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FORMERLY UTILIZED SITES REMEDIAL ACTION PROGRAM (FUSRAP)

Data Gap Analysis Report

Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Contract No. W912QR-08-D-0013, Delivery Order DN03

Prepared for:

U.S. Army Corps of Engineers, Buffalo District

Prepared by:

Shaw Environmental & Infrastructure, Inc.

9 March 2012
Final

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FINAL
DATA GAP ANALYSIS REPORT

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Acronyms and Abbreviations

μg/L	microgram(s) per liter
ac	acre
ACM	asbestos-containing material
AEC	Atomic Energy Commission
Allegheny	Allegheny Ludlum Corporation
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
Bi	bismuth
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
cm	centimeter
cm^2	square centimeters
COPC	constituent of potential concern
CSM	conceptual site model
DCA	dichloroethane
DCE	dichloroethene
DCGL	Derived Concentration Guideline Level
DGA	Data Gap Analysis
DO	dissolved oxygen
DOE	United States Department of Energy
dpm	disintegrations per minute
DQO	Data Quality Objective
EM	Engineer Manual
EU	Exposure Unit
FS	Feasibility Study
FSP	Field Sampling Plan
ft	foot/feet
FUSRAP	Formerly Utilized Sites Remedial Action Program
GIS	Geographic Information System
Guterl Steel Site	Guterl Specialty Steel Corporation Site
GWS	gamma walkover survey
ha	hectares
HHRA	Human Health Risk Assessment
IA	investigation area
ICP-MS	inductively coupled plasma-mass spectrometer
Kd	adsorption coefficients
keV	kiloelectron volt
km	kilometers
LF	linear feet

Acronyms and Abbreviations (continued)

LM	linear meters
LP	laser phosphorimetry
m	meter(s)
MACTEC	MACTEC Engineering and Consulting, P.C.
MCL	maximum contaminant level
MED	Manhattan Engineer District
mL/g	milliliter(s) per gram
mrem	millirem(s)
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NLO	National Lead of Ohio
NRC	Nuclear Regulatory Commission
NYSDEC	New York State Department of Environmental Conservation
ORISE	Oak Ridge Institute for Science and Education
ORP	oxidation reduction potential
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PACM	presumed asbestos-containing material
Pb	lead
PCB	polychlorinated biphenyl
pCi/g	picocurie(s) per gram
pCi/L	picocurie(s) per liter
PDT	Project Delivery Team
PPE	personal protective equipment
PRG	preliminary remediation goal
QAPP	Quality Assurance Project Plan
Ra	radium
redox	oxidation reduction
RESRAD	RESidual RADioactivity
RI	Remedial Investigation
Rn	radon
ROC	radionuclide of concern
Shaw	Shaw Environmental & Infrastructure, Inc.
SI	Site Inspection
Simonds	Simonds Saw and Steel Company
SLERA	Screening Level Ecological Risk Assessment
SOR	Sum-of-Ratios
SVOC	semi-volatile organic compound
t	time

Acronyms and Abbreviations (continued)

TAL	Target Analyte List
TCA	trichloroethane
TCE	trichloroethene
TDS	total dissolved solids
Th	thorium
TPP	Technical Project Planning
U	uranium
UO_2	uranium dioxide
U.S.	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
yd^3	cubic yards
yr	year

EXECUTIVE SUMMARY

ES1.0 Purpose and Scope

In accordance with United States Army Corps of Engineers (USACE), Buffalo District Contract Number W912QR-08-D-0013, Delivery Order No. DN03, Shaw Environmental & Infrastructure, Inc. (Shaw) has prepared this Data Gap Analysis (DGA) Report to identify gaps in existing data and recommend the collection of additional data to be used in the preparation of the Feasibility Study (FS) for the former Guterl Specialty Steel Corporation Site (Guterl Steel Site), previously known as the Simonds Saw and Steel Company (Simonds).

The DGA focus is on the information needed to support the selection of a remedial action for impacted media at the Guterl Steel Site, in accordance with the USACE Buffalo District *Scope of Work - Data Gap Analysis and Report, Numerical Groundwater Model, and Feasibility Study for the Former Guterl Specialty Steel Corporation*, *Lockport, New York*, dated March 2010.

The following activities were completed during the implementation of the DGA:

- Performed a visual walkover (site inspection) of the former Guterl Steel Site on October 12, 2010.
- Performed bi-weekly discussions with the Project Delivery Team (PDT).
- Conducted an internal Technical Project Planning (TPP) meeting and an external TPP which included the regulatory agencies and local industry/government representatives.
- Reviewed documents and data pertaining to the Guterl Steel Site.
- Evaluated the environmental analytical data used to support the conclusions of the Remedial Investigation (RI) Report.
- Conducted an assessment of site data sets to identify informational gaps for each of the following media:
  - Soil
  - Groundwater
  - Surface water and sediment
  - Buildings and utilities, including radiological, structural, and asbestos data.

The data review covered chemical analyses of various media; geochemical modeling results reported in the RI Report; the site-specific adsorption coefficients (Kd) values that were determined for the Guterl Steel Site through laboratory tests of site soil to support the FS modeling efforts; and RESidual RADioactivity (RESRAD) and RESRAD-Build modeling to determine whether additional data are needed to support development of remediation alternatives.

After the data review was completed for each of the media, any data gaps that would optimize the FS effort were identified. Recommendations are presented in this report for data to be acquired to fill these gaps.

ES2.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

ES2.1 Soil

The horizontal extent of areas with Sum-of-Ratios (SOR) greater than one was calculated to be 1.19 hectares (ha) (2.95 acres [ac]). The average depth to bedrock was calculated in each area where SOR greater than one (generally between 1 and 2 meters (m) (3 and 6 feet [ft])). This was used to calculate the approximate volume at each area. The total estimated volume of soil with SOR greater than one was estimated to be 19,500 cubic meters (m^3) (25,500 cubic yards [yd^3]). For the purpose of completing the FS, there is no additional data collection recommended for soil at the site. However, additional soil sampling may be required as part of pre-remedial design.

ES2.2 Groundwater

The horizontal and vertical extent of contamination is not known. The stability of the total uranium (U) plume has not been established. The nature of groundwater flow in the deeper bedrock is not known. External controls on the site hydrology need to be better characterized, including effects from the nearby dolostone quarry, the Erie Canal, and any groundwater extraction wells in the area. These additional aquifer characterization data are needed to construct the groundwater model in support of the FS. Additional information is needed on the distribution of volatile organic compounds (VOCs) in the groundwater and geochemical characteristics of the aquifer that could affect uranium mobility.

Eight deeper on-site monitoring wells and five off-site monitoring well pairs (shallow and deep) are recommended to delineate the horizontal and vertical extent of contamination. All monitoring wells should be cored and logged. Two boreholes should be cored and logged until the Rochester Shale is encountered to determine the depth and characteristics of fracture zones. All the existing and new wells should be sampled for total uranium (filtered and unfiltered), isotopic uranium (filtered and unfiltered), anions (unfiltered), alkalinity (unfiltered), total dissolved solids (TDS) (unfiltered), and Target Analyte List (TAL) metals (filtered and unfiltered). In addition, the 16 wells where VOCs are known to be present from previous sampling by the New York State Department of Environmental Conservation (NYSDEC), all newly installed wells and seeps should be analyzed for VOCs (unfiltered).

ES2.3 Surface Water and Sediment

Surface water and sediment samples were collected from the Erie Canal (12 locations) and sediment samples were collected in the landfill area (five locations - no surface water was present). No radiological contamination was found in surface water exceeding the screening levels used in the RI United States Environmental Protection Agency (USEPA) maximum contaminant levels (MCLs)] for radium (Ra) and uranium, and no sediments had a SOR greater than one; therefore, no further data collection is recommended.

ES2.4 Buildings

The data assessment for the buildings included the building surfaces, the building contents, the structural integrity, asbestos containing materials (ACM), and the sewer lines/utilities. The data on the building characteristics are sufficient for the FS and no additional data collection is recommended.

At the TPP meeting, there was a discussion of possibly sampling the manholes located along Ohio Street, where the Guterl Steel Site utilities leave the property. This would mainly be done to confirm that there are no worker safety issues in the manholes as a result of Manhattan Engineer District (MED)/Atomic Energy Commission (AEC) activities at the site. Therefore, sampling of the water and sediment at the two manholes along the eastern edge of the Guterl Steel Site property should be considered.

1.0 INTRODUCTION

1.1 Purpose and Scope

In accordance with United States Army Corps of Engineers (USACE), Buffalo District contract number W912QR-08-D-0013, Delivery Order No. DN03, Shaw Environmental & Infrastructure, Inc. (Shaw) has prepared this Data Gap Analysis (DGA) Report to identify gaps in existing data and recommend the collection of additional data to be used in the preparation of the Feasibility Study (FS) for the former Guterl Specialty Steel Corporation Site (Guterl Steel Site), previously known as the Simonds Saw and Steel Company (Simonds).

The DGA focus is on the information needed to support the selection of a remedial action for impacted media at the Guterl Steel Site, in accordance with the USACE, Buffalo District, *Scope of Work for the DGA and Report, Numerical Groundwater Model, and Feasibility Study for the Former Guterl Specialty Steel Corporation, Lockport, New York*, dated March 2010.

The following activities were completed during the implementation of the DGA:

- Performed a visual walkover (site inspection) of the former Guterl Steel Site on October 12, 2010. The Shaw Program Manager and key Shaw project staff (DGA, Modeling, and FS Task Managers) were present along with the USACE Project Manager and project delivery team personnel. The Shaw Project Manager performed a visual walkover of the site along with the USACE personnel on November 5, 2010.

- Conducted bi-weekly discussions with the Project Delivery Team (PDT).

- Conducted an internal Technical Project Planning (TPP) meeting and an external TPP which included the regulatory agencies and local industry/government representatives.

- Reviewed documents and data pertaining to the Guterl Steel Site. Data review included, but was not be limited to, pertinent documents listed in the References section of the Scope of Work, the references listed in the Remedial Investigation (RI) Report, and post RI groundwater sampling data from the USACE 2008, 2009, and 2010 annual sampling events.

- Evaluated the environmental analytical data used to support the conclusions of the RI Report to determine whether the data are sufficient to delineate the horizontal and vertical extent of contamination, and calculate volumes of impacted media so that remediation alternatives can be identified, developed, screened, and analyzed reliably for the fate and transport modeling effort and the FS. The relevance and usefulness of the data were evaluated according to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (United States Environmental Protection Agency [USEPA], 1988) requirements for development of FS documents such as the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final* (USEPA, 1988) and documents used to support the sample collection and use at the Guterl Steel Site such as *Requirements for the Preparation of Sampling and Analysis Plans*, Engineer Manual (EM) 200-1-3 (USACE, 2001a) and *Chemical Quality Assurance for HTRW Projects*, EM-200-1-6, (USACE, 1997a).

- Conducted an assessment of the existing site data set to identify potential gaps for each of the following media:
  - Soil
  - Groundwater
  - Surface water and sediment
  - Buildings and utilities, including radiological, structural, and asbestos data.

The data review covered chemical analyses of various media; geochemical modeling results reported in the RI Report; and the site-specific adsorption coefficients (Kd) values that were determined for the Guterl Steel Site through laboratory tests of site soil to support the FS groundwater modeling efforts; the RI Report subsequent RESidual RADioactivity (RESRAD) and RESRAD-Build modeling performed by USACE in support of the FS were reviewed to determine whether additional data are needed to support development of remediation alternatives.

