* (Earth Tech, 2005b).

A Technical Project Planning (TPP) Meeting was conducted August 9 and 10, 2005 for the Guterl Steel site. The purpose of the TPP Meeting was to gather the project stakeholders for informational and technical discussions regarding the project objectives for the Guterl Steel site RI/FS. A major outcome of the meeting was the identification of site-specific project objectives.

The project data quality objectives, as defined by the TPP Meeting, include (grouped by topic):

### Overarching Objectives:

1. Determine the nature and extent of MED/AEC related constituents present at the site (i.e., uranium and thorium, and the media and locations in which they are present).
2. Acquire information to define the fate and transport of contaminants from the site.
3. Determine whether contaminants present constitute a threat to human health or the environment.
4. Provide sufficient characterization data to allow completion of subsequent Feasibility Study (FS), Remedial Design (RD), and Remedial Action (RA).

### Operations:

5. Define AEC-contracted site operations, including processing and material handling areas, to identify: 1) any chemicals unique to the AEC contracted process; and 2) areas of the site that could be impacted (especially during forging, quenching, oxidation, and descaling processes).
6. Identify the underground utility system within the site, including if possible, utilities in place at the time of AEC contracted efforts and utilities installed after the AEC contracted efforts. Includes both between building and within building utilities.

## Health and Safety:

7. Determine magnitude of any chemical contamination to support worker safety protection.
8. Evaluate the safety and stability of the existing building structures to allow for RI activities. Establish worker protection requirements. Establish a baseline assessment of building condition to determine minimum requirements for building preparation to allow for execution of the RI. (If extensive building preparation is required, a cost/risk management decision may need to be made to determine the effect on the FS alternative cost and to determine whether it is cost-effective to stabilize the building for sampling, or to dismantle the building and conduct the sampling of building materials on the ground.)

## Nature and Extent:

9. Define nature and extent of isotopic uranium and thorium in surface soils, subsurface soils, and buildings to support risk assessment (using Nuclear Regulatory Commission screening levels for human health and Department of Energy [DOE, 2002] for ecological) and development and evaluation of FS alternatives (volume determination).
10. Determine whether groundwater has been impacted by isotopic uranium and thorium above screening levels; and if so, determine nature and extent to support risk assessment, and development and evaluation of FS alternatives.
11. Determine whether surface water and sediments have been impacted by isotopic uranium and thorium above screening levels (screening levels for these media will need to be researched and developed during RI/FS tasks).
12. Determine the ground disturbances on the site that may have had an effect on where MED/AEC contaminants may have been moved. (i.e., landfill area, north area, etc).
13. Determine if isotopic uranium and thorium has contaminated underground utilities.

## Risk Assessment/Feasibility Study:

14. Determine the magnitude of any chemical contamination to support establishing transportation and disposal requirements (e.g., waste classification) and associated costs to be included in various FS alternatives.
15. Conduct an inventory of building content/structures to support FS alternatives and evaluations.
16. Review ORISE (1999) data to evaluate the uranium pathway and to verify that plutonium is not likely to exist at this site.
17. Confirm that the preliminary list of ROPCs is complete; and determine if any other non-radioactive material contaminants affect risk exposure calculations for radiation, and/or for the chemical toxicity of uranium.

18. Delineate Exposure Units (EUs) for building areas, surrounding land, and adjacent properties.
19. Gather sufficient data to complete a Baseline Human Health Risk Assessment (HHRA) for human health and a screening level ecological risk assessment.
20. Conduct risk assessment for current and future use scenarios.
21. Develop site-specific preliminary remediation goals.

The data quality objectives will be refined as the project progresses. The data quality objectives will guide the evaluation of existing data (as presented in this report) and the acquisition of any additional data needed to fill the data gaps identified for the Guterl Steel site so that the data used and obtained are sufficient to achieve the project-specific objectives. The preliminary DQOs (Earth Tech, 2005b) will be updated in the Task 5 Sampling and Analysis report, after finalization of this Data Gap Analysis Report.

## 1.4 Report Organization

This data gap analysis report is organized as follows:

- Section 1 Introduction and Objectives
- Section 2 Summary and Assessment of Existing Data
- Section 3 Data Gap Summary
- Section 4 Recommendations for Data Collection
- Section 5 Summary and Recommendations
- Section 6 References
- Tables and figures developed for this report follow the text sections
- Attachments

  Attachment 1 – Selected tables from previous reports

  Attachment 2 – Selected figures from previous reports

Supporting tables and figures that were not generated by Earth Tech that were presented in prior reports that provide pertinent summary or illustrative details are provided in Attachments 1 and 2 of this report, for the readers convenience. The tables and figures are referenced in Section 2 through Section 5.

# 2. Summary and Assessment of Existing Data

## 2.1 Previous Investigations

Existing data were generated under a number of previous investigations performed at the site, dating back to 1978. USACE personnel compiled the data and conducted a preliminary evaluation of the existing data from seven of these investigations, focusing on usability for risk assessment (which is a use that typically has the most stringent data quality requirements). Earth Tech added summary information for one additional report, ORNL (1978), in the same spirit as the USACE summary.

Previous investigations that are summarized below include:

- *Radiological Survey of the Former Simonds Saw and Steel Company, Final Report*, September 1978. Prepared by Oak Ridge National Laboratories (ORNL) for DOE. (ORNL, 1978)
- *Preliminary Engineering and Environmental Evaluation of the Remedial Action Alternatives for the Former Simonds Saw and Steel Company Site*, November 1981. Prepared by Ford, Bacon & Davis Utah, Inc. for Bechtel National, Inc., for DOE. (FBDU, 1981)
- *Phase I Investigation, Guterl Specialty Steel, City of Lockport, Niagara County*, January 1988. Prepared by Engineering-Science and Dames & Moore for NYSDEC. (NYSDEC, 1988)
- *Preliminary Site Assessment, Task 1 Records Search, Guterl Specialty Steel Corporation*, January 1991. Prepared by E.C. Jordan for NYSDEC. (NYSDEC, 1991)
- *Preliminary Site Assessment Evaluation Report of Initial Data, Guterl Specialty Steel, Volumes I and II,* April 1994. Prepared by ABB Environmental Services for NYSDEC. (NYSDEC, 1994)
- *Final Report, Guterl Steel Site, Lockport, New York*, USEPA Work Assignment No. 2-194, April 1998. Prepared by Roy F. Weston, Inc. for US EPA/ERTC. (EPA, 1998)
- *Radiological Survey of the Guterl Specialty Steel Corporation, Lockport, New York*, December 1999. Prepared under a contract with DOE by Oak Ridge Institute for Science and Education (ORISE) for United States Bankruptcy Court for the Western District of Pennsylvania. (ORISE, 1999)
- *Immediate Investigative Work Assignment (IIWA) Report for the Unlisted Guterl Excised Area*, October 2000. Prepared by NYSDEC. (NYSDEC, 2000).

A summary of the data contained in each of these reports, as well as the preliminary conclusions regarding the usability of the data, taken from the USACE summary report (USACE, 2005b), is presented below. A summary of the analyses performed and referenced in these reports, with more details on the sample quantities and analyses of each sample type is presented in Table 2.1-

1. The USACE summary report did not include a review of the ORNL (1978) report or data; the assessment and data compilation of that report was prepared by Earth Tech.

### 2.1.1 *Radiological Survey of the Former Simonds Saw and Steel Company, Lockport, New York, Final Report.* Prepared by Oak Ridge National Laboratory (ORNL) for the Department of Energy (DOE) under FUSRAP, September 1978

This investigation included the results of a radiological survey of the former Simonds Saw and Steel Company, Lockport, New York. The survey was conducted "to characterize the existing radiological status of the property" (ORNL, 1978), primarily in what is now referred to as the Excised Area. Investigations, which were conducted in October 1976, included measurement of residual alpha and beta-gamma radiation levels in the rolling mill building and forging shop; external gamma radiation in the same area; uranium, radium, thorium in soil samples taken from beneath removable floor plates in the rolling mill area and from other parts of the site; radon and radon daughter concentrations in air samples in the rolling mill building; and contamination in drainage paths leading from the buildings and grounds. A few samples were also analyzed for individual uranium isotopes (U-234, U-235, and U-238) by mass spectrometry.

Using the same criteria as applied by USACE in its review, Earth Tech believes that these data may be usable in a risk assessment if chain-of-custody forms (COCs), equipment calibration records, detection limits, and analytical methods, are obtained from ORNL / DOE, assuming that the appropriate analytical methods were used, and that the detection limits are below appropriate screening levels for constituents of interest. Due to the age of the data, it is unlikely that all the supporting documentation will be available. However, even if the data quality does not allow the data to be used directly in a risk assessment, the data are likely be useful for determining nature and extent of contamination, focusing subsequent investigations, and may assist in determining disposal options.

### 2.1.2 *Preliminary Engineering and Environmental Evaluation of the Remedial Action Alternatives for the Former Simonds Saw and Steel Company Site, Lockport, New York,* Former Utilized MED/AEC Sites Remedial Action Program, Final Report. Prepared by Ford, Bacon & Davis Utah, Inc. for Bechtel National, Inc. under FUSRAP, for DOE, November 1981

The purpose of this report was to present the results of a preliminary engineering evaluation and the environmental assessment leading to the selection of appropriate remedial action options for the former Simonds Saw and Steel Company Site (now referred to as the Guterl Steel Site). This investigation included analysis of cinder samples from the Guterl Excised Area, primarily within the area of the 16-inch rolling mill. Ford, Bacon & Davis Utah also collected external gamma radiation measurements in "Building A" (equivalent to Building 8 in the ORISE 1999 report) in the general vicinity of the 16-inch rolling mill, and in "Building B" (equivalent to Building 3 in the ORISE 1999 report). Test parameters included radium, thorium and uranium. The report included analytical results with units, and sample location and depth.

USACE (2005b) concluded that the data may be usable in a risk assessment if COCs, equipment calibration records, detection limits, analytical methods, and uncertainty are obtained from

Bechtel, assuming that the appropriate analytical methods were used, and that the detection limits are below appropriate screening levels for constituents of interest. As with the ORNL (1978) data, it is unlikely that all the supporting documentation will be available. However, even if the data quality does not allow the data to be used directly in a risk assessment, the data are likely to be useful for determining nature and extent of contamination, focusing subsequent investigations, and may assist in determining disposal options.

### 2.1.3 *Engineering Investigations at Inactive Hazardous Waste Sites - Phase I Investigation, Guterl Specialty Steel, City of Lockport,* Niagara County. Prepared by Engineering-Science and Dames & Moore for NYSDEC, January 1988

The purpose of this report was to assess the hazard to the environment caused by the then-present condition of the landfill area. Materials reportedly disposed in the onsite landfill, operated from 1962 until 1981, includes slag, palletized baghouse dust, foundry sand, wood, and miscellaneous plant rubbish. The Phase I Investigation report included presentation of five rounds of prior analyses, collected between 1980 and 1982 by Secure Landfill Contractors (SLC), for groundwater samples from the Guterl Landfill Area. Test parameters reported included oil & grease, phenols, total organic carbon (TOC), total halogenated organics, and metals. The report included analytical results with units and sample location. Boring logs and monitoring well construction logs were also included.

USACE (2005b) concluded that these data may be usable in a risk assessment if COCs, equipment calibration records, detection limits and analytical methods are obtained from NYSDEC. (Some of this information was included in the 1991 PSA-Task 1 document [NYSDEC, 1991], described immediately below.) Earth Tech notes that the data presented in the report were from samples collected between December 1980 (approximately 25 years ago) and April 1982; as such, the data are unlikely to be representative of current conditions. As a result these data are unlikely to be useful for current and future data needs.

### 2.1.4 *Engineering Investigations at Inactive Hazardous Waste Sites - Preliminary Site Assessment, Task 1 Records Search, Guterl Specialty Steel Corporation, City of Lockport, Site No. 932032, Niagara County.* Prepared by E.C. Jordan for NYSDEC, January 1991

This report was prepared solely to determine the proper classification of the site in accordance with NYSDEC regulations (i.e., to determine if hazardous waste is present at the site [6 NYCRR Part 371] and if the waste at the site poses a 'significant threat'). This investigation included a summary of previous analysis of groundwater samples collected by SLC from the Guterl Landfill Area for the period 1980 to 1982. Test parameters summarized in the report included oil & grease, TOC, total halogenated organics (as lindane), metals (chromium, copper, iron, lead, magnesium, and nickel) and phenols; however, no analyses were conducted as part of this Phase 1 PSA (Task 1). Data from the December 1980 through April 1982 samples presented in this report are a re-statement of the same set of samples presented in the NYSDEC, January 1988 Phase I Report; however, a more complete summary is provided in the appendix to this 1991 PSA report than was present in the 1988 Phase I report.

USACE (2005b) concluded that these data may not be usable in the risk assessment as only maximum concentrations are provided at each location; however, Earth Tech notes that a more complete summary is provided in Appendix D of the report (NYSDEC, 1991), which includes all the parameters and all the events, including reporting limits for non-detects. (Appendix D indicates that analyses were performed, including lindane, oil and grease, and other metals.) In addition, Earth Tech notes that the data presented in the report were from samples collected between 1980 and 1982 (more than 20 years ago); as such, the data are unlikely to be representative of current conditions. As a result these data are unlikely to be useful for current and future data needs.

### 2.1.5 *Engineering Investigations at Inactive Hazardous Waste Sites- Preliminary Site Assessment Evaluation Report of Initial Data, Guterl Specialty Steel, City of Lockport, Niagara County,* Volumes I and II. Prepared by ABB Environmental Services for NYSDEC, April 1994

The purpose of this report was to establish the presence of hazardous waste at the Guterl Site and to determine if the Site posed a significant threat to public health or the environment. Specifically, the investigation was performed to develop data to reclassify the Site from a Class 2a to a Class 2 hazardous waste site.

This investigation included analysis of surface and subsurface soil, surface water, sediment, groundwater, and waste from the Guterl Landfill Area. Analytical parameters included volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), pesticides, PCBs, metals, and TCLP. Groundwater and surface water samples were also analyzed for gross alpha and gross beta activity. A survey for gamma radiation was conducted over the landfill area (228 grid points on a 33.33-ft spacing). In addition, split spoon samples were scanned for alpha, beta, and gamma radiation using a survey meter. The report included COCs, analytical results with units, detection limits, data qualifiers, analytical methods, equipment calibration records, and sample location and depth.

USACE (2005b) concluded that these data may be usable in a risk assessment. Data for conventional chemical analyses were validated by the contractor (ABB-ES); the laboratory data for gross alpha and gross beta radioactivity (groundwater and surface water samples) were not validated.

### 2.1.6 *Final Report, Guterl Steel Site, Lockport, New York.* Prepared by Roy F. Weston for USEPA, Work Assignment No. 2-194, April 1998

The purpose of this investigation was to conduct in-situ surficial, and ex-situ subsurface soil analyses for target metals using x-ray fluorescence (XRF). The samples were collected within the Excised Area, inside and outside Buildings 1, 2, 3, and 4/9. The samples were analyzed to evaluate the horizontal and vertical distribution of cadmium and lead (identified by the authors as primary indicators), and arsenic, nickel, and zinc (identified as secondary indicators). Additionally, shallow subsurface soil samples analyzed ex-situ by XRF analysis were submitted for TCLP metals analysis. Samples were also collected for PCB analysis from oil-stained areas and in the vicinity of an electric transformer.

Surficial lead and cadmium concentrations were detected in excess of the "screening level" of 400 parts per million (ppm) for lead and 200 ppm for cadmium over variable areas in each of the buildings and in the building exterior "vicinity." TCLP analyses showed limited areas of lead exceedances per regulatory guidance (5 ppm). PCBs (Aroclor 1260) were detected in samples collected near the transformer area, but were not detected in samples collected within oil-stained areas of Building 3.

The report included COCs, analytical results with units, equipment calibration records, detection limits, data qualifiers, analytical methods, and several figures depicting sample locations (without a fixed grid system) and contaminant isopleths. Data for the sample depth is present, but must be derived from COCs and analytical data reports. USACE (2005b) concluded that these data may be usable in a risk assessment.

### 2.1.7 *Radiological Survey of the Guterl Specialty Steel Corporation, Lockport, New York*. Prepared under a contract with DOE by Oak Ridge Institute for Science and Education for United States Bankruptcy Court for the Western District of Pennsylvania, December 1999 (ORISE, 1999)

The purpose of the ORISE investigation was to (1) adequately characterize the radiological status of the land and buildings areas located at the properties at the Guterl site including the Allegheny Ludlum property, and (2) to be comprehensive enough to provide both a volume and cost estimate for remediation design. This work was conducted in response to a request of the US Bankruptcy Court for the Western District of Pennsylvania and with the approval of the Department of Energy.

This investigation included analysis of surface and subsurface soil and sediment samples from the Guterl Excised Area. The investigation also included a radiological survey of the buildings in the Excised Area. Test parameters included radium, thorium and uranium. The report included analytical results with units, uncertainty, data qualifiers, analytical methods, and sample location and depth. Sample locations are often generalized to an item rather than a specific coordinate.

USACE (2005b) concluded that these data may be usable in a risk assessment if COCs, equipment calibration records, and detection limits are obtained from ORISE.

### 2.1.8 *Immediate Investigative Work Assignment Report, Guterl Excised Area, City of Lockport, Niagara County*. NYSDEC, October 2000

The purpose of this report was to determine the presence and extent of hazardous wastes at the Site. Specifically, the purpose was to determine if consequential amounts of hazardous wastes were disposed of in the Excised Area that would require the Excised Area be listed in the New York State Registry of Inactive Hazardous Waste Sites. In addition, this report evaluated the effects of the Erie Barge Canal and the Frontier Stone Products quarry on the groundwater flow pattern in the vicinity of the Site by studying the strata underlying the site.

This investigation included analysis of surface and subsurface soil, groundwater, surface water, and sediment samples collected from the Guterl Excised Area. Analytical parameters included VOCs, SVOCs, pesticides, PCBs, metals, and TCLP. The report included analytical results with units, data qualifiers, analytical methods, and sample location and depth. Sample COCs, equipment calibration records, and detection limits were not included in the report.

USACE (2005b) concluded that these data may be usable in a risk assessment if COCs, equipment calibration records, and detection limits are obtained from NYSDEC.

## 2.2 Conceptual Site Model

A conceptual site model (CSM) has been developed to organize the data evaluation process, and to allow for the evaluation of the impacts of MED/AEC operational history at the Guterl Steel site on the distribution, and potential fate and transport mechanisms of MED/AEC related wastes.

### 2.2.1 Production Process/Material Handling

The primary radionuclides of potential concern (ROPCs) for the Guterl Steel site include uranium-238 (U-238), uranium-235 (U-235), uranium-234 (U-234), and thorium-232 (Th-232). The presence of radium-226 (Ra-226) at a steel mill of this age is not considered indicative of MED/AEC related activity. As such, the presence of radon-222 (Rn-222) is also not considered indicative of MED/AEC activity. Therefore, Ra-226 and Rn-222 are not considered ROPCs for this investigation.

According to prior reports, the majority of MED/AEC related activity involved the processing of uranium (U) metal through the 16-inch mills in Buildings 6 and 8 at the Guterl Steel facility; thorium was also processed, to a lesser extent, during the latter part of this period. On average, the MED/AEC materials were processed one week per month over the period 1948 through 1956. There is also some information that a limited amount of zirconium may have been processed by Simonds at Guterl for AEC between 1948 and 1958 (HGL, 2005; pg 3-9). However, zirconium is not radioactive and is generally considered to be of low toxicity, and there are no federal or state standards for zirconium in soil or water. Therefore, zirconium is not considered a contaminant of concern at Guterl and will not be evaluated further. (See Section 2.4 for a more detailed discussion of the contaminants of concern identified for the Guterl Steel site.)

Based on a review of operational history prepared by others, routine MED/AEC operations for the Guterl Steel site are summarized as follows (ORNL, 1978; see also ORNL Figure 2 and HGL Figure 3.5 in Attachment 2):

- Uranium/thorium (U/Th) metal billets or ingots arrived at the Guterl Steel site via railroad car from the railroad spur located east and north of the landfill area.
- The U/Th metal was offloaded from the railroad cars along the west side of Building 8 at the loading dock, and was subsequently weighed in inside Building 8.

- The U/Th metal was uncrated and stored for processing in the eastern portion of Building 8.
- The U/Th metal was then processed through the 16-inch mills within Building 8. Several small lots were run through the 10-inch rolling mill located in Building 2.
- The processed U/Th bars were then packaged for shipping adjacent to the loading dock, and were weighed for shipment.
- The processed U/Th metal was shipped out of the facility via railroad car along the railroad spur east and north of the landfill.

Background information indicates that baghouse flue dust from the 16-inch rolling mills was not always completely accounted for during the MED/AEC activities, and that the collection of flue dust was not always operational. An example of the impact of this is indicated in prior reports that indicate U-238 was detected in dust samples collected from the building rafters (HGL, 2005).

Definitive information with respect to Simonds Saw and Steel Company's management of waste materials generated as part of routine steel manufacturing and processing (i.e., non-MED/AEC materials) was not located. Several reports indicate the development of the onsite landfill was not initiated until 1962, several years after the MED/AEC activities were completed. However, radioactivity above background levels has been detected in part of the landfill (ABB-ES for NYSDEC, 1994). An understanding of how routine wastes were managed would provide insight into the potential areas where poor housekeeping or inadequate management of MED/AEC waste materials might be located. Aerial photographs of the site from the period of MED/AEC operations indicate significant areas of soil disturbance to the west and north of the Excised Area, extending westward to the railroad spur and north along the spur (HGL, 2005).

Significant development of the Guterl Steel property has taken place since the conclusion of MED/AEC activities. Several new production and storage buildings have been constructed to the north, northwest, and west of the Excised Area buildings. Land disturbance (documented in the review of historical aerial photographs) during development could serve to bury or sporadically relocate wastes that may have been located in those areas. Such disturbance may account for the detection (and in some cases, visual observation) of radioactive materials outside of the areas know to have been utilized for processing the MED/AEC materials.

### 2.2.2 Geology/Hydrogeology

Groundwater occurrence at the site has been described in several reports. Groundwater occurrence is best summarized by NYSDEC (2000). As described by NYSDEC, there are three basic lithologic overburden units, one bedrock unit, and two water bearing zones present at the site. The basic overburden lithologic units include imported and/or man-made fill materials, overlying native overburden materials comprised of glaciolacustrine silts and clays overlying glacial till. The two water bearing zones include a water-table zone in the overburden, and bedrock groundwater. Each component is described in more detail below.

In general, fill material ranges from 0.3 to 3.7 feet in thickness at the site. (Fill material at the landfill area, however, ranges up to 14 feet in thickness.) The fill material is reported to consist predominantly of production and miscellaneous plant wastes containing coal, ash, coke, and brick.

Native overburden is described as a combination of a thin, discontinuous glaciolacustrine deposit of silts and clays overlying a thin, discontinuous glacial till of silt and clay with lesser amounts of sand and bedrock fragments. Both native units were noted to display vertical desiccation cracks. The glaciolacustrine unit ranged from 0.5 to 8.7 feet in thickness, where present. The glacial till unit ranged from 0.3 to 4.0 feet in thickness, where present.

The uppermost bedrock surface consists of an east-southeast dipping Goat Island Member of the Lockport Dolostone Group, which contains horizontal and vertical fractures. Other physical features observed within the region in the Goat Island Member include vugs, physical weathering of the bedrock surface (e.g., glacial effects), and solution weathering of the fractures (i.e., solution-widened secondary porosity). Depth to bedrock ranges from less than 3 feet below grade (north/northwest portions of the site) to approximately 5 feet below grade (southeast portion of the site).

According to NYSDEC (2000), groundwater occurs in the fill and native soils of the overburden, and in the shallow bedrock. This report concludes that groundwater flow in both the overburden and bedrock zones appears to flow from a north-south trending groundwater divide centered over the landfill. Groundwater west of this divide appears to flow west toward the former Frontier Stone Products quarry, and groundwater east of this divide appears to flow east toward the Erie Barge Canal. Additional conclusions drawn by NYSDEC include that the two water bearing zones appear to be hydraulically well connected, and each zone exhibits definable seasonal water level fluctuations.

### 2.2.3 Environmental Surface Water/Environmental Sediment

Based on an assessment of available information, surface water at the site is largely unmanaged. Surface water can be considered to occur in two forms at the site: storm water runoff, and standing or ponded water resulting from generally poor drainage patterns. Earth Tech suggests that the generally poor drainage patterns are a result of generally poor management of filling, landfilling, and grading activities at the site. USACE also notes "In general, this area of Lockport is found to have poor drainage. Due to low soil permeability, there is a high potential to collect water from precipitation and overland drainage" (USACE, 2001; p 5).

Since storm water runoff is unmanaged, i.e., no storm sewers reportedly exist at the site, runoff is expected to move as sheet flow from topographic highs to topographic lows. Two prominent topographic lows are apparent at the property: one at the northeastern corner of the site (north of the Excised Area); and, another south-southwest of the landfill. USACE notes that "Drainage of the Guterl Steel site is to the north. During periods of high precipitation, overland runoff flowing to the north could reach Gulf Creek, a tributary of Eighteen Mile Creek" (USACE, 2001, p. 5). The landfill is poorly graded, and has been observed to exhibit pockets of standing water (e.g., NYSDEC, 1991). Storm water that falls within the buildings of the Excised Area can be considered to be trapped, and subject to evaporation or infiltration within the building footprints.

With respect to environmental sediment, no regulated wetlands have been identified at the Guterl site. FBDU (1981) noted that the site is not in a floodplain; but do not specifically mention the presence or absence of wetlands. NYSDEC (1988; citing Doleski, 1980) notes that there is a low-lying wet area to the west and southwest of the site (the landfill area, which was the 'site' studied), but states that "this area is not classified as a regulated wetland." However, this assessment is now somewhat dated, and should be repeated to confirm the current status. The site does not contain any streams and has no visible connection to other surface water bodies (NYSDEC, 1988), including the Erie Canal located south-southeast of the site. Historic documents (e.g., HGL, 2005) indicate that a cooling water intake and an oil/water separator were located in close proximity to the Erie Canal, and overflows from the oil/water separator may have reached the Erie Canal.

Sediment that may occur in site utilities, including sewers and drains, is addressed in the following section.

### 2.2.4 Sewers and Drains/Site Utilities

During the TPP Meeting, and as noted in prior reports (e.g., NYSDEC, 2000), a better understanding of the type and distribution of site utilities is necessary to complete the conceptual site model. Features such as trenches, drains, and sewers are poorly defined and require additional document research (e.g., plant engineering drawings) and investigation. HGL attempted to acquire detailed utility maps of the site and contacted the Lockport City Engineer, Lockport Department of Sewers, and New York State Electric and Gas to gain access to these records. However, HGL was informed that it would not be possible to view these records without Allegheny Ludlum's permission as these utilities were privately installed and located on private property (HGL, 2005; p 6-2). HGL does note that the bankruptcy trustee for Guterl Specialty Steel conveyed an easement to NCIDA and Allegheny Ludlum granting, among other rights, use of the sewer lines on the Excised Property (HGL, ibid).

The NYSDEC IIWA report notes that "Inspection of the Excised Area did not reveal a clear and distinct stormwater system to collect and convey surface water at the site, although there is an expectation that such a system did exist" (NYSDEC, 2000; p 40).

A brief description of the intake system for a cooling water system is presented in the IIWA (NYSDEC, 2000). According to the report, the plant withdrew water from the Erie Canal for storage in a small intake reservoir. The pump house and intake reservoir were located between Ohio Street and the Erie Canal. The water was pumped to the production areas for use as contact cooling, non-contact cooling, and process water. A sump and pumping system located between Building 2 and Building 3 collected the waters after use in the plant. The IIWA states that waters from the sump between Building 2 and Building 3 were then pumped back to an oil/water separator located at the pump house near the Erie Canal. After oil/separation, the waters were returned to the intake reservoir, or overflowed back to the Erie Canal. NYSDEC (2000) reports that the oil/water separator was backfilled and covered, and was no longer capable of service. This information appears to be consistent with other information indicating that a "sewer system under the excised area of the site was used during site operations to bring water in from and to discharge wastewater to the Erie Canal" (HGL, 2005; p 2-4; citing USACE and Niagara County historian sources). From 1974 to 1986, discharges from this system to the Erie Barge Canal were regulated under NPDES permit 0002674 (NYSDEC, 2000; p 40). (The NPDES system was established under section 402 of the Clean Water Act in 1972; so discharges prior to this time would not have been subject to permit requirements.) The 1981 permit application by Guterl indicated use of 2,000 gallons per year of trichloroethylene (TCE).

As a result of the poor documentation, it is unclear whether utilities within the production areas may have accumulated sediment as direct runoff from the dirt floors.

## 2.3 Identification of Investigative Areas

During the TPP Meeting, the concept of developing Investigative Areas (IAs) to better manage the assessment of existing data and future data needs was introduced. The organizational benefit of developing IAs is demonstrated by developing a correlation between the CSM and data gap analysis. These IAs may also be useful for developing Exposure Units for risk assessment purposes.

- IA01 Excised area – Building Surfaces and Interiors (including Building 24)
- IA02 Excised Area – Building Exterior Areas
- IA03 Landfill Area
- IA04 NCIDA property (Allegheny Ludlum operations area, not including Excised Area, landfill, or Building 24)
- IA05 Railroad Right-of-Way north of site proper
- IA06 Off-site Northeast properties
- IA07 Groundwater
- IA08 Site Utilities (Sewers and drains)

### 2.3.1 Investigative Area 01 (IA01) - Excised Area – Building Surfaces and Interiors (Including Building 24)

The buildings included in IA01 are the nine buildings within the Excised Area; several of the buildings are attached and appear to be a single building. The nine buildings in the Excised Area are Buildings 1 and 2; the attached (co-joined) buildings 3, 4, 5, 6, 8, and 9; and Building 35. Building 24, which is attached to the north side of Building 8, is not part of the Excised Area but is discussed within this section due to the impact of MED/AEC operations on the south end of the building. Table 2.3.1-1 provides a summary of building construction date, floor space, and use.

The most comprehensive radiological survey of the Excised Area (and of the Guterl Site in general) is the survey conducted by ORISE in 1999. The ORISE survey was based on the contamination potential definitions provided in the Multi-Agency Radiation Survey and Site

Investigation Manual (MARSSIM) (USEPA, 2000). Areas of the Guterl Steel site were designated by ORISE as Class 1, Class 2, or Class 3 based on the potential for residual radioactivity and on previous investigations by ORNL, Bechtel and NYSDEC. Table 2.3.1-2 provides a summary of the initial classifications for each Excised Area building. The investigative protocol, especially with regard to the density of sampling, is a function of the designation of a particular area; however, area designations were re-classified (either up or down) during the execution of the ORISE survey, based on information obtained during the performance of the survey. The Class 1, 2, and 3 area designations are defined as follows.

> Class 1 – Areas that have a significant potential for radioactive contamination (based on site history), known contamination (based on previous survey data), or any interior areas identified to be greater than 75 percent of the surface activity guideline based on scans and direct surface activity measurements, or exterior areas with direct gamma scan reading at least two times the background readings.
>
> Class 2 – Areas contiguous to Class 1 areas, or areas that have known or potential contamination between 25 and 75 percent of the surface activity guideline based on scans and direct surface activity measurements for interior areas and for exterior areas that are not directly associated with firebrick, based on direct gamma scans between 1.3 and 2 times background.
>
> Class 3 – Areas that are not expected to contain residual contamination based on site history or previous data. Exterior areas identified to be at or near background based on direct gamma scans, or interior areas identified to be less than 25 percent of the surface activity guideline based on scans and direct surface activity measurements.

Initially, ORISE designated only Buildings 6 and 8 as Class 1 areas. However, data acquired as the survey progressed resulted in a re-classification of some areas of Buildings 1, 2, 3, 4 and 9 (and 24) as Class 1 areas.

Originally, all of buildings 2, 3, 4 and 9, 5, and 35 (and the southern section of 24) were designated as Class 2 areas. However, as noted above, parts of these Class 2 areas were re-assigned to Class 1 as the investigation progressed.

Building 1 and the northern section of Building 24 were originally designated as Class 3 areas.

The USACE 2005 Summary of Historical Analytical Data for the Guterl Site found that the ORISE radiological survey data was the most comprehensive and potentially useable set of data relative to all other comparable data, subject to the availability of documentation on quality assurance. The building survey procedures include surface scans, surface activity measurements, exposure rate measurements, soil samples media isotopic concentration, and external exposure rates.

This description of the ORISE building survey procedures is applicable to all of the buildings surveyed by ORISE, including those outside the excised area (Buildings 24).

In Building 6 and 8, a 5 x 5 meter reference system was used on the floors and a 1 x 1 m reference grid was used on the lower walls up to 2 m. The ceilings, walls above 2 m, and equipment in these buildings were not gridded. The remaining buildings were not gridded. Measurements and samples collected on ungridded surfaces were referenced to site features and documented on to-scale facility drawings.

The ORISE surface scans on floors and lower walls were made for beta and gamma radiation. Scan coverage was based on the area classification. Particular attention was given to cracks and joints in the floors and walls, ledges, ducts, drains, and horizontal surfaces where material had accumulated. Scans were performed using NaI scintillation detectors for gamma radiation and gas proportional or GM detectors for beta radiation coupled to ratemeters or ratemeter-scalers with audible indicators. Locations of elevated direct radiation were marked for further investigation. Where residual contamination was detected, additional areas were scanned to delineate the contamination boundaries.

The ORISE surface activity measurements included direct measurement of building surfaces as a measure of total beta activity (fixed plus removable) on the surface and removable alpha and beta activity, in units of disintegrations per 100 $cm^2$ (dpm/100 $cm^2$). The direct readings noted in the report as Total Activity are based on the measurement of the beta radiation only, since accurate measurements of alpha radiation in the field are difficult to make due to the high potential for variable surface effects. The removable activity measurements were determined by analyzing smear samples collected from the building surfaces for alpha and beta radiation. Systematic and judgment locations were measured using gas flow and GM detectors coupled to ratemeter-scalers. A total of 306 measurements were taken in the buildings within the Excised Area. An additional 135 surface activity measurements were taken in Buildings 24 and 35.

Exposure rate measurements at one meter above the surface were made at a minimum of five locations within each building using a microrem meter. A total of 62 of the 72 measurements taken in buildings were in the buildings within the Excised Area (ORISE 1999, Table 10).

Surface soil samples (0 to 15 cm) were collected systematically or randomly from locations of elevated direct gamma and beta radiation. A total of 102 surface soil samples were collected from soil areas from Buildings 2, 3, 6, and 8. Samples of residue from equipment pits and similar areas that were inherently soil-like are included. Sample frequency was set to at least one sample per 100 $m^2$ in Class 1 areas and at least 10 locations in each Class 2 building.

In addition, subfloor samples from beneath the concrete floor or other type of overlayments were collected from within Buildings 2, 3, 4 and 9. A total of 25 samples were collected from 15 locations within these buildings.

Miscellaneous samples include one composite of dust and loose material from random horizontal surfaces within Building 8. Sediment samples were collected from the oil/water separator, located in a small building next to the east side of Building 3 (i.e., not the same OWS that is adjacent to the former water intake at the Erie Canal), and five water-filled equipment utility trenches in Buildings 3 and 8.

Samples and data were returned to the ORISE/ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. Sample analysis was performed in accordance with the ORISE/ESSAP Laboratory Manual. Soil and miscellaneous samples were analyzed by gamma spectroscopy and results were reported in picoCuries per gram (pCi/g). Smear results and direct measurements were converted to dpm/100 cm$^2$. Exposure rates were reported in microroentgens per hour (μR/h). Although the radionuclides of interest were processed uranium and thorium-232, spectra were also reviewed for other identifiable photopeaks. Samples with photopeaks initially thought to be associated with americium-241 and thorium-230 were thought to be the result of low-energy x-ray interferences. Subsequent analysis of these samples by alpha spectroscopy for americium, plutonium and thorium-230 were conducted to confirm that these radionuclides were not present. The results confirmed that americium and plutonium were not present and they were inconclusive for Th-230 due to interferences. X-ray fluorescence analysis identified high levels of tungsten in samples. The low energy x-rays that caused false positives for americium-241 and thorium-230 were found to be the result of high uranium activity causing the tungsten to fluoresce and emit these x-rays.

The results from the conduct of these survey procedures at the Guterl site are summarized by building in Tables 2.3.1-3 through 2.3.1-13 of this report.

The general areas of contamination within and around the buildings in the excised area are shown in Figure 36 of the ORISE (1999) report (provided in Attachment 2). This figure illustrates the approximate areal extent of the contamination in and around these buildings in excess of 5,000 dpm/100 cm$^2$ and/or soil concentrations exceeding 35 pCi/g U-238 or 5 pCi/g Th-232.

To further illustrate the nature and extent of this contamination in the Excised Area, a summary description of the surveys, the results and the findings are provided by building.

**Building 1** was initially surveyed by ORISE as a Class 3 area. According to the initial classification of Building 1 as Class 3, the ORISE 1999 survey protocol for this building was approximately 50% for gamma and 10% for beta on accessible surfaces. This survey protocol used gamma scanning surveys to first identify locations of interest that are either elevated or representative of the conditions in the immediate area. In addition, approximately 10% of accessible locations were measured for total beta activity. Using the approximate Building 1 floor space of 815 m$^2$, the six direct measurements recorded for the floor is an average measurement frequency of approximately one measurement per 135 m$^2$.

The survey confirmed the Class 3 designation of the northern part of the building and identified elevated readings in the West Work Room (ORISE, 1999; Figure 11 and Table 2). Radiological contamination was below the direct measurement screening values throughout the building except in the Work Room located in the southwest corner of Building 1. All of the direct measurements noted in the Work Room on the countertop, a lower shelf and the concrete floor exceed 5,000 dpm/100 cm$^2$. The maximum reading of 100,000 dpm/100 cm$^2$ was measured on the concrete floor below the shelf. The throat of a floor drain in the immediate area is sealed with concrete and the concrete floor at the drain read 35,000 dpm/100 cm$^2$. As a result, the sealed drain and the drain line are suspect for contamination. Based on these findings, this area was reclassified as a Class 1 area but a more thorough survey of the Work Room was not conducted due to health and safety concerns. The Work Room is approximately 100 $m^2$ and the locations of the readings that exceed the screening values appear to be limited to the southern half of the room (ORISE 1999, Figure 11). In the worst case, the approximate 100 $m^2$ area in the Work Room represents approximately 12% of the floor space in Building 1. None of the measurements for removable activity identified values above the screening values. No soil or subfloor samples were collected for analysis in Building 1. The basement could not be surveyed since it was flooded.

**Building 2**, which is between Buildings 1 and 3, was identified to have both elevated surface and soil activity (ORISE 1999, Figures 12, 13 and 27; Tables 2 and 12). Building 2 was originally classified as Class 2. The survey protocol for this class was 100% gamma scans for dirt surfaces, beta scans on non-dirt surfaces to a minimum frequency of 50% and up to 100 % if suspect areas are identified, and beta scans of approximately 1% for equipment and horizontal surfaces above 2 meters with emphasis on areas with accumulation. Based on the 29 direct measurements made on the floor and the Building 2 floor space of approximately 6400 $m^2$, the average measurement frequency is approximately one measurement per 230 $m^2$.

Out of the total of 76 direct measurement locations, twelve (approximately 16%) had readings above 1,000 dpm/100 $cm^2$ and six (approximately 8%) were above 5,000 dpm/100 $cm^2$. The elevated readings were generally localized. Specific locations included a work bench and a door facing in the north section and a locker and multiple floor surfaces in the center section. Investigations beneath a concrete overlayment at the location noted on the west side of the building identified slag-like material which exhibited elevated gamma activity. No areas of elevated radiation were found in the southern section of the building, other than numerous old samples presumably stored there during previous site investigations. No surface measurements found removable levels of alpha or beta radiation in excess of the screening values. The limited overhead and upper wall surface investigations did not identify surface activity in excess of 5,000 dpm/100 $cm^2$. Three of the 13 surface soil samples (approximately 23%) and both of the subfloor samples exceeded one or more of the soil concentration screening values.

Figure 36 in the ORISE 1999 report shows 7 separate locations in Building 2 that have either surfaces above 5,000 dpm/100 $cm^2$ and/or soils above 35 pCi/g U-238 or 5 pCi/g Th-232. Based on the scale drawing, the total area of these locations is estimated to be approximately 150 $m^2$. Specific locations that are noted to be above the screening values include a locker, a work bench, and a door frame.

**Building 3**, which is connected and open to Buildings 4 and 9, and 6 and 8, was identified as having both elevated surface and soil activity (ORISE 1999, Figures 14, 15 and 28; Tables 3 and 12). A total of 38 out of 58 locations were elevated above 1,000 dpm/100 $cm^2$ and 22 exceed 5,000 dpm/100 $cm^2$. These elevated areas were found primarily in the southern two-thirds of the structure, the northern point being the point at which Building 8 ends. Based on the 24 direct measurements made on the floor and the Building 3 floor space of 6300 $m^2$, the average measurement frequency is approximately one measurement per 262 $m^2$.

In general, contaminated structures were in and around the equipment, the large trench located in the southern section, a roller cap located in the south section, the walkway/hopper track leading to the east side of the building, and multiple locations interspersed on concrete areas next to the cafeteria and in the vicinity of Building 8. Most of the overhead surfaces in the southern two-thirds of the building were also found to have elevated surface activity. Although five measurement locations above 2 meters showed removable alpha and or beta levels above background, none were in excess of the screening values. The limited overhead and upper wall surface investigations did not identify surface activity in excess of 5,000 dpm/100 cm$^2$. A total of 19 of the 26 surface soil samples and both of the subfloor samples exceed one or more of the soil concentration screening values. Elevated soil activity detected was generally within the same regions as those described for surface activity, with the highest levels in the area immediately adjacent to Building 8.

Figure 36 in the ORISE 1999 report (included in Attachment 2) shows five separate locations in Building 3 that have either surfaces above 5,000 dpm/100 cm$^2$ and/or soils above 35 pCi/g U-238 or 5 pCi/g Th-232. Based on the scale drawing, the total area of these locations is estimated to be approximately 1,500 m$^2$. Specific locations in the North Section that are noted to be above the screening values include the center throughway near the track, the truss above the furnace at 4 m, and the window ledge at 8 m. In the South Section, notable findings include an I-beam pedestal, a cabinet top, a roller cap, the south end of the trench, a window ledge at 8 m, a crane rail I-beam at 8 m, I-beams at 5 and 7 m, and the sidewalk near the cafe noted in Figure 28 of the ORISE 1999 report.

**Building 4 and Building 9** survey results were consolidated in the ORISE 1999 report. Building 4 is connected to and open to Building 9 on the west side and connected and open to Building 3 on the east side. The surveys identified elevated direct beta radiation in the central portion of the area and another area in the east central portion in the vicinity of a roller furnace (ORISE 1999, Figures 16, 17 and 29; Tables 4 and 12). Based on the approximate 4,400 m$^2$ floor space in Buildings 4 and 9 and the 17 direct measurements on the floor, the average measurement frequency is approximately one per 260 m$^2$.

A total of eight out of 28 measurement locations exceeded 1,000 dpm/100 cm$^2$, and five of these exceeded 5,000 dpm/100 cm$^2$. Overhead surfaces above these areas also had elevated activity levels in excess of the screening values. Although six measurement locations showed removable alpha and or beta levels above background, none were in excess of the screening values. The floor in this area is primarily comprised of brick. Both of the floor surface residue samples exceed one or more of the soil concentrations screening values. Both of the subfloor soil sample analysis results were below the soil concentration screening values.

Figure 36 in the ORISE 1999 report shows one location in the center of Building 4/9 with either surfaces above 5,000 dpm/100 cm$^2$ or soils above 35 pCi/g U-238 or 5 pCi/g Th-232. Based on the scale of the drawing, this area is estimated to be less than 750 m$^2$. Specific measurement locations that are noted to be above the screening values include the brick floor, a furnace hood at 4 m, and several roof trusses at 10 m.

**Building 5** was listed as a Class 2 area in the ORISE 1999 report. Although no specific data is included in the ORISE report for Building 5, the report does state that there were no areas of elevated beta or gamma radiation detected by surface scans within this facility.