After the data review was completed, the data gaps were identified for each of the media. Recommendations are presented in this report for data to be acquired to fill these gaps.

1.2 Site Location and Background

1.2.1 Site Location

The Guterl Steel Site is located in Lockport, New York, approximately 30 kilometers (km) (20 miles) northeast of Buffalo, New York. The approximately 28 hectares (ha) (70-acre [ac]) site is bordered by Ohio Street to the south and east, residential and commercial properties to the north, and New York State Route 93 to the west. The Erie Canal is located to the south-southeast of Ohio Street as shown on RI Report Figure 1-2 in Appendix A.

The Guterl Steel Site property is grouped into three areas:

- The 21.04 ha (52 ac) Allegheny Ludlum Corporation (Allegheny) property, which includes four buildings that were constructed after the termination of Atomic Energy Commission (AEC) activities.
- The 3.48 ha (8.6 ac) landfill area, located in the northwest corner of the site.
- The 3.64 ha (9 ac) excised property (also referred to in some documents as the ”Excised Area”), which includes nine buildings that existed during the AEC activities, located in the southeast corner of the site, Appendix A (Figure 1-2).

1.2.2 Background

In October 1997, Congress transferred management of the Formerly Utilized Sites Remedial Action Program (FUSRAP) to the USACE. In the Energy and Water Development Appropriations Act, 2000 (Title VI, Public Law 106-60, 113 Stat. 483, 502), Congress indicated that response actions taken under FUSRAP by the Secretary of the Army, acting through the Chief of Engineers, shall be subject to the process outlined in CERCLA (USEPA, 1988) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (USEPA, 1990). Under the Memorandum of Understanding between USACE and the U.S. Department of Energy (DOE), once determination has been made by the DOE to include a site, responsibility for CERCLA action (USEPA, 1988 and USEPA, 1990) is transferred to USACE (USACE, 2001) to evaluate site remedies.

When a potentially impacted site is identified, records are reviewed by DOE, and if DOE determines there is potential for contamination present that may affect human health and the environment, a request is sent to the USACE to review the site. The USACE then does a Preliminary Assessment (PA), and possibly a Site Inspection (SI), to review historical records, perform limited sampling, and determine if further investigation is necessary. If contamination is found that is connected with past Manhattan Engineer District (MED) or AEC activities, the CERCLA process is then followed under FUSRAP. Congress has also added sites to FUSRAP through legislation.

The DOE declared the Guterl Steel Site eligible for FUSRAP in a letter to the USACE dated May 19, 2000, stating that the Guterl Steel Site met several preliminary conditions for inclusion in the FUSRAP.

From 1910 to 1966, the Guterl Steel Site was owned and operated by Simonds 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 United States (U.S.) Government under various contracts (U. S. Ordnance Department, 1919 and Simonds, 1943).

Simonds performed rolling mill operations on uranium metal (U), and to a much smaller extent, thorium (Th) metal during the period from 1948 to 1956. Uranium and thorium operations were performed under contracts with the New York Operations Office of the AEC (predecessor to the Nuclear Regulatory Commission [NRC]) from 1948 to 1952. Simonds continued the work from 1952 to 1956 under a subcontract to National Lead of Ohio (NLO). During operations from 1948 through 1956, the AEC was responsible for providing radiological monitoring and safety guidance and assistance. Residue from manufacturing operations was returned to AEC or NLO.

In 1966, Simonds was acquired by the Wallace-Murray Corporation (Delaware Secretary of State, 1966). Wallace-Murray Corporation continued to operate the plant as a specialty steel mill until 1978, when Guterl Specialty Steel Corporation acquired the site property (Niagara County Clerks Department, 1978).

In 1982, Guterl Specialty Steel Corporation filed for Chapter 11 bankruptcy protection in the U.S. 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 purchased Guterl Specialty Steel Corporation's assets at an auction (U.S. Bankruptcy Court, 1984).

1.2.3 Identification of Constituents of Potential Concern

The initial list of constituents of potential concern (COPCs) presented in the *DGA Report* (USACE, 2006) consisted of ^{234}U, ^{235}U, ^{238}U, and ^{232}Th. During the development of the RI, four additional radiological isotopes (thorium isotopes ^{228}Th and ^{230}Th and radium isotopes ^{226}Ra and ^{228}Ra) were added to the COPC list as key daughter products of the initial COPC list and as potential impurities in the raw materials processed at the Guterl Steel Site.

Eight COPCs were identified in the Human Health Risk Assessment (HHRA) presented in the RI and included:

- Uranium isotopes (^{234}U, ^{235}U, and ^{238}U)
- Thorium isotopes (^{228}Th, ^{230}Th, and ^{232}Th)
- Radium isotopes (^{226}Ra and ^{228}Ra)

The list of COPCs identified during the RI was further evaluated during the preparation of this DGA for exceedances of either the receptor-based risk level, dose level, or both. Based on the evaluation, a list of six radionuclides of concern (ROCs) for the FS was prepared. The list of ROCs and details of the criteria used to develop the list are presented in Section 2.0.

1.3 Project Specific Data Quality Objectives

The goal of the Guterl Steel Site RI, as defined in the RI Report, was to generate data of known and sufficient quality and quantity, with quantitation levels low enough to meet pertinent standards, Applicable or Relevant and Appropriate Requirements (ARARs), and remediation goals, with the long-term objective being the selection of a protective remedy under CERCLA. To achieve this, it was necessary to obtain data that are sufficient to determine nature and extent, fate and transport, and risk of contaminants in a RI, conducted utilizing CERCLA guidance (USEPA, 1988). A secondary objective of the RI was 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 will also be used to identify appropriate disposal facilities for wastes generated during site investigation activities and during remedial action.

A preliminary identification of Data Quality Objectives (DQOs) and ARARs was presented in the report *Preliminary Identification of Data Quality Objectives and Applicable, Relevant, and Appropriate Requirements, Former Guterl Specialty Steel Corporation FUSRAP Site* (USACE, 2005). Based on the Guterl Steel Site RI TPP meeting (August 9 and 10, 2005), the project stakeholders developed site-specific project DQOs for the RI. A total of 21 project DQOs were developed for the RI during the TPP meeting, and are summarized in the *DGA Report* (USACE, 2006).

Several of the project DQOs were accomplished prior to development of the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), or were not directly applicable to the RI field data collection and management program. The project DQOs that were determined to be directly applicable to the RI data acquisition phase are listed in the following paragraphs and discussed in detail in Table 2-7 of the RI Report. The project DQOs applicable to this RI include (numbering as presented in the FSP [USACE, 2007a]), as well as the achievement status for each as provided in Section 8.1.5 of the RI Report:

Overarching Objectives:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium, and the media and locations in which they are present).

   - The RI Report determined that this DQO has been met through the acquisition of surface soil, subsurface soil, surface water, sediment, groundwater, and building material data in general accordance with the project plans. A data gap for shallow bedrock groundwater has been identified.

2. Acquire information to define the fate and transport of contaminants from the Guterl Steel Site.

   - The RI Report determined that this DQO has been met as sampling and analysis of RI field data is complete and the items necessary to evaluate fate and transport have been acquired (e.g., meteorological data, site lithology, groundwater hydrology, geotechnical and geochemical properties of site soils).

4. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

   - The RI Report determined that this DQO has been met through the acquisition of surface soil, subsurface soil, surface water, sediment, groundwater, and building material data in general accordance with the project plans. The outcome of additional bedrock groundwater data acquisition may impact this conclusion if it is determined that deeper groundwater is affected by MED/AEC-related constituents. Additional data requirements may also arise as the FS and Remedial Design are performed in coordination with future use scenarios or alternative remediation technologies.

   - For clarification in this evaluation, this DQO has been subdivided into 4a (soil), 4b (groundwater), 4c (surface water/sediments), 4d (buildings), and 4e (off-site sewers).

Operations:

6. Identify the underground utility system within the Guterl Steel Site, including if possible, utilities in place at the time of AEC contracted efforts and utilities installed after the AEC contracted efforts, including utilities both between the building and within the buildings.

- The RI Report determined that this DQO has been met with respect to general layout and number of existing utilities; however, the exact construction details for both indoor and outdoor utilities were not able to be located. Field data were acquired to identify the number, relative dimensions (where accessible), and locations of major utility features inside and outside buildings. These data should allow for development of the FS without significant qualification.

Nature and Extent:

9. Define nature and extent of isotopic uranium, thorium, and radium in surface soils, subsurface soils, and buildings to support risk assessment (using NRC screening levels for human health and DOE guidance for ecological [DOE, 2002]) and development and evaluation of FS alternatives (volume determination).

    - The RI Report determined this DQO has been met through the acquisition of surface soil, subsurface soil, and building material data in general accordance with the project plans. The HHRA has been completed and is presented as Section 6 of the RI Report. Determination of volumes requiring remediation will be developed during the FS as future use scenarios and remediation technologies are evaluated.

10. Determine whether groundwater has been impacted by isotopic uranium, thorium, and radium above screening levels; and if so, determine nature and extent to support risk assessment, and development and evaluation of FS alternatives.

    - The RI Report determined this DQO has been met for the majority of the shallow bedrock zone for the Guterl Steel Site through the installation of new wells, collection of radiological and geochemical data from new and existing wells, and assessment of groundwater data. However, a data gap for shallow bedrock groundwater nature and extent has been identified for the southwest and southeast perimeters of the Guterl Steel Site.

11. Determine whether surface water and sediments have been impacted by isotopic uranium, thorium, and radium above screening levels.

    - The RI Report determined this DQO has been met through the acquisition of surface water data from investigation area (IA) 09 (Erie Canal) and sediment data from IA03 (Landfill) and IA09 (Erie Canal). It has been determined that surface water and sediment have not been impacted above screening levels.

13. Determine if isotopic uranium, thorium, and radium have contaminated underground utilities.

    - The RI Report determined this DQO has been met with respect to representative utilities sampled. The field investigation was modified to accommodate more locations than anticipated; however, the data collected should allow for adequate interpolation of results to allow for completion of the FS without significant qualification.

    - For clarification in this evaluation, this DQO has been subdivided into 13a (on-site underground utilities) and 13b (off-site underground utilities).

Risk Assessment/FeasibilityStudy:

14. Determine the magnitude of any comingled chemical contamination to support establishing transportation and disposal requirements (e.g., waste classification) and associated costs to be included in various FS alternatives.

    - The RI Report determined this DQO has been met. The radiological data set is complete for each matrix, and other data sources exist for non-radiological (chemical) data.

15. Conduct an inventory of building content/structures to support FS alternatives and evaluations.

    - The RI Report determined this DQO has been met. A building inventory survey was conducted as part of this RI and is presented in Appendix E of the RI Report.

19. Gather sufficient data to complete a Baseline HHRA for human health and a Screening Level Ecological Risk Assessment (SLERA).

    - The RI Report determined this DQO has been met. The HHRA and SLERA have been completed and are presented in the RI Report.