**Building 6** is located west of and open to Building 3 and south of Building 8. A total of 11 out of 30 measurement locations exceeded 1,000 dpm/100 $cm^2$ (ORISE 1999, Figures 18 and 30, Tables 5 and 12), one of which exceeded 5,000 dpm/100 $cm^2$. The highest reading of 30,000 dpm/100 $cm^2$ was located on a metal floor plate near the transition to Building 8. The overhead surfaces in Building 6 could not be accessed for surveying. None of the removable alpha and or beta levels were in excess of the screening values. Nine of 21 floor surface samples exceed one or more of the soil concentration screening values. Based on the approximate 970 $m^2$ floor space in Building 6 and the 28 direct measurements on the floor, the average measurement frequency is approximately one per 35 $m^2$. No measurements on any surfaces above one meter and no subfloor samples were noted for Building 6.

Figure 36 in the ORISE 1999 report shows six locations in Building 6 with either surfaces above 5,000 dpm/100 $cm^2$ and/or soils above 35 pCi/g U-238 or 5 pCi/g Th-232. Based on the scale drawing, this area is estimated to be less than 150 $m^2$. Specific measurement locations that are noted to be above the screening values include the brick floor, a furnace hood at 4 m, and several roof trusses at 10 m.

**Building 8**, which is connected to Buildings 6 and 3, was found to have extensive areas of elevated direct beta activity in soils and on surfaces throughout Building 8 including all of the overhead surfaces investigated (ORISE 1999, Figures 19 and 31, Tables 6 and 12). The ORISE report referred to and verified the findings of several prior surveys that had identified cinders below the metal plates that had residual radioactivity that exceeded the screening values. Based on the approximate 2,300 $m^2$ floor space in Building 8 and the 81 direct measurements on the floor, the average measurement frequency is approximately one per 30 $m^2$. Essentially, all surfaces within Building 8 had some residual activity, with the highest levels noted in the central and eastern portions. A total of 110 out of 132 locations were elevated above 1,000 dpm/100 $cm^2$, 77 of these exceed 5,000 dpm/100 $cm^2$ and 34 are above 15,000 dpm/100 $cm^2$. Readings at three locations exceeded 50,000 dpm/100 $cm^2$, with the highest (64,000 dpm/100 $cm^2$) located on an I-beam at 4 m above the floor. These elevated areas were found primarily in the southern two-thirds of the structure, the northern point being the point which Building 8 ended. Although approximately 54 measurement locations showed removable alpha and or beta levels above background, none were in excess of the screening values. A total of 35 of the 42 surface soil samples and all 15 of the subfloor samples exceed one or more of the soil concentration screening values. Although large areas of Building 8 have residual contamination in excess of the screening values, the equipment and structural surfaces that were scanned within Building 8 and found to be free of dust or other residues, and generally did not have residual contamination in excess of the screening values.

**Building 24** is outside the Excised Area but it is included in this discussion since it is adjacent to Building 8 and known to have areas of contamination above the screening values. Building 24 is connected to and partially open to Building 8. The southwestern section of Building 24 was found to have a number of areas of direct beta activity that exceed the screening values (ORISE 1999, Figures 21). Many of these findings were associated with the expansion joints in the concrete floor. Additional elevated findings were identified on elevated structures above 2 m. One measurement on the concrete floor in the southeastern section exceeded the screening values (ORISE 1999, Figure 22). Additional locations on the concrete that exceeded the screening values were found on the concrete floor in the Southeast Storage Room (ORISE, 1999, Figure 23).

The ORISE survey confirmed the Class 3 designation of the northern part of Building 24 (ORISE, 1999; Figures 20, 32 and Table 7); no subfloor soil samples were collected in the north area. None of the 15 measurement locations in the north section are above the screening values for total or removable activity. In the southeastern section of Building 24 (ORISE, 1999; Figures 21, 22, 23, and 24, and Tables 8 and 12), seven of 37 measurements in the southeastern area exceeded 5,000 dpm/100 $cm^2$. The majority of the measurement and sampling locations in the southeast storage room and in the southwest area of Building 24 (ORISE, 1999; Figure 21) exceed 5,000 dpm/100 $cm^2$ and many exceeded 15,000 dpm/100 $cm^2$. A total of six data points were recorded for upper surfaces in Building 24, all in the southwest and southeast sections; readings at four of the six upper surface locations exceeded 5,000 dpm/100 $cm^2$. The results for the only subsurface sample in the southeast area did not exceed any of the soil concentrations screening values. Three of the five subfloor samples in the southwestern section exceed one or more of the soil concentration screening values.

**Building 35** was found to have no areas of elevated beta or gamma radiation detected either by surface scans or direct measurements. It was concluded that there is no residual contamination in Building 35.

A number of statements in the ORISE 1999 report regarding the radionuclide concentrations in soils from inside the buildings within the excised area are relevant to the evaluation of these data. These following statements are taken from the ORISE 1999 report.

1. Page 8, first paragraph – Exposure rate measurements at one meter above the surface were made at a minimum of five locations within each building using a microrem meter. A total of 72 measurements were made.

2. Page 9, first paragraph – One composite sample of dust and loose residue was collected from random horizontal surfaces within the Building 8 area.

3. Page 16, first paragraph – The U-238 concentration reported by gamma spectroscopy using the 63 keV Th-234 gamma may be underestimated by a factor of 1.5 to 3.

4. Page 16, second paragraph extending to p.17 – It should be noted that a number of samples collected from Buildings 2, 6, and 8, in addition to the uranium contamination, also had elevated concentrations of Th-232. Many of the surface soil samples exhibiting the highest uranium concentrations had a yellow substance associated with the sample. The material closely resembled the appearance of $U_3O_8$ commonly referred to as "yellowcake".

5. Page 17, second paragraph and extending to p. 18 – Previous investigations at the site clearly document that the contamination in Building 8 extends as deep as one meter and possibly deeper, within the cinder material beneath the floor plates. Contamination up to 45 cm in depth was clearly evident during this investigation. Deeper samples could not be collected due to auger refusal. Field investigations during this survey determined that contamination in other interior areas was usually in the first 15 cm with some locations in Buildings 3 and 6 showing increased activity below the first 15 cm.

6. Page 18, first paragraph – Alpha spectroscopy results confirmed that americium and plutonium were not present and were inconclusive for thorium-230 due to interferences. X-ray fluorescence analysis identified high levels of tungsten in samples. The low-energy x-rays that caused false positives for americium-241 and thorium-230 were the result of high uranium activity causing the tungsten to fluoresce and emit these x-rays.

The following comments are provided in regard to the above statements in the same sequence:

1. None of these measurements are noted with a location. The ORNL 1978 and the FBDU 1981 surveys did record gamma exposure rate values (μR/hour at approximately 1 meter above the floor surface) throughout the rolling mill area. This area generally corresponds with ORISE Building 8. These results are consolidated in Figure 4-3 of the FBDU, 1981 report. (FBDU collected this survey data under subcontract to Bechtel National, Inc.). A background measurement of 9 μR/hr is noted north of this area in what appears to be ORISE Building 24S. The readings in the vicinity of the 16-inch mill range from 6 to 300 μR/hr.

2. No sample analysis results are noted in the report for this composite dust and loose residue sample.

3. The Pa-234m (1001 keV) peak was used to determine activity except where values were less than the MDC, in which case the Th-234 (63 keV) result was included in the results in parenthesis.

4. The specified MED/AEC processes conducted at the Guterl Steel site were rolling and forming of uranium and thorium alloys. These processes included heating of the uranium metal in furnaces, including some heating in air. The heating of uranium metal in air produces a corrosion scale (uranium oxide) that has a characteristic fluorescent yellow color. A number of the soil samples from ORISE 1999 and prior surveys are reported to be characterized with this apparent oxidation material. Descaling and cleaning operations conducted during the uranium and rolling and milling operations could be the source of creating this material in a powder form. Since the contracted operations only involved the rolling and milling of uranium metals, the suspect oxidation material is probably powdered uranium oxide. Chemical analysis could confirm this.

5. The ORNL 1978 and FBDU 1981 reports include results from sampling the cinders below the steel plates in Building 8. The results are included with the FBDU, 1981 report as Table 4-3. Additional limited sampling beneath the metal plates in Building 8 conducted by ORISE in 1999 verified that the ROPC concentrations exceeded the screening values. The cinders are considered to be soil like material and the soil screening values will be used to evaluate the concentration of the ROPCs in the cinder sampling data.

6. These findings are based on the analysis of "selected samples", suggesting that a limited but unspecified number of samples were analyzed for americium and plutonium. Given the historical record showing that only uranium and thorium alloy materials were processed at the Guterl Steel site, it may be reasonable to conclude that these negative alpha spectroscopy results for americium and plutonium confirm that plutonium is not a radionuclide of potential concern at this site. However there is some concern for this finding, given the uncertainty associated with the unspecified limited number of samples that were analyzed and the possibility that some of the uranium used at the site could have been extracted from spent reactor fuel which could be contaminated with plutonium. Knowing the source of the uranium metals used at the Guterl Steel site could confirm that recycled uranium from spent fuel was not used at the Guterl Steel site and that plutonium should not be expected. With regard to the potential for Th-230, Earth Tech has verified that there has not been sufficient time since the MED/AEC operations were initiated at the Guterl Steel site for the in-growth of measurable concentrations of Th-230 as one of the daughter products from the radioactive decay of U-238.

### 2.3.2 Investigative Area 02 (IA02) - Excised area – Building Exterior Areas

The exterior grounds of the Excised Area include a crane yard to the east of Buildings 1 and 2; an alleyway between Buildings 2 and 3; an alleyway surrounding Building 5; a courtyard area between Buildings 3 and 24; and the exterior loading dock area to the west of Buildings 6 and 8 and north of Building 4 and 9.

As is the case for IA01, the most comprehensive radiological survey of IA02 (building exterior areas within the Excised Area) is the ORISE 1999 survey. As stated above, subject to the availability of documentation on quality assurance, the USACE 2005 Summary of Historical Analytical Data for the Guterl Site found that the ORISE radiological survey data was the most comprehensive and potentially useable set of data relative to all other comparable data. The survey procedures in the exterior excised area include gamma scanning surveys, exposure rate measurements, surface soil samples, and borehole samples to maximum depths of 180 cm.

These land surveys were based on the expected contamination potential definitions provided in the MARSSIM guidance. ORISE established a site grid system throughout the exterior areas consisting of 20 m x 20 m grid blocks. This grid was further subdivided into 10 m x 10 m grids within some areas of the excised property area where a greater sampling density was desired (ORISE 1999, Figure 3).

The investigative protocol, especially with regard to the density of sampling, is a function of the designation of a particular area and the criteria for Class 1, 2 and 3, as stated in the IA01 discussion. The area within the Excised Area fence line was initially considered to be Class 1 area.

Surface scans for gamma radiation were performed over 100% of these Class 1 areas using NaI scintillation detectors coupled to ratemeters with audible indicators. Locations of elevated gamma radiation were marked for further investigation and documented on field data sheets and site drawings.

Exposure rate measurements were made at one meter above grade using a microrem meter at 131 locations within the exterior excised area. The measurements ranged from 3 to 50 μR/hr (ORISE 1999, Table 10). As above, no coordinates are included in the ORISE report for the locations of these gamma exposure rate measurements.

Surface soil samples were initially collected every 10 meters within the Class 1 designated areas. However, based on the findings, most of the area was reclassified as a Class 2 and the sample frequency was reduced to one every 20 meters. Additional surface soil samples were also collected at locations of interest based on elevated scanning results.

Borehole locations were selected based on surface scan results and were placed within, and at the perimeters of areas of elevated direct gamma radiation based on the gamma scans. Subsurface sample collection was using a subcontracted, truck-mounted drill rig equipped with a split-spoon sampler.

As discussed in IA01 for the building interior surveys, the ORISE samples and data from the exterior excised areas were returned to the ORISE/ESSAP laboratory in Oak Ridge, Tennessee for analysis and interpretation. The results from the conduct of these survey procedures at the Guterl site are summarized by building in Tables 2.3.2-1 through 2.3.2-2 of this report.

The general areas of contamination around the buildings in the excised area are shown in Figure 36 of the ORISE 1999 report. This figure illustrates the approximate areal extent of the contamination in and around these buildings in excess of 5,000 dpm/100 $cm^2$ or soil concentrations exceeding 35 pCi/g U-238 or 5 pCi/g Th-232.

Surface scans around the exterior of the buildings in the excised area of the facility identified or verified the presence of multiple locations of elevated direct gamma radiation, some of which were the result of visible firebrick. Those locations that were determined not to be the result of visible firebrick were investigated further. Locations identified within the excised property included three general areas within the crane yard on the east side of the Excised Property, three locations within the alley that separates Buildings 2 and 3, an area in the alley encircling Building 5, and four areas on the west side of Buildings 6 and 8.

Surface soils in approximately 113 locations were sampled in this area (ORISE 1999, Figures 33 and 36 [included in Attachment 2]; Table 13 [see Attachment 1]). All of the samples included the soil from 0 to 15 cm. Most of the samples were collected systematically from the 10 meter grid, with approximately eight collected from biased locations. The sampling frequency varied by location based on proximity to off-site boundaries and access limitations. The sampling east of the overhead crane yard to the eastern fence line generally sampled each node of the 10 meter grid. West of the overhead crane yard, alternate nodes of a 10 meter grid were generally sampled. This frequency was reduced in some areas due to access limitations and increased in others due to the need to investigate elevated scanning results. Nine of these 113 surface samples exceed the individual screening value for U-238 at 14 pCi/g above background. None of the samples exceeded the screening values for Th-232 or U-235.

An additional 27 locations in the Excised Area exterior were sampled based on elevated radiation as determined by surface scans (i.e., biased samples). All but one of these 27 samples exceeds one or more of the soil concentration screening values (ORISE 1999, Table 14). Three of these biased locations were investigated further by borehole sampling (ORISE 1999, Table 15). The samples from each location included soils from 0 to 15 cm, 15 to 60 cm and 60 to 120 cm. The analysis results to 60 cm depth at two of the locations exceeded the individual screening values for U-238 at 14 pCi/g above background. None of the sample concentrations exceeded the screening values for Th-232 or U-235.

The soil sample results throughout these Class 1 and 2 exterior areas of the excised area show that there is residual uranium and thorium contamination at various locations around the site. General notes to the borehole sampling identify the presence of a characteristic "yellowcake" material, as noted for the building interior surveys. A gray colored material was also noted in one of the sample locations in the alley between Buildings 2 and 3. A review of the three subsurface sample results in the exterior excised areas shows that the contamination generally extends to a depth from 30 to 60 cm and suggests that the limiting ROPC is U-238. These findings are consistent with the general conclusion that the primary radionuclide of concern at the Guterl site is U-238 associated with the processed uranium alloys and that there are lesser amounts of Th-232 and U-235 at some locations. Where U-235 is identified in the biased samples the ratio of U-235 to U-238 is relatively constant at approximately 3%. When Th-232 is identified in the biased samples from the exterior excised area, it is typically co-located with U-238 at concentrations that are in excess of the screening values.

### 2.3.3 Investigative Area 03 (IA03) – Landfill Area

The Landfill Area is a Class 2 NYSDEC Inactive Hazardous Waste Site (ID 9-32-032). It consists of an 8.6-acre area in the northwest part of the site. From 1962 to 1980, Simonds (to 1963), or Wallace-Murray (1963 to 1972), or Guterl (1972 to 1980) disposed of wastes such as slag, baghouse flue dust, foundry sand, and other plant rubbish in the landfill. It should be noted that the landfill is not reported to have accepted wastes until a number of years after the MED/AEC operations ceased (in 1956 or 1958), although historic aerial photographs (1938, 1951, and 1958) show apparent disturbances in the northeast corner of the landfill area. In August 1980, NYSDEC required Guterl to stop disposing chromium-contaminated baghouse dust in the landfill, as it was a listed RCRA hazardous waste (K091). In 1982, Guterl salvaged approximately two million pounds of metal slag from the landfill for recycling. The landfill has not been used since (NYSDEC, 2005).

In 1983 (at which point the landfill had been inactive for approximately two years), representatives of the Niagara County Department of Health conducted a visual inspection of the landfill. Disposed refuse included brick, slag, wood, foundry sand, empty oil drums, ore products, grinding dust, and baghouse dust. The Niagara DOH inspector noted that "the waste has not been properly covered or graded which has lead to minor ponding and erosion problems" (HGL, 2005; p 3-26). At that time, waste oil was being salvaged by a private contractor, and the hazardous blower dust was being manifested for off-site disposal.

According to NYSDEC, groundwater flows from the landfill toward the nearby Frontier Stone Company quarry. The quarry is discharging the water into the Erie Canal in close proximity to the City of Lockport emergency raw water intake in the Erie Canal (at the foot of Summit Street).

NYSDEC notes that no private wells have been identified near the site so exposures via drinking water are not expected (DEC, 1991). NYSDEC also notes that there are no surface soil data for the landfill, so possible public exposure cannot be evaluated; however, there has not been any evidence of reported trespass at the landfill. (NYSDEC does note evidence of trespass in the Excised Area, however.)

A Phase I investigation was conducted in 1988 (NYSDEC, January 1988), a PSA – Records Search (Task 1) was completed in 1991 (NYSDEC, January 1991); and a PSA – Preliminary Evaluation of Initial Data (Task 3) was completed in 1994 (NYSDEC, April 1994). This last (Task 3) investigation included sampling of several site media (including a 35-gallon container [the field notes have the size corrected to 25-gallon]); sampling of soil and slag from test pits and soil borings; groundwater; and co-located surface water and sediment samples.

Soil and groundwater samples have been collected from the landfill and the data reported by NYSDEC. Chemical data from the 1992-93 investigation (NYSDEC, 1994) were fully validated and as such are fully useable, with the qualifications and caveats as noted in the report (ABB-ES, 1994; Volume 2). However, the gross alpha and beta radiation data generated as part of that same investigation were not validated.

It should be noted that landfilling activities did not occur on the entire area designated as the 'Guterl Landfill'. Review of aerial photography and site history and operations do not indicate that landfilling activities took place in the southern and western parts of the landfill – i.e., the parts of the Guterl Landfill which are described as 'marshy' or 'inundated'.

**Groundwater.** Four overburden groundwater monitoring wells were installed by Secure Landfill Contractors (SLC) in the landfill area in December 1980 as part of an application for a solid waste management facility (HGL, 2005). An additional well (MW-105) was installed in 1992 to replace one of the SLC wells (referred to as MW-3; however, the original installation ID was 81-01,) which had become unusable. NYSDEC groundwater Class GA criteria for chromium, iron, magnesium, sodium and thallium were exceeded in groundwater samples from the landfill. Alpha radioactivity and pH also exceeded Class GA criteria. Details of the groundwater data are included in section 2.3.7, IA07 (Groundwater). A summary of the radiological data for the groundwater samples is presented in Table 2.3.3-1.

**Surface Water/Sediment.** NYSDEC (2005; 1994) also notes "phenol and iron also exceeded the Class D surface water standard," although it is not clear what sample is 'surface water' or why NYSDEC compared the results to surface water criteria. (It has been reported that there is frequently standing water in the western part of the landfill.) The PSA Task 3 Investigation (NYSDEC, 1994) shows five "surface water/sediment" pairs of samples from the western and southern parts of the landfill, with the sampling locations plan indicating that these samples were collected from a marshy area. The field notes indicate a sample description of "seep" for most of these samples; except that one sample, collected from the fence line along the eastern side of the landfill (separating it from the Allegheny Ludlum part of the site) is described as being from a flowing ditch. These surface water samples were submitted for gross alpha and beta analysis, in addition to chemical analyses. (The associated sediment samples were analyzed for chemical constituents but not radiation.) A summary of the radiological data for the surface water sample data is presented in Table 2.3.3-1.

**Soil.** Elevated levels of chromium (3,150 mg/kg in sediment sample SD-6, located at the northern edge of IA03, at the western perimeter of the limits of the filled area [see NYSDEC (1994) Figure 1-2 in Attachment 2]; and 4,360 mg/kg approximately 2 ft bgs in the southwest corner of the filled area [TP-105]) and other metals have been detected in landfill soils (data from the Phase 1 Task 3 investigation; NYSDEC, April 1994). However, none of the samples from six test pits or three test borings failed EP toxicity testing for metals (now TCLP – metals fraction) (NYSDEC; 1994). The same nine samples were also analyzed for target compound list (TCL) organics (VOCs, SVOCs, pesticides, and PCBs) and inorganics. VOCs were detected in only one sample, and at low concentrations (40 µg/kg or less). SVOCs detected were predominantly polynuclear aromatic hydrocarbons (PAHs). PAHs were detected in all nine samples but at low concentrations – all individual PAHs detected were at concentrations less than 1 mg/kg. (Data for the acid-extractable fraction of SVOCs, consisting primarily of the phenolic compounds, were almost entirely unusable – i.e., rejected during data validation.) PCBs were detected in all of the samples except the sample of native material (TB-101); concentrations ranged from 32 to 15,000 µg/kg. The only sample at which the PCB concentration exceeded 1 mg/kg (1,000 µg/kg) was TP-101, located in approximately the center of the landfill (south and west of areas in which elevated radiological measurements were reported).

Metals were detected in all nine samples; and concentrations in the eight samples of landfill material were generally higher than those in the sample of native material. Metals which exceeded the published background range for soil in NY state and eastern US were chromium, cobalt, copper, iron, lead, manganese, nickel, and vanadium. (Exceedances of background do not necessarily constitute a level of concern, however. For example, none of the lead concentrations exceeded 400 mg/kg, which is used by USEPA as a screening level for residential exposures.) The Task 3 PSA also concluded that the materials sampled represent slag disposed on site, and do not resemble the baghouse dust co-disposed at that time (NYSDEC, 1994).

**Radiation.** During the October 1992 sampling (conducted by ABB-ES for NYSDEC) as part of the Task 3 PSA, which was reported in 1994), anomalous levels of radioactivity were detected, necessitating modification to the health and safety plan. It was also reported that "during the Task 3 walkover [October 26, 1992], conversations between ABB-ES representatives (contractor to NYSDEC) and an employee of the City of Lockport water department (on site for utility clearance purposes) revealed that former Guterl employees recalled disposing of radioactive materials in or near the landfill" (NYSDEC, 1994; pg 2-2).

The October 1992 radiation monitoring employed a Radiation Monitor 4 (RM4) survey meter (used for screening only); a Ludlum Model 3 meter with a model 44-3 Gamma Scintillator (sodium iodide or NaI) probe (M3/P44-3); and a Ludlum Model 3 meter with a Model 44-9 pancake Geiger-Mueller (GM) probe (M3/P44-9). In addition, field personnel wore film dosimeter badges. The Ludlum M3/P44-9 pancake probe is sensitive to alpha, beta, and gamma radiation and provides data only in counts-per-minute (cpm); this instrument was used to monitor personnel, equipment, split-spoon samples, and drill cuttings. The most sensitive gamma detector used in the 1992 survey, the Ludlum M3/44-3 NaI probe [*sic*], was used for detailed screening of the proposed sampling locations and provided direct readings in cpm. The detailed screening indicated three points in the northeast part of the landfill near one of the test borings having anomalous readings (greater than background, which was approximately 200 cpm); contact measurements at these three points (October, 1992) ranged from 1,000 cpm to 30,000 cpm. The background level was obtained at the site and confirmed by readings "near the center of town and at the Holiday Inn in Niagara Falls" (NYSDEC, 1994, Volume 2).

Sampling resumed under a revised health and safety plan and additional (different) radiation monitoring instruments in January 1993. In addition to the dosimeter badges, RM4, and Ludlum M3/P44-9 pancake GM probe, instruments included a Ludlum Model 18 with a Model 44-10 Gamma Scintillator probe (M18/P44-10) and a Ludlum Model 2221 meter with a Model 44-10 Gamma Scintillator probe (M2221/P44-10). The Ludlum M18/P44-10 probe was used to monitor personnel, equipment, proposed sampling locations, split spoon samples, and test pit spoils. This instrument is sensitive to beta and gamma radiation and provided readings only in cpm. The M2221/P44-10 probe, the most sensitive instrument used in the January 1993 sampling event, was used to conduct a detailed survey of the site surface on January 12 and 13, 1993. This instrument is sensitive to gamma radiation and provided direct readings only in cpm. Background at the Guterl Site using the Ludlum M2221/P44-10 was measured as 4100 cpm. (Review of raw data [NYSDEC, 1994; Volume 2] shows that background was reported as 4,830 cpm on January 13, 1993.) No readings more than two times background were found during screening of test pit, surface water/sediment, or groundwater sample locations.

The landfill area radiation survey was conducted on a systematic grid, with lines spaced at 33.33 ft intervals, with measurements at 228 locations. The grid shown on the figure is arbitrary (i.e., the origin [0 northing, 0 easting point] is not tied to the New York State Plane coordinate system which was used for the survey of other locations such as monitoring wells), and the raw data are difficult to corroborate as the field sheets use an alpha character (A through N; and X through Z) for the easting coordinate. However, it is evident that high readings – approaching 300,000 cpm on the Ludlum M2221/P44-10 – were detected in the northeastern part of the survey area.

HGL (2005; p 2-17) states that in 1999, NYSDEC conducted a radiation survey of the northern portion of the site (the entire 'Guterl Site'), including the landfill area and a former railroad spur used during AEC operations. The surveys included two USRADS and four manual surveys. It is unclear from the HGL summary as to the extent to which the landfill was actually surveyed; nor is there any indication of elevated radioactivity in the landfill area itself (HGL; pp 2-17 to 2-19). The 1999 NYSDEC radiation survey data were not available to Earth Tech; and it appears that HGL only had access to a summary document, not the full report or full set of data.

The ORISE (1999) site investigation included the landfill area. Approximately 40 samples were collected in the landfill area (parts of the landfill were noted as "Marsh Inaccessible" and were not surveyed or sampled by ORISE). Samples were collected at alternate (every other) location, staggered on a 20-meter grid (so each sample was typically located approximately 28 m from the adjacent location). Most (approximately 35) of the samples were reported as ≤ 35 pCi/g U-238. One sample was reported as ≥ 100 pCi/g U-238, and five were ≥ 5 pCi/g Th-232; all six of these samples were near the northeast corner of the landfill, at least approximately coincident with the areas reported by NYSDEC (ABB-ES, 1994) with high beta and gamma radiation readings. Some of this area is likely to be associated with the contamination in the area of the railroad tracks, especially the Th-232 contamination (see NYSDEC [1994] Figure 1-2 and ORISE Figure 34, both included in Attachment 2 to this report).

The screening levels utilized by ORISE (35 pCi/g U-238 and 5 pCi/g Th-232) were somewhat higher than those provisionally applied for the basis of this report (see Section 2.6, below). However, the raw data were reviewed (as provided in ORISE Table 13, included in Attachment 1 of this report) along with ORISE Figure 36 (provided in Attachment 2), which includes identification of areas exceeding 10 pCi/g U-238 (lower than the provisional screening value shown in Section 2.6). Utilizing the provisional screening values developed in this report results in only a slight increase in the impacted area; with one additional isolated location (260 N, 260 W) with a U-238 measurement (18.2 pCi/g) slightly exceeding the criterion. No additional criteria exceedances were noted for U-235 or for Th-232 the provisional criteria in Section 2.6.

The reporting limits for the ORISE data were reviewed. The ORISE data are sufficiently sensitive to confirm the absence of criteria exceedances for Th-232, U-235, and U-238. In samples without high levels of radioactivity, reporting limits were typically less than 1 pCi/g for Th-232, less than 0.5 pCi/g for U-235, and approximately 10 pCi/g for U-238. As such, the available ORISE data are likely to be adequate for all purposes, including risk assessment.

Although the ORISE data set did include isotopic analysis of some soil borings, the selection of locations for boreholes was biased to detections of surficial contamination. Although the limited amount of borehole data (four samples, all in the northeast corner) generally show a trend of decreasing radiation levels with depth, this is not universally true (see ORISE Table 15, included in Attachment 2). The northeast corner of the landfill, which is the area which both ORISE (1999) and NYSDEC (1994) reported most of the radiological contamination, is approximately coincident with the disturbed areas shown on the aerial photographs from 1951 and 1958. However, later photographs (1972 and 1981) show significant disturbances throughout most of the landfill area (it appears that only the marshy areas in the southern part of the landfill were undisturbed); so it is possible that material that may have been deposited near the northeast corner of the landfill may have been re-located (intentionally or inadvertently) during subsequent activities at the site, including the landfill mining *circa* 1981. Although NYSDEC (1994) indicates that the soils from borings and test pits were screened; however, details about exactly what was screened are missing. NYSDEC does state that "Radiation measurements of samples collected for laboratory analysis were within twice the background level."

### 2.3.4 Investigative Area 04 (IA04) – Niagara County Industrial Development Agency (NCIDA) Property (Excluding Excised Area, Landfill, and Building 24)

Based on the information provided by USACE (HGL, 2005), EPA conducted a removal action at the Site in mid-1996. (This was the first phase of a planned two-phase removal action; however, the second phase was never conducted.) In addition to the removal action at the site, the EPA conducted tests for any radiological contamination that might have migrated off-site. As reported by HGL, during the July 1996 EPA radiological survey, soil on the Allegheny Ludlum property was determined to be contaminated, although the exact location of the survey was not available. (The EPA report from which this information was derived was not available for use in this DGAR.)

The Environmental Survey and the Site Assessment Program (ESSAP) of the ORISE took surface measurements and soil samples from exteriors areas on the Allegheny Ludlum property. (Field work was conducted in April/May 1999 and again in November 1999, and the report was issued in December 1999.) Multiple locations on the Allegheny Ludlum property exhibited elevated gamma radiation. In areas designated as "Class 1 and 2 Areas" (areas with a 'significant potential for radioactivity' [Class 1] or areas contiguous to Class 1 areas or have a potential for contamination levels at least 25 percent of surface guideline values [Class 2]), areas of high radioactivity ($\geq$ 100 pCi/g U-238) were noted to the west-northwest and to the east of Building 38, and also in an area north of Building 35 (ORISE, 1999; Figure 33). In Class 1 and Class 2 areas, samples were generally collected at alternate (staggered) locations on a 20-m grid (as was the case for the Landfill, IA03, discussed above).

The ORISE survey also covered the Class 3 Area of the Allegheny Ludlum property, comprising roughly the southwest part of the active manufacturing area of the Guterl Site including the areas adjacent to Buildings 24, 37, and 47, and the area south of the Excised Area (south of Buildings 4 & 9 and including the extant [un-numbered] current office building and guard house) (see ORISE Figure 35). Of the approximately 18 measurements reported by ORISE, only one exceeded 35 pCi/g of U-238. The one exceedance was at the northeast corner of Building 37, adjacent to the Class 2 area (as shown on Figure 33). In Class 3 areas, several pieces of thoriated metal were observed outside the northern fence and due east of the landfill on Allegheny Ludlum property. These pieces of metals exhibited high levels of radiation, and therefore, specific samples of the materials were not collected.

The screening levels utilized by ORISE (35 pCi/g U-238 and 5 pCi/g Th-232) were somewhat higher than those provisionally applied for the basis of this report (see section 2.6, below). However, the raw data were reviewed (as provided in ORISE Table 13, included in Attachment 1 of this report) along with ORISE Figure 36 (provided in Attachment 2), which includes identification of areas exceeding 10 pCi/g U-238 (lower than the provisional screening value shown in Section 2.6). Utilizing the provisional screening values developed in this report results in only a slight increase in the impacted area; primarily in the area between 160 E and 60 E (north of Building 35). No additional criteria exceedances were noted for U-235 or for Th-232 the provisional criteria in Section 2.6.

The reporting limits for the ORISE data were reviewed. The ORISE data are sufficiently sensitive to confirm the absence of criteria exceedances for Th-232, U-235, and U-238. In samples without high levels of radioactivity, reporting limits were typically less than 1 pCi/g for Th-232, less than 0.5 pCi/g for U-235, and approximately 10 pCi/g for U-238. As such, the available ORISE data are likely to be adequate for all purposes, including risk assessment.

Based on the aerial photographs covering the period of MED/AEC operations at Guterl (HGL, 2005), there are a number of possible storage areas and buildings outside of the Excised Area for which there is no radiation survey data. These include the laboratories discussed in the HGL 2005 report (HGL building number 7, now the Allegheny Ludlum office building), the storage area/building (Building 47), and several cleared areas shown near the southwestern boundary where some materials were apparently stored.

As with IA02, the ORISE data for the NCIDA area also include isotopic analysis of some soil borings. However, the selection of locations for boreholes was biased to detections of surficial contamination. Although the limited amount of borehole data generally show a trend of decreasing radiation levels with depth, this is not universally true (see ORISE Table 15, included in Attachment 2). No subsurface radiological analyses were conducted on samples which did not exhibit surficial contamination. The NCIDA area was not investigated by NYSDEC (unless some of the unreported 1999 screening locations were in this area; but in any event were not likely to have included subsurface sampling). Similarly, the USEPA 1996 data cited above, even if located, are not likely to have included subsurface sampling.

### 2.3.5 Investigative Area 05 (IA05) --Railroad Right of Way North of Site

Available records indicate that the MED/AEC materials arrived at, and left, the facility via rail car (HGL, 2005, page B-5; and, ORNL, 1978, page 3). Based on available information, it appears materials were delivered to, or picked up at, the loading dock located at the west side of Building 6 (ORNL, 1978). Simonds did grant an easement to New York Central Railroad, and Simonds indicated in an August 1949 memorandum to the AEC, that the New York Central RR was the railroad company that transported materials from Simonds (HGL, 2005; p 3-17). Transport of radioactive materials was allowed by law and in fact there were a number of regulations and guidelines for transportation of such materials by various means. For example, an adequately trained AEC representative was required to accompany shipments of radioactive materials (HGL, 2005; ibid).

Based on the information provided by USACE (HGL, 2005), the NYSDEC conducted a radiation survey along the former railroad spur (HGL [2005], citing *Radiation Survey, Guterl*

*Specialty Steel Corporation,* NYSDEC, June 1999). NYSDEC conducted four manual surveys, two surveys using the ultrasonic ranging and data system (USRADS®), and a gamma spectroscopy survey for isotopic identification and evaluation of approximate concentrations. During the manual surveys, above background readings were found on the "back side" of a mound of dirt associated with some clearing and construction work on the Lombardi property, and readings up to approximately 30,000 counts per minute (cpm) were noted under an east-west power line near the southern end of the former rail spur. The USRADS studies conducted by the NYSDEC measured gamma radiation emitted from surface soils. The surveys identified a number of areas that had gamma readings above background including, the spur bed, both sides of the rail spur, a small concrete pad, and several individual locations with a cumulative area of approximately 750 square feet. The gamma spectroscopy survey showed that the highest concentrations of uranium and thorium were east of the former rail spur at the same location where the second USRADS survey collected a reading of approximately 1 million cpm using a gamma sensitive instrument that had a background of approximately 8,000 cpm. The NYSDEC concluded that elevated uranium and thorium concentrations were found along the former railroad spur at several locations up to 600 feet north of the Allegheny Ludlum fence. The radioactive materials found consisted of small pieces of thorium metal, soil-like mixtures containing uranium and thorium, one location of identifiable small flakes containing uranium and thorium, slag, and fire brick.

Based on the information available, it is Earth Tech's understanding that only screening level data are available from the areas along the former railroad spur and no soil or groundwater samples have been collected.

### 2.3.6 Investigative Area 06 (IA06) - Off-site Northeast properties

During the TPP Meeting, the status of three parcels of land that were historically owned by Simonds Saw and Steel Company but are located off the FUSRAP-defined Guterl Specialty Steel Corporation property was discussed (Tracts K, L, and M [HGL, 2005]). Based on information presented in the HGL (2005) report, records indicate that these parcels were sold by Simonds Saw & Steel Company to third parties in February 1942; i.e., several years before Simonds began MED/AEC activities (HGL, 2005, page 6-4). Therefore, it does not appear reasonable that these parcels would be located in an area that would have been affected by Simonds' MED/AEC activities. As a result, Earth Tech recommends removing these properties, and thus this IA, from further consideration under the FUSRAP investigation.

### 2.3.7 Investigative Area 07 (IA07) - Groundwater

In December 1980, four overburden monitoring wells (boring log IDs 81-01 through 81-04; NYSDEC, 1988) were installed at four points along the landfill perimeter by Earth Dimensions, Inc., under subcontract to Secure Landfill Contractors (SLC), as part of an application for a solid waste management facility (NYSDEC, 1991) prepared by SLC on behalf of Guterl Steel. The monitoring wells were installed in the overburden, with refusal noted to occur between 3.4 feet and 5.5 feet below grade (assumed bedrock surface). According to NYSDEC 1991 (Appendix D), monitoring well 81-03 was destroyed sometime between September 1981 and April 1982, and is no longer available. (The reader is advised that NYSDEC [2000] refers to these same wells as MW-1 through MW-4.) Boring and monitoring well construction logs for these wells are presented in NYSDEC 1988. A figure showing these well locations (HGL 2005, Figure 2-3) is presented in Attachment 2.

NYSDEC (2000) also presents information for a monitoring well identified as MW-105 installed October 1992 in the Guterl Landfill Area. NYSDEC (2000) does not provide a source for this information; however, NYSDEC (1994; p. 2-10) reports MW-105 was installed as a replacement for MW-3, which was destroyed in 1982. MW-105 appears to be installed in a similar manner as the earlier monitoring wells 81-01 through 81-04; i.e., it appears to be an overburden monitoring well with bedrock encountered at 4.6 feet below grade.

The landfill perimeter wells were sampled by or on behalf of SLC five times between 1980 and 1982 (NYSDEC, 1991). Test parameters reported included oil & grease, TOC, total halogenated organics (as lindane), metals (chromium, copper, iron, lead, magnesium, nickel) and phenols. NYSDEC groundwater Class GA criteria for chromium, iron, magnesium, sodium and thallium were exceeded in groundwater samples from the landfill. Alpha radioactivity and pH also exceeded Class GA criteria. NYSDEC (2000) also notes that "phenol and iron also exceeded the Class D surface water standard," although it is not clear what sample is 'surface water' or why NYSDEC compared the results to surface water criteria. (It has been reported that there is frequently standing water in the western part of the landfill.)

In May 1997, five bedrock monitoring wells (MW-1 through MW-5) were installed within Guterl Excised Area by Maxim Technologies under the direction of NYSDEC as part of the Immediate Investigative Work Assignment (boring and monitoring well logs can be found in NYSDEC 2000). A figure showing these well locations (HGL 2005, Figure 2-3) is presented in Attachment 2. The bedrock surface was observed from 6.4 to 6.8 feet below grade.

Groundwater samples were collected June 1997 from the five bedrock monitoring wells (MW-1 through MW-5) and were analyzed for VOCs, SVOCs, pesticides, PCBs, and metals. NYSDEC Class GA criteria were exceeded at one or more wells for the VOCs chloroethane, methylene chloride, 1,1-dichloroethene, 1,1-dichloroethane, 1,1,1-thrichloroethane, for the pesticide alpha BHC, and for the PCB Aroclor 1260. The greatest frequency of exceedances occurred at MW-4 and MW-5. NYSDEC Class GA criteria were exceeded at one or more wells for the following inorganic parameters: iron, magnesium, manganese, sodium, and zinc. The greatest frequency of exceedances occurred at MW-3.

The NYSDEC (2000) report contains survey control data for monitoring wells 81-01, 81-02, 81-04, and MW-105 at the landfill, and wells MW-1 through MW-5 within the excised area.

### 2.3.8 Investigative Area 08 (IA08) – Site Utilities (Sewers and Drains)

NYSDEC's IIWA (NYSDEC, 2000) reports data for "surface water" and "sediment" samples collected from three points of the cooling water system. A figure showing these sampling locations (DEC 2000, Figure IV-1) is presented in Attachment 2.The sample locations included a sewer line in Building 3 (SW-1), the former pump house and intake reservoir located near the Erie Canal (SW-2), and the sump located between Building 2 and Building 3 (SW-3/SED-3). (Note that these are not the same as the samples with the same designation as those collected in the Landfill Area (IA04) in 1993 and reported in the 1994 PSA [NYSDEC, 1994]). NYSDEC acknowledges that the samples were not "surface water" or "sediment" samples in the conventional sense, but that because the waters could overflow to a surface water body, NYSDEC surface water and sediment guidance values were used to evaluate the data.

The surface water and sediment samples were analyzed for VOCs, SVOCs, pesticides/PCBs, and metals. In addition, TCLP-VOC analysis was performed on the sediment sample from the sump located between Building 2 and Building 3. SW-1 was a sample collected for radiological analyses, "and is therefore not included in this report" (NYSDEC, 2000); no mention of where the data could be located was provided.

The IIWA concluded that the sump located between Building 2 and Building 3 "indicates notable organic and metals contamination. Elevated levels of PCB (Aroclor 1248) in the pump house sediments are a concern." Contaminants in the samples collected from the lagoon formerly serving the water treatment system were "not significant" (NYSDEC, 2000; p 44).

ORISE collected five "sediment" samples from "five water-filled equipment or utility trenches that are in Buildings 3 and 8", and one "sediment" sample from the oil/water separator located between Building 2 and Building 3 (ORISE, 1999; p 9, Table 15, Figures 28 and 31). The radionuclide concentrations ranged from < 0.1 to 1.2 pCi/g for Th-232, from 0.2 to 3.9 pCi/g for U-235, and from 3.8 to 96.8 pCi/g for U-238. The highest concentrations of U-238 were located in Building 8 (90.2 and 96.8 pCi/g), with one sample above 14 pCi/g from Building 3 at 29.9 pCi/g. These data indicate that the residual materials in the production area floor trenches are a concern.

During the 1996 removal and investigative effort conducted by USEPA (as cited in HGL, 2005; p 2-7) EPA "...encountered a pipe next to the western portion of the site, next to an exit leading to the loading dock area. This pipe carried running water, and the EPA recommended that the water be tested to determine if it was carrying contamination off-site." HGL reports that the "sewers of the mills were constructed of concrete, with iron floor plates to cover them. The sewers were left open for easy cleaning access. Wastewater was dumped into a central 'dump pit,' where water was brought from a lower level and discharged into the city sewer system by a 5-hp electrical pump and a 1,000-gallon steam-driven pump" (HGL, 2005; p 3-7, citing information from the Niagara County historian).

A 1950 AEC report (as cited by HGL, 2005; p 3-15) indicates that there was a significant potential for loss of uranium, and one part of the loss could be attributed to losses of uranium dust through the water quench effluent stream. AEC recommended passing the quenching water through an additional long settling tank to minimize the amount of uranium flowing to the sewer drain.

A 1998 RCRA inspection of the Allegheny Ludlum operations indicated that wastewaters produced during plant operations were discharged into a municipal sewer system through floor drains. Allegheny had the proper permits for discharging wastewater into the sewers, and the effluent was in compliance with wastewater effluent disposal regulations (HGL, 2005; p3-31; citing USEPA Region 2 sources).

## 2.4 Identification of Contaminants of Potential Concern

Extensive review of the available site history conducted by Earth Tech, including review of the HGL (2005) report, indicates that the only contaminants of potential concern (including both radioactive and conventional chemicals) are uranium and thorium. In addition, some 'enriched' uranium has been processed (i.e., uranium with a higher than natural ratio of U-235 to U-238) (USACE, 2001; p 2; and, ORNL, 1978).

The U-238 decay chain includes U-234, which can either have equivalent or greater activity than U-238, depending on whether it is natural or enriched uranium. With regard to natural uranium, it has the same activity as U-238. When considering enriched uranium, U-234 will have greater activity than U-238.

The natural abundance of U-234 in uranium is 0.0053 atom percent, while U-235 and U-238 are present at 0.72 and 99.275 atom percent, respectively. With regard to enriched uranium, the typical U-235 enrichment methods in use at the time of the subject work at Guterl would also increase the weight-percent of U-234. These methods enrich U-234 at an even higher ratio than U-235 due to its lower atomic weight.

Although the ORISE 1999 and the FBDU 1981 reports did not present data for U-234, the ORNL 1978 report did present a limited amount of U-234 data. Table 5 on page 22 of the ORNL report presents the results from mass spectrometry analysis of the residual uranium in the Guterl site soil for two samples: one with 6.73% U (w/w); and, the other with 0.1% U (w/w). The U-234 atom percent concentration in both samples was approximately 0.005. The U-235 and U-238 atom percent for both samples were 0.71 and 99.28, respectively. These sample results are consistent with the concentrations of processed natural uranium.

The activity percentages of U-234 and U-235 relative to U-238 in natural uranium are 100.0% and 4.5%, respectively. Both the FBDU 1981 and the ORISE 1999 reports identified U-235 at activities ranging from less than 1% up to approximately 5% of the U-238 activity. These activity percentages are consistent with depleted uranium and processed natural uranium, respectively.

Page 3 of the ORNL 1978 report states that some of the later materials included depleted and 2.5% enriched uranium. For uranium enriched in U-235 to 2.5% (w/w), the activity of the U-235 is approximately 16% of the U-238 activity. For 2.5% enriched U-235, the U-234 activity is approximately 393% of the U-238 activity. Although the ORNL 1978 and the HGL 2005 reports state that enriched uranium metal was processed at Guterl, none of the sample results reported to date support this.

As the parent of the thorium decay chain, Th-232 decay produces ten radioactive daughter products (radium-228, actinium-228, thorium-228, radium-224, radon-220, polonium-216, lead-212, bismuth-212, polonium-212 and thallium-208) before reaching a stable non-radioactive daughter (lead-208). In natural thorium, and in processed thorium after 60 years from initial separation from the thorium ore, these daughter products are in secular equilibrium with the Th-232 activity, due to the relatively short half-lives of these decay products.

No evidence has been located that plutonium or other radioactive materials were processed at the site; and levels of radium detected in other investigations are consistent with background or naturally-occurring levels of radioactive materials typically associated with steel mill operations.

It has been reported that a relatively small amount of zirconium may have been processed by Simonds near the end of its work for the AEC. HGL indicates that starting in 1948, Simonds processed experimental 20 to 50-lb zirconium ingots for the AEC. A Simonds report indicated that they processed 120,000 pounds of zirconium in 1958; this was after what is otherwise considered the period in which Simonds processed MED/AEC materials (1948 through 1956). HGL was not able to locate any contract documentation to confirm that Simonds processed this zirconium for AEC (HGL, p 3-9). The potential processing of zirconium for AEC is logical, as the greatest commercial use of zirconium (alloy) has been for the protective cladding of uranium for use in atomic fuel reactors (Kirk-Othmer, 1970). In nature, all zirconium contains some hafnium, and most practical applications of zirconium commonly contain approximately 2 percent hafnium. However, the presence of hafnium is undesirable in atomic reactor use; as such, the zirconium (if any) processed at Simonds (Guterl) would not have contained any significant amount of hafnium.

Zirconium metal, and especially the powdered metal, is hazardous due to its reactive and ignitable characteristics. However, there is no evidence that zirconium in this form (i.e., powdered) is present at Guterl (if zirconium is present at all). From a human health perspective, its toxicity is low. Sittig (1991) reports that prolonged exposure to zirconium dust can cause changes on a chest x-ray, but that this is not believed to cause harm to health. Direct contact with zirconium may cause an allergic skin reaction. There is no evidence that zirconium is a carcinogen or potential carcinogen. No quantitative or qualitative information on the toxicity of zirconium was located in a review of numerous USEPA information sources (IRIS; HEAST; STSC PPRTVs; EPA Region 9 PRGs; or EPA Region 3 RBCs). Analysis for zirconium is not ordinarily conducted under standard EPA protocols (i.e., it is not regulated under the RCRA toxicity characteristic; it is not a priority pollutant metal; and it is not included in the USEPA target analyte list [TAL] of metals).

The HGL report (among others, including USACE, 2001) identifies a number of 'contaminants of concern' at the site including metals (aluminum, chromium, copper, iron, lead, manganese, and nickel), PCBs, fuel oils, phenols, and corrosive liquids (hydrochloric acid and hydrofluoric acid), in addition to the radioactive materials (uranium and thorium). However, it is important to distinguish between the chemicals which may be of concern at 'the site' (the entire Guterl Steel property) from its over 90-year history of metal processing operations, and those which are specifically related to operations related to eight years of government (MED/AEC) contracts.

The FUSRAP program is by law limited to addressing the contamination related to (and incidental to) the government-related work; as such, only the uranium and thorium contamination are COPCs for the purpose of the FUSRAP program, although other contaminants which may be commingled with these COPCs will also be addressed for health, safety, and possibly disposal purposes. The determination of the extent to which non-radioactive contaminants will be addressed under FUSRAP was identified as an issue for the TPP Meeting (held in August, 2005) and noted in the Preliminary Identification of DQOs and ARARs report (Earth Tech, 2005), as quoted below.

> "The extent to which the FUSRAP investigation will include "industrial contamination" (e.g., metal working fluxes, fuel oil, solvents, acids, bases, etc.) which may have been used during the MED/AEC-related operations, but which also could be attributable to the industrial operations at the site in its 90-year history which are unrelated to the eight-year period of processing nuclear material. The FUSRAP eligibility letter for the Guterl Steel site (Appendix C of the USACE PA/SI [USACE, 2001]) states "The contaminants of concern from MED and AEC activities might include industrial chemicals (metal working fluxes, solvents, fuel oil, acids, bases, etc.) and radioactive substances." Subsequent (March 28, 2005) correspondence from the Department of the Army notifies the US Senate that the Corps intends to expend FUSRAP funds toward the Guterl Steel site (US Army, 2005); this letter includes the following paragraph:
>
> "*The PA also indicates that there may be significant quantities of other contaminants unrelated to the MED and the AEC activities at the site. Under FUSRAP, the Corps only has authority to clean up contamination related to the MED and AEC activities. Other contaminants may remain at the site after the FUSRAP clean up and would be the responsibility of other remediation programs that exist for this purpose, such as RCRA or Superfund. After a prolonged bankruptcy proceeding, the court recently abandoned this site; therefore, further remediation of contaminants not eligible for FUSRAP would be the responsibility of US EPA or NY State.*"
>
> The Guterl Steel site has an operational history that both pre-dates and post-dates MED and AEC activity. Therefore, if non-radioactive wastes are present at the site that exceed clean up standards, identification of the time period and allocation of the resources for clean up is problematic."

As of this writing, no information has been developed which identifies any non-radioactive contaminants which were unique to the processing of MED/AEC materials; nor any information suggesting that any of the 'industrial chemicals' which were used at the site were used or disposed to a significant extent during the processing of MED/AEC materials. The historical documents (as summarized by HGL) indicate that during the approximately nine-year period during which processing of MED/AEC materials has been documented (1948 to 1956), the uranium and thorium processing activities were conducted only one week per month (i.e., approximately 25 percent of the time). Operations within the Excised Area were conducted from at least 1911 (at which time Simonds had constructed seven buildings on the site, primarily in the Excised Area [HGL, p 3-3]) until Guterl Steel declared bankruptcy in 1982, a period of over 70 years. Proportionally, processing of MED/AEC material occurring during less than three percent of this period (approximately 108 weeks [12 weeks per year for nine years] in a time span of over 3700 weeks [52 weeks per year for 72 years]); as such, the extent to which the processing of MED/AEC materials contributes to 'industrial contamination' at the site is minimal at best. In addition, many of the metals detected at the site (other than uranium and thorium) are more likely attributable to the production of steel alloys and specialty steels by Simonds (1956-1966) and later by Wallace-Murray (1966-1978). Metals specifically identified as having been used in alloys manufactured during this period (i.e., subsequent to processing of MED/AEC materials) include chromium, nickel, manganese, cobalt, vanadium, copper, and aluminum (HGL, pp 3-18 to 3-23).

As a result of the review of the information available to Earth Tech, the COPCs identified for the site under the FUSRAP program are limited to uranium (U-238, U-235, and U-234) and thorium (Th-232). It is Earth Tech's opinion that there is adequate basis for this determination, and that there are no data gaps with regard to the identification of FUSRAP-eligible COPCs.

## 2.5 Radiological Background for the Guterl Steel Site

Previous investigations and reports do not include a comprehensive description of the radiological background conditions at the site. However, some of the reports on previous investigations do include statements on various aspects of the radiological background. Additional information on the radiological background conditions can also be inferred by review of the lower values documented for the various surveys. By assembling these statements and inferences, some general conclusions on the radiological background conditions can be stated. The use of this preliminary information should be limited for planning purposes and subject to the findings from more exhaustive studies that will be defined by the Sampling and Analysis Plan.

The ORNL 1978 and the FBDU 1981 investigations were primarily focused on the rolling mill area. Each of these reports addresses the radiological conditions in the vicinity of the rolling mill area and directly refers to the background soil concentrations and external gamma levels in the Lockport area. Although the NYSDEC 1994 survey of the landfill area and the ORISE 1999 investigations are the most recent and comprehensive surveys performed to date at the Guterl site, neither includes any significant additional discussion of the background radiological conditions. While some of the lowest values found from each of these investigations might serve as indications of the radiological conditions in the immediate area, this cannot replace offsite determinations of the ambient background conditions by which the Guterl site radiological survey data should be defined for use in the RI/FS.

To establish conservative background values for use in the data gap analysis, the lower values of the background range from the following quotes and summary statements are taken from these previous investigations and organized by the type of radiological background data.

### Radionuclide Concentrations in Soils

From ORNL, 1978:

The lowest value of U-238 concentrations identified from the on-site sampling was 1.8 pCi/g (refer to page 9, first paragraph). Table 4 in the ORNL 1978 report shows that at this location, the Th-232 concentration was measured as 0.4 pCi/g. The lowest value for Th-232 in this table is 0.3 pCi/g.

From FBDU, 1981, page 4-4:

"Background soil concentrations in the Lockport area are on the order of 1.5 to 2.0 pCi/g of U-238, 0.6 to 1.2 pCi/g of Ra-226, and 1.0 to 1.1 pCi/g of Th-232."

From ORISE, 1999, Table 16, Radionuclide Concentrations in Soil Exterior Class 3 Area, page 109:

The lowest value of U-238 concentrations identified (above those noted as less than values) from the on-site sampling was 0.9 pCi/g. The lowest Th-232 concentration was 0.4 pCi/g.

### External Gamma Radiation Levels

From the ORNL 1978 report:
Page 12, last paragraph

"Outside the grid area … the maximum reading was 12 μR/hr, which is within the range of background measurements which have been taken in the Lockport area."

From ORISE 1999 report:
Page 19, second paragraph:

"Exterior background levels in this geographic region generally average 8 μR/hr (ORAU 1989 and 1990)."

Table 10, the lower value of the external gamma radiation levels is 5 μR/hr inside the buildings within the excised area and 3 μR/hr in the exterior areas inside and outside of the excised area.

### Radon Levels

From the ORNL 1978 report, page 13:

Two samples were taken in the rolling mill area for the measurement of radon (Rn-222); concentrations were less than 0.4 pCi/L in both samples. Two additional air samples were collected for the measurement of radon daughter concentrations, one outside the mill area and one in the rolling mill area. Both sample results were below 0.001 WL.

This is consistent with the soil sample concentrations that show that Ra-226 in soils at the Guterl Steel site are typically at background levels and indicate that radon emanation is not a radiological issue at this site.

### Uranium and Thorium Background Levels

When considering natural uranium without enrichment, U-234 is in secular equilibrium with U-238 due to the short half-lives of the intermediate decay products. With regard to background concentrations for natural uranium, U-234 has the same background activity as U-238. The U-235 concentration can be calculated from the average U-238 concentration in soil of 1.75 pCi/g given that the natural abundance U-235 in uranium is 0.71% by weight and the Specific Activity of U-235 is approximately 6.5 times that of U-238.

Based on the above stated ranges for Th-232 and U-238, U-234 in secular equilibrium with U-238, and the subsequent calculation for U-235, the average background radiological conditions for these ROPCs at the Guterl Steel site are:

U-238 = 1.75 pCi/g
U-235 = 0.081 pCi/g
U-234 = 1.75 pCi/g
Th-232 = 1.05 pCi/g

Given that these values are derived from the simple average of the background lower and upper range reported by ORNL (1978), there is no description of the statistical distribution of these summary values and there are no additional statements that demonstrate either the specific location, the quantity or the quality of this background data. Also, the lower values of the range of the stated background values are greater than those values measured by ORISE in the Class 3 area. Given these uncertainties, the following values will be used for the initial background screening criteria ROPCs in soil at the Guterl Steel site to assure conservatism in the data gap analysis.

U-238 = 0.9 pCi/g
U-235 = 0.04 pCi/g
U-234 = 0.9 pCi/g
Th-232 = 0.5 pCi/g

These values are set to approximately 50% of the average values and they are in general agreement with the lower values of the stated background range. However, these estimates will be augmented in future sampling plans that will define the collection of statistically defensible background samples for use in future decision-making documents regarding this FUSRAP site.

As the parent of the thorium decay chain, Th-232 decay produces ten radioactive daughter products (Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Po-212 and Tl-208) before reaching a stable non-radioactive daughter (Pb-208). In natural thorium, (i.e., background) and in processed thorium after 60 years from initial separation from the thorium ore, these daughter products are in secular equilibrium with the Th-232 activity, due to the relatively short half-lives of these decay products. With regard to background concentrations for thorium, the Th-232 background which is conservatively set as discussed above at 0.5 pCi/g, will be used with the screening values specified for Th-232, since it is the same value as that specified for Th-232 plus daughters (USNRC, 1999).

## 2.6 Radiological Screening Values for the Guterl Steel Site

The surface activity screening values (above background) are taken from those specified in EM 385-1-80 for those ROPCs identified at the Guterl Site. These values are:

| **Surface Activity** | **Screening Value** | |
|---|---|---|
| Beta-Gamma Emitters | Average | 5,000 dpm $\beta\gamma/100cm^2$ |
| | Maximum | 15,000 dpm $\beta\gamma/100cm^2$ |
| | Removable | 1,000 dpm $\beta\gamma/100cm^2$ |
| Thorium natural, Thorium-232 | Average | 1,000 dpm $\beta\gamma/100cm^2$ |
| | Maximum | 3,000 dpm $\beta\gamma/100cm^2$ |
| | Removable | 200 dpm $\beta\gamma/100cm^2$ |
| Uranium natural, U-238, U-235, U-234 | Average | 5,000 dpm $\alpha/100cm^2$ |
| | Maximum | 15,000 dpm $\alpha/100cm^2$ |
| | Removable | 1,000 dpm $\alpha/100cm^2$ |

The screening values (above background) for the ROPC concentrations in soils are taken from those values specified by NRC (Federal Register Vol. 64, No. 234, December 7, 1999 and NUREG-1727). These values are:

| **Radionuclide** | **Soil Concentration (pCi/g)** |
|---|---|
| U-238 | 14 |
| U-235 | 8.0 |
| U-234 | 13 |
| Th-232 | 1.1 |

These screening values were derived from the DandD screening code, Version 1, using default physical parameters that were selected at the 90th percentile of the dose distribution. The Th-232 value is the same for Th-232 and Th-232 with all decay product daughters present.

Statements from the previous investigations that are relevant to the analysis of the radiological survey results for the data gap analysis include the following:

From the ORNL 1978 report, Page 10

> "The radioactive materials processed on-site were natural uranium and natural thorium, and there has been sufficient time for Th-228 to attain almost complete (~80-90%) radioactive equilibrium with Th-232."

Page 11

> "However, it appears from the relative activities of U-238 and Th-232 in soil samples from Simonds that the standard for natural uranium is the appropriate standard to be applied to this site. ... Soil samples were taken from beneath the floor plates at 9 of these 14 locations ...

and in 8 of these 9 soil samples, U-238 concentrations were at least 100 time as much as the Th-232 concentrations (assuming equilibrium of Th-232 and Th-228)."

In general, screening values for multiple radionuclide mixtures are to be applied based on the sum of fractions rule to derive a value that is a function of the relative concentration of the radionuclides in excess of background. Since definitive background radiological conditions are not sufficiently defined and the basis for establishing the relative concentrations have not been agreed upon, this data gap analysis is conducted by adding the conservative values of the background soil concentrations discussed in Section 2.5 to the above screening values without regard to the relative concentrations of the radionuclides at a given location. The resultant soil screening values including background for use in analysis of the radiological survey data at the Guterl Steel site are:

| **Radionuclide** | **Soil Concentration (pCi/g)** |
|---|---|
| U-238 | 15 |
| U-235 | 8.0 |
| U-234 | 14 |
| Th-232 | 1.6 |

The values listed immediately above have been used as the provisional site screening values subsequently in this report.

It should be noted that the ecological screening values (or Biota Concentration Guides [BCGs]; USDOE, 2002, Table 6.4) for terrestrial receptors are several orders of magnitude higher than the site-specific provisional screening values presented herein. BCGs for the ROPCs at Guterl (Th-232; U-234; U-235, and U-238) range from 2,000 to 5,000 pCi/g and as such are not limiting criteria in terms of necessary analytical sensitivity.

# 3. Data Gap Summary

According to the Statement of Work for this project, the data is to be evaluated here for sufficiency to complete a Remedial Investigation (RI) report. This is to include the conduct a Fate and Transport Analysis, a Baseline Human Health Risk Assessment, and a screening level Ecological Risk Assessment.

## 3.1 IA01 Excised Area – Building Surfaces and Interiors

As discussed above (Section 2.3), a number of investigations have been conducted in the Excised Area. Since the ORISE 1999 radiological survey was performed using currently accepted methods and instrumentation and since it was the most comprehensive survey conducted to date, it is considered to be the best set of data for use in the data gap analysis for this IA. Although the ORISE surveys were generally performed in conformance with the survey protocols in the MARSSIM guidance for final status surveys, the direct measurement and sampling locations were often based on an observational approach rather than on statistical sampling. The USACE (USACE, 2005b) noted that the report included "analytical results with units, uncertainty, data qualifiers, analytical methods, and sample location and depth." It concluded that the "data may be usable in a risk assessment if COCs, equipment calibration records and detection limits are obtained from ORISE." The recognized credibility of the ORISE organization may contribute to the usability of these data.

This data gap analysis is based on project specific data needs derived from the end-user perspectives of risk, compliance, remedy, and responsibility. Each of the data needs for the buildings within the Excised Area is associated with one or more environmental media, surfaces and fixtures, specifically: the floor surface, the subfloor media, interior walls, fixtures and equipment, water, sediment, exterior walls, and roofs.

At the TPP Meeting for the Guterl Steel site, it was suggested that the buildings within the Excised Area may either be so contaminated, so structurally unsafe and/or so old, that remediation and rehabilitation for reuse may not be feasible. In such case, the current data could potentially be used with conservative assumptions for the extent of the contamination to support a preliminary RI. However, if greater accuracy is desired, additional data will be required to better define the actual extent of the contamination.

Generally, the following list of data gaps is applicable to all buildings in the Excised Area unless specifically noted otherwise below by building:

1. Since this data gap analysis uses the ORISE 1999 data, according to the USACE (2005b), its usability in a risk assessment is subject to obtaining the relevant COCs, equipment calibration records and detection limits from ORISE.

2. There are no measurements or samples from the building exterior surfaces including roofing media where applicable.

3. The gamma exposure rate measurements (μR/hr) taken within these buildings is specified only as a range for each building (ORISE 1999, Table 10). Since there are no specific measurements, there are no coordinates and no way to correlate the findings to a location within the building.

4. The limited depth profiling within the buildings precludes accurate estimates of the volume of subfloor media above the screening values.

5. While the areal extent of the contaminated areas is generally known based on the survey findings and presentation in the ORISE figures, the accuracy of the area determination is limited by the measurement and sample density. Current data is sufficient to determine that the surficial and subsurface conditions generally exceed the screening values and to determine the nature of the ROPCs. Additional surface measurements and subsurface samples may be desired to support better definition on the extent of the contamination.

6. While the scanning survey data was conducted on a grid basis in some buildings, the recorded direct measurement and sample locations within these buildings based on observational results.

7. Within the ORISE 1999 report, the scale drawings appear to be approximate, and there are no grid coordinates for location of measurements and samples inside these buildings. All direct measurement locations and all sampling locations are denoted on scaled figures by numbered symbols. These numbers are used to report the tabulated measurement and sample analysis results, which include brief descriptions of the location or item. This allows for approximate location within several meters, subject to the size of the overall building as depicted in the figures. While this is sufficient for determination of the general conditions of a given area, this does not readily support the efficient conduct of confirmation measurements. In addition, the generally sparse and/or clustered data from observational locations does not facilitate the automated interpolation of the data using standard geographic methods for more precise presentation and interpretation of the data.

8. An accurate set of drawings is desired to clearly demarcate the building boundaries between adjacent buildings that are open to each other to aid in interpretation of the survey results by building.

9. Some of the reported values for surface areas in the buildings differ significantly based on the source of information. In addition, the ORISE 1999 report provides the building size in units of square meters ($m^2$) in terms of 'total area' or 'floor space'. The distinction between these two terms is not clear. Some of the stated values differ from calculations of floor space based on the scale drawings included in the report by in excess of 15% (Buildings 6 and 8). The HGL report lists the dimensions of each building in feet. The resulting calculations of floor space from the HGL values are typically less than those values stated in the ORISE report by 38 to 88%. As a

specific example, the combined area of Buildings 4 and 9 given in the ORISE report is approximately 4,400 $m^2$. Figure 16 in the ORISE 1999 report shows approximately 3,750 $m^2$ of floor space for a difference of approximately 15%. The walls add another approximate 400 $m^2$ of area, bringing the total according to the figure to approximately 4,150 $m^2$, for a difference of approximately 6%. This suggests that the term 'total area' as used in the ORISE report is total area surveyed. The HGL building designated as Building 4 is denoted as Buildings 4 and 9 in the ORISE report. The HGL dimensions for this area produce a calculated floor space of 1560 $m^2$, which is 38% (1560/4150) of the value that calculated from the ORISE figure.

Finally, there are several data gaps that apply to site utilities. There are no measurements or samples from the drain lines, the sewer lines, or the underground utility lines. There is only limited sampling and analysis of sediment and water from tanks, pits, and trenches within these buildings. There are limited design or as-built drawings that show the location of any subfloor drain lines, sewers or underground utilities. These data gaps are addressed under IA08 (Site Utilities).

In addition to the 'General' data gaps stated above, the following data gaps are specifically identified by building.

### Building 1

In addition to those issues noted above as 'General', there are no measurements or samples from:

1. Within the Work Room that provide sufficient detail on the nature and extent of the concrete floor and subfloor media that exceeds the screening values,
2. The sealed drain line at Work Room near the readings on the concrete floor that are above the screening values,
3. Any interior surfaces or equipment above 2 meters,
4. The flooded basement, the exterior surfaces,
5. The subfloor media, and
6. The underground utility lines.

### Building 2

With regard to those issues noted above as 'General', there is also one measurement that is noted in Table 2 of the ORISE 1999 report only as 'Roofing Debris' that may or may not be representative of the exterior roof surface depending on whether it is from within the building or from the exterior roof media, and there is another measurement that is noted in the same table as "Pit Wall". In addition to those listed above as 'General', specific data gaps in Building 2 include:

1. Depth data at the floor locations that were identified to be above the screening values to better define the nature and extent of the contamination (ORISE 1999, Figure 12).

### Building 3

With regard to those issues noted above as 'General', there is also one measurement noted as "South End of Trench". In addition to those listed above as 'General', specific data gaps in Building 3 include:

1. Direct measurements and/or additional sediment sampling in the large trench to support estimates of the volume of sediment above the screening values (addressed as IA08),

2. Additional surface measurements and subsurface samples to support better definition on the areal and vertical extent of the contamination (the elevated areas indicated in Figure 36 of the ORISE 1999 report do not appear to coincide closely with the measurement or sampling results shown in Figures 14 and 28 of the ORISE 1999 report),

### Building 4 and 9

There are no additional data gaps identified for Buildings 4 and 9 other than those issues noted above as 'General'.

### Building 5

ORISE summarized its findings for Building 5 as "No residual contamination identified." However, in addition to those issues noted above as 'General', the absence of any documented measurements or samples by location to support this conclusion is a data gap.

### Building 6

In addition to those items listed above as 'General', specific data gaps in Building 6 include:

1. Direct measurements on surfaces above 1 meter to determine extent of surface activity on elevated surfaces.

### Building 8

There are no additional data gaps identified for Building 8 other than those issues noted above as 'General'.

### Building 24

Building 24 is outside the Excised Area but it is included here since it is adjacent to Building 8 and known to have areas of contamination above the screening values. There are no additional data gaps identified for Building 24 other than those issues noted above as 'General'.

### Building 35

There are no data gaps identified for Building 35 other than those issues noted above as 'General'.

## 3.2 IA02 – Excised Area – Building Exterior Areas

With regard to the nature and 'general' extent of the ROPCs in surface soils, there are no data gaps identified in the building exterior areas. For a more accurate estimation of the areal extent, additional scanning and biased surveys that correlate the measurements with location coordinates to at least one-meter precision is recommended. The objective is to produce continuous scanning data for 100% survey coverage and augment any finding with static measurements. Based on the analysis of this more comprehensive data set, additional subsurface sampling, including borehole analyses, could be required to accurately estimate the vertical extent of the ROPC.

Data gaps for groundwater and sewers and drains which may be present in this area are discussed in Section 3.7 (IA07) and Section 3.8 (IA08), below, respectively.

## 3.3 IA03 – Landfill Area

As discussed above (Section 2.3), a number of investigations have been conducted in the landfill area. However, much of the investigative work has been focused on conventional (non-radioactive) contaminants, and there is only limited isotope-specific radioactive material data for the landfill. As a result, there are key data gaps for this area.

As noted in Section 2.3.3, the likely presence of MED/AEC-related material has been detected in the northeast corner of the landfill (based on thorium contamination [ORISE, Figure 33]; and review of historical aerial photographs showing disturbance in this area during the time of MED/AEC material processing at the site). However, it has not been determined whether or not MED/AEC (i.e., FUSRAP-eligible) wastes exist within the remainder of the landfill area. Neither the conceptual site model nor the operational history of the landfill provide a clear rationale for the existence of MED/AEC wastes in the rest of the landfill; although operations (filling and mining) subsequent to 1956 may have re-located materials originally deposited in the northeast corner.

Prior screening investigations have found high levels of radioactivity in the landfill, primarily in the northeastern part of the landfill. (This part of the landfill is close to the railroad spur, and is also the closest [most accessible] to the Excised Area. The ORISE report indicates that numerous pieces of thoriated metal were present outside the northern fence and due east of the landfill [ORISE, 1999; p 18].) Therefore, the nature of the elevated radiation levels in the landfill needs to be determined. Are the levels due to uranium and thorium (or equipment or other materials contaminated by U and Th), or is the source of the radiation levels unrelated to MED/AEC activities? USACE 2001 (p. 3) states "areas on the landfill exceeding 100 pCi/g U-238 and 5 pCi/g Th-232" were detected; however, review of the ORISE report shows only one sample location at which U-238 was detected above 100 pCi/g, and that one location was a surface soil sample right on the fence line on the eastern edge of the landfill (all other uranium measurements were less than 35 pCi/g). The elevated Th-232 readings (greater than 5 pCi/g) were all located in roughly a straight line approximately due north, and within approximately 100 meters of the elevated Th-232 measurement. It appears that this area is coincident with the area adjacent to or between the railroad tracks (see NYSDEC Figure 1-2 and ORISE Figure 33, both in Attachment 2).

The areal extent of potential surficial radiological contamination has been reasonably well determined by the systematic surveys conducted previously (e.g., ORISE, 1999; Figure 34). Data are limited in the southern and western parts of the landfill, due to standing water or saturated soil conditions. (NYSDEC [1994] collected several paired "surface water/sediment" samples in that part of IA03 [see NYSDEC Figure 1-2, presented in Attachment 2].) However, the screening data, site history, and review of aerial photography do not suggest that the areas which were not surveyed previously are likely to be radiologically contaminated; therefore, the absence of data for this part of the landfill is not considered a data gap. Although the screening criteria utilized by ORISE are higher than the provisional site-specific screening criteria (see Section 2.6), the raw data (ORISE Table 13) and ORISE Figure 36 were reviewed; and results in only minor changes to the identification of 'impacted' areas. One (discrete) additional data point within the landfill proper (260 N, 260 W) slightly exceeds the provisional criteria (18.2 pCi/g, as compared to the 15 pCi/g criterion developed in Section 2.6). No landfill samples in the area considered unimpacted exceed the more stringent screening criteria presented in this report.

The landfill was reportedly first used for disposal of site wastes in approximately 1962 (i.e., at least six years after the cessation of known MED-AEC related activities), and was used for approximately 20 years, until 1981. In 1981 or 1982, Guterl steel excavated and reclaimed approximately two million pounds of alloy steel from the landfill; the landfill was not formally closed. The landfill was reportedly used for disposal of slag, baghouse dust, foundry sand, and general plant rubbish; as such, contaminants would be expected to be principally inorganic (metals) or inert materials. However, it is certainly possible that other industrial chemicals and wastes, utilized as part of plant operations, may have been disposed in the landfill. While the data and site historical information for the non-radioactive contaminants are not complete in the sense of providing a full delineation of contamination, the data (primarily the PSA data generated by the Task 3 Investigation [NYSDEC, 1994]) are adequate for providing a reasonable overview of the nature and concentration of non-radioactive constituents. The data indicate that, in areas potentially impacted by radiological contamination, the concentrations of other materials are relatively low and unlikely to have a significant impact on remediation or disposal. The one moderately elevated PCB concentration (15 mg/kg in TP-101) is below the threshold at which it would be regulated as hazardous under New York law; and in any event is not in the area at which disposal of MED/AEC wastes is suspected. Therefore, no data gaps have been identified for non-radioactive contaminants in IA03.

One possible data gap for the landfill area is the lack of information regarding subsurface contamination in filled or previously disturbed areas which did not exhibit surficial contamination. While the currently available data, including limited screening of soils from borings and test pits conducted by NYSDEC, suggest that MED/AEC contamination is limited to the areas identified in the northeast corner of the landfill (and as shown on ORISE Figures 34 and 36 [see Attachment 2]). However, a systematic investigation for potential subsurface wastes has not yet been conducted.

As noted in Section 2.2.3, prior investigations have identified "wetland" or "marsh" setting west and southwest of the landfill, although the area was not noted as a regulated wetland by NYSDEC. A wetland assessment should be conducted to determine whether the area has been identified as a regulated wetland since the prior investigations were performed. As noted above, there is no evidence that landfilling activities were ever conducted in this part of IA03, based review of aerial photography, site history, and the limited amount of data for this part of IA03.

## 3.4 IA04 NCIDA Property (Allegheny Ludlum operations area, excluding Excised Area, Landfill, and Building 24)

The available data for IA04 were summarized and discussed in Section 2.3.4. The radiological screening – primarily by ORISE (1999; see Figure 33, provided in Attachment 2) – suggests that within the areas surveyed, contamination is largely confined to two areas.

One area of contamination is located in the area east of the landfill and north of Building 38, roughly from grid lines 280N to 320N and from the west edge of the landfill (approximately 210W) to approximately 80W (with an additional isolated 'hot spot' at approximately 40 W). The second area is located north of Buildings 24 and 35, and extends from approximately 270N to 320N and from approximately 60E to 160E (see ORISE Figure 33). The ORISE interpretation of the contaminated ("impacted") areas is provided in Figure 36 (ORISE, 1999).

Several pieces of thoriated metal were observed outside the northern fence (and due east of the landfill) of Allegheny Ludlum property (ORISE, 1999; p 18). These pieces of metals exhibited high levels of radiation, and therefore, specific samples of the materials were not collected.

The HGL report summarizes results of USEPA radiological surveys conducted in 1996 (HGL, 2005; p 2-7). The initial survey (July 15) consisted of "a radiological survey of all buildings on the site, and no surface contamination was discovered outside of the expected areas." A more extensive study was subsequent conducted (July 24); and is summarized as "EPA personnel discovered contamination in areas where it had not been previously detected" and "soil on the Allegheny Ludlum property was also determined to be contaminated" (HGL, 2005; p 2-7).

One data gap for this area is the unavailability of the documentation for the EPA surveys discussed in the HGL report. However, based on HGL's review of those documents, and the ORISE report, it appears that the "Class 3 Area" including the buildings (14, 37, 47, and the office building), as shown on ORISE Figure 35 (included in Attachment 2), have not been impacted by MED/AEC materials, and that further investigation of this area is not warranted.

However, the HGL report (Section 3.1.2 Layout) refers to a number of laboratories that existed in the office building (HGL, 2005, pp. 3-6, 3-7). The HGL report refers to the office in their report as Building 7, stating that it "was 45 x 85 feet and two stories tall. The lower east portion of the building was used as an office, and the lower west portion was used as a laboratory." It also states that "The western portion of the second floor contained a laboratory and a 12 by 15 foot room which was used by the chief chemist. The eastern end of the second floor contained the office of the chief metallurgist as well as a private laboratory used for special experiments." The HGL report also shows that Building 7 was present in the 1938, 1951, and 1958 aerial photographs. The absence of any survey data to confirm that there are no residual MED/AEC ROPCs in excess of the screening values present in the current office building is a data gap.

Given that a number of laboratories apparently existed in this building during the period of MED/AEC operations, a Class 3 survey of this building is recommended. In addition, a detailed review of the EPA documentation should be conducted to confirm the HGL summary.

In addition to the EPA (1996) survey data, it is believed that there also exists radiological survey data from NYSDEC (1999) which also has not yet been provided for use in this DGAR. It is believed that this survey included the northwest part of IA04, as well as some coverage of IA05 (discussed below). This information should be obtained and reviewed.

Several figures in the ORISE report (Figures 33 and 36) show the approximate areas in the NCIDA area which may have been impacted by MED/AEC materials. In addition, the EPA survey cited by HGL indicates contamination detected in areas where it had not been previously detected; although no specific information as to where these areas are actually located is available. Furthermore, the ORISE report references finding individual pieces of thoriated metal within or near the Allegheny Ludlum area; again, no information as to the specific locations as to where these items were found is provided.

Based on the available information, the exact locations of MED/AEC contamination on the NCIDA property cannot be determined; and the extent to which discrete individual pieces of radiologically contaminated material have been located and removed is also unknown. This represents a significant data gap which should be addressed, as discussed further in Section 4.4, below. However, to the extent that the ORISE data identify general areas that are not impacted, the data are adequate (sufficiently specific and sensitive), so the focus of additional investigations should be in the vicinity of those areas identified as exceeding criteria (either the ORISE criteria or the provisional site-specific screening criteria presented in Section 2.6).

Another data gap for the NCIDA area is the lack of information regarding subsurface contamination in areas which did not exhibit surficial contamination. Unlike the landfill, no subsurface data of any sort whatsoever was found, other than the biased boreholes sampled by ORISE (see ORISE Table 15). However, a systematic investigation for potential subsurface wastes has not yet been conducted. Historical aerial photos reviewed for this report show significant disturbances at various times throughout this area; so contamination which may have been initially surficial may have subsequently been moved, buried, or covered by other material. Therefore, the potential for subsurface contamination in the NCIDA area has not been adequately addressed.

In addition to data gaps for the exterior soils, it does not appear that the buildings in this area were surveyed; and no samples were collected. Therefore, the absence of MED/AEC contamination in or beneath the structures in this area can only be assumed, as there are no survey or isotopic data for the buildings or subsurface material beneath the buildings.

### 3.5 IA05 Railroad Right-of-Way North of Site Proper

The available data for IA05 were summarized and discussed in Section 2.3.5. Based on the information available, it is Earth Tech's understanding that only screening level data are available from the areas along the former railroad spur and no soil or groundwater samples have been collected.

It is believed that there also exists radiological survey data from NYSDEC (1999) which also has not yet been provided for use in this DGAR. It is believed that this survey included some coverage of IA05, along with the northwest part of IA04 (discussed above). This information should be obtained and reviewed. Due to different terminology used in the various reports, and the fact that this area is generally not included in the area(s) referred to as the "Guterl Site" in previous reports, information on IA05 is sketchy at best. Aerial photography (reviewed by HGL) suggests potentially impacted areas in IA05 (based on the presence of disturbances in various photographs), but no definitive data exists for IA05.

The existing data are insufficient to draw conclusions with regard to the extent, if any, to which MED/AEC-related materials may be present on IA05. This represents a significant data gap which needs to be addressed, as discussed further in Section 4.5 of this DGAR.

### 3.6 IA06 Off-site Northeast Properties

No data gaps exist for this investigative area. Earth Tech recommends that these parcels, identified as tracts K, L, and M in HGL, 2005, be removed from further consideration under the FUSRAP program.

### 3.7 IA07 Groundwater

To fully develop the CSM and determine the mechanisms that will control the fate and transport of potential groundwater contamination, groundwater data must be evaluated in connection with geology and must be available in chemical and hydraulic format. Groundwater occurrence and movement will be controlled by the physical characteristics of site soils and bedrock. Therefore, sufficient geologic information must also be available. As noted above, NYSDEC (2000) provides a detailed analysis of the occurrence and predicted movement of groundwater at the site. However, only limited radiological data is available for site groundwater.

Based on a review of available boring logs for the landfill and the Excised Area, the depth to bedrock at the Guterl Steel site ranges from 3.4 feet to 6.8 feet below grade. Groundwater was noted to occur as a shallow overburden water-table zone, and in the shallow bedrock monitoring wells. NYSDEC (2000) also noted that seasonal fluctuations of overburden groundwater were noted, resulting in conditions where monitoring wells were observed to be dry. This is further supported by NYSDEC (1994) where MW-4 (also referred to as 81-04) could not be sampled January 1993 because it was dry. NYSDEC also concluded that the shallow overburden water bearing unit was hydraulically connected to the uppermost bedrock unit based on a review of synchronous water level data (NYSDEC, 2000).

Groundwater samples that have been collected to date are limited to the landfill area (overburden monitoring wells 81-01 through 81-04 and MW-105) and the Excised Area (bedrock monitoring wells MW-1 through MW-5). Groundwater samples were collected from the landfill perimeter wells on five occasions between 1980 and 1982 for conventional parameters (i.e., non-radiological); and on one occasion for conventional parameters plus gross alpha and gross beta activity in January 1993 (NYSDEC, 1994). Alpha radioactivity detected in MW-105 (23 pCi/L) exceeded the NYSDEC Class GA criterion (15 pCi/L); beta activity was detected in each sample but well below the NYSDEC Class GA criterion (NYSDEC, 1994). Groundwater samples were collected during June 1997 from the five bedrock monitoring wells within the Excised Area for conventional parameters only (i.e., non radiological).

NYSDEC (2000) reports a potential northeast-southwest trending groundwater divide at the site. This divide is postulated to be present due to the dewatering operations of the Frontier Stone Products quarry located southwest of the site, and the Erie Canal located east of the site. However, these data are predicated on a review of groundwater data from wells located both on and off the Guterl Steel site. These data should be confirmed by appropriately located, new on-site and off-site wells.

NYSDEC (2000) reports hydraulic conductivity data for the bedrock wells installed within the Excised Area. The range of values (1.76 E-01 cm/sec to 2.89 E-03 cm/sec) is consistent with Earth Tech's experience for wells installed within the Niagara County area in the uppermost weathered portion of the Lockport Dolostone (in this case, Goat Island Member). However, it should be noted that the bedrock wells extend through only approximately the top 10 feet of bedrock. Additional site-specific information on the occurrence and nature of secondary porosity (i.e., horizontal and vertical fractures) in the bedrock is necessary to determine if the potential for downward contaminant migration exists.

Based on a review of the available data, and considering the need to complete the CSM, the following data gaps for this IA have been identified:

- The limited number of wells, the cluster of overburden wells to the northwest (i.e., landfill) and the cluster of bedrock wells to the southeast (i.e., Excised Area) results in a significant areal data gap, as well as a cross-sectional data gap, for both overburden and bedrock hydrogeology across much of the site. More thorough combined coverage of the overburden and bedrock water bearing zones is necessary.
- Three of the existing wells adjacent to the landfill (81-01, 81-02, and 81-04) were installed in 1980, and are over 20 years old. As a result, these wells were not constructed under what would be considered currently acceptable design and

installation practices. One well (MW-105), however, was installed in 1992 by a NYSDEC contractor; therefore, this well may be more likely to provide reliable data.

- Appropriate upgradient and downgradient monitoring points in both the overburden and bedrock water bearing zones is necessary. NYSDEC (1991) notes that the overburden wells at the landfill are installed to close to the landfill perimeter to provide meaningful upgradient or downgradient data. NYSDEC (2000) utilized off-site bedrock monitoring wells to develop a hydrogeologic assessment for the site. However, appropriately located monitoring wells to track groundwater quality that may have been affected by the landfill or the Excised Area are needed.
- The influence of the Frontier Stone Products quarry dewatering operation, and the seasonal fluctuation of the Erie Canal on overburden and bedrock groundwater occurrence and movement must be determined.
- The collection of additional data regarding the nature of bedrock fractures at the site is recommended.
- Radiological data are needed for the Excised Area bedrock monitoring wells.
- An updated private drinking water well survey should be conducted. In addition, NYSDEC (2000) reported that an investigative report titled "Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York" was under preparation. Earth Tech recommends that NYSDEC be contacted to determine if this report was finalized.

### 3.8 IA08 Site Utilities (Sewers and drains)

Only a limited amount of data exists to define the presence and status of site utilities and drains. For the purpose of this report, this category is intended to include storm sewers, sanitary sewers, trenches constructed for sewer, gas, water, or electric service, and interior floor trenches or drains. As noted in Section 2.2.4, prior investigators (HGL, 2005) have made attempts to develop information with respect to sewers and utilities, but were unable to acquire useable site-specific information for on-site utilities.

The presence of granular bedding within trenches for conventional utilities presents a potential pathway for off-site migration of contaminants via shallow groundwater (given the very shallow water table at the site). Several trenches and floor drains are visible within the Excised Area buildings, and limited information is available regarding two oil/water separators (one between Building 2 and Building 3, and one adjacent to the Erie Canal at the process water intake).

The only available radiological data for Excised Area trench sediment was provided by ORISE (1999), and indicates that the residual materials in the trenches are a concern due to elevated U-238 concentrations.

Considering the project objectives, the following data gaps have been defined:

- Determine the location and status (continuity, if accessible) of potentially abandoned Excised Area interior floor drain inlets, drain lines, or trenches.
- Determine the location and operational history of the oil/water separator (OWS) between Building 2 and Building 3, and the OWS adjacent to the Erie Canal.
- Determine if sediment has accumulated in the sewers, drains, OWSs, and trenches, and if present, determine whether the sediments are radiologically contaminated.
- NYSDEC (2000) reported collection of a surface water sample from the sump located between Building 2 and Building 3 (identified as SW-1). This sample was collected for radiological analyses. However, data were not included in the IIWA (NYSDEC, 2000); no mention of where the data could be located was provided. These data should be located and provided for evaluation.
- Utility drawings have recently been made available to Earth Tech, but the accuracy and completeness will need to be field verified.

## 3.9 Other Data Gaps

Other data gaps identified, not tied to a specific investigative area, include:

- Most sample locations from previous work (e.g., ORISE, ORNL) cannot be accurately located, as sample locations or grids were not surveyed. NYSDEC sampling events, and monitoring well locations, are surveyed.
- Lack of a baseline assessment of building conditions to determine minimum requirements for building preparation to allow for execution of the investigative activities.
- Only a limited amount of background radiological data were located for this report. As radiological criteria are normally based on exceedances of naturally-occurring background for a given site or area, accurate delineation of impacted areas cannot be performed without adequate data to establish background radiation levels
- As noted in Section 2, summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) were not yet available to USACE for this data gap analysis. As soon as these data are available to USACE, they should be reviewed prior to making final decisions with respect to sampling and analysis plan scoping.
- NYSDEC (2000) notes that a surface water sample was collected from a sewer line in Building 3 (within the Excised Area) and was submitted for radiological analysis, but the results were not included in the IIWA Report.
- As was noted in USACE's historical data summary report (USACE, 2005b), assessment of supporting documentation related to previous reports (especially ORISE, 1999) is an important aspect of evaluating the acceptability of the related data. Earth Tech has conducted this data gap analysis under the assumption that the 1999 ORISE data are useable given the maturity of the ORISE program in conducting

such investigations. However, having the documentation would validate that assumption and maximize unqualified use of the data.