1.4 Report Organization

This DGA report is organized as follows:

- Section 1.0 – Introduction and Objectives
- Section 2.0 – General Summary of Existing Data

- Section 3.0 – Soil Data Assessment
- Section 4.0 – Groundwater Data Assessment
- Section 5.0 – Surface Water and Sediment Data Assessment
- Section 6.0 – Buildings Data Assessment
- Section 7.0 – Summary of Findings and Recommendations
- Section 8.0 – References

2.0 GENERAL SUMMARY OF EXISTING DATA

2.1 Historical Investigations Through Remedial Investigation

2.1.1 Investigations Conducted Prior to the Remedial Investigation

A radiological survey by Nuclear Science and Engineering Corporation/Carborundum Metals was performed in 1958 that identified elevated radiation levels in certain manufacturing areas. Area decontamination was performed, clean steel plates were placed over floor areas, and a second radiological survey was performed in December 1958 to verify decontamination and shielding were effective. Since that time, additional radiological investigations have been performed (Oak Ridge National Laboratories, 1978; Ford, Bacon, & Davis Utah Inc., 1981; and Oak Ridge Institute for Science and Education [ORISE], 1999), as well as several environmental investigations led by the New York State Department of Environmental Conservation (NYSDEC 1988, 1991, 1994, 1999, 2000, and 2008).

The USACE Buffalo District completed a PA/SI Report in May 2001 (USACE, 2001). The Guterl Steel Site was included in FUSRAP based on evidence of residual contamination. The PA/SI concluded that there was no current threat to human health or the environment at the Guterl Steel Site; however, because of the potential for the FUSRAP-related contaminants to pose a threat to human health and the environment in the future, it was recommended that the Guterl Steel Site proceed to the RI phase to further characterize radioactive residuals associated with past activities.

2.1.2 Remedial Investigation

Field sampling data for the RI were obtained between June 2007 and December 2007. Activities performed during the RI field data collection consisted of sampling and analysis of soil, sediment, surface water, groundwater, and building materials. The Final RI Report was issued in July 2010. The COPCs identified for the RI phase of work included uranium (^{238}U, ^{235}U, and ^{234}U), thorium (^{232}Th, ^{230}Th, and ^{228}Th), and radium (^{228}Ra and ^{226}Ra).

2.1.2.1 Human Health Risk Assessment

A HHRA was conducted as part of the RI Report (USACE, 2010a). The HHRA evaluated potential cancer risks, radiological doses, and systemic effects to both current and potential future human receptors from exposure to FUSRAP-related contamination in:

- Building materials within the Excised Area

- Surface and subsurface soil
- Groundwater
- Sediment and waste water within utilities, ditches, trenches, etc.
- Surface water and sediment within the Erie Canal.

While current receptors include the juvenile trespasser and the on-site worker, potential future receptors included in the HHRA were the juvenile trespasser/recreational visitor, the on-site worker, the construction worker, and the hypothetical resident. To support the risk assessment processes, the Guterl Steel Site was divided into 20 Exposure Units (EU) based upon historical activities and potential exposures in IAs across the previous rolling mill site (RI Report Figures 6-1 and 6-2). EUs represent areas over which a given receptor would be likely to average his or her exposure to COPCs. EUs 1 through 9 are the building interiors within the Excised Areas, while EUs 10 through 20 are considered the outdoor EUs. The EU locations are listed with their corresponding RI IA.

Building Interiors within the Excised Area EUs:

- EU1, Building 1 – part of IA01, Excised Area Building Interiors
- EU2, Building 2 – part of IA01, Excised Area Building Interiors
- EU3, Building 3 – part of IA01, Excised Area Building Interiors
- EU4, Building 4/9 – part of IA01, Excised Area Building Interiors
- EU5, Building 5 – part of IA01, Excised Area Building Interiors
- EU6, Building 6 – part of IA01, Excised Area Building Interiors
- EU7, Building 8 – part of IA01, Excised Area Building Interiors
- EU8, Building 24 – part of IA01, Excised Area Building Interiors
- EU9, Building 35 – part of IA01, Excised Area Building Interiors

Outdoor EUs within Excised Areas:

- EU10, East of Buildings – part of IA02, Excised Area Building Exterior Areas
- EU11, Between Buildings – part of IA02, Excised Area Building Exterior Areas

Outdoor EUs Outside the Excised Area:

- EU12, Landfill – IA03, Landfill Area

- EU13, IA04A – part of IA04, Allegheny Property
- EU14, IA04B – part of IA04, Allegheny Property
- EU15, IA04C – part of IA04, Allegheny Property
- EU16, IA04D – part of IA04, Allegheny Property
- EU17, IA05A – part of IA05, Railroad Right-of-Way
- EU18, IA05B – part of IA05, Railroad Right-of-Way
- EU19 – IA09, Erie Barge Canal
- EU20 – IA10, Lot 4.1 (Lombardi Property)

Each of these EUs were sampled for one or more investigative media (i.e., surface and subsurface soil, groundwater, surface water, sediment, and building materials) and represent areas over which receptors are assumed to spend their time while at the Guterl Steel Site.

The COPCs evaluated in the HHRA were ^{226}Ra, ^{228}Ra, ^{228}Th, ^{230}Th, ^{232}Th, ^{234}U, ^{235}U, and ^{238}U. The potential routes of exposure included ingestion of all media, inhalation of particulates, and exposure to external gamma radiation.

Radiological doses and cancer risks were compared to target threshold risk or dose levels established by the NRC, New York State, and the USEPA. Exposure to building materials and contaminated soils beneath Building 8, and a localized area of elevated activity in the railroad right-of-way, posed the greatest potential human health risks of any areas on the site**.** Although the risk assessment estimated that potential lifetime cancer risks and yearly radiological dose rates received by someone trespassing in Building 8 (for 4 hours a week for 6 months of the year for 10 years) could exceed acceptable targets, the actual radiological doses received by the USACE and the contractor investigators taking samples in that building were below health and safety monitoring detection limits.

Based on the results of the HHRA, the receptor most at risk for EUs 1-9 is the on-site worker and the construction worker, and the primary exposure pathway is in building soil (flooring). For EUs 10-20, the most at-risk receptor is a hypothetical resident with the primary exposure pathways external gamma radiation and consumption of home-grown produce. However, since the property is currently zoned industrial, and expected to stay so in the future; further evaluation is provided in the following section, based on the anticipated land use.

Uranium in groundwater below some areas of the site could pose unacceptable risks if the site groundwater were to be used as a source of potable water.

2.1.3 Radionuclides of Concern (ROC) for Soil

The significant COPC contributors to incremental cancer risk and radiological dose estimated in the risk assessment were examined in order to identify ROC for the purposes of developing soil cleanup levels for the FS. These ROCs were identified as those radionuclides that contribute over 10 percent of the total risk for soils, for exposure units, and receptors in which the total risk exceeds 1E-04 incremental lifetime cancer risk. Because the reasonable future land use is industrial, residential risks are not considered for the purposes of identifying ROCs for the FS. In addition, risks due to contribution from drinking groundwater from beneath the site are not considered further for the FS, as the industrial use scenario does not include use of groundwater as a potable water source. Municipal water is supplied to the City of Lockport from surface water sources.

According to Table 6-13 of the RI Report (USACE, 2010a), there are several exposure units in which the hypothetical on-site worker received a risk above 1E-04 for exposure to soils. (Drinking water risks are presented in Table 6-13 of the RI Report for a time 58 years into the future, when the RESRAD model indicated that the soil contaminants would reach peak concentrations from leaching from soil to groundwater. Risks from this time period are not considered in this risk assessment summary.) The radionuclides that consistently contributed most significantly to overall risk in these exposure units are ^{232}Th (and associated daughter products ^{228}Ra and ^{228}Th), and uranium isotopes (^{234}U, ^{235}U, and ^{238}U). The other COPCs investigated by USACE, ^{226}Ra and ^{230}Th, always contributed less than 10 percent of the overall risk in these exposure units.

This pattern of significant COPC contributions to risk for the on-site worker was also examined for radiological doses for the construction worker in those exposure units that resulted in greater than 25 millirems (mrem)/year (yr) total dose for soil exposure, as the construction worker receives a greater annual radiological dose, while the on-site worker receives a greater incremental lifetime cancer risk from exposure to radionuclides over several years in a row. The pattern of significant COPC contributions to radiological dose for the construction worker was consistent with significant COPC contributions to risk for the on-site worker, i.e., ^{226}Ra and ^{230}Th were not found to be significant contributors to dose. In a couple instances, ^{226}Ra and/or ^{230}Th contributed over 1 percent (but less than 10 percent) of the overall risk or dose, but the slightly elevated ^{226}Ra or ^{230}Th was always collocated with either uranium and/or ^{232}Th. This is consistent with the history and nature of contamination on the site, in which refined uranium and thorium metals were milled (not extracted). Therefore, ^{226}Ra and ^{230}Th will not become separate radionuclides of concern to be addressed during this FS.

The ROCs for which soil cleanup goals will be developed in the FS are ^{232}Th (and associated short lived daughter products ^{228}Ra and ^{228}Th, which are assumed to be in equilibrium with ^{232}Th), total uranium (including ^{234}U, ^{235}U, and ^{238}U), and ^{238}U as a surrogate for the total uranium derived concentration levels.

2.1.2.2 Screening Level Ecological Risk Assessment

A SLERA was also performed to evaluate potential risks to plants and animals (ecological receptors) from both external and internal exposure to radionuclides and total uranium from soil, sediment, surface water, and food items that may have bio-accumulated site-related contaminants. Some potential risks to ecological receptors at the site were identified based on the SLERA. However, given the localized nature of the exceedances of the screening levels used in the assessment, as well as the current and future use of the site, further assessment and considerations of ecological risks are not necessary. Although some limited patches of habitat exist on abandoned portions of the site, much of the Guterl Steel Site is actively disturbed or occupied by buildings and paved areas. There are no sensitive habitats on site which require protection.

The site is not currently managed for ecological purposes and the creation of an ecological preserve on site in the future is unlikely.

2.1.2.3 RI Findings

The results from the RI field investigation activities are summarized below.

- There are currently no imminent threats to human health or the environment due to FUSRAP-related materials on the Guterl Steel Site.
- Soil and groundwater contamination was documented above RI screening levels (levels established by the NRC or the USEPA to assist in defining the nature and extent of contamination) within the Guterl Steel Site boundary.
- Some degree of FUSRAP-related material was detected above background in the Excised Area including all the buildings, the soil, and the utility water and sediments. The most heavily contaminated buildings in the Excised Area are Buildings 6 and 8, primary buildings used for receiving, heating, rolling, packaging, and shipping uranium metal.

- The RI confirmed the results of previous studies that indicated the presence of thorium and uranium contamination at the Guterl Steel Site. The RI also added much new information about the nature and extent of thorium and uranium contamination at the Guterl Site. No evidence was found for primary ^{226}Ra contamination.

- Shallow bedrock groundwater on the Guterl Steel Site is impacted by FUSRAP-related materials.

- Surface water and sediment samples collected from the Erie Canal did not indicate FUSRAP-related impacts.

The RI also concluded that while bedrock groundwater contamination at the Guterl Steel Site is localized, the shallow bedrock hydrogeology is heterogeneous due to the presence of fractured bedrock and the presence of the Erie Canal and dolostone quarry (affects groundwater flow patterns). The vertical extent of bedrock groundwater contamination, as well as the horizontal extent of shallow bedrock groundwater contamination in the southeast and southwest quadrants of the Guterl Steel Site, is undetermined.

2.2 On-going Investigations

Since the completion of the RI, annual groundwater sampling has been conducted at the Guterl Steel Site by the USACE (2008 through 2010). In addition, MACTEC Engineering and Consulting, P.C. (MACTEC), under contract to the NYSDEC, sampled soil and groundwater at both the Landfill and the Excised Area in October and November 2006, followed by additional groundwater sampling in April 2008. MACTEC conducted a RI/FS for the metals and volatile organic contaminant (VOC) related impacts at the Guterl Steel Site and prepared an Interim Data Summary Report. The results of sampling and analysis performed by the USACE and MACTEC are described in Section 4.2. Although metals and VOCs are not addressed under FUSRAP, a discussion of these constituents is included since the presence of other chemical constituents needs to be considered when evaluating fate and transport and developing remedial options such as treatment and disposal.