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# 4. Recommendations for Data Collection

This section provides a discussion of the nature and extent of additional data needed, including recommendations with respect to further data gap collection and analysis, and how the collection of additional data will enhance the understanding of the surficial and subsurface systems and the fate and transport of the suspected contaminants. This discussion is arranged by the investigative areas, in the same sequence as in the previous chapters.

## 4.1 IA01 Excised Area – Building Surfaces and Interiors

The ORISE radiological survey data (discussed in Section 3.1) are generally considered by Earth Tech to be of sufficient quality for its original purpose. In addition, although the instrumentation capabilities have improved since the conduct of the ORISE survey in 1999, each of the different survey measurement, sampling and analysis methods used in the conduct of this survey are still appropriate and current. As a result, the quality of these data is sufficient and potentially usable for some current and future purposes. Given the time since the ORISE survey, some limited amount of measurements should be repeated in all buildings to verify that the current conditions have not changed and confirm the quality of the ORISE results.

Several of the survey areas that were initially designated for a Class 3 or a Class 2 survey measurement and sampling frequency were subsequently reclassified based on the initial survey results, requiring (according to the protocol) sampling at a higher frequency (density). Although only Buildings 6 and 8 were initially designated as Class 1, some areas of Buildings 1, 2, 3, 4/9 and 24 were reclassified as Class 1 areas as the ORISE survey proceeded.

In the case of Building 1, it was noted by ORISE that no additional surveys were conducted subsequent to being reclassified due to safety issues. In addition, the basement area in Building 1 was not surveyed at all due to flooding. Once the safe access issues are resolved, the Building 1 Work Room should be resurveyed as a Class 1 area, and the presently flooded basement room should be initially investigated as a Class 3 area.

The ORISE report does not make any specific statement regarding the resurvey of any other areas that were reclassified (to Class 1) based on the initial survey findings. According to the report, the Class 1 survey protocol was intended to have a sampling frequency of a minimum of at least one sample per 100 $m^2$, and at least 10 sample locations in each Class 2 area. The report noted that a total of 105 surface samples were collected in Buildings 2, 3, 6, and 8. It also estimated that the impacted total floor area of these four building is approximately 3090 $m^2$ based on the ORISE screening values. This is equivalent to an approximate average sampling frequency of one sample per every 30 $m^2$ of impacted area, suggesting that these other buildings were sampled in accordance with their reclassified status.

With regard to the quantity of the data, there are several issues that preclude universal acceptance of these data and its usability for current and future purposes. First, it is reasonable to expect that the current screening values (e.g., the provisional screening values discussed in Section 2.6) will result in identification of larger impacted area than that identified by ORISE (e.g., in Figure 36; see Attachment 2). Without additional measurements and samples at known locations around these areas, the new boundaries for those areas that correspond to the lower soil screening values cannot be determined. Even when a survey grid was used for the location of measurements and samples (Buildings 6 and 8), there are no coordinates provided in the report to accurately position the measurement or sampling locations. Based on the notations on the figures in the ORISE report that show the direct measurement and sampling locations on the floor in these buildings, the locations can be generally associated with a specific 5 meter grid. The direct measurement locations appear to approximate one measurement per grid, although more so in Building 8 than in Building 6. However, the sampling locations appear to be much more clustered rather than uniformly spaced, especially in Building 8, with some grids having two or more samples, while many have none. The absence of location coordinates precludes any accurate verification of the findings or any reevaluation, interpretation, and extension of these data in a statistically sound manner. For Building 6, the ORISE report recommends that the remaining floor plates be removed and additional soil investigations be performed. For Building 8, it may be possible to use the ORISE survey grid relative to the equipment locations shown on the survey results to locate the measurement and sampling locations to within several meters. If so, these data could be sufficient for subsequent interpretation and determination of the new impacted area boundaries based on the current screening values. If not, additional measurements and sampling should be performed to support the determination of area and depth determination at the current screening values.

Second, while the quantity of the recorded data may be sufficient to verify general determinations for the presence or absence of residual radioactive materials, it is frequently insufficient to demonstrate that the findings are statistically valid for the delineation of specific areas or volumes of the impacted media. In many buildings (Buildings 1, 2, 3, 4/9, 24, and 35), the measurement locations appear to be chosen based on biased locations, elevated field measurements, or randomly, with only a few locations noted to document the extent of radiological contamination in the rest of the building. In many cases, the measurement locations appear to focus on locations with elevated direct readings, with only sparse sampling in other areas. While the use of real-time survey findings can be used to delineate the areas of interest above a specified screening value and to identify the extent of such areas, the resultant clustering of data within an area does not provide representative data for the balance of the building and it does not support subsequent reevaluation of the data at a lower screening value to identify the corresponding new areal extent.

The quantity of measurements and samples in these areas needs to be determined based on a statistically sound sampling plan. In addition to the quality of the measurement, sampling and analysis, it is imperative that the sample locations be established accurately and unambiguously. Therefore, if accurate volume estimates are desired at the current soil screening values for current and future purposes, a formal re-survey of these areas (horizontal and vertical) should be conducted and any sample grids or biased sample locations should be tied into a recognized coordinate system (e.g., New York Plane Coordinate System).

Since there are no documented results for Building 5 in the ORISE report, this building should be re-surveyed as a Class 3 area with full documentation.

The northern part of Building 24 was constructed subsequent to MED/AEC activities. It is possible that MED/AEC-contaminated material (slag or other materials) may have been disposed in the area where Building 24N now exists; and that this material was not removed prior to its construction. Surface scans (conducted by ORISE) in Building 24N may not have detected the presence of subfloor radioactive materials; therefore, a limited subsurface sampling (coring through the floor) and analysis program is recommended to confirm the absence of radioactive materials below the floor of Building 24N.

Data for Buildings 2, 3, and 4/9 appear generally adequate to establish nature and extent of contamination.

Confirmation surveys, at 5 to 10 percent of the frequency utilized in the ORISE investigation, are recommended for all buildings in the Excised Area. In addition, gamma exposure measurement locations should be documented and measurements and samples to assess site conditions against current screening values should be added.

## 4.2 IA02 – Excised Area – Building Exterior Areas

The ORISE radiological survey data as discussed in Section 3.2, is considered by Earth Tech to be generally of sufficient quality for its original purpose. Each of the different sampling and analysis methods used in the conduct of this survey are still appropriate and current. As a result, these resultant data are considered to be potentially usable the current and future purposes).

A survey grid was used in determining the sampling locations. It is based on a local coordinate system with the origin located approximately 20 feet west of the southwest corner of Building 4/9 (Figure 3 in ORISE, 1999). The north axis appears to be located parallel to the west side of Building 4/9. The accuracy of the grid layout should be verified and the coordinates of the sample locations should be tied into a recognized coordinate system (e.g., New York State plane coordinates).

The sampling in this area has documented the presence of MED/AEC related materials. Both the horizontal and the vertical extent of the contamination have been fully established. The existing radiological data (Th-232, U-235, and U-238 in pCi/g) are in a form and are sufficiently sensitive to allow comparison to the provisional site-specific screening criteria developed in Section 2.6 of this report.

External gamma exposure rate readings at one meter above grade should be recorded at each of the grid nodes. Subject to obtaining the quality control documents for the ORISE survey in this area, only limited additional data collection is recommended. A random sampling of the surface and subsurface sample locations should be recollected and analyzed to verify the previous findings.

## 4.3 IA03 Landfill Area Soils

Although the potential presence of MED/AEC related materials has been documented in the northeast part of the landfill, neither the areal nor vertical extent of the contamination has been fully established. The existing radiological data (Th-232, U-235, and U-238 in pCi/g) are in a form and are sufficiently sensitive to allow comparison to the provisional site-specific screening criteria developed in Section 2.6 of this report.

The PA/SI (USACE, 2001) indicated that the potential current human receptors for the site are an on-site worker and a trespasser. The on-site worker scenario was for warehouse duties (which would not be applicable to the landfill area); and stated that the "trespasser scenario is unlikely due to the presence of perimeter fencing" (p 3). However, the landfill area could conceivably be developed (commercial or industrial use), so construction workers as well as commercial/industrial employees could be potential future receptors. Ecological receptors could potentially be exposed to site contaminants in soil under both current and future conditions.

As noted above (Section 3.3), the possible presence of subsurface contamination in areas not exhibiting surficial contamination cannot be completely ruled out. Therefore, to obtain better certainty that the landfill investigation (discussed below) can be focused on the northeast corner of the landfill (i.e., landfill areas shown as 'impacted' on ORISE Figure 36), a systematic screening investigation could be conducted. Since the depth of interest is generally 2 meters or less, the Geoprobe system for sample collection and subsequent laboratory analysis of selected samples to represent the stratum of interest (0 to 15, 15 to 30, 30 to 60, 60 to 120, and 120 to 180 cm, and beyond as needed) to either bound the ROPC concentrations at levels below the screening values or until reaching refusal. This approach may offer the following advantages:

- Straightforward sampling and analysis
- Sensitivity is laboratory grade using High Purity Germanium Lithium (GeLi) Drifted Detectors for high resolution gamma spectroscopy (portable lab grade GeLi systems are readily available)
- These GeLi systems can be used *in situ* in the field to "take a shot" of an area or a volume (e.g., soils volume) for subsequent conversion to pCi/g
- These capabilities are readily available and can even include preliminary on-site analysis to support an observational approach that allows modification of the sampling density when warranted by results.

Assuming that the screening investigation confirms the assumption that potential MED/AEC contamination is limited to the northeast corner of the landfill, a test pit excavation program, coupled with isotope-specific sampling and analysis, would be appropriate in the area approximately 100 m by 40 m, covering the area shown on ORISE Figure 34 (see Attachment 2) from grid location 340N to 440N and from approximately 220W to 180W. Based on reported observations that many of the elevated screening readings are associated with discrete items that can be discerned (e.g., thoriated metal; yellowcake; firebrick), one intent of test pits (rather than test borings) would be to attempt to correlate specific, visually identifiable materials to that which has elevated readings. These materials (at least the firebrick) might also need to be analyzed for radium. Firebrick normally has approximately equal concentrations of radium and uranium, but if the uranium to radium ratio is high, the material may have been contaminated by contact with MED/AEC material. Other materials with evident radioactivity would also be analyzed to (a) verify that they are consistent with the material known to have been processed by Simonds for the AEC; and (b) to verify that the levels exceed the NRC screening criteria. If MED/AEC materials are present but below screening levels, then no further action would be needed.

There is no evidence that the standing water or underlying soils (referred to as sediment in some reports) in the southern and western parts of the landfill have been affected by radiological contamination; no further investigation of these media in the landfill area is warranted.

A wetland assessment should be conducted to determine whether the area west and southwest of the landfill is a regulated wetland.

For efficiency, the investigation of the landfill area could be integrated with the investigations of IA03 (NCIDA property) and IA05 (railroad right-of-way north of site). As the landfill area appears to be the only part of the site for which adequate survey data (horizontal and vertical) are available (as presented in NYSDEC, 1994, Volume II, Section 4), sampling of other areas at the Guterl site could be tied into the existing NYSDEC survey data for the landfill.

For each of the areas IA03, IA04, and IA05, the potential for discovering isolated pieces of thoriated metal exists. As was discussed during the TPP Meeting, if isolated pieces of thoriated metal are identified during the screening level survey, the sampling and analysis plan and radiation protection plan should be written such that investigators are prepared to safely and immediately collect the items for interim storage within the Excised Area of the site. Each location should be identified and field surveyed to guide later assessment surveys, including documentation of the nature of the material collected (approximate size, weight, count, etc.).

## 4.4 IA04 NCIDA Property (Allegheny Ludlum Operations Area, Excluding Excised Area and Landfill, and Building 24)

As noted in Section 3.4 of this report, although the ORISE data are considered to be of adequate quality, the areas of contamination are not considered to be sufficiently delineated. Additional isotope-specific radiological data should be obtained (at multiple depths) in the vicinity of areas identified as 'impacted' by ORISE (see ORISE Figure 36, provided in Attachment 2).

Prior to developing a detailed data acquisition plan for this area, the July 1996 USEPA survey data should be obtained and reviewed. The results of the USEPA surveys should be taken into account in developing the sampling plan for IA04.

Assessment of the former laboratory facilities reported by HGL is recommended. As noted in Section 3.4, a Class 3 survey is recommended, and can be conducted during off-hours or weekends to minimize disruption to personnel currently assigned or using that building.

A key data gap identified for both this area and for the landfill is the lack of certainty that all areas which may have subsurface MED/AEC wastes, but no surface manifestation, have been found. Therefore, the same type of screening level investigation (using direct push technology and field instruments) should be conducted in a systematic manner in the areas identified as Class 1 and Class 2. (The Class 3 area around Buildings 14 and 37 does not appear to have a sufficient likelihood of contamination to warrant extending the survey into this area.) For these parts of the NCIDA area, a systematic subsurface screening investigation, similar to the one described above for the landfill area (Section 4.3) is recommended. In general, it would be expected that the investigations of IA04 and IA05 would be similar, and should be conducted concurrently for efficiency.

The lack of current evidence of surface contamination in the Class 3 area of IA04 does not preclude the potential for subsurface contamination below the structures in this area (i.e., Buildings 14, 37, and the current office building), especially since no interior radiation surveys are known to have been conducted in the buildings in this area. Therefore, a Class 3 survey is recommended, coupled with limited subsurface sampling to investigate the potential for the existence of radioactive contamination below the floor of these buildings.

## 4.5 IA05 Railroad Right-of-Way North of Site Proper

Prior to initiating data acquisition planning for IA05, the 1999 NYSDEC radiological survey data should be obtained and reviewed. It is likely that a staged approach would be applicable for this area, with a screening level survey conducted initially (to fill in the gaps or confirm information from the 1999 NYSDEC survey), with subsequent intrusive sampling based on the screening survey. As with IA04, it is important that both screening surveys and sampling investigations be located unambiguously; so this area should be included in site surveys. Screening surveys should be focused on areas with evidence of disturbances as shown in the aerial photography reviewed (HGL, 2005). However, there is anecdotal evidence of discrete pieces of thoriated metal being found in IA05 also, so screening should also include coverage of areas near the former railroad tracks, even in areas where no historical disturbed areas have been noted.

## 4.6 IA06 Off-site Northeast Properties

No additional data needs have been identified. As noted in Section 3.6, Earth Tech recommends that this IA be removed as an area of concern.

## 4.7 IA07 Groundwater

Additional information regarding site-specific geology and hydrogeology is needed to evaluate the nature and extent of potential MED/AEC impacts to groundwater. The most direct method for acquiring this site-specific data is the installation and testing (chemical, hydraulic) of properly designed and located groundwater monitoring wells. The monitoring wells should be installed in both the overburden and bedrock zones.

The first recommendation is to assess the condition of the existing on-site wells. As noted above, three of the existing wells at the landfill were installed in December 1980, and one well was installed in 1992. The three 1980 wells may be in a condition where the collection of reliable data is not possible. The 1992 landfill well and the five wells installed at the Excised Area should be expected to be in much better condition, and are likely to be reliable. To address this concern, performance of a preliminary well assessment program was discussed during the TPP Meeting. The program was recommended to include an assessment of the monitoring well construction (surface seal intact, protective casing intact, open interval intact, etc.), a preliminary re-development of the well to evaluate the potential reliability of the well (e.g., observe for stabilization of drawdown, turbidity, conductivity, pH, temperature). Collection of groundwater samples using low-flow purging methods was also discussed; analysis of these samples for site-specific ROPCs could be considered, and should be contingent upon the evaluation of the adequacy of the sampling point. The performance of this preliminary assessment should be included in the sampling and analysis plan as a first phase to completing a needs assessment of the horizontal and vertical assessment of groundwater monitoring points.

As noted in Section 3.7, the presence of a groundwater divide and the connectivity of the overburden and bedrock water-bearing zones were suggested by NYSDEC (NYSDEC, 2000). To further evaluate these suggested conditions, Earth Tech's recommendation is to "pair" at least two of the existing wells at the landfill area (i.e., add bedrock wells) and the Excised Area (i.e., add overburden wells). Additional well locations that will be selected to fill data gaps also should be paired. Initial recommendations that should be considered include paired wells at the northeast corner of the site, the central portion of the site, and the southwestern corner of the site. These wells would provide reasonable coverage of the site as described in the SOW (USACE, 2005a). Other potential well locations that may be considered include north of the site (e.g., IA04), southeast of the Excised Area (east of Ohio Street to monitor possible effect of Erie Canal water elevation on site groundwater levels), and potentially south or southwest of the landfill (to investigate the influence of Frontier Stone Products quarry dewatering).

Only a few radiological groundwater analyses exist for the site. Therefore, a third recommendation is to collect groundwater samples from the expanded monitoring well network for isotopic analyses (U-238, U-235, U234, Th-232) and to evaluate conditions with respect to drinking water standards (gross alpha and gross beta). The sampling procedures and specific analytical methods should be spelled out in the sampling and analysis plan.

Earth Tech recommends that the soil and bedrock profile should be screened for gross radiological contamination as the borings are being advanced. Monitoring well construction and sampling procedures should be conducted in accordance with current USEPA and NYSDEC guidance documents (guidance to be specified within the sampling and analysis plan). Boring logs should be detailed enough to allow for the generation of geologic cross-sections (i.e., identify depth and description of each strata encountered) to support the evaluation of the fate and transport of ROPCs and to provide sufficient information for the evaluation of FS alternatives.

An important consideration for the movement of groundwater within the bedrock is the nature and occurrence of the fracture network. Particular detail should be provided to the location, orientation (e.g., inclined, vertical, horizontal) and condition of each fracture encountered in the test borings. Sufficient detail should be obtained to map specific horizontal fracture zones across the site. The existing bedrock monitoring wells at the Excised Area are constructed as PVC monitoring wells completed within bedrock boreholes, so post-construction evaluation using a downhole televiewer or caliper is not an option for these wells. However, it is possible that a temperature probe or flow sensing device could be used to detect the approximate location of fractures in the screened interval. Recent investigations at an unrelated Superfund site in Niagara Falls, NY at which Earth Tech has provided technical support to USEPA since 1990 (Hyde Park Landfill Site) used geophysical logging tools to identify discrete flow zones.

One of the alternative technologies used at the Hyde Park Landfill Site, among others, is a downhole geophysical logging tool (e.g., gamma logging). This technology could be considered for use as a screening tool at the Guterl Steel site. Application of this technology could provide a gross assessment (or potentially isotopic analysis depending on the tool selected) of conditions in the vicinity of the boring, and potentially mapping of individual horizontal flow zones. Given the shallow depth to bedrock at the site, installation of multiple temporary test borings may be a cost effective method to evaluate subsurface geology and groundwater conditions at the site. This technology could be further evaluated during preparation of the sampling and analysis plan.

NYSDEC (1991) reported that the nearest drinking water well was approximately three miles from the site. Earth Tech recommends that an updated private drinking water well survey be conducted. In addition, NYSDEC (2000) indicated that a report titled "Hydrogeologic Investigation of the Southwestern Portion of the Town of Lockport, Niagara County, New York" was under preparation. Earth Tech recommends that NYSDEC be contacted to determine if this report has been issued.

## 4.8 IA08 Site Utilities (Sewers and Drains)

To address the data gaps identified in Section 3.8, Earth Tech recommends a phased approach to assessing the effect of site utilities on the conceptual site model, and the nature and extent of potential contents (aqueous, non-aqueous, or sediment). Earth Tech recommends the following activities to address data gaps associated with IA08:

- Review recently provided engineering drawings for the Excised Area and for the active facility that provide detail regarding site utilities, floor drains, and trenches. The purpose of this activity is to identify potential locations for contamination to have accumulated, or to have been transported off site.
- Contact City of Lockport and Niagara County officials to determine the location of City/County water supply or sewer connections to potentially back-trace utility trenches (e.g., if drawings are not available for the site proper).
- Contact private utilities (electric, gas) to determine the location of connections and potentially locate trenches.

- Inspect the site (all IAs) for storm sewer catch basins, valve boxes, pavement repair patches, or other signs of buried utilities. Identify this information on a site plan and include in the assessment of the various IAs. Where possible, identify whether non-intrusive techniques (e.g., gamma sensing "pencil probe") could be used to investigate the utility for the presence of ROPCs. The pencil probe uses a small (approximately 1/2-inch diameter) sodium iodide (NaI) detector that is sensitive to gamma radiation (counts per minute). It is connected by a long cable to a recording device that records the detector output readings each second for subsequent downloading. By inserting the detector probe into a pipe and moving the detector through the pipe at a uniform rate or past radiation emitting benchmarks (such as pipe joints that have accumulated contamination), the gamma profile of the pipe is recorded. The subsequent readout is overlaid onto the pipe run to show the gamma profile readings by position in the pipe. The readout would be used to guide intrusive explorations.
- Locate the remaining, open floor trenches and floor drains within the Excised Area buildings. Identify whether the trenches or drains contain aqueous, non-aqueous, or sediment phases. As noted earlier, ORISE (1999) identified ROPCs within the open floor trenches in Building 3 and Building 8. Future sampling should be directed toward refining the extent of sediment that exceeds ROPC screening levels and toward determining whether aqueous or non-aqueous (if present) phases contain ROPCs.
- Using engineering drawings identified in the first bullet, above, determine if any floor drains or trenches have been abandoned-in-place. If yes, determine whether or not the materials below or adjacent to the trench or drain can be screened for the presence of ROPCs.
- Locate the former OWS adjacent to the Erie Canal and the OWS between Building 2 and Building 3. Identify and map these locations relative to IA02 (Excised Area Building Exteriors) and IA08 (Sewers and Drains). If accessible, obtain radiological analyses of OWS contents (aqueous phase, non-aqueous phase, sediment) for the purpose of determining whether ROPCs are present. This IA would include piping exterior to the buildings connecting to the former OWSs.

It is not expected that a non-intrusive technology such as ground penetrating radar would be successful for locating buried utilities in open areas at the site due to the extensive presence of slag and miscellaneous fill in outdoor areas, or the presence of reinforced concrete floors in some interior areas. However, this technology may be worth evaluating for refining the suspected locations of features such as the two OWSs. The advantage of this technology over test pits and test borings is increased safety and reduced IDW.

## 4.9 Miscellaneous Data Gaps

As noted in Section 1.3, one of the project objectives developed during the August 2005 TPP Meeting was to evaluate the safety and stability of the existing building structures to allow for investigative activities. The purpose of the evaluation was to establish a baseline assessment of building conditions to determine minimum requirements for building preparation to allow for execution of the investigative activities. Therefore, consideration for the scope of this assessment and the schedule impact should be included as a Data Gap. During the TPP Meeting, it was noted that if extensive building preparation is required, a cost/risk management decision may need to be made to determine the effect on the Feasibility Study alternatives cost assessments and to determine whether it would be cost-effective to stabilize the building for sampling, or to dismantle the building and conduct the sampling of building materials on the ground.

As noted in Section 2.5, only a limited amount of background radiological data were located for this report. As radiological criteria are normally based on exceedances of naturally-occurring background for a given site or area, accurate delineation of impacted areas cannot be performed without good data to establish background radiation levels. Due to the lack of good background data, the provisional site-specific screening criteria presented in Section 2.6 made certain conservative assumptions with regard to background concentrations at the Guterl Steel site. It is recommended that a sufficient number of background samples be collected from appropriate locations and analyzed for ROPCs as part of any future investigations.

For usability of future investigative data generated for all IAs, it is imperative that sample locations be established accurately and unambiguously. Therefore, a formal survey of this area (horizontal and vertical) should be conducted and any sample grids or biased sample locations be tied into a recognized coordinate system (e.g., New York State plane coordinates). Establishment of a simplified master site grid with a tie to the recognized system is recommended.

As noted in Section 2, summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) were not yet available to USACE for this data gap analysis. As soon as these data are available to USACE, they should be reviewed prior to making final decisions with respect to sampling and analysis plan scoping.

NYSDEC notes that a surface water sample was collected, apparently by NYSDEC personnel, from a sewer line in Building 3 (within the Excised Area) and submitted for radiological analysis, but the results were not included in the IIWA Report (NYSDEC, 2000; p 40). It would be useful to obtain the data from this sample; however, it is unlikely that this lone sample would contribute significantly to reducing the data gaps identified in this report.

Earth Tech recommends that USACE request supporting documentation for the 1999 ORISE report. As was noted in USACE's historical data summary report (USACE, 2005b), assessment of this supporting documentation is an important aspect of evaluating the acceptability of the related data. Earth Tech has conducted this data gap analysis under the assumption that the 1999 ORISE data are useable given the maturity of the ORISE program in conducting such investigations. Having the documentation would validate that assumption; however, the usability of the ORISE data in this DGAR is not impacted by the absence of the supporting documentation.

# 5. Summary and Recommendations

This section of the report summarizes the results of the work conducted for this report, and also summarizes the recommendations for future data acquisition. The summaries in this section are also illustrated on Table 5-1.

## 5.1 Summary of Findings

The DGAR included a review of eight previous reports which included analytical data of some sort (as described in section 2.1), and also historical and literature searches (e.g., HGL) to identify site uses and likely or potential areas of contamination. USACE (2005b) conducted a data quality review, focused on data usability for risk assessment. For this DGAR, and especially for the purpose of establishing the nature and extent of contamination, data were not excluded from consideration solely on the basis of missing documentation (although such documentation should be acquired; see Section 5.2, below). For determining the current status of the site with regard to MED/AEC contamination, the ORISE (1999) radiological survey report was the most useful although relevant information and data were taken from many of the other reports reviewed.

## 5.2 Investigative Areas

In order to facilitate the review of the data, the site was divided into investigative areas, as described below. These IAs may also be useful for developing Exposure Units for risk assessment purposes.

- IA01 Excised Area – Building Surfaces and Interiors (including Building 24)
- IA02 Excised Area – Building Exterior Areas
- IA03 Landfill Area
- IA04 NCIDA property (Allegheny Ludlum operations area, not including Excised Area, landfill, or Building 24; but including Buildings 14, 37, and the current office building)
- IA05 Railroad Right-of-Way north of site proper
- IA06 Off-site Northeast properties (Tracts K, L, and M)
- IA07 Groundwater (site-wide)
- IA08 Site Utilities (Sewers and drains)

## 5.3 Identification of Data Gaps

Data gaps were assessed for each investigative area. In addition, general data gaps (i.e., information not specific to one or two individual areas) were also identified.

### 5.3.1 IA01 Excised Area – Building Surfaces and Interiors (including Building 24)

Most sampling in IA01 appears to be 'observational' (i.e., not based on a formal grid) and may not provide sufficient density of coverage to meet the current project objectives. Screening levels used by ORISE were higher than those considered currently (see Section 2.6). Reporting limits for isotopic analyses are generally adequate (i.e., are sensitive enough to meet the provisional proposed screening levels). The prior sample locations cannot be accurately determined, as locations were not surveyed (grid was site-specific). The ORISE data indicate that radioactivity is not 'removable' and therefore decontamination of structures is not likely to be feasible. Building 1 was not surveyed adequately due to safety (structural) considerations, and the basement of Building 1 was not evaluated due to flooded condition. The ORISE survey of Building 5 was described as 'minimum' due to structural concerns and accumulated debris. No residual contamination (based on screening) was reported by ORISE in Buildings 5 and 35; however, no samples were collected in these buildings. Buildings 2, 3, 6, and 8 (initially Class 3) were re-surveyed as Class 1; coverage seems adequate, but only Buildings 6 and 8 were surveyed on a grid (again only site-specific). Not all the floor plates were removed, therefore contamination under the plates needs to be assessed in many areas. Information on the extent of the survey in the northern part of Building 24 (24N), currently used for storage by Allegheny Ludlum, is lacking, and no sub-surface (subfloor) samples were collected from 24N.

### 5.3.2 IA02 Excised Area – Building Exterior Areas

The Excised Area was surveyed using a site-specific grid (developed by ORISE), but the grid used was based on local coordinates (not tied to the New York Plane Coordinate System). The extent of MED/AEC contamination (horizontal and vertical) was roughly established, although the sample density may not be sufficient for full delineation of impacted (contaminated) area. Some contamination found was associated with firebrick and pieces of radioactive metal.

### 5.3.3 IA03 Landfill Area

This area is a NYSDEC inactive hazardous waste site (Site ID 9-32-032), and as such NYSDEC has conducted several studies of this area (see Section 2.1). The chemical (non-radioactive) data are adequate; consisting of test pits, test borings; and groundwater sampling. TCL/TAL and TCLP analyses were conducted by NYSDEC. Samples in the southern part of the landfill, from the marshy area, were also collected and analyzed by NYSDEC; these samples were reported as 'surface water' and 'sediment' samples. Surficial radiological data includes isotopic analyses of soils and are adequate except in the northeast corner of the landfill; this area was screened both by NYSDEC and ORISE. Isotopic data were generated only by ORISE. Subsurface data in this area (i.e., the filled or disturbed area) are inadequate, as it is possible that MED/AEC material initially deposited in the northeast corner may have been moved (and buried) as a result of later activities (landfilling, mining, and covering). NYSDEC contractors excavated test pits and conducted borings in areas outside of the northeast corner, but samples were only screened (not sent for analysis) for radiological contamination. Subsurface data are inadequate, as ORISE subsurface data (boreholes) were obtained only from locations with evidence of surficial contamination. A wetland assessment should be conducted to determine whether the area west and southwest of the landfill is a regulated wetland.

### 5.3.4 IA04 NCIDA Property (Allegheny Ludlum Operations Area, not including Excised Area, Landfill, or Building 24; but including Buildings 14, 37, and the Current Office Building)

Surficial radiological data coverage is insufficient in some parts of the NCIDA area. Subsurface data are inadequate, as subsurface data (boreholes) were obtained only from locations with evidence of surficial contamination. Different sample densities were employed by ORISE at Class 1/Class 2 areas as opposed to Class 3 areas (around Buildings 14 and 37). The interior of Buildings 14 and 37 (in the Class 3 area) were not surveyed, although history and exterior screening suggest MED/AEC contamination unlikely. No screening or sampling data were located for the current office building (part of which was formerly used as a laboratory). No subsurface data were found for IA04, either within the buildings, or in the exterior areas.

### 5.3.5 IA05 Railroad Right-of-Way North of Site Proper

No data were found for this area, although there may be some screening information available (NYSDEC, 1999). Anecdotal evidence of thoriated metal in this area has been reported. It is reported (e.g., in HGL 2005; and also at the TPP) that there have been NYSDEC surveys in this area; however, these reports have not yet been made available to Earth Tech for review.

### 5.3.6 IA06 Off-site Northeast Properties (Tracts K, L, and M)

There were no analytical data or radiological survey data located for Tracts K, L, and M, which are not contiguous to the rest of the site. These properties are not in an area (e.g., railroad right-of-way) likely to have been affected by the manufacturing, processing, storage, or transportation of MED/AEC materials at the Guterl Steel site. The historical record is considered adequate to characterize this IA with regard to potential MED/AEC impacts. Based on the historical information reviewed there is no evidence of MED/AEC related use, and it is recommended that this IA be removed from further consideration.

### 5.3.7 IA07 Groundwater

Only limited data is available from monitoring wells, and there is no current ongoing sampling program. Monitoring wells are present only in the landfill and Excised Areas. The data are not current, and radiological data are very limited. The existing monitoring well network is not adequate. As many as three of the four landfill wells may need to be replaced, due to problems associated with their age (e.g., mineralogic fouling, sediment blinding) or inadequacies in their initial construction with respect to current standards. An updated private drinking water well survey should be conducted.

### 5.3.8 IA08 Site Utilities (Sewers and Drains)

Very limited data exists relative to the sewers, drains, and trenches. Subsurface utilities have not been located, and there are only sporadic data available from drains and trenches. Utility drawings have recently been made available to Earth Tech, but the accuracy and completeness will need to be field verified. Five trenches (in Buildings 3 and 8) and an oil-water separator were sampled by ORISE (1999).

### 5.3.9 Other Data Gaps Identified

- Most sample locations from previous work (e.g., ORISE, ORNL) cannot be accurately located, as sample locations or grids were not surveyed. NYSDEC sampling events, and monitoring well locations, are surveyed.
- Lack of a baseline assessment of building conditions to determine minimum requirements for building preparation to allow for execution of the investigative activities.
- Only a limited amount of background radiological data were located for this report. As radiological criteria are normally based on exceedances of naturally-occurring background for a given site or area, accurate delineation of impacted areas cannot be performed without adequate data to establish background radiation levels
- As noted in Section 2, summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) were not yet available for this data gap analysis. As soon as these data are acquired by USACE, they should be reviewed prior to making final decisions with respect to sampling and analysis plan scoping.
- NYSDEC (2000) notes that a surface water sample was collected from a sewer line in Building 3 (within the Excised Area) and submitted for radiological analysis, but the results were not included in the IIWA Report.
- As was noted in USACE's historical data summary report (USACE, 2005b), assessment of supporting documentation related to previous reports (especially ORISE, 1999) is an important aspect of evaluating the acceptability of the related data. Earth Tech has conducted this data gap analysis under the assumption that the 1999 ORISE data are useable given the maturity of the ORISE program in conducting such investigations. However, having the documentation would validate that assumption and maximize unqualified use of the data.

## 5.4 Summary of Recommendations

In order to address the data gaps identified above (as summarized in Section 5.1 and Table 5-1), Earth Tech recommends the following data acquisition:

### 5.4.1 IA01 Excised Area – Building Surfaces and Interiors (including Building 24)

**Building 1.** Resolve safe access issues; resurvey Work Room as Class 1; conduct initial survey of flooded basement as Class 3.

**Building 6.** Survey under floor plates, additional soil sampling needed.

**Building 8.** Additional survey optional; existing data may be sufficient to delineate impacted areas to within ±5 m.

**Building 5.** Resurvey as Class 3 area.

**Building 24 (North).** Resurvey as Class 3 area; conduct limited subsurface sampling (coring) to evaluate possible sub-floor contamination.

**Buildings 2, 3, and 4/9.** Existing data appear adequate, subject to general confirmation.

**General.** Existing data for equipment and structures above 2 m are inadequate; a more comprehensive survey is needed. In addition to the building-specific recommendations, confirmation re-sampling at 5 to 10 percent of ORISE frequency is recommended. Document gamma exposure measurement locations and add measurements and samples to evaluate new (current) screening values.

### 5.4.2 IA02 Excised Area – Building Exterior Areas

Correlate previous local sample grid coordinates to the NY Plane Coordinate system. Conduct random re-sampling of surface and subsurface locations to confirm ORISE data. Collect gamma readings at 1 m above sample grid nodes.

### 5.4.3 IA03 Landfill Area

Evaluate potential subsurface contamination in the area used for fill (i.e., excludes the marshy area) using direct-push sampling and on-site screening and analysis to limit the number of samples required to be sent off for laboratory analysis. Additional intrusive investigation (test pits) may be useful in the northeast corner (where MED/AEC contamination, specifically thorium, has been identified). Field screening or field analyses will likely be useful to identify samples for off-site isotopic analysis. It is Earth Tech's understanding that NYSDEC is initiating a RI/FS for the Guterl Landfill site (NYSDEC ID 9-32-032); it may be possible to coordinate the FUSRAP investigation of potential MED/AEC materials with the NYSDEC RI (e.g., conduct investigations as a team rather than sequenced to minimize health and safety overlap, subcontractor mobilization, installation of monitoring points, potential wetland delineation, etc.). Wetland delineation may be needed if MED/AEC material is found in the southern part of the landfill; however, this appears unlikely based on the site history and available data.

### 5.4.4 IA04 NCIDA property (Allegheny Ludlum Operations Area, not including Excised Area, Landfill, or Building 24; but including Buildings 14, 37, and the Current Office Building)

Conduct direct-push sampling and on-site screening and analysis to limit the number of subsurface samples required to be sent off-site for laboratory analysis throughout Class 1 and Class 2 Areas (may need to add limited subsurface sampling in Class 3 areas), on systematic surveyed grid. Screen current office building (use Class 3 criteria to establish program); consider including Buildings 14 and 37 also. In addition, conduct limited sub-floor sampling (coring) in these buildings. Request and evaluate NYSDEC (1999) and EPA (1996) when available.

### 5.4.5 IA05 Railroad Right-of-Way North of Site Proper

Acquire the NYSDEC (1999) screening data. Subsequent to review of NYSDEC data, design and conduct a scanning survey of the area followed by direct static measurements of significant findings for evaluation prior to implementing a subsurface sampling approach such as direct push. This survey will be focused on, but not limited to, areas with evidence of historical disturbance. The need for sampling, if any, should be determined after screening. Private owner (Lombardi) disturbance of soils at boundary is a complicating factor.

### 5.4.6 IA06 Off-site Northeast Properties (Tracts K, L, and M)

Based on the historical information reviewed there is no evidence of MED/AEC related use, and it is recommended that this IA be removed from further consideration. No data acquisition is recommended.

### 5.4.7 IA07 Groundwater

Evaluate the condition of the existing monitoring wells. Replace as needed (may include three of the four landfill wells) and install additional overburden and bedrock wells to obtain an adequate network for hydraulic and chemical monitoring. Conduct two rounds of sampling (focused on radiological contaminants and transport-related geochemical parameters). Conduct updated drinking water well survey near the site.

### 5.4.8 IA08 Site Utilities (Sewers and Drains)

Follow up attempts to acquire utility drawings. Evaluate various techniques (geophysical and others) to locate sewer lines, drains, and trenches. Sample residuals (water and solids remaining in lines, basins, lift stations, separators, etc.) and materials of which sewers/drains are constructed.

### 5.4.9 Data Acquisition to Fill Other Data Gaps Identified

- Evaluate the safety and stability of the existing building structures to allow for investigative activities to determine minimum requirements for building preparation to allow for execution of the investigative activities. If extensive building preparation is required, a cost/risk management decision may need to be made to determine the effect on the Feasibility Study alternatives cost assessments and to determine whether it would be cost-effective to stabilize the building for sampling, or to dismantle the building and conduct the sampling of building materials on the ground.

- Lack of adequate background radiological data has been identified as a data gap. As radiological criteria are normally based on exceedances of naturally-occurring background for a given site or area, accurate delineation of impacted areas cannot be performed without good data to establish background radiation levels. It is recommended that a sufficient number of background samples be collected from appropriate locations and analyzed for ROPCs as part of any future investigations.
- For usability of future investigative data generated for all IAs, it is imperative that sample locations be established accurately and unambiguously. Therefore, a formal survey of the site (horizontal and vertical) should be conducted and any sample grids or biased sample locations be tied into a recognized coordinate system (e.g., New York Plane Coordinate System). Establishment of a simplified master site grid with a tie to the recognized system is recommended.
- Summary reports and/or data relating to prior investigations conducted by USEPA (1996) and NYSDEC (1999) were not yet available for this data gap analysis. As soon as these data are available to USACE, they should be reviewed prior to making final decisions with respect to sampling and analysis plan scoping.
- Obtain data from a surface water sample collected by NYSDEC personnel from a sewer line in Building 3 (within the Excised Area) and submitted for radiological analysis (NYSDEC, 2000; p 40). However, it is unlikely that this lone sample would contribute significantly to reducing the data gaps identified in this report.
- Earth Tech recommends that USACE request supporting documentation for the 1999 ORISE report. As was noted in USACE's historical data summary report (USACE, 2005b), assessment of this supporting documentation is an important aspect of evaluating the acceptability of the related data. Earth Tech has conducted this data gap analysis under the assumption that the 1999 ORISE data are useable given the maturity of the ORISE program in conducting such investigations. Having the documentation would validate that assumption; however, the usability of the ORISE data in this DGAR is not impacted by the absence of the supporting documentation.

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# TABLES

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Table 2.1-1

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**INVESTIGATION AND ANALYSES SUMMARY TABLE**

| | Analysis | | | | | | | | | | | | | | | | | | | | Usability | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Analytical Method | | | | | | Field Radiation Measurements | | | | | | Matrix | | | | | | | | | | | | | | | | | | |
| Investigation | Radium | Uranium | Thorium | Metals | Pesticides | PCBs | SVOCs | VOCs | ICAP (USEPA SW-846) | Gas Chromatograph | X-Ray Fluorescence | TCLP | Gamma Spectroscopy | Gross Alpha and Beta | Alpha Contamination (direct alpha) | Beta/Gamma Contamination | Beta/Gamma Dose Rate (mrad/hr) | Gamma Exposure (uR/hr) (external Gamma) | Removable Alpha/beta-gamma | Removable Alpha and Beta | Cinders | Surface Soil Sample Locations | Subsurface Soil Sample Locations (>15 cm) | Sediment | Surface Water | Groundwater | Building Material | Waste | Results/Units | COCs | Calibration | DLs | MDLs | Uncertainty | Method | Location | Depth | Qualifiers | Building Survey |
| ***Radiological Survey of the Former Simonds Saw and Steel Company, Lockport, New York, Final Report.*** **Prepared by Oak Ridge National Laboratory (ORNL) for the Department of Energy under FUSRAP, September 1978.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | 28 | 28 | 28 | | | | | | | | | | 28 | 73 | 114 | 57 | 89 | 71 | 34 | | | 22 | 6 | | Y | | | | | | | | | X | X | X | X | X | X |
| Landfill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ***Preliminary Engineering and Environmental Evaluation of the Remedial Action Alternatives for the Former Simonds Saw and Steel Company Site, Lockport, New York, Former Utilized MED/AEC Sites Remedial Action Program, Final Report.*** **Prepared for Bechtel National, Inc., November 1981.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | 14 | 14 | 14 | | | | | | | | | | | | | | | | | | 14 | | | | | | scan | | X | | | | | | | X | X | | |
| Landfill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ***Engineering Investigations at Inactive Hazardous Waste Sites- Phase I Investigation, Guterl Specialty Steel, City of Lockport, Niagara County.*** **Prepared for NYSDEC, January 1988.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill | | | | 18 | | | 16 | 18 | | | | | | | | | | | | | | | | | | 18 | | | X | | | | | | | X | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ***Engineering Investigations at Inactive Hazardous Waste Sites - Preliminary Site Assessment, Task 1 Records Search, Guterl Specialty Steel Corp., City of Lockport, Niagara County.*** **Prepared for NYSDEC, January 1991.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill | | | | 18 | | | 16 | 18 | | | | | | | | | | | | | | | | | | 18 | | | X | | | | | | | X | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ***Engineering Investigations at Inactive Hazardous Waste Sites- Preliminary Site Assessment Evaluation Report of Initial Data, Guterl Specialty Steel, City of Lockport, Niagara County, Volumes I and II.*** **Prepared for NYSDEC, April 1994.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill | | | | 29 | 16 | 16 | 29 | 29 | | | | 16 | | 8 | | | | | | | | | 9 | 5 | 5 | 10 | | 1 | X | X | X | X | X | | X | X | X | X | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ***Final Report, Guterl Steel Site, Lockport, New York.*** **USEPA Work Assignment No.: 2-194, April 1998.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | | | | 399 | | 11 | | | 38 | 11 | 399 | 58 | | | | | | | | | | 299 | 91 | | | | | 2 | X | X | X | | X | | X | X | X | X | |
| Landfill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Table 2.1-1

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**INVESTIGATION AND ANALYSES SUMMARY TABLE**

| | Analysis | | | | | | | | | | | | | | | | | | | | Matrix | | | | | | | | Usability | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Analytical Method | | | | | | Field Radiation Measurements | | | | | | | | | | | | | | | | | | | | | | | | |
| Investigation | Radium | Uranium | Thorium | Metals | Pesticides | PCBs | SVOCs | VOCs | CAP (USEPA SW-846) | Gas Chromatograph | X-Ray Fluorescence | TCLP | Gamma Spectroscopy | Gross Alpha and Beta | Alpha Contamination (direct alpha) | Beta/Gamma Contamination | Beta/Gamma Dose Rate (mrad/hr) | Gamma Exposure (uR/hr) (external Gamma) | Removable Alpha/beta-gamma | Removable Alpha and Beta | Cinders | Surface Soil Sample Locations | Subsurface Soil Sample Locations (>15 cm) | Sediment | Surface Water | Groundwater | Building Material | Waste | Results/Units | COCs | Calibration | DLs | MDLs | Uncertainty | Method | Location | Depth | Qualifiers | Building Survey |
| ***Radiological Survey of the Guterl Specialty Steel Corporation, Lockport, New York.*** **T.J. Vitkus, Oak Ridge Institute for Science and Education, December 1999 (ORISE 99-1699).** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | 149 | 149 | 149 | | | | | | | | | | 149 | | | | | 131 | | | | 111 | 18 | | | | | | X | | X | X | X | X | X | X | X | X | X |
| Landfill | 53 | 53 | 53 | | | | | | | | | | 53 | | | | | | | | | 37 | 4 | | | | | | | | | | | | | | | | |
| NCIDA | 177 | 177 | 177 | | | | | | | | | | 177 | | | | | 129 | | | | 64 | 28 | | | | | | | | | | | | | | | | |
| Class 3 | 18 | 18 | 18 | | | | | | | | | | 18 | | | | | | | | | 64 | 28 | | | | | | | | | | | | | | | | |
| Building interiors | 135 | 135 | 135 | | | | | | | | | | 135 | | | 473 | | 72 | | 473 | | 111 | 18 | 6 | | | scan | | X | | X | X | X | X | X | X | X | X | X |
| ***Immediate Investigative Work Assignment Report, Guterl Excised Area, City of Lockport, Niagara County*****. NYSDEC, October 2000.** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Excised Area | | | | 34 | 22 | 22 | 34 | 29 | | | | 32 | | | | | | | | | | 18 | 40 | 1 | 3 | 4 | | | X | | | | | | X | X | X | X | |
| Landfill | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Other | | | | 2 | 2 | 2 | 2 | 1 | | | | | | | | | | | | | | | 1 | | | 2 | | | X | | | | | | X | X | X | X | |

**Notes:**

ORNL collected one tap water sample, one surface water sample (Erie Canal is assumed), and one "drain" sample.
Table based on information compiled and reviewed by USACE (June 2005); except ORNL (1978) information compiled by Earth Tech.