2.3 Preliminary Conceptual Site Model

A conceptual site model (CSM) depicting the site's physical setting was presented in the RI Report to organize the data evaluation process, and to evaluate the impacts of MED/AEC support operations at the Guterl Steel Site on the distribution, and potential fate and transport mechanisms of MED/AEC-related constituents. The physical setting CSM helps identify and visually organize factors associated with physical setting on potential exposure pathways and receptors. This CSM is considered preliminary and may be revised as a result of any additional site investigations that may follow the DGA. The basic elements of the preliminary physical setting CSM are:

1. Contamination Mechanism (Rolling Mill operations, disposal practices, spills)
2. Source Media (Building surfaces and surface soil)
3. Transportation Mechanisms (Wind, surface water runoff/sewers and drains, leaching, and land disposal/disturbance)
4. Physical Features of the Study Area (Land development, hydrology, surface water, geology, hydrogeology, groundwater)
5. Matrices of Interest (Building surfaces, soil [surface and subsurface], surface water/sediment, and groundwater)
6. Exposure Routes (Ingestion, dermal contact, inhalation [fugitive dust], external radiation, and ingestion of produce)
7. Current and Future Human Receptors (Trespasser, future on-site worker, future construction worker, and future resident).

The physical setting CSM for the Guterl Steel Site is shown on RI Report Figure 2-14 (Appendix B). There is uncertainty regarding the definition of the bottom elevation of fractured dolomite that was described as shallow bedrock in the RI Report, the presence or absence of preferential groundwater pathways such as joints and bedding planes in the deeper dolomite bedrock, and the lower bound to the groundwater flow defined by the interface of deeper dolomite bedrock with the underlying Rochester Shale. These uncertainties will be addressed in the data gap analysis presented in later sections.

Uranium is the dominant COPC in the groundwater at the Guterl Steel Site. The RI indicates that the original source of uranium was dust and debris generated by the historical operations of the Rolling Mill. Potential migration pathways for the dust and debris listed in the RI Report include: land disposal/disturbance, wind erosion/deposition, surface water runoff and transport through storm sewers, infiltration of water through surface and/or subsurface soil to groundwater and contaminant leaching, and sediment transport.

The detection of uranium at elevated concentrations in soil and groundwater indicates that migration has occurred. The dominant migration pathway appears to be historical land disposal/disturbance because soil contamination is localized in specific areas of the site and at some locations is found throughout the vadose soil column. Occurrence of contamination at depth in soil is indicative of land disposal practices.

The source material, uranium metal oxidized during milling, was dominantly uranium dioxide (UO_2). Uranium is present as immobile U^{4+} in UO_2. Uranium U^{6+} is the more easily dissolved form of uranium; and therefore, a more mobile form of uranium. U^{6+} may have been produced due to further oxidation of UO_2 during historical milling operations or slow oxidation of UO_2. Soil sampling data from the RI did not distinguish the actual oxidation state of uranium; therefore, percentages of the mobile uranium (U^{6+}) and immobile uranium (U^{4+}) in the soil are not known.

Groundwater levels are shallow at the Guterl Steel Site and fluctuate seasonally, but are generally less than 1 to 2 m (3 to 6 ft) below the ground surface. Historical practices at the site include soil disturbance and relocation. This could allow direct contact of the uranium-contaminated material with the shallow groundwater in the weathered/fractured dolostone. In addition, the disturbed soil could be directly in contact with groundwater during the periods when the groundwater is at seasonally high elevations, resulting in contact of the groundwater with soil contaminated with uranium.

The uranium contamination detected in the site groundwater could originate from the following sources:

- Uranium that was oxidized during milling operations and leached to groundwater through soil
- Ongoing oxidation of uranium in soil, present due to historical disposal and disturbance practices, that is seasonally in contact with groundwater.

RI Report Figure 6-3 provided in Appendix B shows a generalized conceptual site model with potential pathways for human exposure that were identified in the RI HHRA. The uranium from rolling mill operations and disturbed soil is transported to the groundwater by leaching. People could be exposed to this uranium contamination if they were to drink the groundwater, either intentionally or incidentally through other activities in which exposure to the subsurface were involved. However, the groundwater below the site is not a source of drinking water.

Updates to this RI CSM will be performed following the collection of any Data Gap Investigation data performed as a result of the DGA.

2.4 Identification of Exposure Pathways

The RI HHRA CSM identified the potential pathways for human exposure to COPCs at the Guterl Steel Site. The potential human receptors are as follows:

- Current potential receptors
  - Juvenile trespasser
  - On-site worker

- Future potential receptors
  - Construction worker
  - On-site worker

2.4.1 Soil

Potential exposure routes to the juvenile trespasser and on-site worker have been identified as incidental ingestion of soils, inhalation of fugitive dust, and external radiation. Although dermal contact is possible, exposure is considered insignificant because of the very low absorption rates of the radionuclides found at the Guterl Steel Site. The HHRA suggested that a current or future juvenile trespasser could be exposed to soils while walking across the site. Access to the site could occur by a small portion of the surrounding population trespassing by either climbing over or cutting the fence. The current and future on-site workers work outside of the fenced area and are not likely to be exposed to the impacted soils. However, an adult may not be intimidated by the warning signs and could enter the Excised Area and explore the buildings during breaks. A future construction worker, could be exposed through ingestion or fugitive dust; however, any workers are expected to wear protective gear to minimize exposure.

2.4.2 Sediment

Potential exposure routes to the juvenile trespasser and on-site worker have been identified as incidental ingestion of sediment in site utilities. Exposure could also occur while recreating in the Erie Canal, although sediment in the canal has been shown not to be impacted. Although dermal contact is possible, exposure is considered insignificant because of the very low absorption rates of the radionuclides found at the Guterl Steel Site. The HHRA suggested that a current or future juvenile trespasser could be exposed to sediment in on-site utilities while walking across the site. Access to the site could occur by a small portion of the surrounding population trespassing by either climbing over or cutting the fence. The current and future on-site workers work outside of the fenced area and are not likely to be exposed to the impacted sediment. However, an adult may not be intimidated by the warning signs and could enter the Excised Area and explore the buildings during breaks. A future construction worker, could be exposed through accidental ingestion; however, any workers are expected to wear protective gear to minimize exposure. The levels found in the on-site sediments are not a risk to the future industrial worker.

2.4.3 Surface Water

Potential exposure routes to the juvenile trespasser and on-site worker have been identified as incidental ingestion of surface water in site utilities. Exposure could also occur while recreating in the Erie Canal, although surface water in the canal has been shown not to be impacted. Although dermal contact is possible, exposure is considered insignificant because of the very low absorption rates of the radionuclides found at the Guterl Steel Site. The HHRA suggested that a current or future juvenile trespasser could be exposed to surface water in on-site utilities while walking across the site. Access to the site could occur by a small portion of the surrounding population trespassing by either climbing over or cutting the fence. The current and future on-site workers work outside of the fenced area and are not likely to be exposed to the impacted surface waters. However, an adult may not be intimidated by the warning signs and could enter the Excised Area and explore the buildings during breaks. A future construction worker, could be exposed through accidental ingestion; however, any workers are expected to wear protective gear to minimize exposure. The levels found in the on-site surface water are not a risk to the future industrial worker

2.4.4 Buildings, Structures and Site Utilities

Potential exposure routes to the juvenile trespasser and on-site worker have been identified as incidental ingestion of building materials, inhalation of dust, and external radiation. Although dermal contact is possible, exposure is considered insignificant because of the very low absorption rates of the radionuclides found at the Guterl Steel Site. The HHRA suggested that a current or future juvenile trespasser could be exposed to the abandoned buildings while playing inside the buildings. Access to the site could occur by a small portion of the surrounding population trespassing by either climbing over or cutting the fence. The current and future on-site workers work outside of the fenced area and are not likely to be exposed to the EU1-EU9 building structures. However, an adult may not be intimidated by the warning signs and could enter the Excised Area and explore the buildings during breaks. A future construction worker could be exposed through ingestion or dermal contact; however, any workers in the buildings are expected to wear protective gear to minimize exposure.

2.4.5 Groundwater

The RI HHRA showed that the ingestion pathway is incomplete for the current human receptors, juvenile trespasser, and on-site workers, because they are not likely to drink groundwater from the site. The ingestion pathway is also incomplete for the future on-site worker. The ingestion pathway is potentially complete for the future construction worker. Although the baseline risk assessment that was presented as part of the RI Report did evaluate a potential/hypothetical resident who may live on site and drink site groundwater, groundwater below the site is not considered a drinking water source and municipal water is supplied for the site and surrounding area from off-site surface water sources. Shallow groundwater flow is generally towards the southeast, and towards the Erie Canal. There are no records indicating that groundwater is used in the area downgradient of the site.

The FS will consider the likely future land use to be industrial, and groundwater beneath the site will not be considered a drinking water source. Any potential human health receptors to groundwater ROCs would be “off-site” receptors. ROCs have not been investigated off site in groundwater. ROCs were not detected above risk-based levels in surface water and sediment samples from the Erie Canal. Future scenarios will consider any place where uranium impacted groundwater would discharge from the site or be encountered off site if any future investigations indicate off site resources have been impacted by on-site ROCs.

The other exposure pathway, dermal contact wherein the skin of a potential receptor is exposed to the site groundwater, is incomplete for the current human receptors (i.e., the juvenile trespasser and the current on-site workers) and the future on-site workers. Dermal contact is possible for the future construction worker; however, it is not expected to pose significant risk because the radionuclides present in the site groundwater have very low adsorption rates. As a result, this exposure pathway was not evaluated quantitatively in the RI HHRA.

The RI did not document the off-site migration of uranium in groundwater. It is considered possible that the uranium plume in groundwater extends off site based on the detection of elevated activities in shallow bedrock groundwater near the Guterl Steel Site boundary (e.g., uranium at MW-604D and MW-2). In case the site related uranium plume extends off site, there could be possible exposure routes to off-site receptors.

2.5 Development of Proposed Cleanup Levels

Proposed cleanup levels for soil are provided in Table 2-1. These preliminary remediation goals (PRGs) were developed by reviewing and slightly revising the information presented in the baseline risk assessment for the construction worker scenario (USACE, 2010a). As explained in Sections 6.3.4 and 6.3.4.1 of the RI Report, the baseline risk assessment utilized the RESRAD computer code to estimate both incremental lifetime cancer risks and also radiological doses from exposure to radionuclides of potential concern in site media. For development of cleanup goals for the FS, the exposure parameter input values and exposure pathways presented in Table 6.4 of the RI Report (RESRAD inputs) were reviewed.

It was determined that a remedial action objective needs to be developed for protection of groundwater. That corresponding soil cleanup goal would best be developed using a more sophisticated groundwater model than that used by the RESRAD code. Therefore, the drinking water pathway was turned off in the RESRAD runs used to develop soil cleanup goals which would be protective of direct soil contact for a construction worker scenario. Otherwise, input parameter values were maintained exactly as they were presented in Table 6.4 of the RI Report.