Table 2.3.1-1

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**Buildings In IA-01 (Excised Area)**

| Building # | Year Built | ~ Floor Space (sf) | ~ Floor Space (sm) | Use of Building | Area of Building |
|---|---|---|---|---|---|
| 1 | 1913 | 87800 | 815 | Metal Smelting | |
| 2 | 1914 | 68900 | 6400 | Metal Rolling/Manufacturing | |
| 3 | 1920 | 67800 | 6300 | Metal Rolling and Grinding | |
| 4 | 1920 | 28000 | 2600 | Metal Rolling/Manufacturing and Loading Dock | |
| 9 | 1918 | 19400 | 1800 | Metal Rolling/Manufacturing and Loading Dock | |
| 5 | 1918 | 3770 | 350 | Housed Heat Exchanger | |
| 6 | 1918 | 10400 | 970 | Metal Rolling and Loading Dock | |
| 8 | 1918 | 24800 | 2300 | Metal Rolling and Loading Dock | |
| 24SE | Before 1948 | 37794 | 3264 | Mill Area | South Section (ORISE 1999) |
| 24SW | Before 1948 | uncertain | uncertain | Only SW Portion used in AEC activities (ORISE) | |
| 24N | unknown | 41657 | 3872 | Mill Area | Northern Section (ORISE 1999) |
| 35 | 1950 | 4400 | 410 | Metal Rolling and Grinding | |

**Notes:**
(sf) - square feet
(sm) - square meters
1. Building 24 and 35 are not in the Excised Area but are included here to consolidate this basic information.
2. Building 24 was built on to over time. The first part of Building 24 was built prior to 1948 and was used to support MED/AEC operations. This area is now the Southwest Section of the building. The balance of the building was built subsequent to the MED/AEC operations.
3. The floor space values for Building 24 are calculated from Figure 32 in the ORISE 1999 report based on the drawing scale and indicated section partitions.

Table 2.3.1-2

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**Scanning Survey Coverage by Survey Classification**

| **Area Type (Class)** | **Surfaces** | **% of Accessible Surfaces by type of radiation** |
|---|---|---|
| Class 1 Areas | Originally all of Buildings 6 and 8, reclassified some areas of 1, 2, 3, 4 and 9 (and 24S) | |
| | Non-dirt <2m | 100% for gamma and beta |
| | Dirt | 100% gamma, 10% beta |
| | Above 2m and Equipment | Random and judgmental, limited by access and safety |
| Class 2 Areas | Originally all of Buildings 2, 3, 4 and 9, 5, (24S and 35) (minimal in Bldg 5 due to safety) | |
| | Non-dirt | 50% minimum for beta, 100% if suspect area identified |
| | Dirt | 100% gamma scans |
| | Above 2m and Equipment | ~1% for beta with emphasis on areas with accumulation |
| Class 3 Areas | Originally all of Building 1 (and 24N) | |
| | Accessible Surfaces | ~50% for gamma, 10% for beta |

Table 2.3.1-3

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 1**

| Building 1 Data Gap Analysis | Year Built | ~ Floor Space (sf) | ~ Floor Space (sm) | Use(s) |
|---|---|---|---|---|
| B1 | 1913 | 87800 | 815 | Gas House (HGL), Metal Smelting (PA/SI) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 6 | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 14 | Wipe Rags |
| Volumetric Samples | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | NA | 0 | None |
| Exposure Rates | See Note 2 | 5 measurements at 1 meter ranged from 6 to 12 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
NA - Not Applicable
(sf) - square feet
(sm) - square meters
m - meters
1. Table 1, Figure 11
2. Table 10

**Comments:**

1. All direct measurements noted in the North Room, Center Room, and South Room are less than 5,000 dpm/100 $cm^2$. The maximum value noted in these rooms is 1,700 cpm/100 $cm^2$. The maximum removable alpha and beta activity at these noted locations is 1 and 3, respectively.

2. All direct measurements noted in the West Work Room are in excess of 5,000 dpm/100 $cm^2$. These findings appear to be associated with a countertop, lower shelf and the concrete floor below the shelf and near a drain. Removable alpha and beta activity are noted for the countertop and lower shelf and the maximum values are 5 and 7 dpm/100 $cm^2$, respectively.

3. The wipe rag direct reading is 340,000 dpm/100 $cm^2$

Table 2.3.1-4

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 2**

| Building 2 Data Gap Analysis | Year Built | ~ Floor Space | | Use |
|---|---|---|---|---|
| | | (sf) | (sm) | |
| B2 | 1914 | 68900 | 6400 | Metal Rolling/Manufacturing |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, Doors < 2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 29 | 0 | 0 | 1 | 0 | 16 | 16 | 13 | 1 (debris) | 0 | 75 | None |
| Volumetric Samples | See Note 2 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | None |
| Exposure Rates | See Note 3 | 17 measurements at 1 meter ranged from 5 to 12 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 2, Figures 12 and 13
2. Table 12, Figure 27
3. Table 10

**Comments:**
1. A total of 12 measurement locations out of the 76 locations in ORISE Table 2 are above 1,000 dpm/100 $cm^2$. Six of these measurements exceed 5,000 dpm/100 $cm^2$. All of these appear to be isolated findings. The highest of these elevated findings are associated with a locker and the nearby concrete floor, a door facing, a work bench, and two additional floor locations in the Center Section.

2. Four locations including the Roof Debris out of 14 measured from items noted as above 2 meters (plus the roof debris) exceed the 1,000 dpm/100 $cm^2$ criteria, with the highest being the roof debris at 1,800 dpm/100 $cm^2$.

3. None of the 76 measurement locations show removable alpha or removable beta values above the screening values.

4. The 15 media samples included 13 surface (floor to 15 cm depth) and 2 sub-floor samples. Three of the surface samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

5. Both of the sub-floor samples exceed the screening values with high Th-232 values (14,200 and 119,000 dpm/100 $cm^2$). However, they are both noted as semi-quantitative since the sample collected was slag-like material. The U-238 values for these locations are also shown to be elevated (noted as <18,000 and 15,000 dpm/100 $cm^2$ respectively). Note that the high Th-232 values can interfere with the gamma spectroscopy analysis results for U-238.

Table 2.3.1-5

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 3**

| Building 3 Data Gap Analysis | Year Built | ~ Floor Space | | Use |
|---|---|---|---|---|
| | | (sf) | (sm) | |
| B3 | 1920 | 67800 | 6300 | Mill Area/Metal Rolling and Grinding |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, Doors < 2m | Walls and Structures >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 26 | 0 | 0 | 0 | 0 | 14 | 4 | 14 | 0 | 0 | 58 | None |
| Volumetric Samples | See Note 2 | 24 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | None |
| Exposure Rates | See Note 3 | 20 measurements at 1 meter ranged from 5 to 11 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 3, Figures 14 and 15
2. Table 12, Figure 28
3. Table 10

**Comments:**
1. A total of 38 measurement locations out of the 58 locations in ORISE Table 3 are above 1,000 dpm/100 $cm^2$. A total of 22 exceed 5,000 dpm/100 $cm^2$ and 8 are above 15,000 dpm/100 $cm^2$. The highest of these elevated measurements are clustered around several areas of the building including the floor areas at the south end of the Trench in the south section of the building and the floor areas outside the Cafe in the center section of the building.

2. Four locations exceed 50,000 dpm/100 $cm^2$, with the highest on the roller cap at 340,000.

3. Three of the 58 measurment locations show removable alpha values above the screening values. These locations include an I-beam Pedestal, a Roller Cap, and the South End of the Trench. Removeable alpha for these locations range from 53 to 130 dpm/100 $cm^2$.

4. The 26 media samples included 24 surface (floor to 15 cm depth) and 2 sub-floor samples. A total of 19 surface samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

5. Both of the sub-floor samples exceed the screening values with elevated Th-232 values (78.5 and 27.0 dpm/100 $cm^2$). The U-238 values for one of these locations is also elevated (90 dpm/100 $cm^2$).

Table 2.3.1-6

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDINGS 4 AND 9**

| Buildings 4 and 9 Data Gap Analysis | Year Built | ~ Floor Space (sf) | (sm) | Use |
|---|---|---|---|---|
| B4 | 1920 | 28000 | 2600 | Mill Area - Southern Portion/Metal Rolling/Manufacturing and Loading Dock |
| B9 | 1918 | 19400 | 1800 | Mill Area - Southern Portion/Metal Rolling/Manufacturing and Loading Dock |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc.<2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 17 | 0 | 0 | 0 | 0 | 7 | 2 | 2 | 0 | 0 | 28 | None |
| Volumetric Samples | See Note 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | Residue |
| Exposure Rates | See Note 3 | 5 measurements at 1 meter ranged from 5 to 10 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 4, Figures 16 and 17
2. Table 12, Figure 29
3. Table 10

**Comments:**

1. A total of 8 measurement locations out of the 28 locations in ORISE Table 3 are above 1,000 dpm/100 $cm^2$. A total of 5 exceed 5,000 dpm/100 $cm^2$ and 2 are above 15,000 dpm/100 $cm^2$. The highest of these elevated measurements are clustered around the center of the building.

2. Four of the highest readings (>10,000 dpm/100 $cm^2$ were on the brick floor. The highest direct reading on the brick floor was 23,000 dpm/100 $cm^2$.)

3. Two of the 28 measurement locations show removable alpha values above the screening value. Both of these readings are on the brick flooring at locations that also show elevated total activity in excess of 10,000 dpm/100 $cm^2$.

4. The 4 media samples included 2 residue and 2 sub-floor samples. Both of the residue samples exceeded the U-238 screening value of 14 pCi/g above background.

5. Both of the sub-floor samples were below the screening values for Th-232, U-235 and U-238.

Table 2.3.1-7

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 5**

| Building 5 Data Gap Analysis | Year Built | ~ Floor Space | | Use(s) | |
|---|---|---|---|---|---|
| | | (sf) | (sm) | | |
| B5 | 1918 | 3770 | 350 | Housed Heat Exchanger (HGL) | Transformer Station and Power House (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, Doors < 2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None |
| Volumetric Samples | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None |
| Exposure Rates | NA | 5 measurements at 1 meter ranged from 5 to 10 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters

**Comments:**
1. No data was reported for Building 5. The report states: "No residual contamination identified."

Table 2.3.1-8

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 6**

| Building 6 Data Gap Analysis | Year Built | ~ Floor Space (sf) | ~ Floor Space (sm) | Use(s) | |
|---|---|---|---|---|---|
| B6 | 1918 | 10400 | 970 | Metal Rolling and Loading Dock (HGL) | Transformer Station and Power House (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc. <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 28 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 30 | None |
| Volumetric Samples | See Note 2 | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | None |
| Exposure Rates | See Note 3 | 7 measurements at 1 meter ranged from 5 to 12 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 5, Figure 18
2. Table 12, Figure 30
3. Table 10

**Comments:**
1. A total of 11 measurement locations out of the 30 locations in ORISE Table 5 are above 1,000 dpm/100 $cm^2$. Only 1 of these exceeds 5,000 dpm/100 $cm^2$.

2. The highest measurement of 30,000 dpm/100 $cm^2$ is near the transition to Building 8.

3. None of the 28 measurement locations show any removable alpha or beta values above the screening values.

4. Nine of the 21 media samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above

Table 2.3.1-9

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 8**

| Building 8 Data Gap Analysis | Year Built | ~ Floor Space | | Use(s) | |
|---|---|---|---|---|---|
| | | (sf) | (sm) | | |
| B8 | 1918 | 24800 | 2300 | Metal Rolling and Loading Dock (HGL) | Cold Rolling (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc. <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 81 | 0 | 0 | 1 | 0 | 43 | 3 | 4 | 0 | 0 | 132 | None |
| Volumetric Samples | See Note 2 | 42 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | None |
| Exposure Rates | See Note 3 | 8 measurements at 1 meter ranged from 6 to 50 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 6, Figure 19
2. Table 12, Figure 31
3. Table 10

**Comments:**

1. A total of 110 measurement locations out of the 132 locations in ORISE Table 6 are above 1,000 dpm/100 $cm^2$. A total of 77 exceed 5,000 dpm/100 $cm^2$ and 34 are above 15,000 dpm/100 $cm^2$. The highest of these elevated measurements are distributed throughout the building and include the floor areas at much of the equipment.

2. Three locations exceed 50,000 dpm/100 $cm^2$, with the highest on an I-beam at 4 meters (Location #2 = 64,000 dpm/100 $cm^2$). The highest reading on the brick floor is 54,000 dpm/100 $cm^2$ (Location #75).

3. Fifteen of the 132 measurement locations show removable alpha values above the screening value of 20 dpm/100 $cm^2$. These locations include a furnace support at 3 meters, the brick floor at Location #75, metal floor plate, concrete floor, equipment, and wood platforms.

4. The 57 media samples included 42 surface and 15 sub-floor samples, which here includes the 0 to 15 cm. Much of Building 8 is covered by metal floor plate. A total of 42 surface samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

5. Nine of the 15 sub-floor samples exceed the screening values with elevated one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

Table 2.3.1-10

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 24N**

| Building 24N Data Gap Analysis | Year Built | ~ Floor Space | | Use(s) | |
|---|---|---|---|---|---|
| | | (sf) | (sm) | | |
| B24N | uncertain | 41657 | 3872 | Mill Area | Northern Section (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc. <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 17 | None |
| Volumetric Samples | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None |
| Exposure Rates | See Note 2 | No exposure rate measurements are noted in the ORISE 1999 report for the North Section of Building 24 | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 7, Figure 20
2. Table 10

**Comments:**
1. None of the 15 locations in ORISE Table 7 are above 1,000 dpm/100 cm$^2$.

2. None of the 17 measurement locations show any removable alpha or beta values above the screening value.

3. No volumetric samples were collected for analysis in Building 24N.

4. The description for the direct measurement location #668 is "Ledge". It is assumed here that this ledge is above 2 meters.

Table 2.3.1-11

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 24S**

| Building 24S Data Gap Analysis | Year Built | ~ Floor Space (sf) | (sm) | Use(s) | |
|---|---|---|---|---|---|
| B24 S | uncertain | 37794 | 3264 | Mill Area | South Section (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc. <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 71 | 0 | 0 | 0 | 0 | 3 | 9 | 10 | 0 | 0 | 93 | None |
| Volumetric Samples | See Note 2 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | None |
| Exposure Rates | See Note 3 | 5 measurements at 1 meter ranged from 5 to 9 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 8, Figure 21 through 24
2. Table 12 and Figure 32
3. Table 10

**Comments:**

1. A total of 61 measurement locations out of the 93 locations in ORISE Table 8 are above 1,000 dpm/100 cm$^2$. A total of 51 exceed 5,000 dpm/100 cm$^2$ and 21 are above 15,000 dpm/100 cm$^2$. The majority of the elevated findings are located along the expansion joints in the concrete floor along the southwest area of Building 24.

2. Two locations exceed 50,000 dpm/100 cm$^2$, with the highest on an electric box located above 2 meters (Location #60D = 66,000 dpm/100 cm$^2$). The highest reading on the concrete floor is 99,000 dpm/100 cm$^2$ (Location #17D).

3. Four of the 93 measurement locations show removable alpha values above the screening value of 20 dpm/100 cm$^2$. These locations include three locations the concrete floor and one I-beam above 2 meters.

4. The 6 media samples are all sub-floor samples, taken from below 10 centimeters or more. Two of these sub-surface samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

Table 2.3.1-12

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR BUILDING 35**

| Building 35 Data Gap Analysis | Year Built | ~ Floor Space | | Use(s) | |
|---|---|---|---|---|---|
| | | (sf) | (sm) | | |
| B35 | 1950 | 4400 | 410 | Metal Rolling and Grinding (PA/SI) | Allegeny (ORISE) |

| Radiation Data Type | ORISE Source | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls, etc. <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | See Note 1 | 7 | 0 | 0 | 0 | 0 | 4 | 9 | 5 | 0 | 0 | 25 | None |
| Volumetric Samples | NA | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None |
| Exposure Rates | See Note 2 | 5 measurements at 1 meter ranged from 5 to 8 microRoentgens/hour | | | | | | | | | | | |

**Notes:**
(sf) - square feet
(sm) - square meters
m - meters
1. Table 9, Figures 25 and 26
2. Table 10

**Comments:**
1. None of the 25 locations in ORISE Table 9 are above 1,000 dpm/100 $cm^2$.

2. None of the 25 measurement locations show any removable alpha or beta values above the screening values.

3. No volumetric samples were collected for analysis in Building 35.

4. Elevated readings listed under Walls, etc. >2 meters include the North Wall at 4 meters, the Crane Rail I-beam at 5 meters, the Crane Rail Center at 6 meters, and a Roof Truss at 7 meters.

Table 2.3.1-13

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**Summary of the ORISE 1999 Radiation Survey Data for the Guterl Steel Site**

| Building Number | Radiation Data Type | Floors, Stairs | Sub-floor Media | Pits | Vats, Tanks | Drains, Lines | Equipment | Walls <2m | Walls, etc. >2m | Roof | Other (see Comment) | Total | ORISE Table No. | ORISE Figure No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B1 | Direct Measurements | 6 | 0 | 1 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 14 | 1 | 11 |
| | Volumetric Samples | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| | Exposure Rates | 5 measurements at 1 meter ranged from 6 to 12 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B2 | Direct Measurements | 29 | 0 | 0 | 1 | 0 | 16 | 16 | 13 | 1 | 0 | 76 | 2 | 12,13 |
| | Volumetric Samples | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 12 | 27 |
| | Exposure Rates | 17 measurements at 1 meter ranged from 5 to 12 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B3 | Direct Measurements | 26 | 0 | 0 | 0 | 0 | 14 | 4 | 14 | 0 | 0 | 58 | 3 | 14,15 |
| | Volumetric Samples | 24 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26 | 12 | 28 |
| | Exposure Rates | 20 measurements at 1 meter ranged from 5 to 11 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B4 and B9 | Direct Measurements | 17 | 0 | 0 | 0 | 0 | 7 | 2 | 2 | 0 | 0 | 28 | 4 | 16,11 |
| | Volumetric Samples | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 12 | 29 |
| | Exposure Rates | 5 measurements at 1 meter ranged from 5 to 10 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B5 | Direct Measurements | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| | Volumetric Samples | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| | Exposure Rates | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| B6 | Direct Measurements | 28 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 30 | 5 | 18 |
| | Volumetric Samples | 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 21 | 12 | 30 |
| | Exposure Rates | 7 measurements at 1 meter ranged from 5 to 12 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B8 | Direct Measurements | 81 | 0 | 0 | 1 | 0 | 43 | 3 | 4 | 0 | 0 | 132 | 6 | 19 |
| | Volumetric Samples | 42 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 57 | 12 | 31 |
| | Exposure Rates | 8 measurements at 1 meter ranged from 6 to 50 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B24N | Direct Measurements | 15 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 17 | 7 | 20 |
| | Volumetric Samples | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| | Exposure Rates | No exposure rate measurements are noted in the ORISE 1999 report for the North Section of Building 24 | | | | | | | | | | | None | None |
| B24S | Direct Measurements | 71 | 0 | 0 | 0 | 0 | 3 | 9 | 10 | 0 | 0 | 93 | 8 | 20 thru 24 |
| | Volumetric Samples | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 12 | 32 |
| | Exposure Rates | 5 measurements at 1 meter ranged from 5 to 9 microRoentgens/hour | | | | | | | | | | | 10 | None |
| B35 | Direct Measurements | 7 | 0 | 0 | 0 | 0 | 4 | 9 | 5 | 0 | 0 | 25 | 9 | 25, 26 |
| | Volumetric Samples | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | None | None |
| | Exposure Rates | 5 measurements at 1 meter ranged from 5 to 8 microRoentgens/hour | | | | | | | | | | | 10 | None |

**Comments:**

1. No data was reported for Building 5. The report states: "No residual contamination identified."

Table 2.3.2-1

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR EXTERIOR ELEVATED LOCATIONS**

| Radiation Data Type | ORISE Source | Excised Area | NCIDA | Landfill | RR ROW northbound | Off-site NE Properties | Pits | Vats, Tanks | Drains, Lines | Equipment | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | NA | There were no direct activity measurements reported at exterior locations with elevated readings. | | | | | | | | | | 0 | None |
| Volumetric Samples | See Note 1 | 27 | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | None |
| Exposure Rates | See Note 2 | 131 measurements at 1 meter in the exterior excised areas range from 3 to 50 microRoentgens/hour | | | | | | | | | | | No locations |
| | | 129 measurements at 1 meter in all remaining exterior areas range from 3 to 25 microRoentgens/hour | | | | | | | | | | | No locations |

**Notes:**
1. Table 14 and Figures 33, 34 and 36
2. Table 10

**Comments:**
1. No tabulated data is noted for direct readings of alpha and beta-gamma levels for the exterior locations with elevated readings.

2. No tabulated data is noted regarding the removable alpha or beta-gamma levels for items in exterior locations with elevated readings.

3. A total of 48 media samples were collected and analyzed from the elevated locations in the exterior areas. A total of 33 samples were taken at the surface (0 to 15 cm) and the other 15 samples were collected at 15 to 30 cm. Forty-seven of the 48 these samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background. The one sample that was below the screening level was collected at 15 to 30 cm.

4. Twenty-seven of the 48 media samples from elevated locations were collected in the excised area. Twenty-six of these 27 samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background. The one sample that was below the screening level was collected at 15 to 30 cm.

5. The other 21 media samples from elevated locations were collected in outside the excised area. A total of 14 samples were collected at 0 to 15 cm and the other 7 were collected at 15 to 30 cm. All of samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

6. Twenty of the 21 media samples from elevated locations outside of the excised area were collected in the NCIDA. All of these 20 samples exceed one or more of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background.

7. 1 of the 21 media samples from elevated locations outside of the excised area was collected in the Landfill area This sample was collected at 0 to 15 cm and did not exceed any of the individual screening values for Th-232 at 1.1 pCi/g, U-235 at 8.0 pCi/g and U-238 at 14 pCi/g above background. It did indicate that the concentration of Ra-226 is above background, but at a concentration of naturally occurring radioactive material that is consistent with steel mill operations.

8. The exposure rate measurements are noted without more specific location information.

9. Although there are some exceptions, in general, the data at locations where depth samples were collected indicates decreasing activity with increasing depth.

Table 2.3.2-2

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**ORISE 1999 DATA REVIEW FOR EXTERIOR SYSTEMATIC GRID, ELEVATED LOCATIONS AND BOREHOLES**

| Radiation Data Type | ORISE Source | Sample Type | Excised Area | NCIDA | Landfill | Class 3 Area | RR ROW northbound | Off-site NE Properties | Pits | Vats, Tanks | Drains, Lines | Other (see Comment) | Total | Comment |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct Measurements | NA | NA | There were no direct activity measurements reported at the systematic grid locations. | | | | | | | | | | 0 | None |
| Volumetric Samples | See Note 1 | Systematic Grid | 113 | 64 | 36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 213 | None |
| | See Note 2 | Elevated Locations | 27 | 20 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | None |
| | See Note 3 | Borehole Locations | 3 | 28 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35 | None |
| | | Borehole Samples | 9 | 93 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 118 | None |
| Exposure Rates | See Note 4 | NA | 131 measurements at 1 meter in the exterior excised areas range from 3 to 50 microRoentgens/hour | | | | | | | | | | | No locations |
| | | NA | 129 measurements at 1 meter in all remaining exterior areas range from 3 to 25 microRoentgens/hour | | | | | | | | | | | No locations |

**Notes:**
1. Table 13 and Figure 33, 34 and 36
2. Table 14 and Figure 33, 34 and 36
3. Table 15 and Figure 33, 34 and 36
4. Table 10

**Comments:**

1. No data is noted for direct readings of alpha and beta-gamma levels for the exterior sample locations.

2. No data is noted regarding the removable alpha or beta-gamma levels for any items in exterior locations.

3. A total of 213 media samples were collected and analyzed from the systematic grid in the exterior areas. All samples were taken at the surface (0 to 15 cm). Forteen of the 213 surface samples exceed the individual screening values for U-238 at 14 pCi/g above background. None of the samples exceeded the screening values for Th-232 or U-235.

4. A total of 113 of the 213 media samples from the systematic grid were collected in the excised area. Nine of these 113 surface samples exceed the individual screening values for U-238 at 14 pCi/g above background. None of the samples exceeded the screening values for Th-232 or U-235.

5. A total of 64 of the 213 media samples from the systematic grid were collected in the NCIDA area. One of these 64 surface samples exceed the individual screening values for U-238 at 14 pCi/g above background. None of the samples exceeded the screening values for Th-232 or U-235.

6. A total of 36 of the 213 media samples from the systematic grid were collected in the landfill area. Two of these samples exceed the individual screening values for U-238 at 14 pCi/g above background. None of these samples exceed the screening values for Th-232 at 1.1 pCi/g or U-235 at 8.0 pCi/g.

7. The exposure rate measurements were reported without more specific location information.

Table 2.3.3-1

Final Data Gap Analysis Report
Former Guterl Specialty Steel FUSRAP Site

**Gross Alpha and Beta Radioactivity**
**Phase I PSA - Task 3**
**January 13, 1993 Samples**

| Sample ID | | Sample | Gross Alpha pCi/L | | Gross Beta pCi/L | | NYSDEC Criteria | | |
|---|---|---|---|---|---|---|---|---|---|
| ABB-ES # | Lab # | Type | Value | Uncert | Value | Uncert | Alpha | Beta | Water Class |
| GSQS003XXX92XX | 1544708 | Blank | <1 | | <3 | | NA | NA | NA |
| GSMW001X0992XX | 1544705 | MW-01 | <8 | | 20 | +/- 5 | 15 | 1000 | GA (Std) |
| GSMW002X0692XX | 1544707 | MW-02 | 23 | +/- 14 | 18 | +/- 5 | 15 | 1000 | GA (Std) |
| GSMW105X0992XX | 1544706 | MW-105 | <10 | | 31 | +/- 6 | 15 | 1000 | GA (Std) |
| GSSW002XXX92XD | 1544704 | SW-02DUP | <8 | | 25 | +/- 5 | 15 | | A (note 1) |
| GSSW002XXX92XX | 1544701 | SW-02 | <8 | | 21 | +/- 5 | 15 | | A (note 1) |
| GSSW003XXX92XX | 1544709 | SW-03 | 35 | +/- 11 | 30 | +/- 5 | 15 | | A (note 1) |
| GSSW004XXX92XX | 1544710 | SW-04 | <6 | | 13 | +/- 4 | 15 | | A (note 1) |
| GSSW005XXX92XX | 1544711 | SW-05 | <8 | | 15 | +/- 4 | 15 | | A (note 1) |
| GSSW006XXX92XX | 1544712 | SW-06 | <7 | | 5.4 | +/- 3.4 | 15 | | A (note 1) |

**Notes:**

Data not validated.

Data as reported in Phase I PSA, Volume II, ABB-ES for NYSDEC, April 1994.

MW = Monitoring well sample (MW-04 was dry on date wells were sampled). When installed, wells referred to here as MW-01, MW-02, and MW-04 were named 81-01, 81-02, and 81-04, respectively (NYSDEC, 1988)

SW = Surface water sample

Std = value is a standard (not a guidance value).

Note 1: No criteria published for other than Class A Surface Water. (Guterl LF SW was compared to Class D criteria for chemical contamination).

Alpha radiation standard excludes radon and uranium.

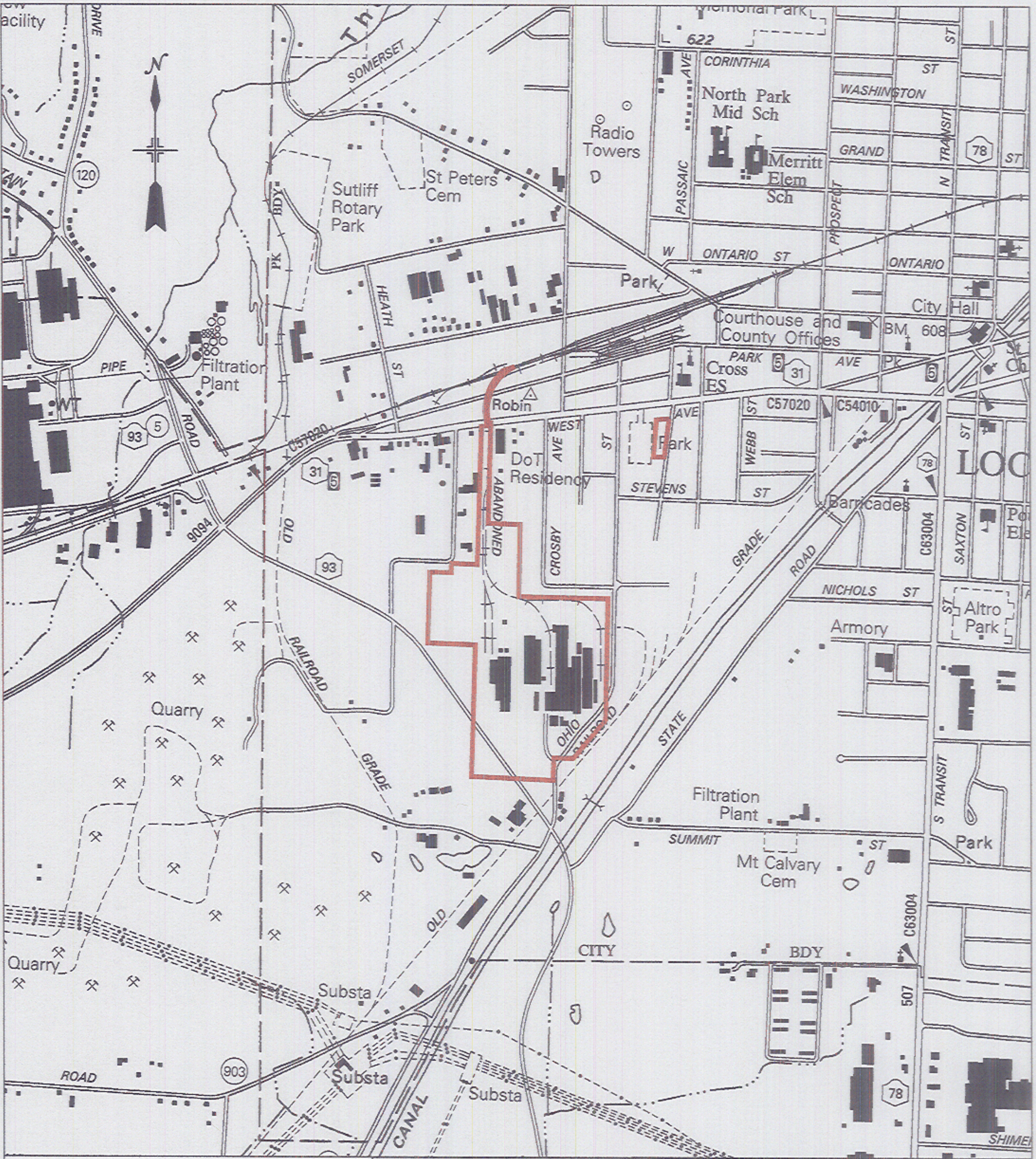
Beta radiation standard excludes strontium-90 and alpha-emitters.

**Table 5-1**
**Data Gap Summary by Investigative Area**

| Investigative Area (IA) | | Media included in IA | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Number | Name | Building | Soil | GW | SW | Sediment | Data Gap Summary | Data Acquisition Recommendation |
| IA 01 | Excised Area - Buildings (including Bldg 24) | X (Buildings 1, 2, 3, 4/9, 5, 6, 8, 35, and 24) | | | | | Most sampling appears to be 'observational', not based on formal grid and may not provide sufficient coverage. Screening levels may have been higher than those considered currently. Reporting limits for isotopic analyses are generally adequate. Sample locations cannot be accurately determined. Data indicates that radioactivity is not 'removable' and therefore decon of structures not feasible. Building 1 not surveyed adequately due to safety (structural) considerations. Basement of Bldg 1 not evaluated due to flooded condition. Bldg 5 survey 'minimum' due to structural concerns and accumulated debris. No residual contamination (based on screening) in Bldgs 5 and 35; no samples in these bldgs. Bldgs 2, 3, 6, 8 resurveyed as Class 1; coverage seems adequate, but only 6 and 8 surveyed on grid. Floor plates not removed, contamination under plates needs to be assessed. | Bldg 1 - resolve safe acess issues; resurvey Work Room as Class 1; conduct initial survey of basement as Class 3. Bldg 6 - survey under floor plates, additional soil sampling needed. Bldg 8 - additional survey optional; existing data may be sufficient to delineate impacted areas to within 5 m. Bldg 5 - resurvey as Class 3 area. Bldg 24 (North) - resurvey as Class 3 area; conduct limited subsurface sampling (coring) to evaluate possible sub-floor contamination.. Bldgs 2, 3, and 4/9 appear adequate subject to confirmation surveys. General - existing data for equipment and structure above 2 m inadequate; needs more comprehensive survey. In addition to specific recommendations, confirmation re-sampling at 5 to 10 percent of ORISE frequency is recommended. In all buildings - document gamma exposure measurement locations and add measurments and samples that are required to evaluate the new screening values. |
| IA 02 | Excised Area - Exterior Areas (Soils) | | X | (Note 1) | | | Survey grid used but based on local coordinates (not tied to NY Plane Coord System). Extent of MED/AEC contamination (horizontal and vertical) established. Some contamination associated with firebrick and pieces of radioactive metal. | Correlate previous local sample grid coordinates to NY Plane Coord system. Random re-sampling of 5 to 10% of surface and subsurface locations to confirm ORISE data. Collect gamma reading at 1 m above grid nodes. |
| IA 03 | Landfill Area | | X | (Note 1) | (Note 2) | (Note 2) | Chemical data adequate; test pits, test borings; MW sampling; TCL/TAL and TCLP analyses conducted by NYSDEC. Surficial radiological data includes isotopic analyses of soils and are adequate except in northeast corner. Inadequate subsurface data. | Direct-push sampling and on-site screening for subsurface throughout LF (marsh area may be deleted). Intrusive investigation (test pits) in NE corner. Wetland delineation may be needed if MED/AEC material found in southern part of LF. |
| IA 04 | NCIDA Area | X (Buildings 14, 37, current office) | X | | | | Surficial radiological data coverage insufficient in some areas. Inadequate subsurface data. Different sample densities at Class 1/Class 2 areas as opposed to Class 3 areas (around Bldgs 14 and 37). Interior of Bldgs 14 and 37 (Class 3) not surveyed but history and exterior screening suggest MED/AEC contamination unlikely. No data for current office building (formerly used as lab) | Direct-push sampling and on-site screening for subsurface throughout Class 1 and Class 2 Areas (may need to add small Class 3 area north of Bldg 37), on systematic surveyed grid. Screen office building (use Class 3 criteria to establish program); consider including Bldgs 14 and 37 also. In addition, conduct limited sub-floor sampling (coring) in these buildings. Obtain and evaluate NYSDEC (1999) and EPA (1996) if available. |
| IA 05 | Railroad ROW North | | X | | | | No data; may be some screening information available (NYSDEC, 1999). Anecdotal evidence of thoriated metal in this area. | Acquire NYSDEC (1999) screening data. Conduct screening investigation; focused on, but not limited to, areas with evidence of historical disturbance. Sampling if any determined after screening. Private owner (Lombardi) disturbance of soils at boundary complicating factor. |
| IA 06 | Off-Site NE (Tracts K, L, M) | | X | | | | No data; historical information reviewed. No evidence of MED/AEC related use. | No data gap. Remove this IA from further consideration. |
| IA 07 | Groundwater (site-wide) | | | X | | | Limited data - wells in LF and Excised area only. Data not current, inadequate radiological data; insufficient MW network. LF wells may need replacement. | Evaluate existing MW condition. Replace as needed and install additional MW; conduct two rounds sampling (focused on rad contaminants). Potential to conduct updated private drinking water well survey nearby site. |
| IA 08 | Site Utilities (Sewers, drains) | | | | (Note 3) | (Note 3) | Very limited data; subsurface utilities not located; only sporadic data from drains and trenches. Five trenches (bldgs 3 and 8) and oil-water separator sampled by ORISE (1999). | Follow up attempts to acquire utility drawings. Evaluate various techniques to locate sewer lines etc. |

Notes:
1 Monitoring wells exist at Excised Area and LF; and GW data available; included as part of IA 07
2 Water and soil samples from marshy area reported as SW and Sediment by NYSDEC
3 Water and solids found in sewers, drains, and trenches referred to as SW and Sediment. This IA also includes the materials comprising the utilities (bedding materials, brick, concrete, etc.)

# FIGURES




## LEGEND

SITE LOCATION

750 0 750 1500

GRAPHIC SCALE


| SYMBOL | DESCRIPTIONS | DATE | APPROVED |
|---|---|---|---|

REVISIONS

Prepared by: EarthTech — A Tyco International Ltd. Company

Prepared for: United States Army Corps of Engineers, Buffalo District

| | |
|---|---|
| DESIGNED BY: JH | GUTERL SPECIALTY STEEL CORPORATION LOCKPORT, N.Y. |
| DRAWN BY: JH | SITE LOCATION PLAN |
| CHECKED BY: JK | |

| SUBMITTED BY: | DATE: | SCALE: | DRAWING NO.: |
|---|---|---|---|
| JK | JUNE 2005 | AS SHOWN | FIGURE 1 |


**LEGEND**

Guterl Site Boundary

Guterl Excised Boundary

Guterl Landfill Boundary

24 Guterl Buildings

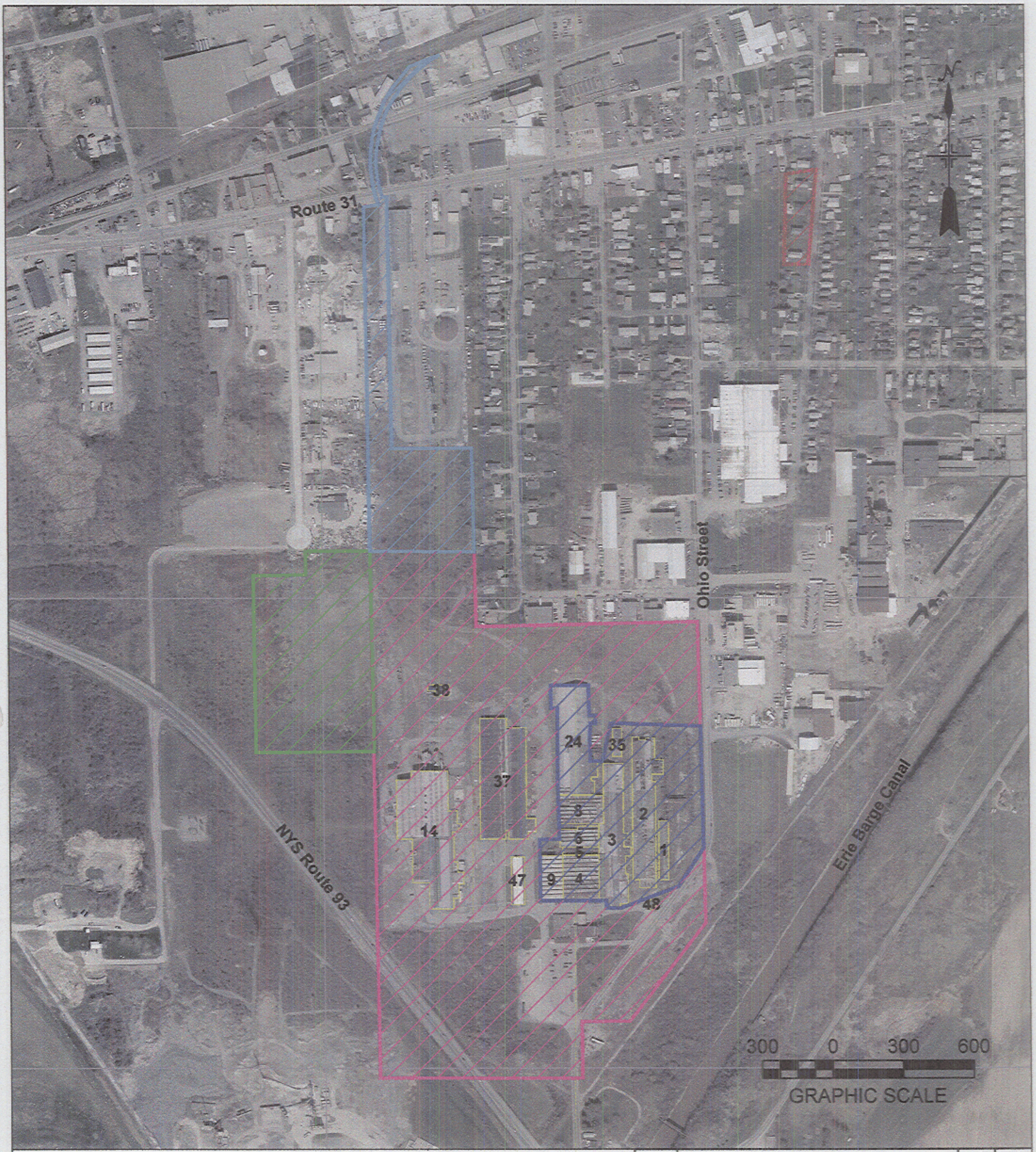
| SYMBOL | DESCRIPTIONS | DATE | APPROVED |
|---|---|---|---|
| | REVISIONS | | |

Prepared by: EarthTech A Tyco International Ltd. Company

Prepared for: United States Army Corps of Engineers Buffalo District

| | |
|---|---|
| DESIGNED BY: JH | GUTERL SPECIALTY STEEL CORPORATION LOCKPORT, N.Y. |
| DRAWN BY: JH | DETAILED SITE PLAN |
| CHECKED BY: JK | |

| SUBMITTED BY: | DATE: | SCALE: | DRAWING NO.: |
|---|---|---|---|
| JK | DECEMBER 2005 | AS SHOWN | FIGURE 2 |




## LEGEND

- 24 — Guterl Buildings
- IA01 Excised Area - Building Surfaces and Interiors & IA02 Excised Area - Building Exteriors
- IA03 Landfill Area
- IA04 NCIDA Property
- IA05 Railroad Right-of-Way
- IA06 Off-site Northeast Properties

**IA07 Groundwater & IA08 Site Utilities includes all hatched areas.**

| SYMBOL | DESCRIPTIONS | DATE | APPROVED |
|---|---|---|---|
| | REVISIONS | | |

Prepared by: EarthTech A Tyco International Ltd. Company

Prepared for: United States Army Corps of Engineers Buffalo District

| | |
|---|---|
| DESIGNED BY : JH | GUTERL SPECIALTY STEEL CORPORATION LOCKPORT, N.Y. |
| DRAWN BY : JH | |
| CHECKED BY : JK | INVESTIGATIVE AREAS |

| SUBMITTED BY : | DATE : | SCALE : | DRAWING NO. : |
|---|---|---|---|
| JK | DECEMBER 2005 | AS SHOWN | FIGURE 3 |

# ATTACHMENT 1

*Referenced Data Tables from Prior Investigations*

TABLE 4-3

CINDER SAMPLE CONCENTRATIONS AT FORMER SIMONDS SITE
BASED ON 1980 FB&DU SURVEY
(INCLUDING BACKGROUND)

| Location[a] | Depth of Sample (ft)[b] | $^{238}U$ (pCi/g) | $^{226}Ra$ (pCi/g) | $^{232}Th$ (pCi/g) |
|---|---|---|---|---|
| GSS-1 | 0 - 1 | 219 | 0.22 | 8.1 |
| GSS-1 | 1 - 2 | 10.7 | 1.12 | 2.4 |
| GSS-2 | 0 - 1 | 226 | 0.38 | 6.4 |
| GSS-2 | 1 - 2 | 2.8 | 1.68 | 2.1 |
| GSS-3 | 0 - 1 | 826 | <0.20 | 6.0 |
| GSS-3 | 1 - 2 | 329 | 0.51 | 7.4 |
| GSS-4 | 0 - 1 | 3.0 | <0.20 | 12.6 |
| GSS-4A | 0 - 1 | 1,900 | 0.89 | 134 |
| GSS-5 | 0 - 1 | 348 | 0.37 | 8.6 |
| GSS-5 | 1 - 2 | 23.3 | 1.35 | 2.1 |
| GSS-5 | 2 - 3 | 366 | 1.02 | 4.1 |
| GSS-6 | 0 - 1 | 5.3 | <0.20 | 1.9 |
| GSS-6 | 1 - 2 | 0.7 | 1.09 | 2.2 |
| GSS-6 | 2 - 3 | 0.7 | <0.20 | 2.1 |

[a]See Figure 4-2.