The dose-to-source ratios from the RESRAD runs were extracted from the initial year of the run ("t = 0 years") as that was identified as the time of peak dose for the radionuclide groups (total uranium, consisting of ^{234}U, ^{235}U, and ^{238}U, as well as ^{232}Th). The total uranium cleanup goal was developed including the contribution to dose from ^{234}U, ^{235}U, and ^{238}U, assuming natural abundance of uranium. The ^{232}Th cleanup goal was developed by summing the dose contributions from ^{228}Ra and ^{228}Th with ^{232}Th, all from time 0 years.

Soil PRGs will be evaluated for the protection of groundwater in the Final ARAR/Remedial Action Objectives Technical Memorandum and the FS. Soil PRGs will be developed by using a soil to groundwater leaching model (SESOIL) coupled with a groundwater flow model (MODFLOW) and a solute transport model (MT3D). A geochemical model such as MINTEQA2 will be used to support the input parameter development for soil to water portioning of uranium in the transport model. These models will be used to determine the effect of the residual soil contamination levels on groundwater concentrations at the compliance boundary and then back-calculate soil PRGs that are protective of groundwater.

3.0 SOIL DATA ASSESSMENT

3.1 Summary of Available Data

3.1.1 Soil Sampling Locations

3.1.1.1 Oak Ridge Institute for Science and Education (ORISE) (1999) Locations

Data from prior investigations were used to provide preliminary guidance for the RI soil sampling program. The most reliable historical data were located in the ORISE report (ORISE, 1999).

3.1.1.2 FUSRAP RI (2007) Locations

The initial surface/subsurface soil sample locations were based on IA-specific data evaluations to minimize duplication of sampling at the historical ORISE locations.

The FSP also was designed to incorporate, to the extent possible, prior investigation data into the real-time decision making process during the execution of the RI. The first step in this process was to compare the preliminary gamma walkover survey (GWS) data and building scan data against the currently designed soil sampling locations. If the GWS or preliminary scan data identified previously unidentified areas of concern, adjustments to surface and subsurface soil sample locations were made to investigate the newly identified areas.

3.1.2 On-Site Radiological Analyses

Calibration data for each instrument used to generate on-site radiological data included in the RI Report were obtained, reviewed, and maintained on file in accordance with the FSP/QAPP.

3.1.2.1 On-Site Core Scanner

Soil samples were collected using direct push technology soil sampling or conventional sampling techniques (i.e., hollow-stem auger and split-spoon sampler driven with a 52.25 kilogram (kg) (140 pound) hammer. Soil samples were advanced in 0.6 m (2 ft) intervals to refusal (i.e., very hard till or bedrock).

Recovered soil cores were transported to a central location for scanning using an automated core scanner. The core scanner contained two diametrically opposed 5.1-centimeter (cm) by 5.1-cm (2-inch by 2-inch) sodium iodide crystals with a thallium activator gamma scintillator detector mounted in a unit with a calibrated track that advanced the core through the scanner in 10.2 cm (4-inch) intervals.

The default soil sampling assumption was that three soil samples would be collected at each designated soil boring location including one surface soil and two subsurface soil samples; or, if no surface soil sample was obtainable due to the presence of non-soil materials such as concrete/brick/metal flooring or crushed stone fill, then three subsurface soil samples were collected.

The most appropriate data generated from the on-site gamma spectroscopy laboratory for further consideration was for the RI COPCs ^{238}U and ^{232}Th for the following reasons:

- ^{226}Ra and ^{235}U: The on-site laboratory gamma spectroscopy results for these COPCs are questionable because of interference between near-identical gamma-ray energies (186 kiloelectron volt (keV) and 185 keV, respectively) in their decay spectra. Holding the samples in a sealed container for several weeks to allow buildup of ^{222}Rn (radon) progeny (^{214}Pb [lead] and ^{214}Bi [bismuth]) that would permit determination of ^{226}Ra concentrations would have defeated the purpose of the on-site laboratory.

- ^{228}Ra: The on-site laboratory assumed that ^{228}Ra was in secular equilibrium with ^{232}Th and reported identical concentrations for both.

- ^{234}U: The on-site laboratory assumed that ^{234}U was in secular equilibrium with ^{238}U and reported identical concentrations for both.

A total of 1,785 soil samples were analyzed at the on-site laboratory by gamma spectroscopy.

3.1.3 Off-Site Radiological Analyses

3.1.3.1 Gamma Spectroscopy

The FSP required that 5 percent of the on-site gamma spectroscopy soil samples (or a minimum of 100 samples, whichever was greater) should be analyzed at the off-site laboratory by gamma spectroscopy. A total of 138 of the 1,785 soil samples analyzed in the field screening laboratory (7.7 percent) were sent to the fixed analytical laboratory for gamma spectroscopic analysis for the RI COPCs.

Preliminary data review indicated poor correlation for off-site gamma spectroscopy data for ^{238}U as compared to on-site gamma spectroscopy data for ^{238}U, and a poor correlation for off-site gamma spectroscopy data for ^{238}U as compared to other off-site analytical data for ^{238}U by alternate methods (e.g., alpha spectroscopy). As a result, it was determined that the ^{238}U concentrations reported by the off-site laboratory using gamma spectroscopy were unusable.

Other results generated by alternate methods reported by the off-site radiological laboratory are used in this report.

3.1.3.2 Alpha Spectroscopy

Between 12 and 30 surface soil samples (top 0 to 15.2 cm [6-inches] of soil) and between 12 and 30 subsurface soil samples from each IA or sub-area were scheduled to be analyzed for uranium and thorium isotopes by alpha spectroscopy. A total of 524 soil samples were sent for off-site alpha spectroscopy analysis for isotopic uranium and thorium. A comparison of off-site alpha spectroscopy and on-site gamma spectroscopy showed good correlation.

3.1.3.3 Isotopic Uranium as a Metal by Inductively Coupled Plasma-Mass Spectrometer (ICP-MS)

Additional data were collected to evaluate the presence of enriched, depleted, and recycled uranium. The presence of ^{236}U indicates recycled uranium; enhanced abundances of ^{234}U and ^{235}U indicate enriched uranium, and the enhanced abundance of ^{238}U indicates depleted uranium. Twelve soil samples that displayed significantly elevated uranium concentrations as determined by on-site laboratory gamma spectroscopy analysis were selected for isotopic uranium by inductively coupled plasma-mass spectrometer (ICP-MS) analysis at the off-site fixed laboratory. The isotope mass concentrations indicate the uranium released at the site has naturally occurring isotope ratios.

3.1.4 Background Reference Sampling

A total of 12 surface soil and 12 subsurface soil samples were collected from the background reference area located in the northern portion of the site. The background soil sample activity levels were extremely low in comparison to samples from impacted areas and the PRGs developed for the FS (Section 2.5).

3.2 Contamination Indicated by Available Data

To evaluate the volume of soil impacted, the Microsoft Access database provided by USACE containing the ORISE and FUSRAP RI sample data was converted to Geographic Information System (GIS) geodatabase to analyze the spatial components of the data. Relationships between the data and additional queries were built into the geodatabase to convert the table structures into GIS compatible formatted tables.

A Sum-of-Ratios (SOR) figure was then generated using the on-site gamma spectroscopy results and the PRGs developed by USACE in 2011 (310 picocurie(s) per gram [pCi/g] for ^{238}U and 6.4 pCi/g for ^{232}Th, developed to be protective of industrial land use). Figure 3-1 shows the results plotted by depth interval in the same manner as the RI Report figures. The results show that the horizontal extent of locations with SOR greater than one are well delineated.

Using the GIS software, the horizontal extent of areas with SOR greater than one were contoured, as shown on Figure 3-2. The horizontal extent of SOR greater than one was calculated to be 1.19 ha (2.95 ac). The average depth to bedrock was calculated in each area where SOR was greater than one (generally between 1 and 2 m [3 and 6 ft]). This was used to calculate the approximate volume at each area. The total volume of soil with SOR greater than one was estimated to be 19,500 m^3 (25,500 yd^3).

The main items under consideration for representation/display of the data are the following:

- All borings were advanced as deep as possible (refusal), meaning the vertical delineation of soil contamination has been determined to the extent possible in the areas sampled.
- Most borings only penetrated approximately 1.2 m (4 ft), which is generally the depth of bedrock at the site.
- Borings that penetrated below the water table (greater than approximately 1.2 m [4 ft]) may be more indicative of contaminant leaching to groundwater than soil contamination.

3.3 Data Gaps

There are no significant data gaps for the soil data. The following DQOs (as originally numbered in Section 1.3) have been met:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium and the media and locations in which they are present).

4a. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

9. Define nature and extent of isotopic uranium, thorium, and radium in surface soils, subsurface soils, and buildings to support risk assessment (using NRC screening levels for human health and DOE guidance for ecological [DOE, 2002]) and development and evaluation of FS alternatives (volume determination).

19. Gather sufficient data to complete a Baseline HHRA for human health and an SLERA.

3.4 Additional Recommended Data Collection

There is no additional data collection recommended for soil at the site at this time. However, additional soil samples may be collected as part of pre-remedial design.

4.0 GROUNDWATER DATA ASSESSMENT

4.1 Summary of Existing Data

Groundwater chemical and geochemical data have been collected at the site as a part of several investigations. These investigations include the following:

- The USACE RI. Field sampling data for the RI were obtained between June 2007 and December 2007. Radiological and geochemical data were collected during this investigation to delineate the nature and extent of groundwater contamination at the site. Geologic and hydrogeologic data were collected to determine the flow paths for site groundwater. This investigation was restricted to the shallow weathered bedrock underlying the site to a depth of 7 m (23 ft) below ground surface (bgs).

- The NYSDEC RI. MACTEC conducted a RI for the metal, VOC, semi-volatile organic compound (SVOC), polychlorinated biphenyl (PCB), and pesticide related impacts at the Guterl Steel Site and prepared an Interim Data Summary Report. Soil and groundwater sampling were conducted at both the Landfill and the Excised Area in October and November 2006, followed by additional sampling in April 2008. In addition to the on-site samples, MACTEC collected a limited number (15) of surface soil samples from three off-site areas to provide data on metals and SVOCs for comparison with the Guterl Steel Site results.

  The findings of the NYSDEC RI related to the inorganic and SVOCs contamination are not critical to the FUSRAP FS that is focused on ROCs. The presence and the distribution of VOC contamination in groundwater are of interest since the oxidation reduction (redox) conditions of groundwater are affected by the presence of the VOCs and, as a consequence, affect the mobility of uranium in groundwater. As a result of the data gaps identified during the 2006 NYSDEC RI, further VOC sampling was conducted in 2008. A figure showing the distribution of VOCs during November 2006 and April 2008 (provided by MACTEC) is presented in Appendix C.

- Groundwater was sampled in March 2008 by the USACE using peristaltic pumps (GeoPump 2). Only metals and geochemical parameters were analyzed in 2008, along with the measurement of field parameters, including pH, specific conductance, turbidity, dissolved oxygen (DO), temperature, oxidation reduction potential (ORP), and depth to water. Field data parameters were analyzed using a multi-parameter water quality instrument (Hydrolab Flow Cell) and a water-level probe. Field data parameters are summarized in RI Report Table 4-136. Data from the August 2007 and November 2007 RI sampling events are also included for comparison.

Elevated pH readings were reported at six monitoring wells in March 2008 (MW-4, MW-600D, MW-601D, MW-603D, MW-605D, and MW-607D), varying considerably from the previous readings from August 2007 and November 2007. A malfunctioning pH sonde was identified as the potential cause of the elevated pH readings. In May 2008, another set of field parameter measurements were performed by USACE for back-checking problematic pH values. The measured pH values were comparable to the 2007 RI data, confirming that the elevated pH readings in March 2008 were erroneous.