[b]1 ft = 0.3048 m

**Table 2.2**
**Summary of Interior Surface Soil Concentrations**

| Area | $Ra^{226}$ (pCi/g) | $Th^{232}$ (pCi/g) | $U^{235}$ (pCi/g) | $U^{238}$ (pCi/g) |
|---|---|---|---|---|
| Building 2 | 0.4 to 8.4 | <0.6 to 2.3 | <0.4 to 4.4 | <16 to 113 |
| Building 3 | <3.0 | <3.4 to 78.5 | <0.4 to 796 | <5.9 to 41,600 |
| Building 4 | 0.4 to 0.6 | 0.4 to 0.6 | <0.1 | <4.1 |
| Building 6 | <0.5 to 0.7 | <0.6 to 68.7 | <1.6 to 10.9 | <12 to 297 |
| Building 8 | <2.2 | <2.8 to 442 | <0.5 to 348 | <15 to 25,200 |
| Building 24 | 0.7 to 1.7 | 0.9 to 1.7 | <0.4 to 1.5 | <7.3 to 37.4 |

Source: GSITNT 1051

The Table 2.3 provides a summary of the results for each building where measurements of total and removable activity levels were taken [GSITNT 1048-1049]:

**Table 2.3**
**Interior Surface Activity Levels**

| Location | Total Beta Activity Range (dpm/100cm²) | Alpha Removable Range (dpm/100cm²) | Beta Removable Range (dpm/100cm²) |
|---|---|---|---|
| Building 1 (11 samples from 14 locations) | -540 to 340,000 | 0 to 5 | -6 to 7 |
| Building 2 (74 samples from 76 locations) | -560 to 24,000 | 0 to 5 | -5 to 18 |
| Building 3 (55 samples from 58 locations) | -1,300 to 250,000 | 0 to 185 | -4 to 248 |
| Building 6 (30 sample locations) | -480 to 30,000 | 0 to 7 | -3 to 15 |
| Building 8 (119 samples from 135 locations) | 17 to 64,000 | 0 to 74 | -4 to 120 |
| Building 24, North (17 sample locations) | -390 to 120 | 0 to 3 | -3 to 6 |
| Building 24, South (93 sample locations) | -650 to 99,000 | 0 to 65 | -5 to 80 |
| Building 6 (25 sample locations) | -760 to 650 | 0 to 3 | -5 to 4 |

Source: GSITNT 1048-1049

**Exterior Survey Results**

Areas surveyed by the survey team were broken down into three separate categories: Class 1 areas, Class 2 areas, and Class 3 areas. Class 1 areas were areas that had a significant potential for radioactive contamination based on site operating history or known contamination based on previous radiological surveys. Class 2 areas were areas contiguous to Class 1 areas, or areas of known contamination based on scans and direct surface activity measures. Class 3 areas were areas not expected to contain any residual contamination based on site operating history [GSITNT 1039-1040].

Surface scans of the exterior of the facility identified and verified the presence of multiple locations of elevated gamma radiation, some of which were the result of firebrick. Locations that were determined not to be the result of firebrick were investigated further, and approximately 11 of those areas were located in the excised area. The survey team identified three areas within the crane yard on the eastern side of the excised property, three locations within the alley that separates Buildings 2 and 3, an area in the alley encircling Building 5 [Building 6], and four areas on the western side of Buildings 6 and 8 [Building 5] [GSITNT 1052].

The Class 1 and 2 portions of the Allegheny Ludlum property exhibited multiple locations of elevated gamma radiation, as well. These areas included one area within the courtyard separating Buildings 3 and 24, one area directly west of Building 24, and numerous areas across the northern property. The survey team observed a brick-sized piece of radioactive material in the landfill area in the northwest portion of the site. This material was labeled as radioactive and stored in Building 2. The survey team also encountered "numerous" pieces of thoriated metal outside the northern fence and due east of the landfill on Allegheny Ludlum property. These pieces of metals exhibited high levels of radiation, and, therefore, specific samples of the material were not collected [GSITNT 1052].

Exposure rates for the exterior areas of the site ranged from 3 to 50 μR/h. Exterior background levels in this geographic region generally average 8 μR/h [GSITNT 1053].

Table 2.4, Summary of Exterior Soil Concentrations, provides a summary of the results for each area where soil samples were collected [GSITNT 1053-1054]. The survey team concluded that soil sample results indicated there was residual uranium and thorium contamination at various locations around the site. The contamination generally extended to a depth from 30 to 60 cm, with some areas exhibiting contamination at a depth of 120 cm. A number of the samples also contained the aforementioned "yellowcake" material encountered during the interior survey [GSITNT 1054].

**Table 2.4**
**Summary of Exterior Soil Concentrations**

| Area | $Ra^{226}$ (pCi/g) | $Th^{232}$ (pCi/g) | $U^{235}$ (pCi/g) | $U^{238}$ (pCi/g) |
|---|---|---|---|---|
| Systematic (Class 1 Areas) (213 sample locations) | <0.3 to 3.0 | <0.8 to 1.5 | <0.6 to 2.6 | <18 to 51 |
| Judgmental (Class 2 Areas) (48 samples at 33 locations | <6.9 to 21 | <8.7 to 307 | <0.9 to 1,079 | <10 to 54,800 |
| Boreholes (118 samples at 35 locations) | <2.0 to 2.1 | <1.3 to 371 | <5.4 to 525 | <35 to 17,780 |
| Class 3 (17 samples) | <0.1 to 9.7 | <0.2 to 2.2 | <0.8 | <0.6 to 8.8 |

Source: GSITNT 1053-1054

Table C-2.
Monitoring Well Instrumentation Summary for Deep Overburden and Upper Lockport Bedrock Wells Installed in the Study Area.

| Well Designation | Ground Surface Elevation (ft. AMSL) | Top of Riser Elevation (ft. AMSL) | Sandpack Interval (ft. BGS) | Sandpack Interval (ft. AMSL) | Well Screen Interval (ft. BGS) | Well Screen Interval (ft. AMSL) | Screened Unit |
|---|---|---|---|---|---|---|---|
| **Guterl Excised Area (Unlisted)** | | | | | | | |
| MW-1 | 597.20 | 599.14 | 7.70 to 15.00 | 589.50 to 582.20 | 9.70 to 14.70 | 587.50 to 582.50 | Goat Island Dolostone |
| MW-2 | 596.70 | 598.56 | 7.50 to 14.50 | 589.20 to 582.20 | 9.20 to 14.20 | 587.50 to 582.50 | Goat Island Dolostone |
| MW-3 | 597.00 | 598.82 | 7.20 to 14.40 | 589.80 to 582.60 | 9.10 to 14.10 | 587.90 to 582.90 | Goat Island Dolostone |
| MW-4 | 596.50 | 598.67 | 6.90 to 14.40 | 589.60 to 582.10 | 9.10 to 14.10 | 587.40 to 582.40 | Goat Island Dolostone |
| MW-5 | 596.10 | 598.24 | 8.20 to 15.50 | 587.90 to 580.60 | 10.2 to 15.20 | 585.90 to 580.90 | Goat Island Dolostone |
| **Guterl Specialty Steel Corporation Site (Registry Number 932832)** | | | | | | | |
| MW-1 | 598.50 | 601.44 | 3.50 to 5.50 | 595.00 to 593.00 | 4.50 to 5.50 | 594.00 to 593.00 | Glacial Till |
| MW-2 | 602.50 | 604.28 | 1.40 to 3.40 | 601.10 to 599.10 | 2.40 to 3.40 | 600.10 to 599.10 | Glacial Till |
| MW-3 | 598.8* | 601.5* | 1.70 to 3.70 | 597.10 to 595.10 | 2.70 to 3.70 | 596.10 to 595.10 | Misc. Fill; Destroyed |
| MW-4 | 603.70 | 605.29 | 3.50 to 5.50 | 600.20 to 598.20 | 4.50 to 5.50 | 599.20 to 598.20 | Miscellaneous Fill |
| MW-105 | 597.40 | 599.25 | 2.00 to 5.00 | 595.40 to 592.40 | 3.00 to 5.00 | 594.40 to 592.40 | Glacial Till |
| **Diamond Shamrock Site (Registry Number 932071)** | | | | | | | |
| MW1-94 | 597.70 | 597.35 | 4.50 to 14.20 | 593.20 to 583.50 | 5.51 to 13.51 | 592.19 to 584.19 | Goat Island Dolostone |
| MW2-94 | 596.75 | 596.52 | 4.60 to 14.60 | 592.15 to 582.15 | 6.60 to 14.60 | 590.15 to 582.15 | Goat Island Dolostone |
| MW3-94 | 597.50 | 596.94 | 5.00 to 14.50 | 592.50 to 583.00 | 6.08 to 14.08 | 591.42 to 583.42 | Goat Island Dolostone |
| MW4-94 | 595.70 | 595.34 | 5.60 to 14.90 | 590.10 to 580.80 | 6.58 to 14.58 | 589.12 to 581.12 | Goat Island Dolostone |
| MW5-94 | 594.43 | 594.14 | 4.50 to 15.00 | 589.93 to 579.43 | 5.88 to 13.88 | 588.55 to 580.55 | Goat Island Dolostone |
| MW6-94 | 595.60 | 595.21 | 5.40 to 15.10 | 590.20 to 580.50 | 6.44 to 14.44 | 589.16 to 581.16 | Goat Island Dolostone |
| MW7-94 | 595.27 | 594.91 | 7.30 to 16.30 | 587.97 to 578.97 | 8.08 to 16.08 | 587.19 to 579.19 | Goat Island Dolostone |

Ft. AMSL Feet Above Mean Sea Level. Ft. BGS Feet Below Ground Surface. * Adjusted Elevation.

## TABLE 13

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 0N, 0E | 987 | < 0.2 | 0.5 ± 0.2[b] | < 0.3 | < 8.3 *(4.3 ± 1.1)*[c] |
| 5N, 125E | 921 | 0.2 ± 0.1 | < 0.5 | < 0.3 | < 7.1 *(1.6 ± 0.9)* |
| 5N, 145E | 900 | 0.2 ± 0.1 | < 0.2 | < 0.2 | < 4.8 *(0.4 ± 0.6)* |
| 15N, 155E | 907 | < 0.3 | < 0.4 | < 0.4 | < 8.0 *(1.6 ± 1.0)* |
| 15N, 165E | 825 | 0.8 ± 0.2 | 1.0 ± 0.3 | < 0.4 | < 6.0 *(2.1 ± 1.3)* |
| 20N, 122E | 728 | < 0.1 | < 0.3 | < 0.2 | < 4.6 *(0.5 ± 0.7)* |
| 25N, 175E | 759 | 0.8 ± 0.2 | 0.7 ± 0.3 | < 0.3 | < 7.7 *(1.4 ± 1.2)* |
| 35N, 155E | 850 | 0.3 ± 0.1 | 0.3 ± 0.1 | < 0.2 | < 6.0 *(2.8 ± 0.8)* |
| 35N, 175E | 1164 | 0.1 ± 0.1 | < 0.2 | < 0.1 | < 2.4 *(< 0.5)* |
| 35N, 185E | 867 | < 0.2 | < 0.3 | < 0.2 | < 6.2 *(0.6 ± 0.7)* |
| 40N, 0E | 939 | < 0.1 | < 0.1 | < 0.1 | < 2.4 *(< 0.5)* |
| 40N, 122E | 1141 | < 0.1 | < 0.3 | 0.2 ± 0.2 | < 5.5 *(1.3 ± 0.5)* |
| 45N, 185E | 775 | 0.6 ± 0.1 | < 0.4 | < 0.2 | < 8.6 *(3.1 ± 1.1)* |
| 45N, 195E | 939 | 0.4 ± 0.1 | < 0.4 | < 0.3 | < 7.8 *(1.3 ± 1.0)* |
| 55N, 155E | 790 | 0.6 ± 0.1 | 1.2 ± 0.3 | 0.6 ± 0.3 | < 9.2 *(6.4 ± 1.6)* |
| 55N, 175E | 880 | 0.5 ± 0.1 | < 0.3 | 0.2 ± 0.2 | < 5.0 *(2.2 ± 0.8)* |
| 55N, 185E | 936 | 0.6 ± 0.1 | 0.6 ± 0.2 | < 0.2 | < 4.4 *(2.0 ± 0.7)* |
| 55N, 195E | 792 | 0.7 ± 0.1 | 0.9 ± 0.2 | < 0.2 | < 5.9 *(1.8 ± 1.0)* |
| 60N, 124E | 877 | 0.4 ± 0.1 | < 0.4 | 0.5 ± 0.4 | 6.5 ± 4.0 |
| 65N, 5E | 1214 | < 0.1 | 0.2 ± 0.1 | < 0.2 | < 5.8 *(1.2 ± 0.7)* |
| 65N, 25E | 856 | 0.2 ± 0.1 | 0.4 ± 0.1 | 0.2 ± 0.2 | 6.4 ± 2.6 |
| 65N, 185E | 796 | 0.7 ± 0.2 | 0.8 ± 0.2 | < 0.3 | < 9.3 *(3.4 ± 1.2)* |
| 65N, 195E | 1077 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | 4.3 ± 3.1 |
| 70N, 45E | 789 | 0.5 ± 0.2 | 1.3 ± 0.3 | 1.1 ± 0.4 | 24.8 ± 9.6 |
| 75N, 15E | 1230 | 0.2 ± 0.1 | 0.4 ± 0.1 | 0.4 ± 0.2 | 9.2 ± 3.8 |
| 75N, 155E | 831 | < 0.3 | 1.0 ± 0.3 | 0.7 ± 0.4 | 9.2 ± 6.9 |
| 75N, 175E | 1086 | 0.6 ± 0.1 | < 0.3 | < 0.2 | < 4.5 *(1.8 ± 0.5)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL EXTERIOR SYSTEMATIC LOCATIONS GUTERL SPECIALTY STEEL CORPORATION LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 75N, 185E | 843 | 1.3 ± 0.3 | 1.4 ± 0.3 | < 0.6 | < 13 *(2.5 ± 1.0)* |
| 75N, 195E | 850 | 0.9 ± 0.2 | 0.9 ± 0.2 | < 0.3 | < 6.5 *(2.8 ± 1.0)* |
| 75N, 205E | 667 | 0.8 ± 0.2 | 1.2 ± 0.3 | < 0.4 | 17.4 ± 9.4 |
| 80N, 0E. | 736 | 0.6 ± 0.2 | 0.8 ± 0.3 | < 0.5 | < 15 *(2.0 ± 0.8)* |
| 85N, 5E | 1253 | 0.3 ± 0.1 | 0.5 ± 0.1 | < 0.2 | < 4.8 *(1.7 ± 0.6)* |
| 85N, 185E | 737 | 0.5 ± 0.1 | 0.9 ± 0.2 | < 0.2 | 6.4 ± 3.4 |
| 85N, 195E | 1147 | 0.5 ± 0.1 | 0.6 ± 0.2 | < 0.3 | < 7.9 *(1.6 ± 0.9)* |
| 85N, 205E | 684 | 0.5 ± 0.2 | 0.5 ± 0.2 | < 0.4 | < 9.6 *(1.9 ± 0.9)* |
| 95N, 15E | 1552 | < 0.1 | < 0.1 | 0.2 ± 0.1 | 10.2 ± 3.0 |
| 95N, 155E | 744 | 0.5 ± 0.2 | 0.9 ± 0.3 | < 0.5 | < 15 *(2.6 ± 1.1)* |
| 95N, 175E | 544 | 1.0 ± 0.2 | < 0.6 | < 0.3 | 5.2 ± 5.1 |
| 95N, 185E | 679 | 1.1 ± 0.2 | 1.4 ± 0.3 | 0.3 ± 0.3 | 12.0 ± 6.1 |
| 95N, 195E | 901 | 0.2 ± 0.1 | < 0.3 | < 0.2 | < 4.2 *(0.5 ± 0.8)* |
| 95N, 205E | 967 | 0.6 ± 0.1 | 0.9 ± 0.2 | 0.4 ± 0.2 | 6.7 ± 4.2 |
| 105N, 165E | 544 | 0.9 ± 0.2 | < 0.7 | < 0.5 | < 11 *(7.2 ± 1.8)* |
| 105N, 195E | 835 | < 0.1 | < 0.2 | < 0.1 | < 2.9 *(< 0.7)* |
| 105N, 205E | 958 | 0.5 ± 0.1 | 0.7 ± 0.2 | < 0.3 | < 7.4 *(2.0 ± 0.8)* |
| 115N, 15E | 936 | < 0.2 | < 0.4 | < 0.3 | < 9.9 *(< 1.5)* |
| 115N, 155E | 878 | 0.5 ± 0.1 | 0.4 ± 0.2 | < 0.4 | < 12 *(< 1.5)* |
| 115N, 175E | 1162 | 0.4 ± 0.1 | 0.4 ± 0.1 | 0.2 ± 0.1 | 2.8 ± 2.3 |
| 115N, 185E | 946 | 0.4 ± 0.1 | 0.6 ± 0.2 | 0.5 ± 0.2 | 14.0 ± 4.7 |
| 115N, 195E | 702 | 1.0 ± 0.2 | 0.6 ± 0.3 | 0.9 ± 0.3 | 19.8 ± 7.0 |
| 115N, 205E | 873 | < 0.2 | 0.5 ± 0.2 | < 0.3 | < 8.6 *(1.6 ± 1.0)* |
| 120N, 0E | 580 | < 0.1 | 0.2 ± 0.1 | < 0.2 | < 4.8 *(0.9 ± 0.7)* |
| 125N, 25E | 259 | < 0.3 | < 0.6 | 0.9 ± 0.6 | 28 ± 13 |
| 125N, 165E | 866 | 0.5 ± 0.2 | < 0.7 | < 0.5 | < 11 *(1.8 ± 1.1)* |
| 125N, 185E | 548 | 0.9 ± 0.2 | 0.7 ± 0.3 | < 0.4 | < 9.9 *(2.4 ± 1.4)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 125N, 195E | 611 | 3.0 ± 0.7 | 1.2 ± 0.4 | 0.6 ± 0.5 | < 18 *(7.2 ± 1.9)* |
| 125N, 205E | 893 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.4 | < 7.6 *(1.9 ± 0.9)* |
| 128N, 115E | 837 | 0.4 ± 0.1 | 0.6 ± 0.2 | 0.2 ± 0.2 | 8.0 ± 4.7 |
| 135N, 155E | 730 | 1.1 ± 0.2 | 1.2 ± 0.3 | < 0.3 | < 11 *(1.9 ± 1.2)* |
| 135N, 175E | 1153 | 0.3 ± 0.1 | < 0.5 | 0.9 ± 0.3 | 21.1 ± 6.3 |
| 135N, 185E | 524 | < 0.3 | < 0.4 | < 0.3 | < 8.7 *(0.4 ± 1.0)* |
| 135N, 195E | 643 | < 0.3 | 0.8 ± 0.3 | < 0.3 | < 7.0 *(1.5 ± 1.2)* |
| 135N, 205E | 919 | 0.6 ± 0.1 | < 0.3 | 0.3 ± 0.2 | 4.4 ± 2.6 |
| 140N, 20E | 568 | < 0.1 | < 0.2 | < 0.1 | < 3.0 *(0.6 ± 0.5)* |
| 145N, 165E | 596 | 0.7 ± 0.1 | 1.1 ± 0.3 | 0.7 ± 0.3 | < 9.7 *(7.1 ± 1.4)* |
| 145N, 185E | 639 | 1.0 ± 0.2 | 0.9 ± 0.3 | < 0.3 | < 6.9 *(< 1.2)* |
| 145N, 195E | 712 | 0.6 ± 0.1 | < 0.3 | < 0.3 | < 6.8 *(1.4 ± 1.0)* |
| 145N, 205E | 522 | 2.1 ± 0.3 | 1.5 ± 0.4 | < 0.5 | < 11 *(3.7 ± 1.7)* |
| 150N, 112E | 891 | < 0.2 | 0.4 ± 0.2 | 1.2 ± 0.4 | 34.6 ± 7.7 |
| 155N, 155E | 808 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | < 5.4 *(1.7 ± 0.6)* |
| 155N, 175E | 1164 | 0.2 ± 0.1 | < 0.4 | < 0.3 | 5.5 ± 3.9 |
| 155N, 185E | 985 | < 0.1 | < 0.2 | < 0.2 | < 4.6 *(0.1 ± 0.4)* |
| 155N, 195E | 659 | < 0.2 | 0.9 ± 0.2 | < 0.3 | < 7.9 *(2.3 ± 1.0)* |
| 155N, 205E | 638 | 1.1 ± 0.2 | 1.0 ± 0.3 | < 0.3 | < 8.8 *(1.8 ± 1.3)* |
| 160N, 0E | 508 | 0.3 ± 0.1 | 0.6 ± 0.2 | < 0.2 | < 4.6 *(1.4 ± 0.8)* |
| 160N, 82E | 814 | 0.5 ± 0.1 | 1.3 ± 0.3 | 0.8 ± 0.3 | 14.6 ± 6.3 |
| 165N, 165E | 521 | 0.5 ± 0.2 | < 0.5 | 0.8 ± 0.4 | 20.7 ± 9.1 |
| 165N, 185E | 851 | 0.2 ± 0.1 | < 0.3 | < 0.2 | < 4.0 *(1.2 ± 0.8)* |
| 165N, 195E | 697 | 0.7 ± 0.2 | < 0.7 | 0.3 ± 0.4 | < 15 *(8.7 ± 1.8)* |
| 165N, 205E | 857 | 0.7 ± 0.2 | 1.1 ± 0.3 | < 0.3 | < 8.4 *(2.5 ± 1.3)* |
| 170N, 118E | 1059 | 0.2 ± 0.1 | 0.5 ± 0.1 | < 0.2 | < 5.4 *(2.8 ± 0.7)* |
| 175N, 175E | 1535 | < 0.1 | < 0.2 | < 0.2 | < 4.4 *(0.4 ± 0.3)* |

TABLE 13 (Continued)

**RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL**
**EXTERIOR SYSTEMATIC LOCATIONS**
**GUTERL SPECIALTY STEEL CORPORATION**
**LOCKPORT, NEW YORK**

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 175N, 185E | 697 | 0.3 ± 0.2 | 0.7 ± 0.2 | < 0.4 | < 9.8 *(1.0 ± 0.9)* |
| 175N, 195E | 907 | 0.6 ± 0.2 | 0.8 ± 0.2 | 0.7 ± 0.5 | 18.5 ± 7.8 |
| 175N, 205E | 1051 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.2 ± 0.2 | < 6.9 *(1.2 ± 0.9)* |
| 178N, 95E | 959 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | 0.7 ± 0.6 |
| 180N, 20E | 1071 | 0.2 ± 0.1 | < 0.3 | < 0.2 | < 6.1 *(0.8 ± 0.7)* |
| 180N, 80E | 754 | 0.5 ± 0.2 | < 0.7 | 0.5 ± 0.3 | 3.6 ± 1.1 |
| 185N, 165E | 501 | < 0.3 | 0.8 ± 0.3 | 0.7 ± 0.4 | 13 ± 11 |
| 185N, 185E | 1204 | 0.3 ± 0.1 | 0.5 ± 0.1 | < 0.2 | 3.6 ± 2.6 |
| 185N, 195E | 891 | 0.6 ± 0.1 | < 0.7 | < 0.4 | < 12 *(2.3 ± 1.4)* |
| 185N, 205E | 702 | 1.0 ± 0.3 | 1.2 ± 0.3 | < 0.5 | < 15 *(2.8 ± 1.9)* |
| 190N, 122E | 819 | 0.4 ± 0.1 | 0.8 ± 0.2 | 0.4 ± 0.3 | 15.3 ± 7.5 |
| 195N, 75E | 663 | 0.3 ± 0.1 | 0.5 ± 0.2 | < 0.2 | 2.4 ± 1.0 |
| 195N, 95E | 1023 | 0.4 ± 0.1 | 0.6 ± 0.2 | < 0.2 | 3.1 ± 1.0 |
| 195N, 175E | 1356 | 0.2 ± 0.1 | 0.4 ± 0.1 | < 0.2 | < 5.5 *(1.3 ± 0.5)* |
| 195N, 185E | 1349 | 0.2 ± 0.1 | < 0.3 | < 0.2 | < 5.1 *(0.9 ± 0.5)* |
| 195N, 195E | 926 | 0.4 ± 0.1 | < 0.2 | < 0.2 | < 4.1 *(0.7 ± 0.6)* |
| 195N, 205E | 1164 | 0.3 ± 0.1 | 0.4 ± 0.1 | < 0.2 | < 3.9 *(0.9 ± 0.5)* |
| 200N, 0E | 816 | 0.6 ± 0.1 | 0.8 ± 0.3 | < 0.3 | < 9.3 *(2.8 ± 1.2)* |
| 205N, 165E | 558 | 0.5 ± 0.2 | 0.7 ± 0.3 | < 0.5 | < 13 *(2.0 ± 0.9)* |
| 205N, 185E | 1435 | 0.2 ± 0.1 | < 0.2 | < 0.1 | < 2.9 *(< 0.4)* |
| 205N, 195E | 710 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.3 | < 8.5 *(2.1 ± 1.3)* |
| 205N, 205E | 1497 | < 0.1 | 0.2 ± 0.1 | < 0.1 | < 4.2 *(0.4 ± 0.4)* |
| 210N, 118E | 929 | < 0.2 | 0.4 ± 0.2 | < 0.3 | 1.3 ± 0.6 |
| 215N, 75E | 702 | 0.5 ± 0.1 | 0.7 ± 0.2 | < 0.3 | 1.4 ± 0.9 |
| 215N, 95E | 730 | < 0.2 | 0.4 ± 0.2 | < 0.2 | 1.2 ± 0.9 |
| 215N, 135E | 897 | 0.2 ± 0.1 | 0.4 ± 0.2 | < 0.2 | 1.5 ± 0.8 |
| 215N, 155E | 787 | 0.6 ± 0.1 | 0.8 ± 0.2 | < 0.2 | < 6.2 *(1.2 ± 0.7)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 215N, 175E | 1414 | 0.2 ± 0.1 | 0.4 ± 0.1 | < 0.1 | < 3.5 *(0.6 ± 0.3)* |
| 215N, 185E | 1509 | < 0.1 | 0.2 ± 0.1 | < 0.1 | < 2.8 *(0.4 ± 0.3)* |
| 215N, 195E | 1035 | < 0.1 | < 0.2 | < 0.2 | < 5.7 *(0.8 ± 0.6)* |
| 215N, 205E | 401 | 0.7 ± 0.2 | < 0.7 | < 0.5 | < 11 *(2.7 ± 1.2)* |
| 220N, 20E | 770 | 0.7 ± 0.2 | 0.8 ± 0.3 | < 0.5 | < 9.9 *(1.4 ± 1.2)* |
| 240N, 80E | 750 | 0.6 ± 0.2 | 0.7 ± 0.2 | < 0.4 | < 12 *(< 1.9)* |
| 240N, 160E | 627 | < 0.2 | < 0.4 | < 0.2 | < 6.2 *(< 1.0)* |
| 240N, 200E | 832 | 0.7 ± 0.2 | 0.7 ± 0.2 | < 0.3 | < 7.1 *(1.2 ± 0.9)* |
| 241N, 0E | 954 | 0.4 ± 0.1 | 0.4 ± 0.1 | < 0.2 | < 6.3 *(< 0.9)* |
| 260N, 20E | 681 | 0.6 ± 0.2 | 0.9 ± 0.2 | < 0.3 | < 5.8 *(0.7 ± 0.9)* |
| 260N, 140E | 1222 | 0.4 ± 0.1 | 1.0 ± 0.2 | 0.4 ± 0.2 | 5.4 ± 3.0 |
| 260N, 180E | 940 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.4 | < 7.8 *(2.2 ± 0.8)* |
| 280N, 80E | 1187 | 0.5 ± 0.1 | 0.5 ± 0.2 | 0.2 ± 0.2 | < 7.0 *(2.0 ± 0.7)* |
| 280N, 120E | 1090 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.2 ± 0.2 | < 6.9 *(2.4 ± 0.8)* |
| 280N, 160E | 1115 | 0.2 ± 0.1 | < 0.2 | < 0.2 | < 5.6 *(0.8 ± 0.7)* |
| 280N, 200E | 785 | 0.6 ± 0.1 | < 0.4 | < 0.2 | < 5.4 *(< 0.9)* |
| 300N, 20E | 778 | < 0.2 | 0.7 ± 0.2 | < 0.3 | < 7.4 *(1.9 ± 1.1)* |
| 300N, 60E | 964 | 0.4 ± 0.1 | < 0.5 | < 0.4 | < 5.3 *(1.5 ± 0.8)* |
| 300N, 100E | 834 | 0.7 ± 0.1 | 1.1 ± 0.3 | 2.6 ± 0.5 | 51 ± 11 |
| 300N, 140E | 1108 | 0.3 ± 0.1 | 0.8 ± 0.2 | 0.5 ± 0.3 | 13.2 ± 4.6 |
| 300N, 180E | 610 | 0.8 ± 0.2 | 1.0 ± 0.4 | < 0.4 | < 7.6 *(2.4 ± 1.6)* |
| 320N, 40E | 732 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.3 ± 0.2 | 11.5 ± 4.2 |
| 320N, 80E | 1174 | 0.5 ± 0.1 | 0.6 ± 0.2 | 0.3 ± 0.2 | 4.6 ± 3.9 |
| 320N, 120E | 1003 | < 0.2 | 0.4 ± 0.1 | 0.2 ± 0.2 | 7.8 ± 4.6 |
| 320N, 160E | 792 | 0.7 ± 0.1 | < 0.4 | < 0.3 | < 6.4 *(2.4 ± 1.1)* |
| 320N, 200E | 732 | 0.6 ± 0.2 | < 0.7 | < 0.5 | < 11 *(2.2 ± 1.3)* |
| 340N, 20E | 517 | < 0.3 | 1.0 ± 0.3 | < 0.4 | < 12 *(5.1 ± 1.7)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 340N, 60E | 988 | < 0.2 | 0.5 ± 0.2 | < 0.3 | < 7.8 *(1.4 ± 0.7)* |
| 340N, 100E | 686 | 0.5 ± 0.2 | < 0.8 | 1.4 ± 0.5 | 36.2 ± 9.6 |
| 340N, 140E | 766 | 0.5 ± 0.1 | 0.9 ± 0.2 | 0.3 ± 0.2 | < 7.7 *(3.4 ± 1.1)* |
| 340N, 180E | 821 | < 0.2 | < 0.3 | < 0.2 | < 4.2 *(0.9 ± 0.7)* |
| 359N, 0E | 686 | 0.5 ± 0.1 | 0.8 ± 0.3 | < 0.3 | < 9.6 *(0.8 ± 1.0)* |
| 359N, 40E | 852 | < 0.3 | < 0.5 | < 0.3 | < 12 *(1.8 ± 0.8)* |
| 359N, 80E | 755 | 0.4 ± 0.1 | 0.7 ± 0.2 | < 0.3 | < 8.0 *(1.2 ± 0.9)* |
| 359N, 120E | 728 | 0.6 ± 0.1 | 0.9 ± 0.2 | < 0.3 | < 6.6 *(1.2 ± 0.9)* |
| 359N, 160E | 785 | 1.4 ± 0.4 | 1.4 ± 0.4 | < 0.6 | < 14 *(2.1 ± 1.3)* |
| 359N, 200E | 839 | 0.6 ± 0.1 | 0.9 ± 0.2 | < 0.3 | < 8.2 *(2.0 ± 1.3)* |
| 240N, 280W | 649 | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.1 ± 0.1 | 5.2 ± 1.8 |
| 260N, 20W | 1040 | 0.4 ± 0.1 | 0.7 ± 0.2 | < 0.2 | < 4.4 *(1.2 ± 0.6)* |
| 260N, 100W | 775 | 0.5 ± 0.2 | 0.7 ± 0.2 | < 0.3 | < 10 *(1.1 ± 1.2)* |
| 260N, 140W | 911 | 0.5 ± 0.1 | < 0.4 | < 0.3 | < 11 *(0.8 ± 0.8)* |
| 260N, 180W | 1027 | < 0.1 | 0.2 ± 0.1 | < 0.2 | < 3.9 *(1.6 ± 0.7)* |
| 260N, 260W | 750 | 0.6 ± 0.1 | 0.5 ± 0.1 | 0.9 ± 0.2 | 18.2 ± 2.9 |
| 260N, 300W | 658 | 0.8 ± 0.2 | 0.5 ± 0.1 | 0.2 ± 0.2 | < 4.9 |
| 262N, 60W | 925 | 0.4 ± 0.1 | 0.6 ± 0.2 | < 0.2 | < 6.6 *(< 1.1)* |
| 280N, 0W | 939 | 0.6 ± 0.2 | 0.9 ± 0.3 | 0.3 ± 0.3 | < 13 *(3.3 ± 1.2)* |
| 280N, 40W | 742 | 0.5 ± 0.1 | 0.7 ± 0.3 | < 0.3 | < 9.3 *(2.5 ± 1.2)* |
| 280N, 80W | 795 | 0.9 ± 0.2 | 1.2 ± 0.3 | 0.5 ± 0.3 | < 9.0 *(5.9 ± 1.5)* |
| 280N, 160W | 776 | < 0.2 | < 0.5 | < 0.3 | < 7.3 *(0.9 ± 1.0)* |
| 280N, 200W | 800 | < 0.1 | < 0.3 | < 0.2 | < 5.8 *(< 0.9)* |
| 280N, 240W | 613 | 0.5 ± 0.1 | 0.8 ± 0.1 | 0.3 ± 0.1 | 5.0 ± 2.1 |
| 280N, 280W | 723 | 0.4 ± 0.1 | 0.4 ± 0.1 | 0.2 ± 0.1 | < 4.9 |
| 280N, 338W | 490 | 0.6 ± 0.1 | 0.7 ± 0.2 | 0.2 ± 0.2 | 5.1 ± 2.4 |
| 283N, 120W | 992 | 0.2 ± 0.1 | < 0.2 | < 0.2 | < 4.9 *(2.1 ± 0.7)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 300N, 20W | 738 | 0.7 ± 0.2 | < 0.8 | < 0.5 | < 13 *(2.8 ± 1.2)* |
| 300N, 60W | 648 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | < 5.6 *(1.5 ± 0.8)* |
| 300N, 100W | 891 | 0.4 ± 0.1 | < 0.4 | 0.5 ± 0.3 | 8.6 ± 3.8 |
| 300N, 140W | 1058 | 0.6 ± 0.1 | 0.9 ± 0.3 | 1.3 ± 0.4 | 32.3 ± 7.6 |
| 300N, 180W | 1003 | < 0.1 | < 0.2 | < 0.2 | < 5.8 *(< 0.7)* |
| 300N, 220W | 877 | 0.3 ± 0.1 | 0.4 ± 0.1 | 0.2 ± 0.1 | 4.5 ± 2.4 |
| 300N, 260W | 767 | 0.4 ± 0.1 | 0.5 ± 0.1 | 0.2 ± 0.1 | 4.9 ± 2.0 |
| 300N, 300W | 618 | 0.3 ± 0.1 | 0.6 ± 0.1 | 0.1 ± 0.1 | < 5.1 *(1.6 ± 0.5)* |
| 320N, 0W | 796 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | < 6.0 *(1.8 ± 1.1)* |
| 320N, 40W | 633 | 0.5 ± 0.1 | < 0.4 | < 0.3 | < 7.7 *(2.3 ± 0.9)* |
| 320N, 80W | 814 | 0.6 ± 0.2 | < 0.7 | < 0.4 | < 10 *(2.2 ± 1.0)* |
| 320N, 120W | 815 | 0.3 ± 0.1 | < 0.2 | 0.3 ± 0.2 | < 4.0 *(1.3 ± 0.7)* |
| 320N, 160W | 999 | 0.5 ± 0.1 | 0.7 ± 0.2 | 0.3 ± 0.2 | < 12 *(3.3 ± 1.2)* |
| 320N, 200W | 767 | 0.5 ± 0.1 | 0.6 ± 0.2 | < 0.3 | < 8.6 *(2.6 ± 1.2)* |
| 320N, 240W | 700 | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.2 ± 0.2 | 6.9 ± 2.9 |
| 320N, 280W | 723 | 0.6 ± 0.1 | 0.8 ± 0.1 | 0.3 ± 0.1 | 6.5 ± 2.3 |
| 320N, 320W | 644 | 0.6 ± 0.1 | 0.5 ± 0.1 | < 0.2 | 2.0 ± 2.7 |
| 340N, 20W | 758 | 0.5 ± 0.1 | < 0.5 | < 0.3 | < 11 *(5.0 ± 1.4)* |
| 340N, 60W | 697 | 0.6 ± 0.1 | 0.8 ± 0.2 | < 0.4 | < 11 *(4.4 ± 1.3)* |
| 340N, 100W | 929 | 0.4 ± 0.1 | 0.5 ± 0.3 | 0.3 ± 0.2 | 7.4 ± 4.5 |
| 340N, 140W | 964 | 0.8 ± 0.2 | < 0.5 | < 0.4 | < 12 *(< 1.6)* |
| 340N, 180W | 981 | 0.4 ± 0.1 | 0.3 ± 0.1 | < 0.2 | < 5.7 *(2.6 ± 0.8)* |
| 340N, 220W | 567 | 0.4 ± 0.1 | 0.6 ± 0.1 | 0.6 ± 0.2 | 13.5 ± 3.2 |
| 340N, 260W | 742 | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.4 ± 0.1 | 10.2 ± 2.8 |
| 340N, 300W | 698 | 0.7 ± 0.2 | 0.8 ± 0.2 | 0.3 ± 0.2 | 5.2 ± 2.9 |
| 357N, 120W | 781 | 1.5 ± 0.4 | < 0.7 | < 0.5 | < 11 *(1.9 ± 1.1)* |
| 359N, 40W | 632 | 0.7 ± 0.2 | 0.8 ± 0.3 | 0.3 ± 0.2 | < 9.7 *(4.8 ± 1.5)* |

## TABLE 13 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SURFACE SOIL
## EXTERIOR SYSTEMATIC LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Sample Quantity (g) | Radionuclide Concentrations (pCi/g) | | | |
|---|---|---|---|---|---|
| | | Ra-226 | Th-232 | U-235 | U-238 |
| 359N, 80W | 702 | 0.6 ± 0.1 | 0.8 ± 0.2 | < 0.3 | < 6.3 *(2.5 ± 1.1)* |
| 359N, 160W | 750 | 0.8 ± 0.2 | 0.7 ± 0.3 | < 0.3 | < 8.3 *(< 1.5)* |
| 359N, 200W | 737 | 0.7 ± 0.2 | 0.8 ± 0.2 | < 0.3 | < 8.5 *(2.6 ± 1.3)* |
| 360N, 240W | 967 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.8 ± 0.3 | 12.4 ± 8.0 |
| 360N, 280W | 827 | 0.6 ± 0.2 | 0.4 ± 0.3 | < 0.4 | < 11 *(2.4 ± 1.0)* |
| 360N, 320W | 736 | 0.6 ± 0.1 | 0.5 ± 0.1 | 0.2 ± 0.1 | 1.9 ± 1.4 |
| 380N, 140W | 683 | 0.6 ± 0.2 | 0.8 ± 0.4 | < 0.3 | < 8.9 *(1.0 ± 1.1)* |
| 380N, 180W | 714 | 0.6 ± 0.1 | 0.9 ± 0.3 | < 0.3 | < 8.2 *(1.8 ± 1.3)* |
| 380N, 220W | 842 | 0.4 ± 0.1 | 0.7 ± 0.2 | 1.0 ± 0.3 | 22.6 ± 6.9 |
| 380N, 260W | 784 | 0.6 ± 0.1 | 0.7 ± 0.2 | < 0.2 | < 6.0 *(3.1 ± 0.9)* |
| 380N, 300W | 800 | 0.5 ± 0.1 | 0.6 ± 0.1 | 0.2 ± 0.1 | 3.6 ± 1.9 |
| 400N, 120W | 579 | 0.7 ± 0.1 | 0.8 ± 0.3 | < 0.3 | < 8.3 *(1.0 ± 0.9)* |
| 400N, 160W | 755 | < 0.3 | 0.7 ± 0.2 | < 0.3 | < 8.2 *(1.2 ± 1.0)* |
| 400N, 200W | 1014 | 0.4 ± 0.1 | < 0.4 | 0.3 ± 0.2 | 7.3 ± 3.3 |
| 400N, 240W | 861 | 0.7 ± 0.1 | < 0.6 | 0.3 ± 0.3 | < 9.9 *(3.2 ± 1.2)* |
| 400N, 280W | 775 | 0.5 ± 0.2 | < 0.5 | < 0.4 | < 10 *(2.3 ± 1.3)* |
| 400N, 320W | 723 | 0.5 ± 0.1 | 0.6 ± 0.1 | < 0.1 | < 3.9 |
| 420N, 140W | 596 | 0.8 ± 0.3 | 0.9 ± 0.3 | < 0.5 | < 12 *(< 2.3)* |
| 420N, 180W | 583 | 0.5 ± 0.2 | < 0.6 | < 0.4 | < 13 *(2.8 ± 1.7)* |
| 420N, 220W | 864 | 0.4 ± 0.1 | 0.5 ± 0.2 | 0.2 ± 0.2 | 9.1 ± 6.7 |
| 420N, 260W | 879 | 0.5 ± 0.1 | 0.6 ± 0.2 | 0.4 ± 0.2 | 15.5 ± 4.9 |
| 420N, 300W | 707 | 0.6 ± 0.1 | 0.5 ± 0.1 | 0.1 ± 0.1 | 2.8 ± 2.4 |
| 420N, 340W | 536 | 0.9 ± 0.2 | 0.6 ± 0.2 | 0.2 ± 0.2 | < 5.5 *(1.1 ± 0.6)* |
| 440N, 320W | 653 | 0.5 ± 0.1 | 0.5 ± 0.1 | 0.2 ± 0.1 | < 3.5 |

[a] Refer to Figures 33 and 34.

[b] Uncertainties are total propagated uncertainties at the 95% confidence level.

[c] Pa-234m (1001 keV) peak was used to determine activity except where values were less than the MDC in which case the Th-234 (63 keV) result was included in parenthesis.