The March 2008 data set also had elevated ORP values at eight monitoring wells MW-4, MW-8, MW-16, MW-600D, MW-601D, MW-602D, MW-604D, and MW-605D. At each of these locations the depth to water was up to 1.2 m (4 ft) shallower than the measured values during the August 2007 and November 2007 RI sampling events. The confirmation sampling in May 2008 had similar ORP measurements to the March 2008 values, indicating a potential relationship between groundwater elevations and ORP.

Radiological parameters were not analyzed in 2008.

Geochemical parameters such as total dissolved solids (TDS), and anions such as chloride, bromide, fluoride, nitrate, nitrite, ortho-phosphate, alkalinity (total, as $CaCO_3$) were analyzed in the laboratory in March 2008. Metals/major cations (aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc) were also analyzed. The March 2008 USACE major cation/anion data were summarized in the RI Report.

- In September 2009, the USACE continued the annual groundwater monitoring and sampling for radiological parameters at the Guterl Steel Site in support of the RI/FS process. The USACE also collected data on major anions and cations. The 2009 data were reviewed and incorporated in the analysis of available site data that is presented in Section 4.2.
- In September 2010, the USACE performed another round of annual groundwater monitoring and sampling at the Guterl Steel Site. Field parameters were collected and

metals, anions and radiological parameters were analyzed. The 2010 data were reviewed and incorporated in the analysis of available site data that is presented in Section 4.2.

4.2 Contamination Indicated By Existing Data

Data collected to date at the site were evaluated in order to determine the extent of groundwater contamination. The findings are summarized in the following paragraphs.

- There are currently no imminent threats to human health or the environment due to FUSRAP-related materials in the groundwater underneath the Guterl Steel Site.
- Shallow bedrock groundwater on the Guterl Steel Site is impacted by FUSRAP-related materials.
- No evidence has been found for primary ^{226}Ra contamination in groundwater underneath the Guterl Steel Site.
- Thorium concentrations are at background levels in groundwater underneath the Guterl Steel Site.
- Total uranium concentrations in groundwater underneath the Guterl Steel Site exceed the USEPA drinking water standard (the groundwater maximum contaminant level [MCL] for total uranium is 30 micrograms per liter [µg/L]). RI Report Figures 4-47 and 4-48 present the total uranium concentrations measured during July/August 2007 and November 2007. Total uranium (filtered and unfiltered) concentrations measured during the September 2009 and September 2010 sampling events are shown on Figures 4-2, 4-3, 4-4, and 4-5.
- The occurrence of elevated uranium in shallow bedrock groundwater is observed at the following locations:
  - In the immediate vicinity of overburden soil with elevated uranium
    - MW-4 and MW-25, which are located in the immediate area of the Buildings 6/8 loading dock that was used during the period of MED/AEC support operations.
    - MW-13D and MW-18, which are located in the immediate area of elevated uranium in soil in IA03.

    - MW-602D, which is located in the immediate area of elevated uranium in soil in IA04A.

  - Downgradient of areas with elevated uranium in soil

    - MW-26, MW-604D, and MW-605D, which are located in IA04B and IA04D. The uranium exceedences detected in the groundwater in these monitoring wells may be attributed to leaching of uranium from soil in IA03 and IA04A, which are located upgradient of these monitoring wells (RI Report Figure 3-13), followed by downgradient migration in groundwater along the regional fracture trend.

    - MW-2, which is located downgradient of elevated soil activity in Buildings 2, 6, and 8.

    - MW-22 and MW-7, which are located downgradient of elevated soil activity in IA04A.

  - In the landfill area

    - MW-16, which is located in the landfill area. The exceedance of the uranium MCL was documented at this location during the September 2009 sampling event.

- Conditions that could lead to elevated uranium in shallow bedrock groundwater include:

  - Presence of source in seasonally saturated zone

  - Presence of oxidizing conditions in groundwater zone

  - Location within downgradient projection of these previous two conditions.

- During the August 2007 RI sampling event, 8 of the 30 locations sampled had total uranium concentrations exceeding the MCL (MW-4, MW-13D, MW-18, MW-22, MW-26, MW-602D, MW-604D, and MW-605D). During the November 2007 RI sampling event, up to 7 of the 30 locations sampled had total uranium concentrations exceeding the MCL (same as August 2007, with the exception of MW-22). In September 2009, the uranium MCL was exceeded at 11 monitoring wells, which included the 8 monitoring wells with total uranium exceedences during the August 2007 RI and 3 additional monitoring wells (MW-2, MW-16 and MW-25). MW-2 is located along the southeast property boundary, upgradient of the Erie Canal. MW-16 is an upgradient landfill area well, while MW-25, which was not previously sampled for uranium, is located on the western boundary of the excised area. In September 2010, the uranium MCL was exceeded at 9 monitoring wells, which included all 7 of the 8 monitoring wells with total uranium exceedences documented during the November 2007 RI sampling event and 2 additional monitoring wells (MW-7 and MW-25). The concentration of total uranium at MW-22 was less than the uranium MCL in September 2010, in contrast to previously documented exceedences of the MCL during the November 2007 RI sampling event and in September 2009. The exceedance of total uranium at the MW-7 in September 2010 indicated an increase in concentration at this location, since total uranium was less than MCL at MW-7 during the RI and the 2009 sampling events. Total uranium concentrations in the monitoring wells located along the groundwater plume axis (MW-18, MW-605D, MW-26, MW-604D) have increased between 2007 and 2010. It appears that the total uranium plume is not in steady state and possibly migrating off-site towards the Erie Canal.

- Shallow bedrock groundwater contamination at the Guterl Steel Site follows a northwest-southeast trend that includes monitoring wells that are located to the southeast of the landfill, to the west of the excised area and continuing to the property boundary to the south of the excised area.

- The shallow bedrock hydrogeology is heterogeneous due to the presence of fractures and weathering. It appears that the uranium plume is aligned with the trace of the regional fracture zone in the area that may be acting as a preferential groundwater and contaminant transport pathway.

- The flow of groundwater towards the Erie Canal and the dewatering operations associated with the nearby dolostone quarry affect groundwater flow patterns at the site.

- The vertical extent of bedrock groundwater contamination, as well as the horizontal extent of shallow bedrock groundwater contamination in the southeast and southwest quadrants of the Guterl Steel Site, is undetermined.

- Data indicate that shallow bedrock groundwater-level fluctuations of 1 to 2 m (3 to 6 ft) or more occur at numerous locations. These fluctuations may influence the groundwater conditions by introducing oxygen or soluble constituents. Field measurements of DO and ORP both increased at wells MW-6, MW-18, MW-19, MW-602D, and MW-604D, and specific conductivity increased substantially at wells MW-1, MW-2, MW-3, MW-24, and MW-26 when shallow bedrock groundwater levels were shallowest. These changes may affect transport of contaminants because wetting and drying soil cycles can lead to unstable redox conditions, which affect the mobility of uranium in groundwater.

- Groundwater at the Guterl Steel Site is impacted by chlorinated solvent VOCs and related degradation compounds, including trichloroethene (TCE), cis-1,2-dichloroethene (DCE), vinyl chloride, 1,1,1-trichloroethane (TCA) and 1,1-dichloroethane (DCA). The data indicate little or no impact to groundwater from chlorinated VOCs (i.e., concentrations are below NYSDEC criteria) in wells installed at and around the landfill, but reveal elevated VOCs in many wells at the Excised Area. Chlorinated compound concentrations are generally highest in the wells installed along the western side of the Excised Area (e.g., MW-23, MW-4, MW-25, and MW-26). TCE and 1,1,1-TCA may be considered the source chemical products while the other chlorinated compounds likely reflect post-release biodegradation. Many reported concentrations exceed groundwater criteria of 5 μg/L for TCE, 1,1,1-TCA, 1,2-DCE, 1,1-DCA; and 2 μg/L for vinyl chloride.

The redox conditions of groundwater are affected by the presence of the VOCs, and as a consequence, affect the mobility of uranium in groundwater. It is relevant during the FS to factor in the co-mingling of the VOC and the uranium plumes. The presence of high VOC concentrations and the movement of the VOC plume through the groundwater, under natural gradients and especially under gradients forced by a pump-and-treat based remedy, can alter the groundwater redox conditions. Any changes in redox conditions will lead to changes in uranium mobility, so the presence of the VOC plume can potentially affect the modeling of remedial alternatives to be performed during the FS.

4.3 Data Gaps

This section summarizes the gaps in existing data. Collection of additional data is necessary to remove these data gaps in order to proceed with the delineation of contamination in the surficial and subsurface systems, and perform the fate and transport modeling of the contaminants in support of the FS remedial alternative evaluation. Data gaps were identified during the DGA related to the delineation of total uranium impacts in the site and off-site groundwater, the groundwater flow pathways, interaction of groundwater and surface water, off-site influences on site groundwater and other input data necessary to perform modeling of the remedial alternatives for the FS. The data gaps are listed in the following paragraphs.

4.3.1 Plume Delineation

- Horizontal delineation of the total uranium plume in the shallow weathered/fractured bedrock is incomplete at the downgradient edge of the plume, specifically at locations between the site the and Erie Canal to the southeast and between the site and the quarry to the southwest. Shallow monitoring wells are recommended in these areas to complete the plume delineation.

- Vertical delineation of the total uranium plume is incomplete. It has not been determined if and to what depth the deeper bedrock is contaminated with uranium, beyond the contamination documented in the shallow weathered/fractured bedrock wells installed to depths of up to 7 m (23 ft) bgs. Deeper bedrock wells are recommended.

- The total uranium plume depicted in the RI, based on the two 2007 sampling events and the post RI 2009 sampling, does not provide sufficient information about the stability of uranium groundwater plume. A review of the data indicates the following (activities shown here in picocuries per liter [pCi/L] are the sum of the activities of ^{234}U, ^{235}U, and 238U measured by alpha spectroscopy; and concentrations in µg/L are the results of elemental analysis):

  - The downgradient monitoring well MW-604D, located near the site southwest boundary, had 49 picocurie(s) per liter (pCi/L) total uranium (filtered) concentration in August 2007, which increased to 87 pCi/L in November 2007. In the post RI, groundwater sampling, the total uranium (filtered) concentrations at MW-604D were 104 µg/L (90 pCi/L) in September 2009 and 121 µg/L (74 pCi/L) in September 2010.

  - The total uranium (filtered) concentration in monitoring well MW-26 increased from 121 pCi/L in August 2007 to 164 pCi/L in November 2007. During the post RI groundwater sampling performed in September 2009, the total uranium (filtered) concentration in monitoring well MW-26 was 144 µg/L (135 pCi/L). In September 2010, the total uranium (filtered) concentration in monitoring well MW-26 was 160 µg/L (90 pCi/L).

  - In monitoring well MW-605D, the total uranium (filtered) concentration was stable in 2007; specifically, it remained between 136 to 137 pCi/L during the August and November 2007 sampling events. During the post RI groundwater sampling performed in September 2009, the total uranium (filtered) concentration in monitoring well MW-605D increased to 238 µg/L (198 pCi/L). In September 2010, the total uranium (filtered) concentration in monitoring well MW-605D further increased to 254 µg/L (174 pCi/L).

– Another property boundary well, MW-2, had a steady total uranium (filtered) concentration of 21 µg/L (14 pCi/L) in August 2007 and November 2007 (less than MCL); however, the concentration increased to 37 µg/L (13 pCi/L) in September 2009, exceeding the MCL, followed by a further increase to 42 µg/L (15 pCi/L) in September 2010.

The isotopic uranium results for the 2009 and 2010 sampling events are consistent and indicate that only natural uranium (neither depleted, enriched nor recycled) has been detected in the samples. Figure 4-6 shows the correlations between the alpha spectroscopy results for ^{234}U versus ^{238}U in activity units (pCi/L). Samples from both events show strong correlations (R^2 greater than 0.99) between the two isotopes and the two trends are coincident. The slopes of the linear regressions of the two data sets, which represent the average $^{234}U/^{238}U$ ratios, are both close to 1.0, which is a fingerprint for natural uranium.

Uranium concentrations were also analyzed as the element via laser phosphorimetry (LP) using Method ASTM D 5174 in the 2009 and 2010 samples. These LP results allow an independent comparison of uranium concentrations by two different methods in each sample. Figure 4-7 shows the uranium concentrations in each of the unfiltered samples as determined via LP (x axis) versus the three uranium isotope activities determined by alpha spectroscopy, converted to mass concentration units (µg/L) and summed (y axis). The dashed line on the figure is the trend expected for perfect agreement (x=y) between the two methods. The majority of the points fall close to the dashed line, and the median alpha spectroscopy/LP ratio for the 71 samples is 1.12. The closeness and symmetry of the points about the dashed line indicates general agreement and lack of bias in either method for most of the samples.

The ratios of uranium concentrations (LP method) in filtered versus unfiltered sample splits in the 2009 and 2010 samples is shown as a function of the unfiltered concentrations in Figure 4-8. Samples with uranium present in a mostly dissolved state should have ratios close to 1.0, and samples with uranium present as suspended particulates should have ratios below 1.0.

Greater scatter in the filtered/unfiltered ratios is observed at lower concentrations where the uncertainties in concentrations increase. However, the majority of the samples line up as a vertical trend over a ratio of 1.0, indicating that the uranium detected in the samples is not removable by filtration, and is therefore mostly present in a dissolved state.

Each of these sampling events was conducted during late summer and fall, when the groundwater table is typically lower in elevation. A longer record of groundwater sampling, along with high water table sampling, are necessary to evaluate the stability of the uranium plume and the effect of seasonal groundwater fluctuation on total uranium concentrations and mobility in groundwater. The USACE is continuing with an annual groundwater monitoring program; however, groundwater sampling at a higher frequency may be necessary to discern the seasonal changes.

In agreement with the conclusions of the RI, the following DQOs (as originally numbered in Section 1.3) have not been met since the vertical and horizontal extent of groundwater contamination have not been fully defined:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium and the media and locations in which they are present).

4b. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

10. Determine whether groundwater has been impacted by uranium, thorium, and radium above screening levels; and if so, determine nature and extent to support risk assessment, and development and evaluation of FS alternatives.

4.3.2 Flow through Deep Bedrock

- Shallow bedrock is intensely weathered and fractured. The deepest well is 7 m (23 ft) in depth. It is undetermined what constitutes the vertical hydrogeologic boundary for groundwater flow; that is, whether the deeper bedrock is massive and therefore providing a barrier to flow, or if it is fractured and has significant joints and bedrock planes that are conduits for groundwater flow. It is also not known if the deeper bedrock has fractures and joints, which may be either open or filled with lower permeability material like clay and gypsum. Deeper bedrock delineation is required through the installation of bedrock stratigraphic borings.

- In order to define the bottom boundary condition for the groundwater flow model, it is necessary to determine the bottom elevation of the bedrock strata through which groundwater flow occurs in the dolostone underneath the site. Literature indicates that there are as many as 11 flow zones between ground surface and Rochester Shale that underlies the dolostone units. At least two deep borings to the Rochester Shale are recommended to help define the lithology and fracture zones beneath the site.

- The following RI DQO (as originally numbered in Section 1.3) has not been met:

    2. Acquire information to define the fate and transport of contaminants from the Guterl Steel Site.

4.3.3 External Hydrologic Controls on Site Groundwater

- A 250 ha (600 ac) dolostone quarry is located to the southwest of the site and is used to mine the Lockport dolomite limestone formation. It is one of the largest quarries in New York State. The quarry operations require dewatering to remove groundwater and ensure dry work conditions for the mining of dolostone. The effect of dewatering on the site groundwater flow is reflected in the groundwater elevation contour maps presented in the RI.

  A stratigraphic record from the quarry was unavailable at the time of the preparation of the DGA report. A review of information available on the internet indicates that the dolostone formation at the quarry and by inference at the site may be about 25 m (75 ft) in thickness (http://rockproducts.com/index.php/news-late/archives/21.html). In order to model the groundwater flow regime at the site and predict the future groundwater flow conditions, data are needed regarding the current extraction rates, seasonal extraction schedules, dewatered water-level elevations, current and future permitted drawdowns, and information regarding the location and rates of discharge to the Erie Canal.

- Information on other groundwater extraction in vicinity of the site is necessary. The NYSDEC 2000 report titled Immediate Investigative Work Assignment Area, Guterl Excised Area, shows an extraction well to the west of the site. During the site walk it was mentioned that there is an off-site pump and treat system. Confirmatory information is needed to determine if there is any off-site groundwater withdrawal that may affect the site groundwater elevations and flow.

- Data are needed on how the site groundwater interacts with the Erie Canal. Canal water elevations during different seasons may be used to determine whether site groundwater flows into or under the canal at various times of the year.

- The following RI DQO (as originally numbered in Section 1.3) has not been met:

    2. Acquire information to define the fate and transport of contaminants from the Guterl Steel Site.

4.3.4 Aquifer Characterization

- Slug tests were performed to determine the hydraulic conductivity of the shallow weathered/fractured bedrock during the RI. Additional hydraulic conductivity data should be obtained at any additional off-site monitoring wells and deep bedrock wells to be installed to determine hydraulic conductivity variability between different aerial locations and depths in order to build a representative groundwater flow model.

- The following RI DQO (as originally numbered in Section 1.3) has not been met:

  4b. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

4.3.5 Geochemistry

- The presence and distribution of VOC contamination in groundwater is of interest because the redox conditions of groundwater are affected by the presence of the VOCs, and as a consequence affect the mobility of uranium in groundwater. It is relevant during the FS to factor in the co-mingling of the VOC and uranium plumes.

- The mobility of uranium in groundwater is most sensitive to pH, redox conditions, and the concentrations of carbonate, which is a strong complexing agent for the oxidized (hexavalent) form of uranium. Of these parameters, redox is the most important because local redox conditions control the valence state of uranium which can be either +4 (tetravalent) or +6 (hexavalent). The solubility of hexavalent uranium is about six orders of magnitude higher than the solubility of tetravalent uranium, so it is important to understand local variations in the redox conditions along potential groundwater flow paths. Estimation of the redox conditions at sample locations are commonly based on DO and ORP measurements performed in the field. These field measurements are qualitative at best, because they are subject to interferences from contamination of reducing samples with atmospheric oxygen. This can be seen in Figure 4-9 which shows the correlation between the DO versus ORP field measurements in the 2010 samples. Reported DO values of zero are assigned a value of 0.15 milligrams per liter and form the vertical stack of points on the left side of the figure. The lack of strong agreement between the two parameters indicates that one or both have high uncertainties. Fortunately, there are more reliable methods of estimating groundwater redox conditions based on selected elemental ratios and the ratios of redox-sensitive element concentrations in filtered versus unfiltered sample splits based on the methods of Thorbjornsen and Myers, 2007 and 2008. These methods, which are based on comparisons of unfiltered iron versus aluminum correlations, iron filtered/unfiltered ratios, and manganese filtered/unfiltered ratios, may be used at the Guterl Steel Site to assess the redox conditions in the groundwater. In addition, an optical DO probe is recommended to be used in the field instead of the standard electrochemical DO probes. The newer optical probe design has the potential to yield more accurate results. Continued annual collection of these data and enhanced (quarterly) sampling is recommended.

- Uranium adsorption coefficients (K_ds) are key parameters that affect the predicted transport rates in groundwater models. The uranium K_ds used in the RI modeling were based on laboratory measurements of site-specific samples. Five samples representing native soil outside of the contaminated area, native soil underlying the contaminated area, contaminated soil/fill, and bedrock were tested using the ASTM D4646-03 method. The test results yielded a wide range of values from 0.22 to 1,345 milliliters per gram (mL/g). These K_ds are consistent with literature values from similar environments. For instance, the lowest K_d of 0.22 mL/g is from the dolostone bedrock, which is known to have low uranium retention capabilities. The highest K_d of 1,356 mL/g is from native soil that has a high clay and iron oxide content, which are materials that are known to strongly adsorb uranium (USEPA, 1999a). These site-specific K_ds are adequate for modeling the transport of uranium along flow paths. It is recommended that additional sorption tests be performed to determine the desorption (leaching) of uranium from contaminated soil by infiltrating precipitation. These tests should be performed using contaminated soil from the site and synthetic rain water, as used in the Synthetic Precipitation Leach Procedure (USEPA Method 1312).

- The following RI DQO (as originally numbered in Section 1.3) has not been met:

  2. Acquire information to define the fate and transport of contaminants from the Guterl Steel Site.

4.4 Recommended Additional Data Collection for Groundwater

This section provides recommendations with respect to further data gap collection and analysis that will enhance the understanding of the surficial and subsurface systems and the fate and transport of the suspected contaminants.

4.4.1 Monitoring Well Installation

4.4.1.1 Core Logging

The core samples obtained during the recommended borings, including the monitoring wells to complete plume delineation and the deep bedrock stratigraphic borings to Rochester Shale, should be logged. Features to be recorded include observations regarding fracture and joint occurrence, inclinations, encrustations or fillings in joints (with clay, gypsum, etc.), and water loss.

In order to define the bottom boundary condition for the groundwater flow model, it is necessary to determine the bottom elevation of the bedrock strata through which groundwater flow occurs in the dolostone underneath the site. It is recommended to core two of the borings to the Rochester Shale to help define the lithology and fracture zones beneath the site prior to installing the deep monitoring wells. Full penetration boreholes to Rochester Shale are recommended to be installed at the locations of deep bedrock monitoring wells to be installed near existing monitoring wells MW-13S/D and MW-604D.

Existing literature indicates that there is shallow groundwater in the densely fractured/weathered shallow rock (almost like gravel with high hydraulic conductivity), followed by discrete deeper flow zones in competent rock. Given this conceptual model (which may be revised based on findings of the investigation), it appears that the shallow wells will be installed in the densely fractured/weathered shallow rock, which is contaminated with uranium, followed by installation of the deep wells in the next water bearing zone (the first groundwater zone in "competent rock"). Literature indicates that there are as many as 11 flow zones between ground surface and Rochester Shale, and the initial investigation of groundwater quality will be limited to the top two flow zones, the densely fractured/weathered shallow rock, which is known to be contaminated with uranium, and the first groundwater zone in "competent rock", which may or may not be contaminated with uranium. Since the shallowest bedrock zone receives contaminant influx, and there is a likely contributor to other potential flow zones, the focus of FUSRAP contaminants transport will be shallow bedrock with lower flow zones as being a secondary focus.