## TABLE 14

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR LOCATIONS OF ELEVATED ACTIVITY
## GUTERL STEEL SPECIALTY CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinate[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 62N, 58E | 0-15 | 688 | < 0.4 | < 0.9 | 5.9 ± 0.9[b] | 108.5 ± 5.8 |
| 70N, 124E | 0-15 | 1040 | < 0.3 | < 0.4 | 33.3 ± 2.5 | 912 ± 51 |
| 70N, 124E | 15-30 | 928 | < 0.9 | < 1.2 | 137.1 ± 9.4 | 3,640 ± 190 |
| 79N, 26E | 0-15 | 682 | 0.7 ± 0.2 | 3.8 ± 0.7 | 2.0 ± 0.7 | 48 ± 19 |
| 82N, 26E | 0-15 | 663 | 1.0 ± 0.3 | 39.5 ± 3.8 | 6.8 ± 1.3 | 238 ± 30 |
| 83N, 26E | 15-30 | 461 | < 2.8 | 307 ± 30 | 6.6 ± 6.1 | 320 ± 150 |
| 85N, 124E | 0-15 | 1082 | < 0.5 | 95.1 ± 8.9 | 2.4 ± 1.2 | 185 ± 25 |
| 85N, 124E | 15-30 | 924 | < 0.3 | 17.9 ± 1.8 | 3.3 ± 0.7 | 138 ± 18 |
| 89N, 10E | 0-15 | 834 | < 0.2 | 7.8 ± 1.0 | 0.6 ± 0.4 | 23.4 ± 9.2 |
| 90N, 24E | 0-15 | 843 | < 0.3 | 6.1 ± 0.8 | 3.5 ± 0.7 | 86 ± 15 |
| 90N, 24E | 15-30 | 651 | 0.5 ± 0.2 | 1.3 ± 0.4 | 1.5 ± 0.6 | 45 ± 10 |
| 94N, 26E | 0-15 | 795 | < 0.3 | 19.6 ± 2.1 | 3.0 ± 0.9 | 91 ± 17 |
| 94N, 26E | 15-30 | 699 | 0.7 ± 0.1 | < 0.6 | < 0.3 | < 9.1 *(1.6 ± 1.5)*[c] |
| 101N, 188E | 0-15 | 934 | 4.3 ± 0.6 | 2.3 ± 0.7 | < 0.9 | 17 ± 16 |
| 105N, 116E | 0-15 | 911 | < 0.5 | 4.3 ± 0.8 | 35.3 ± 3.0 | 2,660 ± 140 |
| 105N, 116E | 15-30 | 774 | < 0.5 | 1.4 ± 0.4 | 11.1 ± 1.4 | 736 ± 57 |
| 105N, 186E | 0-15 | 941 | 1.3 ± 0.2 | 0.8 ± 0.3 | < 0.5 | < 10 *(2.2 ± 1.2)* |
| 106N, 184E | 0-15 | 875 | 0.3 ± 0.1 | < 0.3 | 0.8 ± 0.3 | 16.8 ± 6.2 |
| 106N, 184E | 15-30 | 876 | 0.9 ± 0.3 | 39.1 ± 3.8 | 1.9 ± 0.8 | 59 ± 19 |
| 106N, 185E | 0-15 | 412 | < 6.9 | < 8.7 | 341 ± 32 | 44,400 ± 2,200 |
| 111N, 199E | 0-15 | 608 | < 1.1 | < 1.5 | 433 ± 29 | 13,020 ± 600 |
| 116N, 18E | 0-15 | 1152 | < 0.2 | 1.7 ± 0.4 | 11.0 ± 1.3 | 266 ± 25 |
| 134N, 80E | 0-15 | 846 | < 0.3 | < 0.6 | 13.2 ± 1.4 | 329 ± 30 |
| 135N, 75E | 0-15 | 683 | < 1.7 | < 2.1 | 299 ± 20 | 8,770 ± 430 |
| 135N, 75E | 15-30 | 563 | < 0.6 | < 0.9 | 109.5 ± 7.6 | 2,750 ± 140 |
| 168N, 26E | 0-15 | 161 | < 5.3 | < 5.4 | 1,079 ± 76 | 54,800 ± 2,700 |
| 201N, 185E | 0-15 | 1159 | 0.4 ± 0.2 | 11.6 ± 1.2 | 10.9 ± 1.1 | 279 ± 21 |
| 272N, 108E | 0-15 | 887 | < 3.7 | < 4.3 | 293 ± 23 | 23,500 ± 1,100 |
| 276N, 119E | 0-15 | 809 | < 0.3 | 33.5 ± 3.3 | 11.4 ± 1.5 | 343 ± 29 |
| 276N, 119E | 15-30 | 825 | 0.4 ± 0.2 | 8.3 ± 1.0 | 8.1 ± 0.9 | 218 ± 19 |
| [illegible]78N, 145W | 0-15 | 737 | 0.7 ± 0.2 | 1.9 ± 0.3 | 3.1 ± 0.5 | 84 ± 11 |
| [illegible]5N, 115E | 0-15 | 870 | 0.5 ± 0.1 | 1.2 ± 0.3 | 1.8 ± 0.4 | 35.3 ± 7.9 |
| 289N 144W | 15-30 | 720 | < 0.6 | < 0.9 | 118.0 ± 8.1 | 3,050 ± 160 |

## TABLE 14 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR LOCATIONS OF ELEVATED ACTIVITY
## GUTERL STEEL SPECIALTY CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinate[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 289N, 144W | 0-15 | 1032 | < 1.5 | < 2.0 | 246 ± 18 | 6,970 ± 370 |
| 296N, 88E | 0-15 | 1006 | < 0.7 | 13.0 ± 2.2 | 48.1 ± 4.7 | 1,196 ± 98 |
| 296N, 88E | 15-30 | 736 | < 0.4 | 8.6 ± 1.1 | 17.6 ± 1.8 | 397 ± 38 |
| 297N, 126W | 0-15 | 1237 | < 0.1 | 0.4 ± 0.1 | 1.0 ± 0.3 | 23.1 ± 5.8 |
| 297N, 126W | 15-30 | 1175 | < 0.7 | < 1.0 | 61.7 ± 5.4 | 1,860 ± 120 |
| 306N, 139W | 0-15 | 936 | < 0.4 | 1.1 ± 0.5 | 16.9 ± 1.8 | 615 ± 43 |
| 306N, 139W | 15-30 | 858 | 1.1 ± 0.2 | 1.1 ± 0.3 | 9.3 ± 1.0 | 241 ± 21 |
| 306N, 94E | 0-15 | 654 | 0.6 ± 0.3 | 4.9 ± 0.9 | 15.5 ± 1.7 | 397 ± 38 |
| 306N, 94E | 15-30 | 707 | < 0.4 | 5.4 ± 0.8 | 19.8 ± 1.8 | 465 ± 40 |
| 326N, 205W | 0-15 | 614 | 0.4 ± 0.2 | 5.5 ± 0.9 | 0.9 ± 0.5 | 17.8 ± 9.5 |
| 345N, 208W | 0-15 | 883 | 0.4 ± 0.1 | < 0.3 | 8.2 ± 0.7 | 182 ± 13 |
| 379N, 199W | 0-15 | 779 | 1.1 ± 0.3 | 8.7 ± 0.9 | 0.5 ± 0.3 | 6.5 ± 4.9 |
| 379N, 199W | 15-30 | 685 | 1.5 ± 0.2 | 21.8 ± 2.1 | 0.3 ± 0.4 | 12.8 ± 6.1 |
| 395N, 204W | 0-15 | 781 | 1.4 ± 0.2 | 11.0 ± 1.1 | 0.7 ± 0.2 | 17.0 ± 4.0 |
| 405N, 215W | 0-15 | 817 | 21.0 ± 1.8 | 1.2 ± 0.3 | 0.3 ± 0.3 | < 8.6 *(5.2 ± 1.5)* |

[a] Refer to Figure 33.

[b] Uncertainties are total propagated uncertainties at the 95% confidence level.

[c] Pa-234m (1001 keV) peak was used to determine activity except where values were less than the MDC in which case the Th-234 (63 keV) result was included in parenthesis.

## TABLE 15

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR BOREHOLE LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 107N, 184E | 0-15 | 904 | < 0.2 | < 0.3 | 0.2 ± 0.2[b] | 3.8 ± 4.7 |
| 107N, 184E | 15-60 | 438 | 0.6 ± 0.1 | 1.0 ± 0.3 | 1.6 ± 0.4 | 35.9 ± 8.5 |
| 107N, 184E | 60-120 | 309 | 1.2 ± 0.3 | < 0.9 | < 0.7 | 10.4 ± 8.4 |
| 168N, 24E | 0-15 | 931 | < 0.1 | < 0.3 | < 0.2 | < 6.9 *(0.9 ± 0.6)*[c] |
| 168N, 24E | 15-60 | 166 | 0.5 ± 0.1 | < 0.4 | < 0.3 | < 7.4 *(1.5 ± 0.8)* |
| 168N, 24E | 60-120 | 646 | 0.6 ± 0.2 | 0.8 ± 0.3 | < 0.4 | < 9.0 *(3.2 ± 0.7)* |
| 200N, 184E | 0-15 | 967 | 0.3 ± 0.2 | 11.5 ± 1.2 | 10.4 ± 1.1 | 225 ± 21 |
| 200N, 184E | 15-60 | 681 | 0.9 ± 0.3 | 2.9 ± 0.6 | 2.4 ± 0.6 | 30 ± 12 |
| 200N, 184E | 60-120 | 382 | 1.0 ± 0.2 | 1.2 ± 0.4 | 0.3 ± 0.3 | < 11 *(5.7 ± 0.8)* |
| 224N, 160E | 0-15 | 1076 | 1.0 ± 0.1 | 1.3 ± 0.2 | < 0.2 | < 5.8 *(2.0 ± 0.5)* |
| 224N, 160E | 15-60 | 193 | 2.1 ± 0.3 | 2.6 ± 0.4 | < 0.4 | < 9.2 *(3.3 ± 0.5)* |
| 224N, 160E | 60-120 | 817 | 1.2 ± 0.2 | 1.2 ± 0.3 | < 0.3 | < 9.4 *(1.5 ± 0.7)* |
| 224N, 160E | 120-180 | 169 | 1.0 ± 0.2 | < 0.6 | < 0.3 | < 9.5 *(1.7 ± 0.6)* |
| 275N, 146E | 0-15 | 816 | 0.8 ± 0.3 | 1.9 ± 0.4 | 1.4 ± 0.6 | 83 ± 15 |
| 275N, 146E | 15-60 | 418 | 1.1 ± 0.2 | 1.4 ± 0.4 | 0.8 ± 0.3 | 33 ± 12 |
| 275N, 146E | 60-120 | 148 | 0.6 ± 0.2 | 1.0 ± 0.3 | 0.3 ± 0.4 | 9.0 ± 8.7 |
| 277N, 84E | 0-15 | 1328 | < 0.1 | 0.3 ± 0.1 | 0.2 ± 0.1 | < 5.1 *(0.7 ± 0.4)* |
| 277N, 84E | 15-60 | 932 | 0.4 ± 0.1 | 0.5 ± 0.1 | < 0.2 | < 5.9 *(1.5 ± 0.5)* |
| 277N, 84E | 60-120 | 536 | 0.4 ± 0.1 | 0.5 ± 0.2 | < 0.2 | < 5.3 *(2.1 ± 0.4)* |
| 289N, 87E | 0-15 | 717 | < 0.7 | 23.0 ± 2.6 | 34.7 ± 3.1 | 828 ± 62 |
| 289N, 87E | 15-60 | 440 | < 0.3 | 6.0 ± 0.8 | 10.3 ± 1.2 | 268 ± 26 |
| 290N, 76E | 0-15 | 783 | 0.8 ± 0.1 | 0.8 ± 0.2 | 0.2 ± 0.3 | 8.5 ± 4.7 |
| 290N, 76E | 15-60 | 403 | 0.7 ± 0.1 | < 0.4 | < 0.3 | < 8.1 *(3.7 ± 0.6)* |
| 290N, 76E | 60-120 | 194 | 0.2 ± 0.1 | < 0.3 | < 0.3 | < 7.4 *(1.1 ± 0.5)* |
| 290N, 98E | 0-15 | 924 | 0.5 ± 0.1 | 0.6 ± 0.3 | 1.1 ± 0.4 | 32 ± 11 |
| 290N, 98E | 15-60 | 419 | < 0.3 | 1.2 ± 0.3 | 1.7 ± 0.5 | 24 ± 12 |
| 290N, 98E | 60-120 | 142 | 0.7 ± 0.2 | 1.2 ± 0.3 | 1.1 ± 0.3 | 25 ± 12 |
| 291N, 120E | 0-15 | 1039 | < 0.2 | < 0.4 | < 0.4 | < 11 *(4.3 ± 0.7)* |
| 291N, 120E | 15-60 | 160 | 0.5 ± 0.2 | < 0.6 | 0.6 ± 0.3 | 12 ± 10 |
| 291N, 120E | 60-120 | 449 | 0.7 ± 0.2 | < 0.6 | < 0.4 | < 11 *(2.4 ± 0.6)* |
| 291N, 154E | 0-15 | 490 | 0.4 ± 0.1 | 3.4 ± 0.5 | 0.3 ± 0.3 | 9.1 ± 6.3 |
| 291N, 154E | 15-60 | 361 | 1.0 ± 0.2 | 7.2 ± 0.9 | < 0.5 | < 11 *(8.7 ± 1.1)* |

## TABLE 15 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR BOREHOLE LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 291N, 154E | 60-120 | 452 | 0.7 ± 0.1 | 1.2 ± 0.3 | < 0.3 | < 9.4 *(1.4 ± 0.6)* |
| 291N, 154E | 120-180 | 201 | 0.2 ± 0.1 | < 0.5 | < 0.4 | < 9.4 *(0.7 ± 0.5)* |
| 303N, 112E | 0-15 | 762 | 0.8 ± 0.1 | 1.2 ± 0.3 | 0.8 ± 0.3 | 18.9 ± 6.0 |
| 303N, 112E | 15-60 | 381 | 1.0 ± 0.2 | 1.7 ± 0.4 | 1.1 ± 0.4 | 12.5 ± 8.5 |
| 303N, 112E | 60-120 | 177 | 0.9 ± 0.2 | 1.3 ± 0.4 | < 0.4 | < 14 *(6.0 ± 0.8)* |
| 304N, 118E | 0-15 | 873 | < 0.7 | < 1.1 | 105.7 ± 7.6 | 3,110 ± 160 |
| 304N, 126E | 0-15 | 804 | < 0.2 | 1.3 ± 0.3 | 3.6 ± 0.6 | 79 ± 13 |
| 304N, 126E | 15-60 | 376 | 0.6 ± 0.2 | 1.9 ± 0.4 | 2.6 ± 0.4 | 79 ± 13 |
| 304N, 126E | 60-120 | 132 | < 0.4 | < 0.8 | 0.8 ± 0.5 | 22 ± 12 |
| 310N, 84E | 0-15 | 819 | 0.6 ± 0.2 | 1.0 ± 0.3 | 0.9 ± 0.4 | 14.6 ± 8.7 |
| 310N, 84E | 15-60 | 694 | 0.7 ± 0.2 | 0.7 ± 0.3 | < 0.3 | < 11 *(5.4 ± 1.0)* |
| 310N, 84E | 60-120 | 799 | 0.6 ± 0.2 | < 0.6 | < 0.4 | < 11 *(1.9 ± 0.9)* |
| 310N, 118E | 0-15 | 936 | < 0.2 | 1.0 ± 0.3 | 1.0 ± 0.4 | 30.2 ± 8.4 |
| 310N, 118E | 15-60 | 849 | 0.8 ± 0.1 | 1.1 ± 0.3 | 0.4 ± 0.4 | 14.8 ± 5.3 |
| 310N, 118E | 60-120 | 423 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.5 ± 0.3 | 11.2 ± 6.4 |
| 311N, 13E | 0-15 | 713 | 0.9 ± 0.2 | 2.7 ± 0.4 | 0.3 ± 0.4 | < 9.3 *(5.8 ± 1.9)* |
| 311N, 13E | 15-60 | 363 | 0.8 ± 0.2 | 0.5 ± 0.3 | 0.2 ± 0.3 | < 9.4 *(3.8 ± 1.3)* |
| 311N, 13E | 60-120 | 778 | 0.4 ± 0.1 | 0.7 ± 0.2 | < 0.3 | < 7.4 *(0.5 ± 0.7)* |
| 312N, 65E | 0-15 | 896 | 0.5 ± 0.1 | 4.7 ± 0.2 | 11.2 ± 0.4 | 288.4 ± 9.7 |
| 312N, 65E | 15-60 | 579 | 0.5 ± 0.1 | 1.2 ± 0.3 | 1.5 ± 0.3 | 37.2 ± 8.5 |
| 312N, 65E | 60-120 | 928 | 0.3 ± 0 | 0.4 ± 0.1 | < 0.2 | < 4.7 *(1.4 ± 0.3)* |
| 313N, 64E | 0-15 | 955 | 0.4 ± 0.3 | 6.7 ± 0.7 | 16.4 ± 1.2 | 397 ± 29 |
| 313N, 64E | 15-60 | 525 | 0.5 ± 0.2 | 2.0 ± 0.3 | 3.3 ± 0.4 | 89 ± 15 |
| 313N, 64E | 60-120 | 178 | < 0.2 | 2.3 ± 0.5 | 5.6 ± 0.6 | 159 ± 18 |
| 272N, 79W | 0-15 | 888 | < 0.3 | < 0.5 | 14.6 ± 1.3 | 428 ± 29 |
| 272N, 79W | 15-60 | 668 | < 0.3 | 0.8 ± 0.3 | 18.0 ± 1.6 | 471 ± 34 |
| 272N, 79W | 60-120 | 454 | 0.4 ± 0.1 | < 0.3 | 3.4 ± 0.5 | 85 ± 10 |
| 272N, 79W | 120-180 | 805 | < 0.3 | < 0.5 | 1.3 ± 0.4 | 23 ± 10 |
| 282N, 87W | 0-15 | 1194 | < 0.2 | < 0.4 | 12.2 ± 1.2 | 343 ± 26 |
| 282N, 87W | 15-60 | 678 | 1.0 ± 0.2 | 0.8 ± 0.3 | 4.6 ± 0.7 | 118 ± 14 |
| 282N, 87W | 60-120 | 452 | 0.6 ± 0.2 | < 0.6 | 1.2 ± 0.3 | 34.7 ± 8.2 |
| 282N, 87W | 120-180 | 511 | 0.5 ± 0.1 | < 0.4 | 0.3 ± 0.2 | 11.9 ± 5.4 |
| 282N, 165W | 0-15 | 817 | 0.3 ± 0.1 | 0.4 ± 0.1 | < 0.2 | < 4.4 *(1.5 ± 0.8)* |

## TABLE 15 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR BOREHOLE LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 282N, 165W | 15-60 | 343 | 0.6 ± 0.1 | 0.9 ± 0.3 | 0.9 ± 0.3 | 21.0 ± 8.8 |
| 282N, 165W | 60-120 | 156 | 1.2 ± 0.2 | 1.2 ± 0.4 | 0.9 ± 0.3 | 22 ± 10 |
| 284N, 147W | 0-15 | 837 | < 0.2 | 0.7 ± 0.2 | 0.9 ± 0.3 | 15.6 ± 6.9 |
| 284N, 147W | 15-60 | 391 | < 0.2 | 0.7 ± 0.3 | 0.4 ± 0.3 | 7.7 ± 5.6 |
| 284N, 147W | 60-120 | 725 | 0.6 ± 0.1 | 0.7 ± 0.2 | < 0.2 | 5.0 ± 4.4 |
| 284N, 147W | 120-180 | 173 | < 0.2 | 0.4 ± 0.2 | 0.5 ± 0.2 | 10.7 ± 7.6 |
| 290N, 126W | 0-15 | 977 | 0.5 ± 0.1 | 0.5 ± 0.2 | 0.6 ± 0.3 | 20.3 ± 6.7 |
| 290N, 126W | 15-60 | 176 | 0.5 ± 0.2 | < 0.5 | 2.6 ± 0.5 | 73 ± 12 |
| 290N, 126W | 60-120 | 390 | 1.4 ± 0.2 | 1.5 ± 0.3 | 0.4 ± 0.3 | 15.1 ± 7.2 |
| 290N, 126W | 120-180 | 166 | 0.7 ± 0.2 | 0.9 ± 0.3 | 0.6 ± 0.3 | < 14 *(12.8 ± 1.6)* |
| 299N, 43W | 0-15 | 1136 | 0.5 ± 0.1 | 0.7 ± 0.2 | 1.9 ± 0.4 | 28.0 ± 1.8 |
| 299N, 43W | 15-60 | 566 | < 0.5 | < 0.7 | 93.1 ± 6.6 | 2,830 ± 140 |
| 299N, 43W | 60-120 | 641 | < 0.1 | 0.8 ± 0.2 | 2.2 ± 0.3 | 50.2 ± 8.1 |
| 299N, 43W | 120-180 | 836 | 0.5 ± 0.1 | < 0.4 | 2.7 ± 0.4 | 64 ± 12 |
| 299N, 43W | 180-210 | 298 | < 0.3 | 0.6 ± 0.4 | 17.7 ± 1.6 | 415 ± 33 |
| 304N, 80W | 0-15 | 750 | 0.7 ± 0.4 | 19.5 ± 2.1 | < 1.0 | < 13 *(< 3.6)* |
| 304N, 80W | 15-60 | 319 | 0.6 ± 0.2 | 2.5 ± 0.6 | < 0.4 | < 11 *(3.0 ± 1.4)* |
| 304N, 80W | 60-120 | 338 | 1.5 ± 0.3 | 1.5 ± 0.4 | 0.4 ± 0.4 | 12.8 ± 8.6 |
| 304N, 80W | 120-180 | 467 | 0.8 ± 0.2 | 1.0 ± 0.3 | 0.5 ± 0.3 | 9.0 ± 7.5 |
| 304N, 158W | 0-15 | 841 | < 0.3 | < 0.5 | 17.1 ± 1.6 | 425 ± 35 |
| 304N, 158W | 15-60 | 572 | < 1.0 | < 1.3 | 525 ± 35 | 17,780 ± 810 |
| 304N, 158W | 60-120 | 478 | < 0.8 | < 1.1 | 262 ± 18 | 6,970 ± 330 |
| 304N, 158W | 120-180 | 535 | < 0.3 | < 0.4 | 4.6 ± 0.7 | 121 ± 17 |
| 319N, 145W | 0-15 | 758 | 0.5 ± 0.2 | 0.8 ± 0.3 | < 0.4 | < 15 *(2.4 ± 1.3)* |
| 319N, 145W | 15-60 | 813 | < 0.3 | 0.8 ± 0.2 | 8.2 ± 1.0 | 223 ± 23 |
| 319N, 145W | 60-120 | 191 | 1.2 ± 0.3 | < 0.8 | 31.3 ± 2.6 | 819 ± 56 |
| 319N, 145W | 120-180 | 390 | < 0.3 | 1.0 ± 0.3 | 0.5 ± 0.2 | 11.3 ± 7.4 |
| 325N, 177W | 0-15 | 1272 | < 0.4 | < 0.5 | 63.8 ± 2.0 | 1,843 ± 49 |
| 325N, 177W | 15-60 | 249 | 0.2 ± 0.1 | 0.7 ± 0.3 | 1.1 ± 0.4 | 31.7 ± 8.9 |
| 325N, 177W | 60-120 | 198 | 0.4 ± 0.1 | 0.7 ± 0.1 | 1.1 ± 0.2 | 35.1 ± 4.1 |
| 342N, 121W | 0-15 | 587 | 1.3 ± 0.2 | 1.7 ± 0.4 | < 0.4 | < 14 *(3.6 ± 1.8)* |
| 342N, 121W | 15-60 | 137 | < 0.5 | < 1.0 | < 0.7 | < 21 *(5.3 ± 1.7)* |
| 342N, 121W | 60-120 | 794 | 0.7 ± 0.2 | 1.1 ± 0.3 | < 0.5 | < 14 *(1.2 ± 1.1)* |

## TABLE 15 (Continued)

## RADIONUCLIDE CONCENTRATIONS IN SOIL
## EXTERIOR BOREHOLE LOCATIONS
## GUTERL SPECIALTY STEEL CORPORATION
## LOCKPORT, NEW YORK

| Grid Coordinates[a] | Depth (cm) | Radionuclide Concentrations (pCi/g) | | | | |
|---|---|---|---|---|---|---|
| | | Sample Quantity (g) | Ra-226 | Th-232 | U-235 | U-238 |
| 358N, 19W | 0-15 | 732 | < 0.4 | < 0.5 | 6.0 ± 0.9 | 142 ± 24 |
| 358N, 19W | 15-60 | 459 | 0.6 ± 0.1 | 0.9 ± 0.1 | 5.2 ± 0.3 | 136.3 ± 6.5 |
| 358N, 19W | 60-120 | 768 | 0.6 ± 0.1 | 0.8 ± 0.3 | 2.3 ± 0.5 | 48 ± 13 |
| 358N, 19W | 120-180 | 277 | 0.5 ± 0.2 | 0.6 ± 0.3 | 1.0 ± 0.4 | 31 ± 13 |
| 362N, 197W | 0-15 | 960 | 0.7 ± 0.2 | 2.0 ± 0.3 | 0.6 ± 0.4 | 8.0 ± 7.4 |
| 362N, 197W | 15-60 | 174 | 1.1 ± 0.2 | 3.2 ± 0.5 | 1.3 ± 0.4 | 19 ± 16 |
| 362N, 197W | 60-120 | 79[d] | < 0.5 | 3.2 ± 1.2 | < 0.8 | < 35 *(5.7 ± 2.5)* |
| 362N, 197W | 120-180 | 192 | 1.0 ± 0.2 | 5.5 ± 0.8 | 0.9 ± 0.5 | 27 ± 12 |
| 402N, 186W | 0-15 | 833 | 0.7 ± 0.3 | 17.1 ± 1.8 | < 0.9 | 18 ± 10 |
| 402N, 186W | 15-60 | 175 | < 0.4 | 15.8 ± 1.8 | < 0.8 | < 17 *(15.2 ± 1.8)* |
| 402N, 186W | 60-120 | 523 | 0.8 ± 0.2 | 3.1 ± 0.5 | 0.3 ± 0.3 | < 11 *(6.2 ± 0.9)* |
| 402N, 186W | 120-180 | 159 | 1.2 ± 0.3 | 6.8 ± 0.9 | < 0.6 | 9.8 ± 7.6 |
| 410N, 189W | 0-15 | 435 | < 2.0 | 371 ± 35 | < 5.4 | < 75 *(20 ± 10)* |
| 410N, 189W | 15-60 | 423 | 0.7 ± 0.3 | 13.1 ± 1.5 | < 0.7 | < 14 *(5.5 ± 2.7)* |
| 410N, 189W | 60-120 | 488 | 0.8 ± 0.3 | 17.4 ± 1.9 | < 1.2 | < 19 *(1.7 ± 2.8)* |
| 410N, 189W | 120-180 | 876 | 0.9 ± 0.2 | 3.9 ± 0.6 | < 0.5 | < 8.6 *(2.5 ± 1.7)* |
| 412N, 191W | 0-15 | 667 | 0.9 ± 0.2 | 2.9 ± 0.4 | < 0.4 | < 8.4 *(6.5 ± 1.9)* |
| 412N, 191W | 15-60 | 467 | 1.8 ± 0.2 | 5.1 ± 0.6 | 0.5 ± 0.3 | 10.7 ± 4.9 |
| 412N, 191W | 60-120 | 475 | 1.2 ± 0.2 | 1.9 ± 0.4 | < 0.5 | < 12 *(3.1 ± 1.4)* |
| 412N, 191W | 120-180 | 510 | 0.9 ± 0.1 | 1.3 ± 0.3 | < 0.3 | < 7.5 *(0.9 ± 0.9)* |

[a] Refer to Figures 33 and 34.

[b] Uncertainties are total propagated uncertainties at the 95% confidence level.

[c] Pa-234m (1001 keV) peak was used to determine activity except where values were less than the MDC in which case the Th-234 (63 keV) result was included in parenthesis.

[d] Sample had insufficient volume for an appropriate geometry. Values are semi-quantitative.

# ATTACHMENT 2

*Referenced Figures from Prior Investigations*

Numbers in circles correspond to process steps.
FCE - Furnace.

ORNL DWG 77-5055

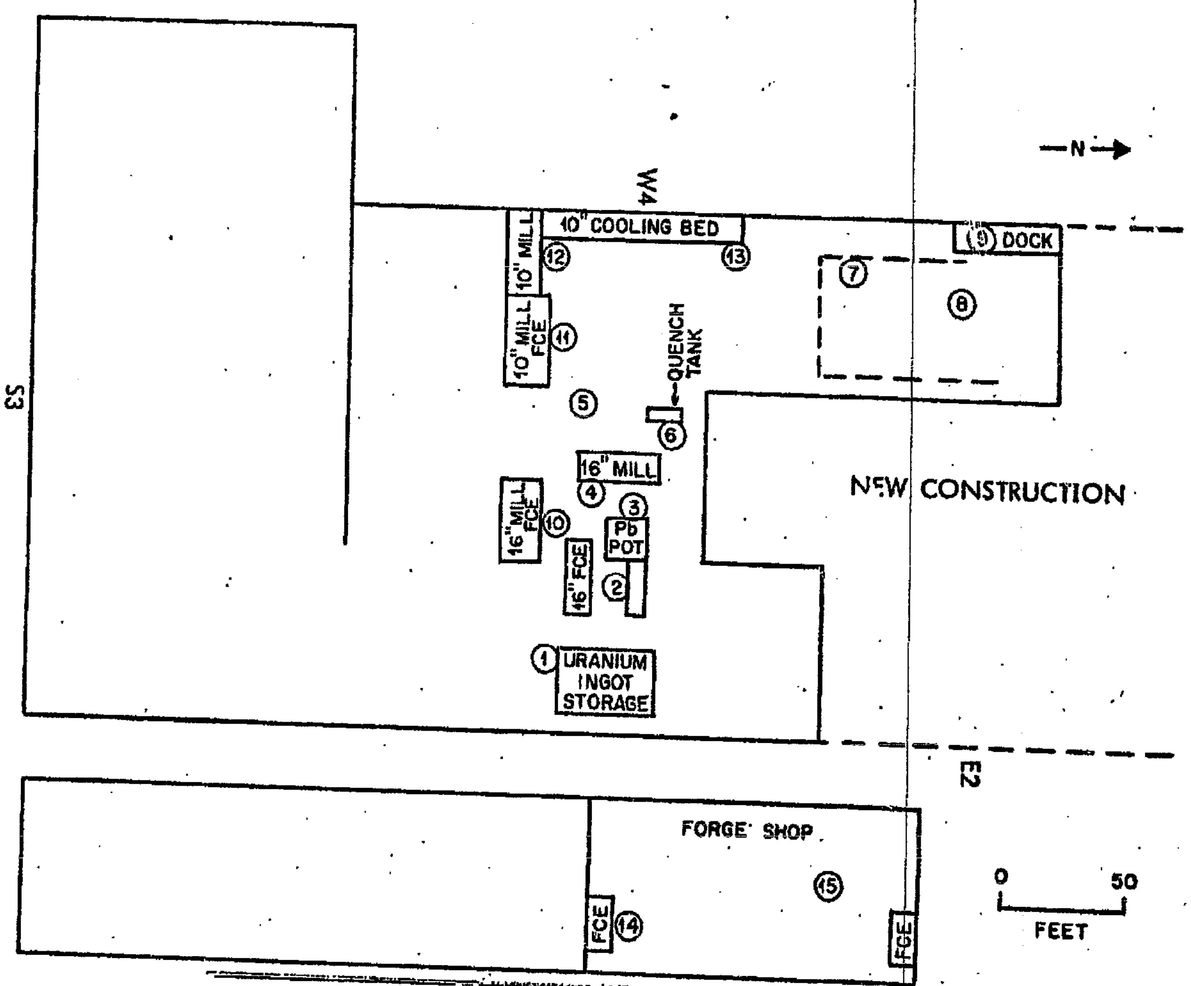



Fig. 2. Plan view of the 16-in. roll mill and forge shop.

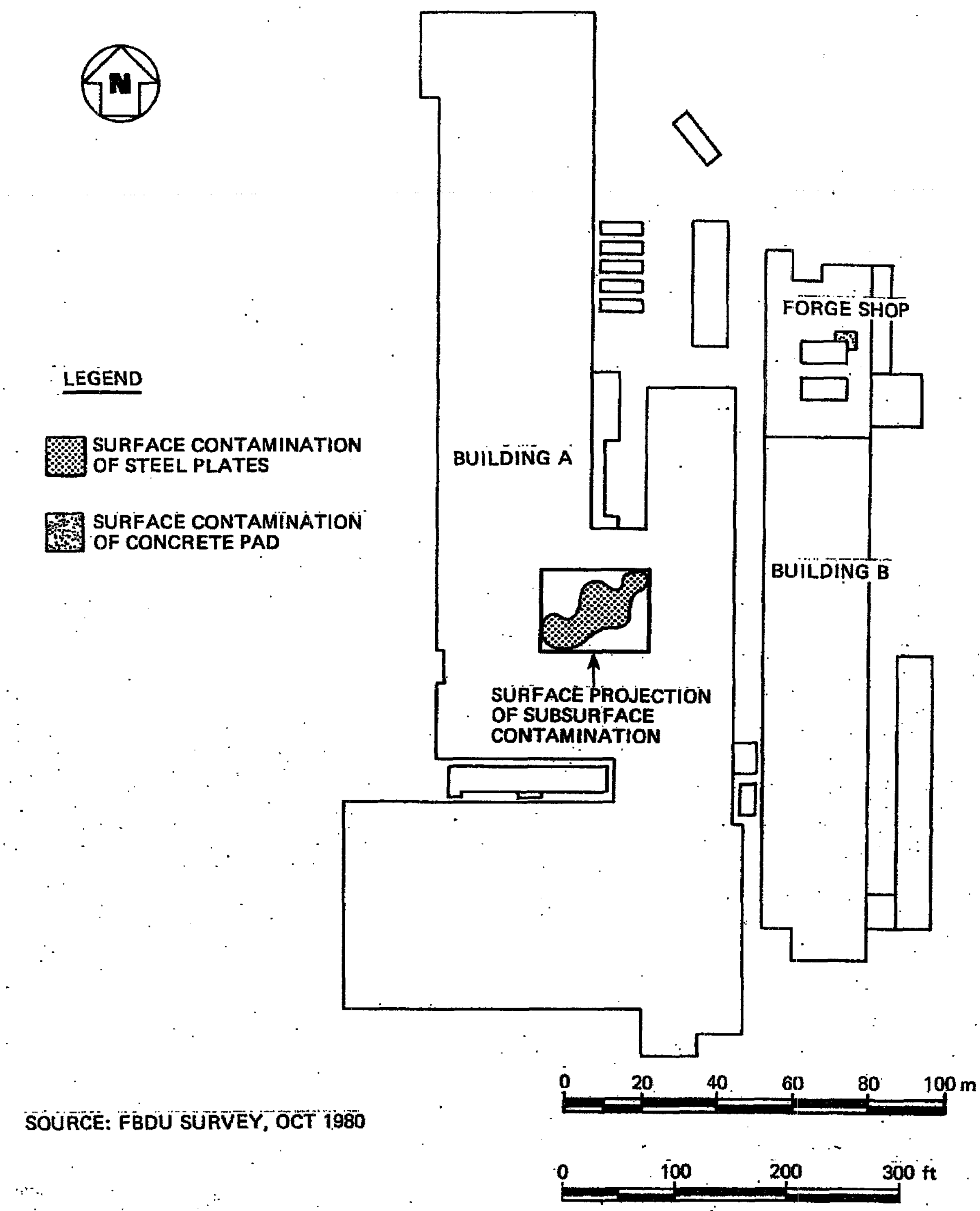



**FIGURE 4-1. SURFACE CONTAMINATION IN BUILDING A AND FORGE SHOP AREA OF BUILDING B**

409-314 11/81

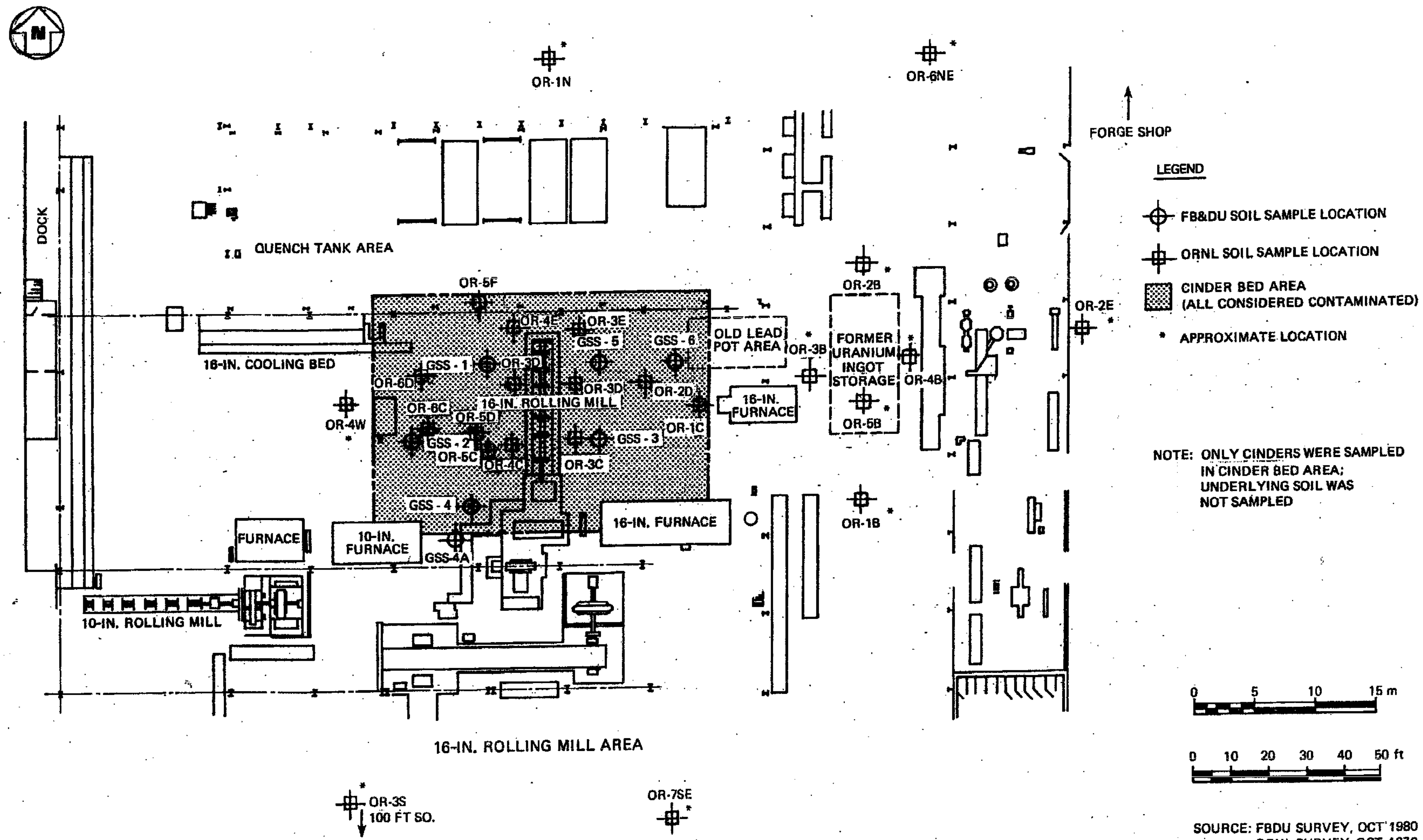



FIGURE 4-2. SOIL SAMPLE LOCATIONS IN BUILDING A

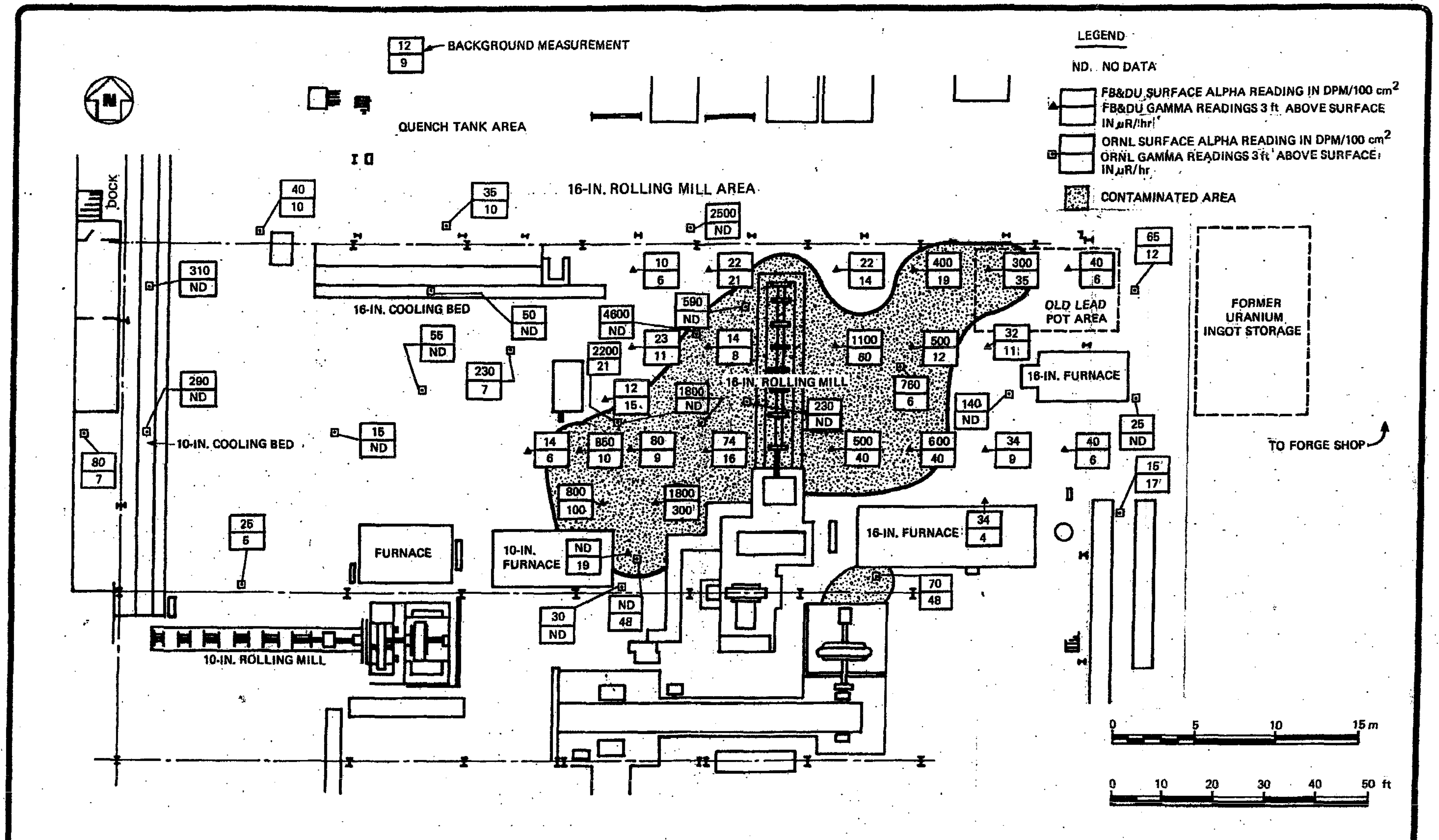



FIGURE 4-3. LOCATION OF SURFACE CONTAMINATION IN BUILDING A

SOURCE: FBDU SURVEY, OCT 1980
ORNL SURVEY, OCT

409-314 11/81

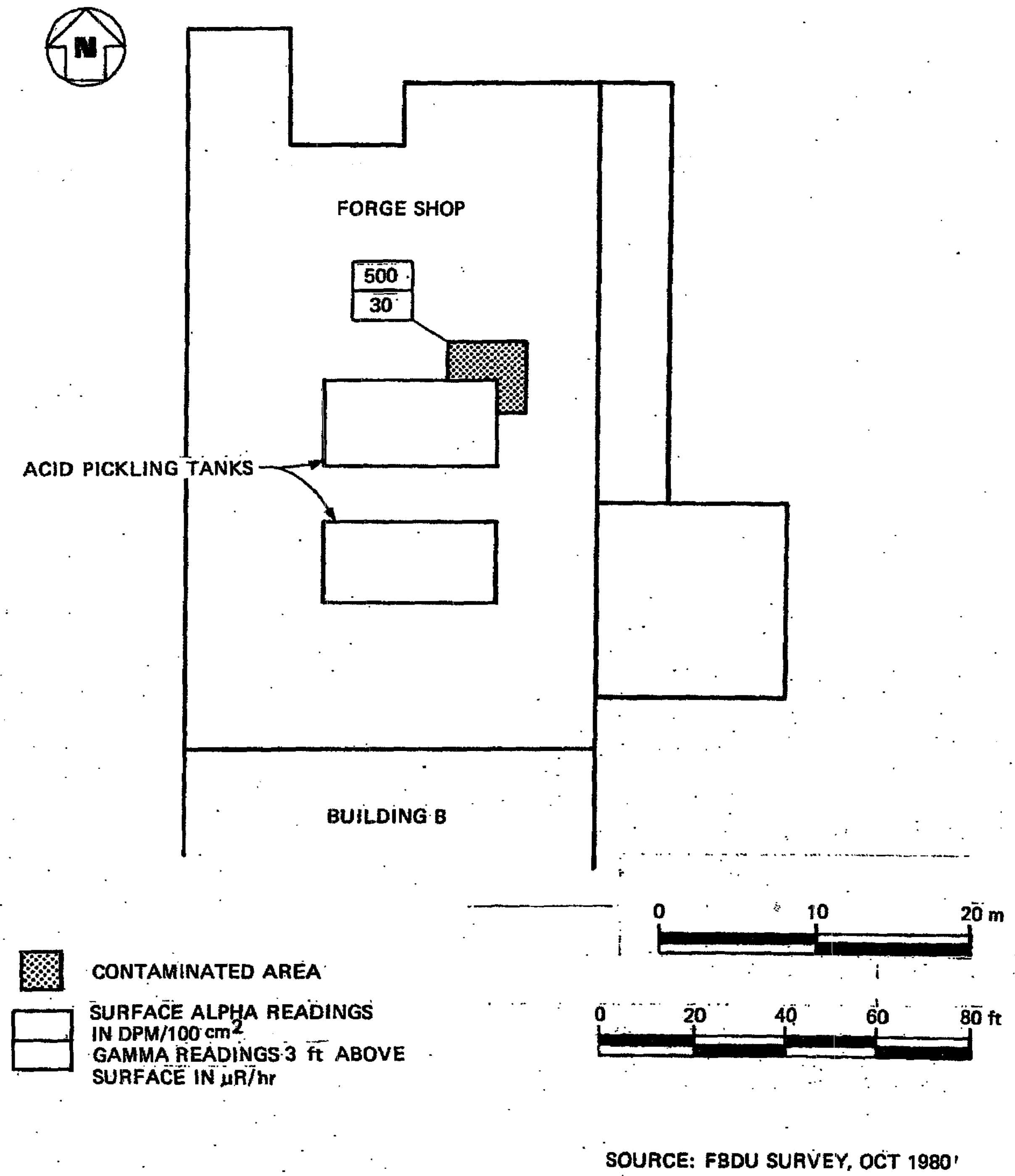



FIGURE 4-4. LOCATION AND LEVEL OF SURFACE CONTAMINATION IN FORGE SHOP AREA OF BUILDING B

409-314 11/81

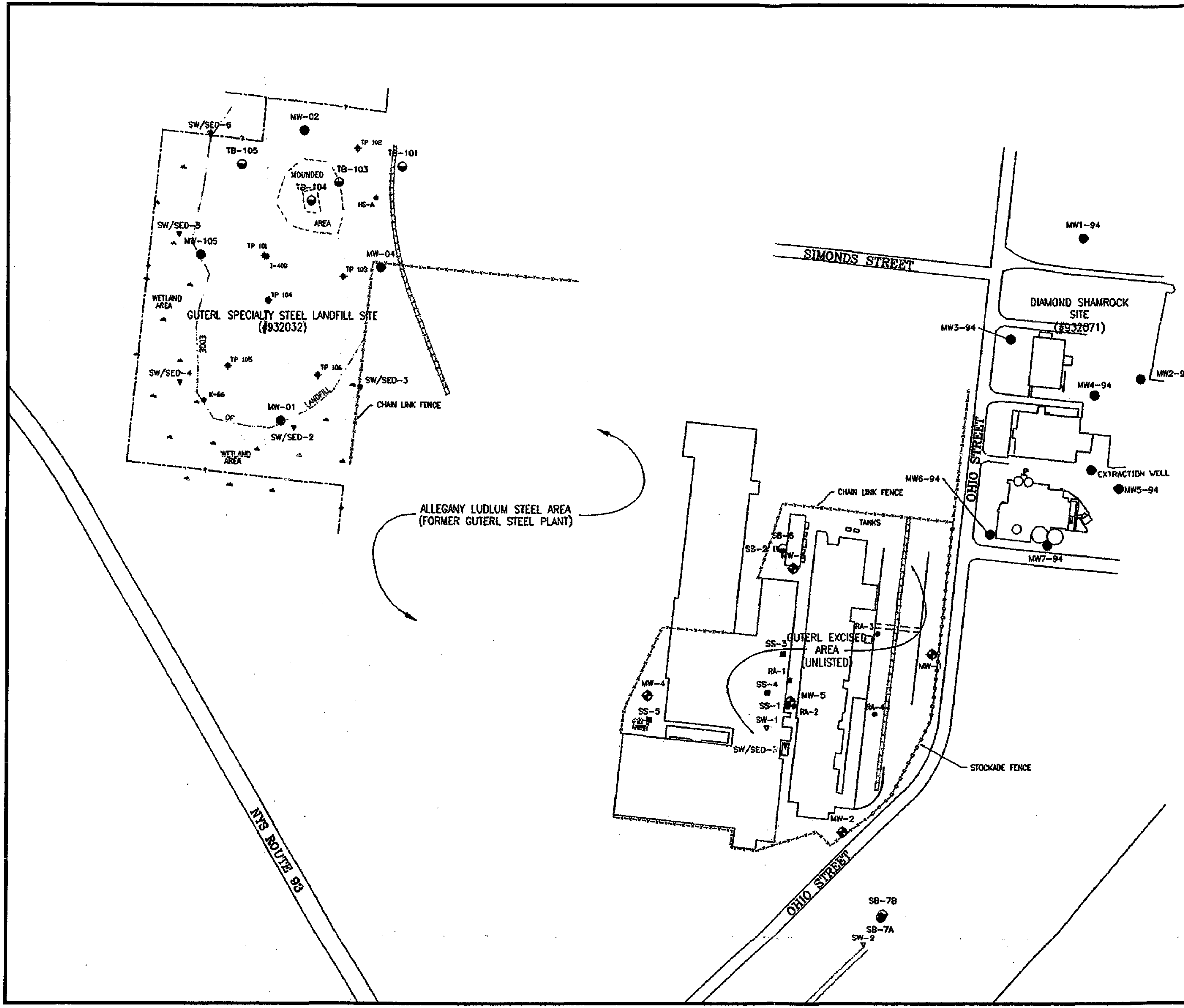





**Figure 2.3**
**NYSDEC Immediate Investigative Work Assignment Report**
**October 2000**

U.S. Army Corps of Engineers
Buffalo District

**Legend**

- TEST PIT
- EXISTING WELL
- MONITORING WELL(NEW)
- SOIL SAMPLE
- SURFACE WATER AND SEDIMENT
- SOIL BORING
- RADIATION ANOMOLY
- JCL CONTROL POINT

SCALE IN FEET

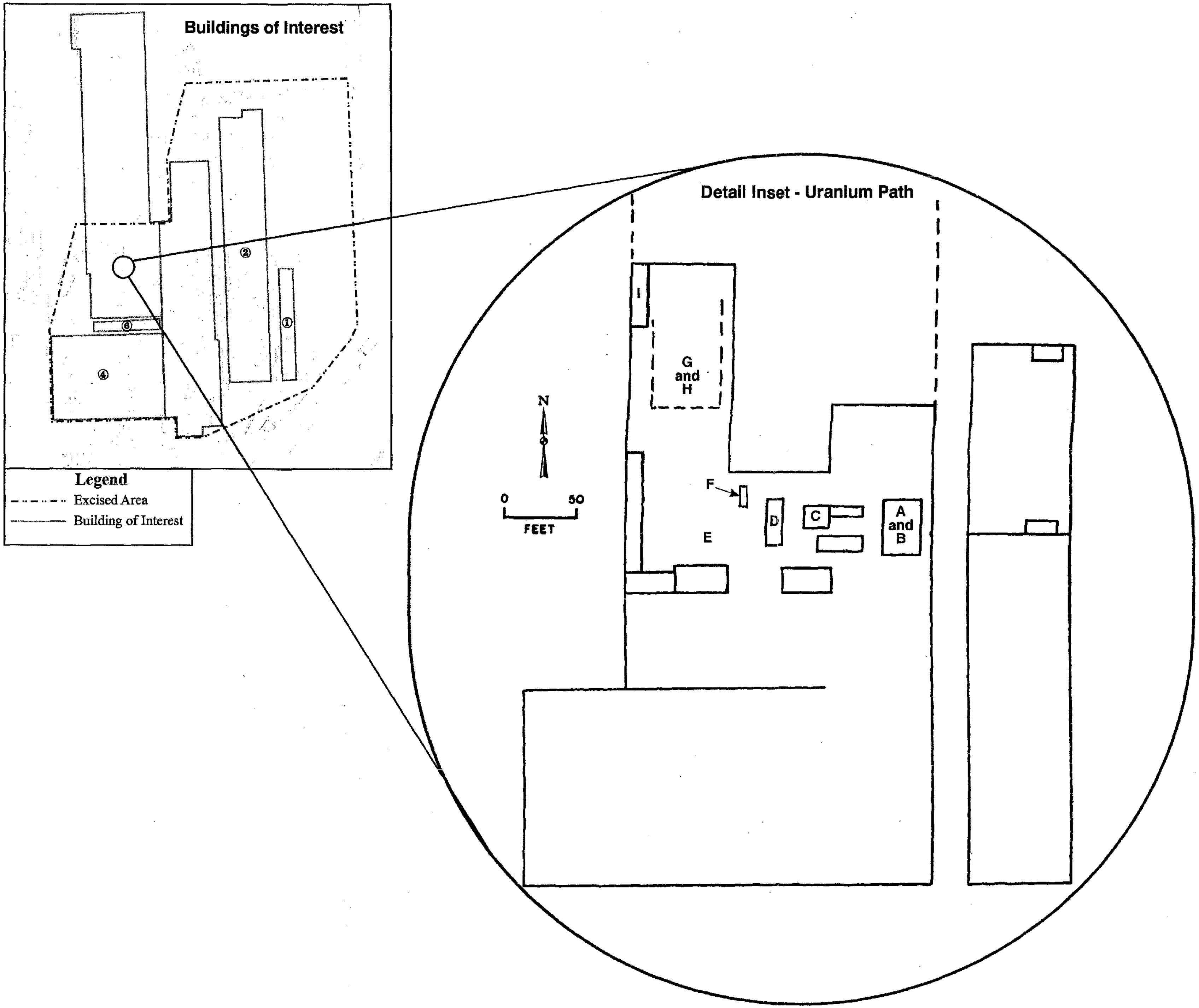
0 200 400 600

*Filename: X:\OMA006\TO_504_Guterl_Steel\Maps*
*:SOOH\sample_locs.cdr*
*Source: GSBCOE 176*
*07/29/05 KRK*

HYDRO GeoLogic INC.

# Figure 3.5
# Path of Uranium Through Plant (1948–1956)

U.S. Army Corps of Engineers
Buffalo District




**Path Steps**

**A.** Uncrating and Storage Area
↓
**B.** Uranium Weigh Station
↓
**C.** Lead Bath Billet Heating Furnace
↓
**D.** 16-inch Rolling Mill
↓
**E.** Shear for End Cropping
↓
**F.** Uranium Bar Quench Tank
↓
**G.** Uranium Bar Shipping Preparation
↓
**H.** Weigh Station
↓
**I.** Shipping Dock

*Filename: X:\OMA006\TO_504_Guterl_Steel\Maps \SOOH\uranium_path_rev.cdr*
*Source: GSNDCA 51, GSBCOE 1009*
*07/28/05 CF*

HYDRO GeoLogic INC.

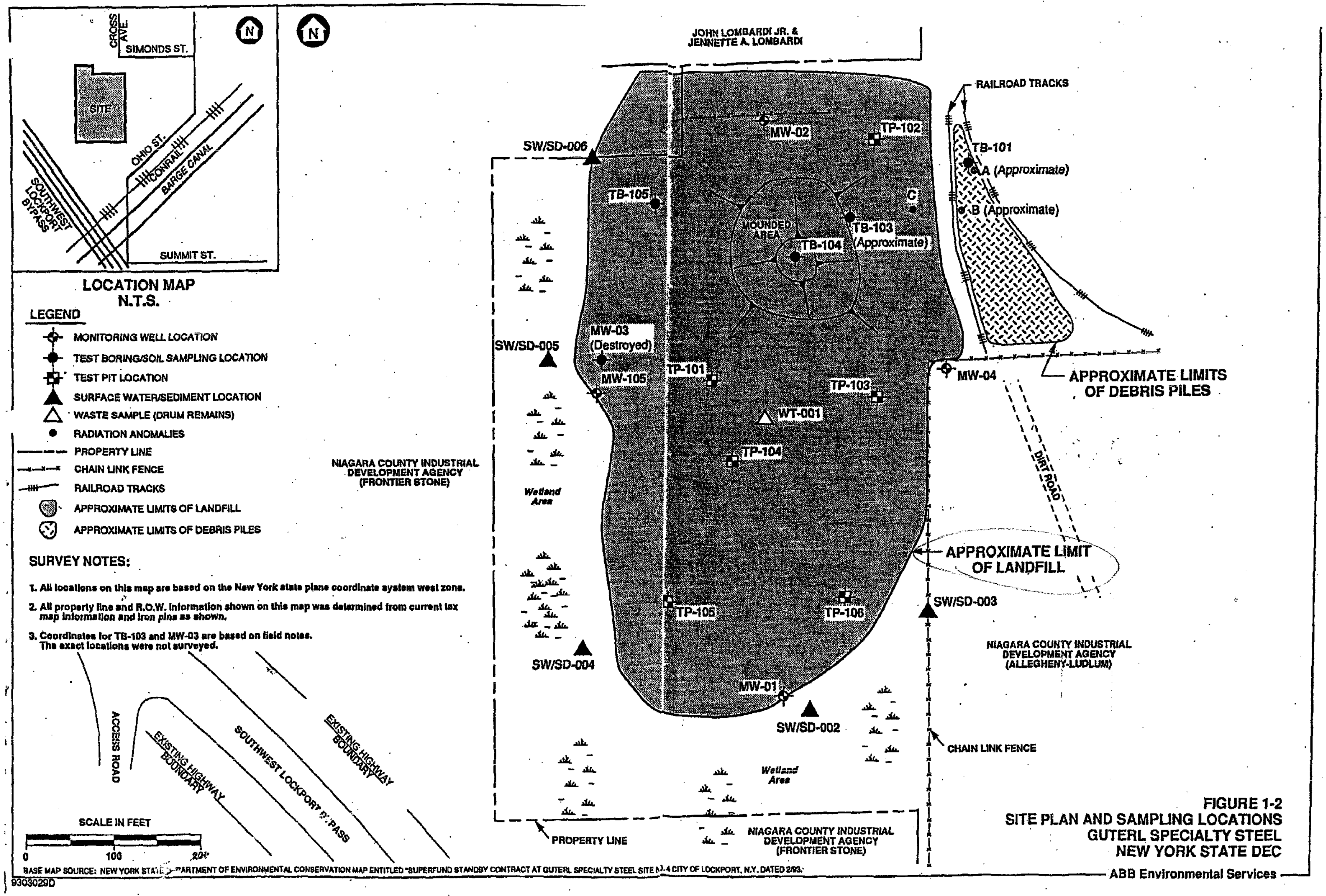
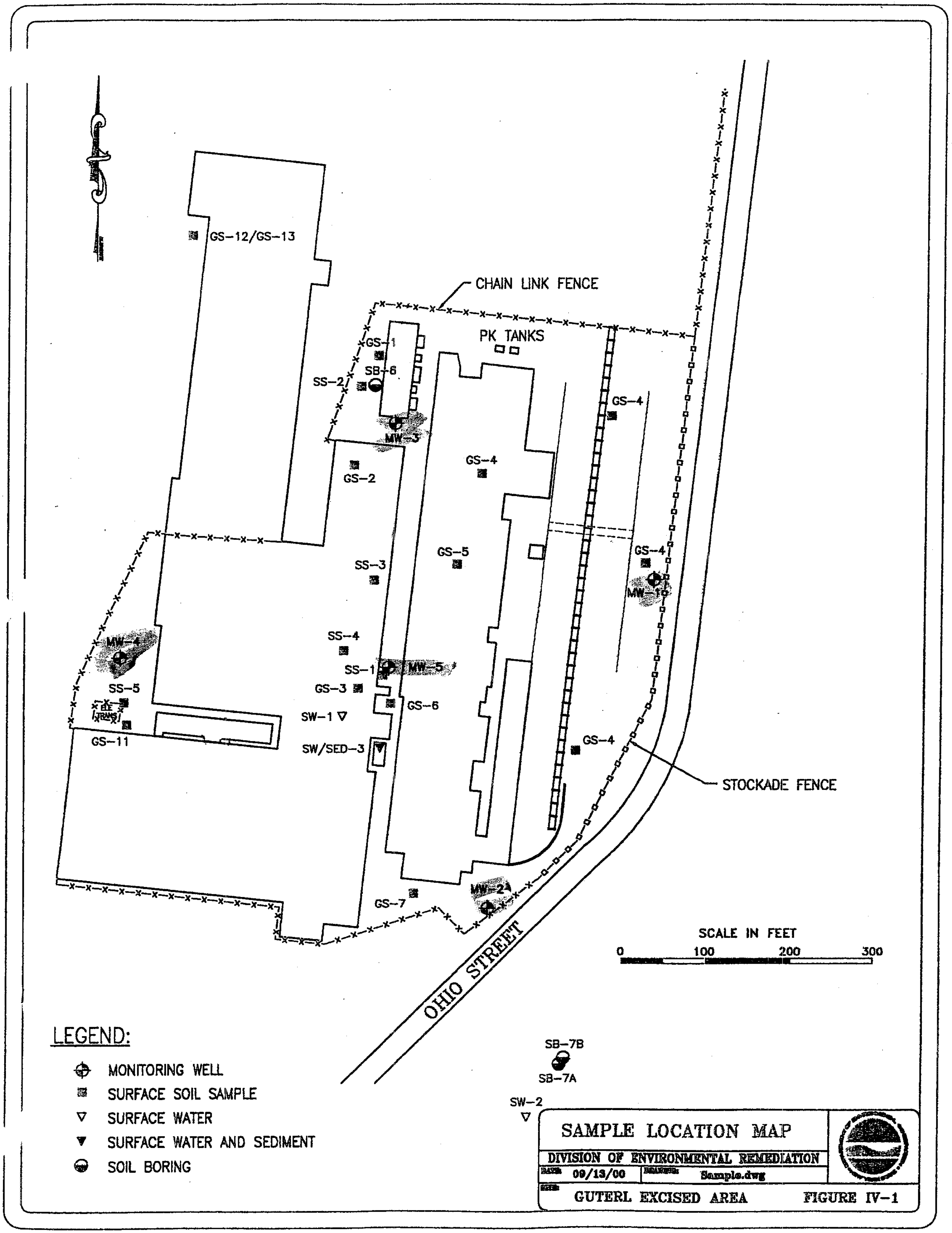



FIGURE 1-2
SITE PLAN AND SAMPLING LOCATIONS
GUTERL SPECIALTY STEEL
NEW YORK STATE DEC


GS-12/GS-13
CHAIN LINK FENCE
PK TANKS
GS-1
SB-6
SS-2
MW-3
GS-4
GS-4
GS-2
GS-5
SS-3
GS-4
MW-1
SS-4
MW-4
SS-1
MW-5
SS-5
GS-3
GS-6
SW-1
GS-11
SW/SED-3
GS-4
STOCKADE FENCE
MW-2
GS-7
SCALE IN FEET
0
100
200
300
OHIO STREET
LEGEND:
MONITORING WELL
SURFACE SOIL SAMPLE
SURFACE WATER
SURFACE WATER AND SEDIMENT
SOIL BORING
SB-7B
SB-7A
SW-2
SAMPLE LOCATION MAP
DIVISION OF ENVIRONMENTAL REMEDIATION
09/13/00
Sample.dwg
GUTERL EXCISED AREA
FIGURE IV-1

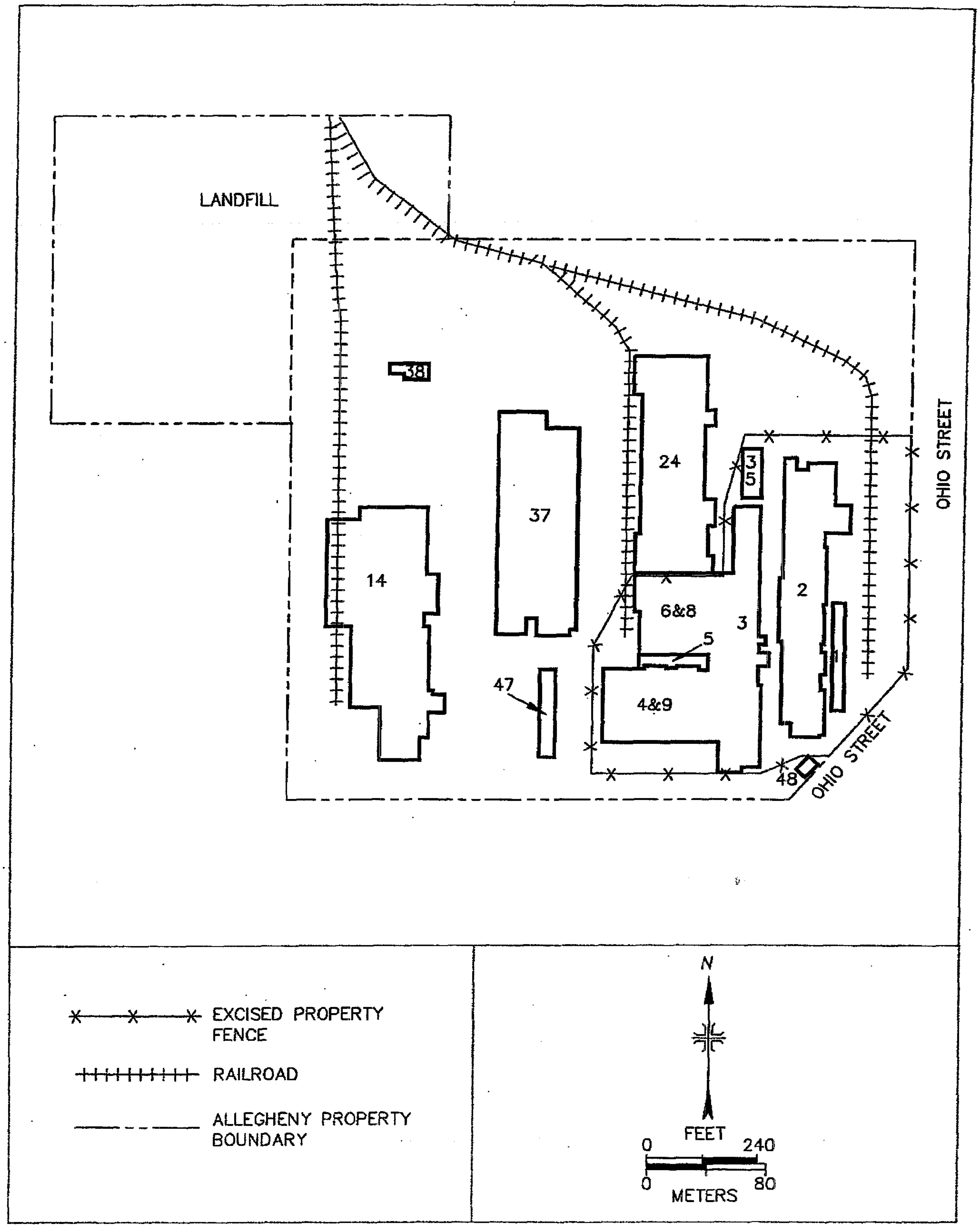



FIGURE 2: Plot Plan of the Guterl Specialty Steel Corporation – Lockport, NY

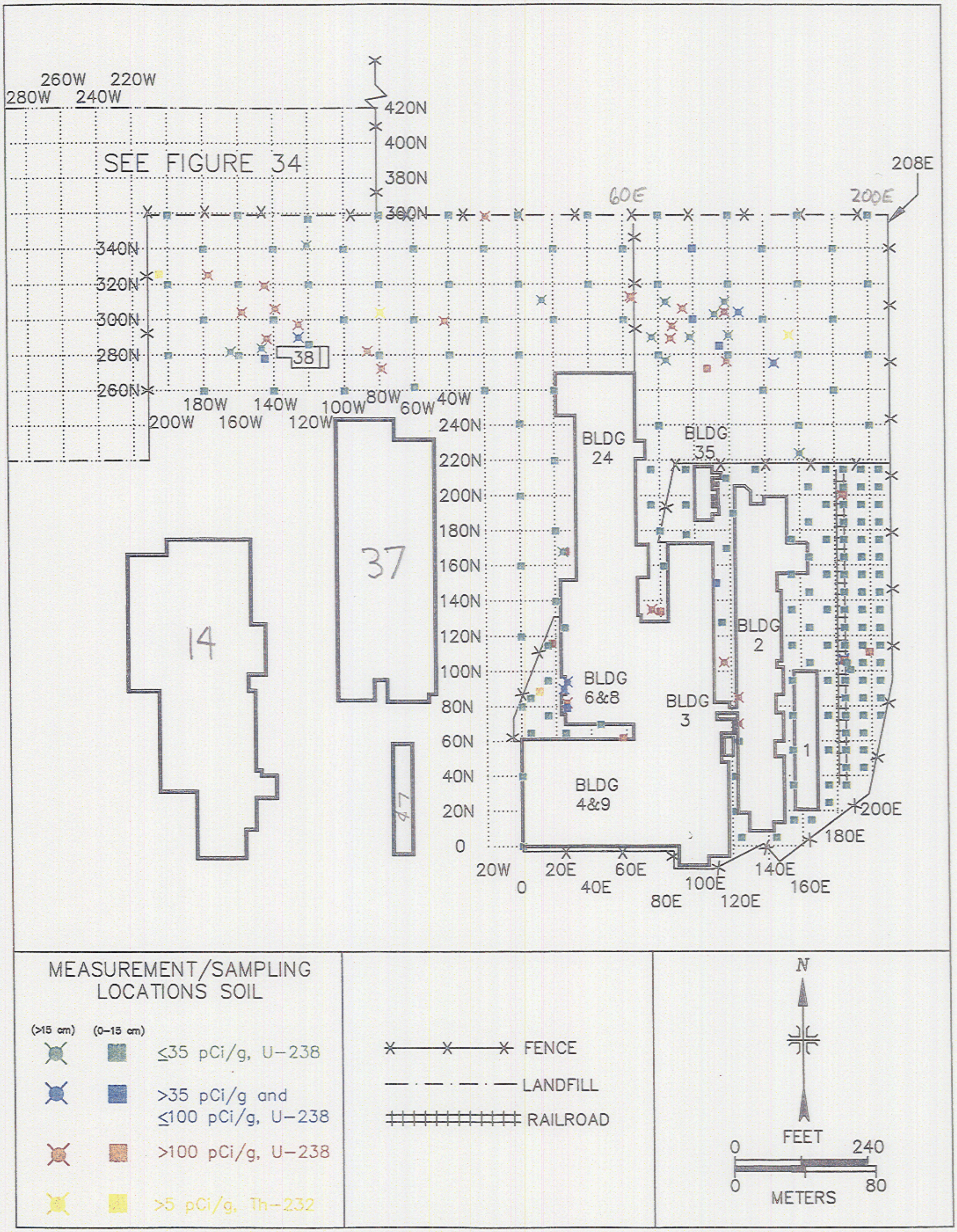



FIGURE 33: Guterl Specialty Steel Corporation — Class 1 and 2 Areas Measurement and Sampling Locations

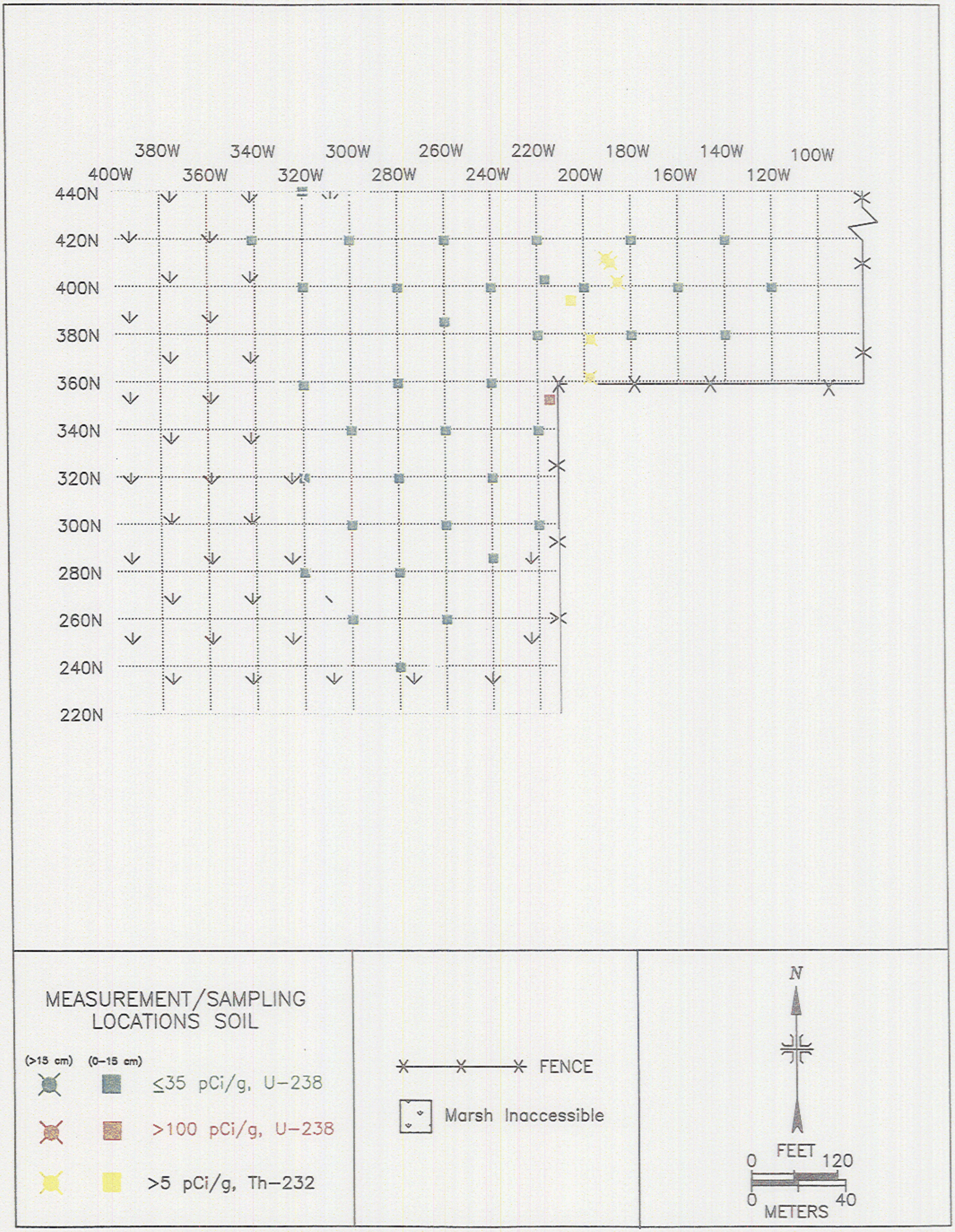



FIGURE 34: Landfill Area — Measurement and Sampling Locations

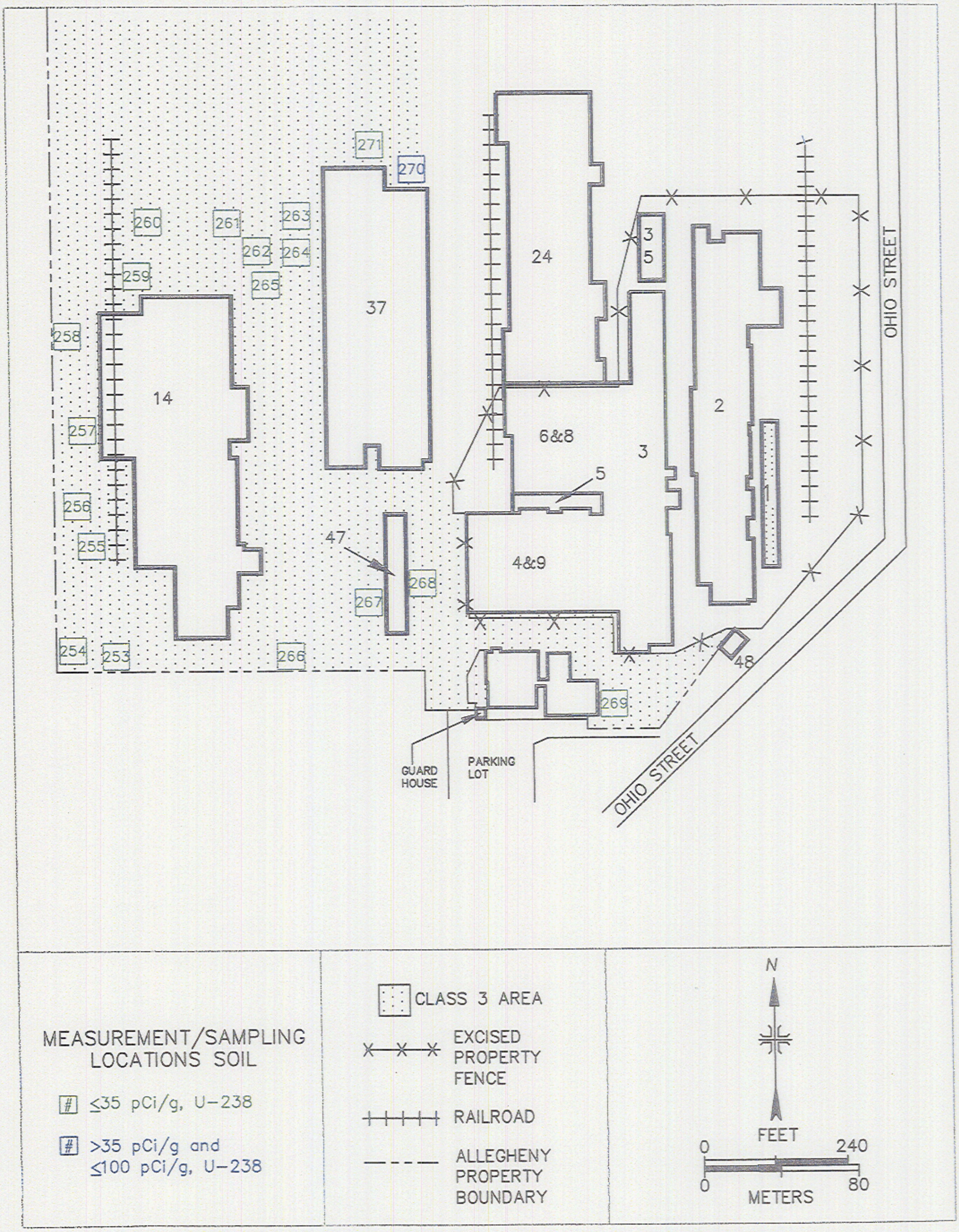



FIGURE 35: Exterior Class 3 Area — Sampling Locations

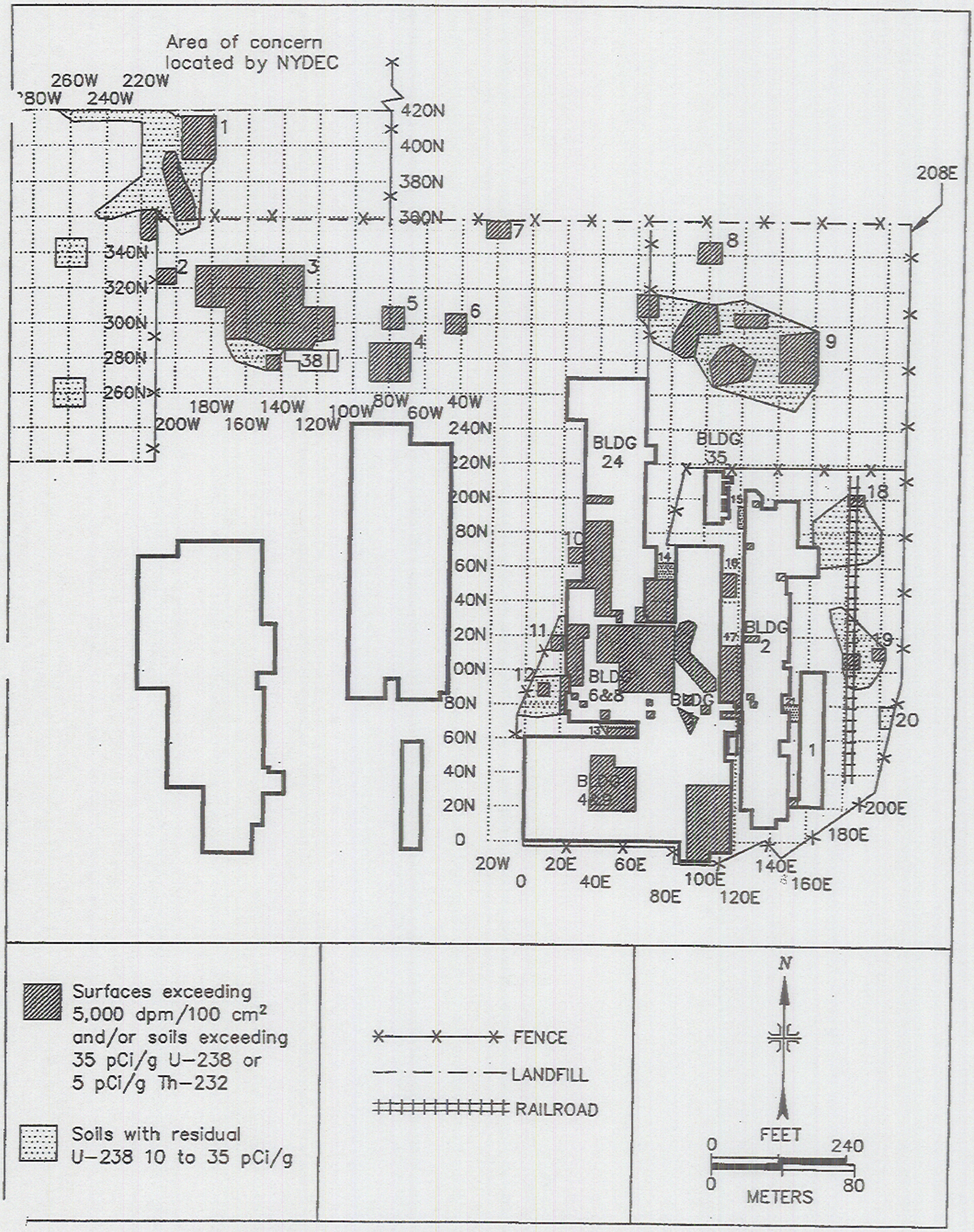
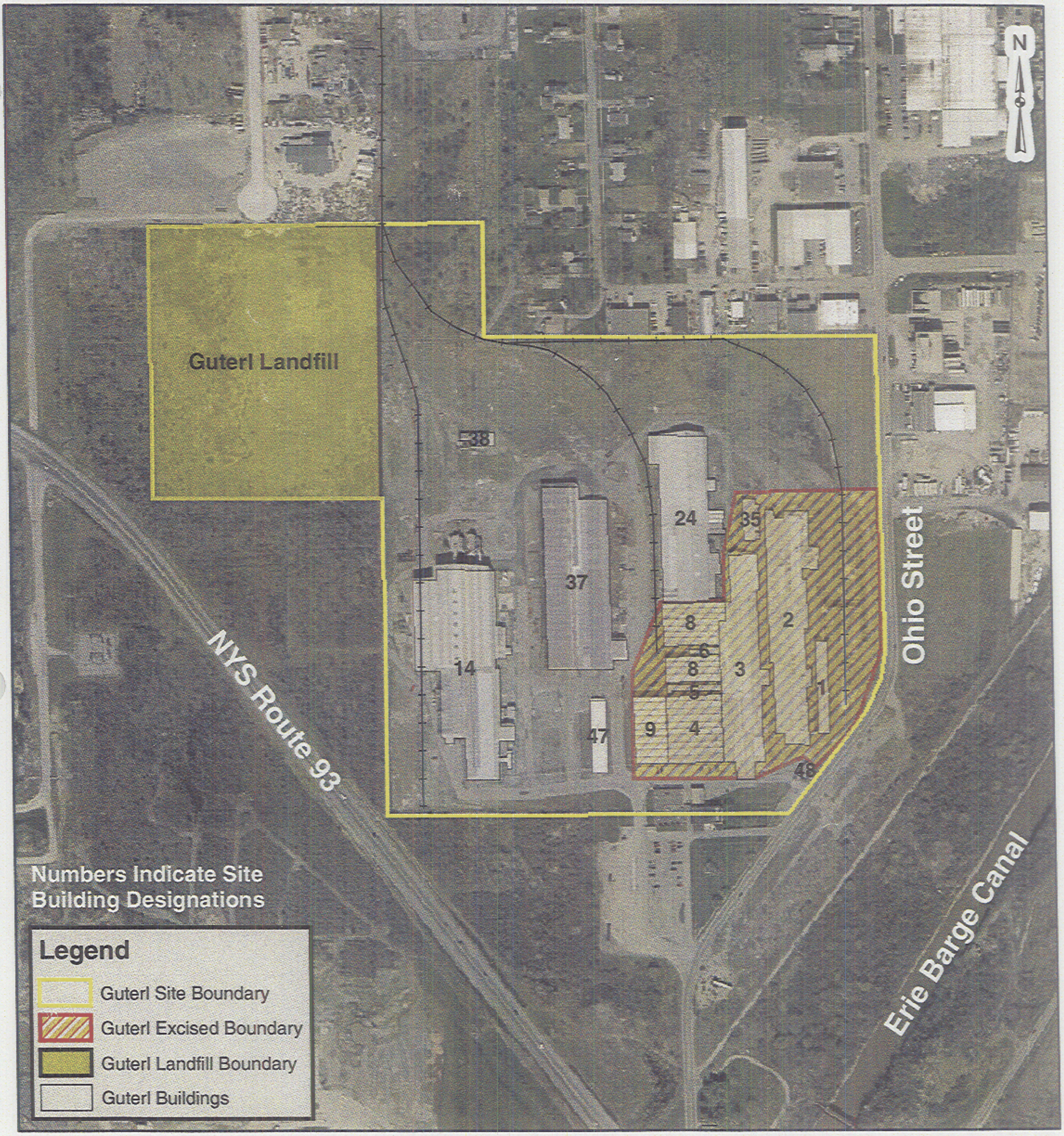
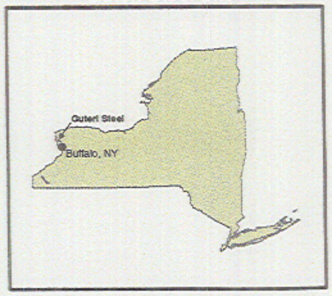



FIGURE 36: Guterl Specialty Steel Corporation – Impacted Areas




Feet
0 125 250 500 750 1,000

NY State Index Map
Guterl Steel Site

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# Figure 2. Guterl Steel Site Entities

PMP Figure
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25-Feb-2005