4.4.1.2 On-site Monitoring Wells

Eight on-site locations (Figure 4-1) are recommended for installing new deep bedrock wells. These monitoring well locations coincide with shallow weathered/fractured bedrock wells MW-2, MW-13S/D, MW-19, MW-26, MW-602D, MW-604D, MW-605D and MW-607D where groundwater exceedences of total uranium MCL were documented during the RI or during the

2009 and 2010 post RI groundwater sampling events. These locations will provide adequate information to delineate the on-site extent of groundwater contamination and optimize the understanding of the transverse dispersion of the plume that is apparent from pumping at the nearby quarry. The actual well locations may be adjusted in the field as approved by the USACE.

The rationale for installing the eight new deep on-site wells is as follows:

- Two of the proposed wells, located near MW-13D and MW-602D, will define the upgradient extent of the deep bedrock uranium exceedences, if any.
- Two of the proposed wells, located near MW-26 and MW-605D, will define the mid-plume deep bedrock uranium exceedences, if any.
- Two of the proposed wells, located near MW-2 and MW-604D, will define the downgradient extent of the deep bedrock uranium exceedences, if any.
- Two of the proposed wells, located near MW-19 and MW-607D, will define the transverse dispersion of the plume that may be induced from pumping at the nearby quarry.

4.4.1.3 Property Boundary/Off-Site wells

Five locations (Figure 4-1) are recommended for installing shallow and deep pairs of bedrock monitoring wells. The off-site deep wells may not be necessary if the on-site deep wells do not show uranium MCL exceedences.

The rationale for installing these monitoring wells is as follows:

- Monitoring well pair S/D-01 is needed to delineate the plume in the direction towards the quarry.
- Monitoring well pairs S/D-02 and S/D-03 will help delineate the plume at the southeast property boundary.
- Monitoring well pairs S/D-04 and S/D-05 will help define the off-site extent of the plume between the property boundary and the Erie Canal.

4.4.2 Well and Seep Sampling and Analysis

In order to fill the data gaps, the following sampling and analysis are recommended, along with a list of analytical parameters where applicable.

4.4.2.1 Annual Sampling 2011 - Groundwater and Seeps

The 2011 annual sampling should be conducted in the late spring or early summer to coincide with high groundwater elevations. In addition to the 36 existing on-site wells, each of the newly installed on-site and off-site monitoring wells should be sampled (54 wells total). Field parameters should be measured and include groundwater elevation, temperature, pH, DO, ORP, turbidity, and specific conductivity.

It is recommended that during the 2011 annual sampling event, all of the existing monitoring wells be sampled without any reduction in the number of sampling locations, because there is not adequate data history to confidently justify reduction in sampling locations. The following observations serve as reasons to continue monitoring all existing wells in 2011, along with the newly installed wells.

- To date, groundwater uranium data are available from only four sampling events. Two of these events were conducted within months of each other (August 2007 and November 2007) while the third and fourth sampling events were conducted in September 2009 and September 2010. Radiological data was not collected during the 2008 groundwater sampling.

- Four rounds of data are not statistically significant numbers of data to make a firm evaluation of data trends, especially considering that the data does not indicate a decreasing trend in concentrations or stability in the spatial extent of the uranium plume.

- In August 2007, uranium MCL was exceeded at eight wells (MW-4, MW-13D, MW-18, MW-22, MW-26, MW-602D, MW-604D and MW-605D). In November 2007, uranium MCL was exceeded at seven wells, which included all locations with August 2007 exceedences except MW-22. In September 2009, uranium MCL was exceeded at 11 wells, which included all locations with August 2007 exceedences and 3 additional locations. The additional locations that exceeded MCL in September 2009 included the property boundary well MW-2, an upgradient landfill area well MW-16, and MW-25, which was not previously sampled for uranium. In September 2010, the uranium MCL was exceeded at nine monitoring wells, which included all seven of the monitoring wells with total uranium exceedences documented during the November 2007 RI sampling event, two of the three additional monitoring wells where exceedances of MCL were documented in 2009, and a new location, MW-7, which did not have concentrations exceeding the MCL prior to 2010.

- Of the three new wells exceeding MCL in September 2009, MW-2 and MW-16 are surrounded by wells that do not have uranium exceedences. However, in order to delineate the plume, the wells in between the wells exceeding the MCL and the RI plume wells also need to be sampled to document stability/expansion of the plume.

- The 2010 data were evaluated and show exceedences of uranium MCL at an additional location (MW-7) beyond that indicated by the 2009 data.

- All four of the uranium sampling events were low water table events in the fall (August, September, and November). Considering that the water table is shallow, a high water table sampling event like the one planned in the late spring or early summer of 2011 could have several wells showing uranium concentrations different than the fall sampling events.

- In general, existing data indicate that the uranium plume may not be chemically and geochemically stable; therefore, the four sampling events to date, all conducted during the fall low water table, do not provide a reliable basis for reduction in the sampling network.

It is also recommended that the USACE conduct a concurrent groundwater seep sampling event from the banks of the Erie Canal. Up to four seep samples should be collected.

The monitoring wells and the seep samples should be analyzed for the following parameters:

- Total uranium – filtered and unfiltered
- Isotopic uranium – filtered and unfiltered
- Anions (chloride, fluoride, sulfate, nitrate, nitrite, and ortho-phosphate) – unfiltered
- General chemistry (alkalinity, TDS) – unfiltered
- Target Analyte List (TAL) 23 metals – filtered and unfiltered

In addition, the 16 wells where VOCs are known to be present from previous sampling by the NYSDEC (NYSDEC 2008), all newly installed wells and seeps shall be analyzed for VOCs (unfiltered).

The intent of filtration is to remove suspended particulates; however, the diameters of suspended particulates form a continuum of values that can range from 100 microns to 0.001 micron, depending on water velocity and the shape and charge of the particulates (Stumm and Morgan, 1996). The standard 0.45-micron pore size filter that is commonly used is roughly in the middle of the range of suspended particulates. Filtration could thus allow some fraction of the finer range of particulates to pass if they are present in the sample. However, comparisons of the analyses of filtered versus unfiltered splits of samples are still useful. If an element such as iron or manganese is mostly present in particulate form, then some reduction in concentration should be observed after filtration, even if some fraction of the suspended particulates remain in the sample, whereas elements in solution should show similar concentrations in both the filtered and unfiltered splits.

4.4.2.2 Supplemental Sampling 2011

A longer record of groundwater sampling is necessary to evaluate the stability of the uranium plume and the effect of seasonal groundwater fluctuation on total uranium concentrations and mobility in groundwater. It is recommended to perform high frequency monitoring starting immediately after the annual 2011 sampling event, described in Section 4.4.2.1, with a total duration of one year.

It is recommended to supplement the annual monitoring program with continuous transducer based monitoring of water levels, pH, DO, and ORP to help determine the stability of redox conditions and the effect of seasonal water level changes on redox and uranium concentrations. It is recommended that 10 key monitoring wells are selected for continuous monitoring along the plume axis where uranium exceeds the MCL and each selected well is equipped with a pressure transducer and a multi-parameter meter, each with data logging capabilities. This will provide a continuous data set that will record the changes in geochemical parameters that affect the mobility of uranium in groundwater as the water level rises or falls. Continuous monitoring, if accurate, would of course provide a range of conditions rather than snapshots in time, which would provide better information for model input. In 2009, the USEPA granted approval to In-Situ Inc.'s method for DO measurement by optical probe equipped transducers. These newer optical probes have the potential to provide more accurate DO measurements than the older electrochemical designs. Either In-Situ Inc.'s probes or another manufacturer's probes could be used.

It is recommended that once per month, the data logged by the transducers are retrieved, and any necessary cleaning, maintenance, and calibration are performed. At the same time as the data retrieval, the 10 wells should be sampled using typical low flow sampling methodology. The sampling equipment should include a depth to water probe and a field water quality meter (not the probe installed in that well) to record the following parameters:

- Depth to Water
- Specific Conductance
- Temperature
- pH
- DO
- ORP
- Turbidity

4.4.3 External Hydraulic Controls

In order to fill the data gaps, the following activities are recommended:

- Contact the dolostone quarry operator to obtain information regarding:
  - Litho-stratigraphic record from the quarry borings
  - Current groundwater-extraction rates
  - Seasonal extraction schedules
  - Dewatered water-level elevations
  - Current and future permitted drawdowns
  - Location and flow rates of discharge to the Erie Canal.
- Contact NYSDEC to obtain information regarding any off-site groundwater withdrawal that may affect the site groundwater elevations and flow.
- Contact the New York State Canal Corporation to obtain available information on water levels in the Erie Canal during different seasons, and any information on geology at the canal section near the site.
- Surface water elevations – The canal is drained during the winter so the flow system in vicinity of the canal changes seasonally. It is recommended that a staff gage be installed in or near the canal to make surface water-level readings at the same time water-level readings are recorded in the monitoring wells for use in establishing the vertical hydraulic gradients from/to the canal.

4.4.4 Aquifer Testing

Additional slug tests should be conducted at any newly installed monitoring well. The data should be analyzed to calculate the localized hydraulic conductivities at individual locations.

5.0 SURFACE WATER AND SEDIMENT DATA ASSESSMENT

This section summarizes the nature and extent of contamination of native surface water and sediment associated with the Guterl Steel Site. This section references information regarding contamination that has been found, gaps in the data that currently exist, and additional recommended data collection to fill data gaps.

5.1 Summary of Available Data

The Guterl Steel Site is divided into 11 functional units known as investigative areas (RI Report Figure 1-3). Investigation areas cover the entirety of the Guterl Steel Site and their location and size is based upon potential impact from contaminants in a localized area. Each investigation area was sampled for uranium and thorium in surface water (if present) and sediment samples.

Based on historical information, the occurrence of native surface water in IA04A, IA04B, IA04C, IA04D, IA05A, IA05B, and IA10 was not anticipated and therefore no native surface water samples were planned for IA04A. Native surface water was not observed within these investigation areas during the RI, and no surface water samples were collected. This indicates that surface water ponding is short-lived and infiltrates to groundwater when not evapotranspirated.

Based on historical information, the occurrence of native sediment in IA04A, IA04B, IA04C, IA04D, IA05A, IA05B, and IA10 was not anticipated and therefore no native sediment samples were planned for IA04A. Native sediment was not observed within these investigation areas during the RI, and no native sediment samples were collected.

5.1.1 IA03 – Landfill Area

The Landfill Area is a Class 2 NYSDEC Inactive Hazardous Waste Site (Site No. 932032). It consists of a 3.48 ha (8.6 ac) area in the northwest part of the Guterl Steel Site. From 1962 to 1980, Simonds (1962 to 1963), 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.

Surface Water (Native)

Although five surface water samples were planned for IA03, surface water was not present within IA03 during the RI. As a result, no surface water samples for IA03 were collected.

Sediment (Native)

Six native sediment samples were collected in IA03. The sediment samples were analyzed at the off-site fixed laboratory for the RI COPCs by gamma spectroscopy (all COPCs), alpha spectroscopy (uranium and thorium isotopes), and gas flow proportional counting GFPC (radium isotopes).

SORs were calculated for the samples using the FS Construction Worker PRGs for uranium and thorium (Section 2.5) and are presented in Table 5-1. All six samples had SORs less than one.

5.1.2 IA09 – Erie Canal

The Erie Canal is located approximately 90 m (300 ft) southeast of Ohio Street (RI Report Figure 1-3). The surface water elevation of the Erie Canal immediately south of the Guterl Steel Site fluctuates by several feet due to seasonal control of the navigable water level (i.e., water elevation is lowered in winter and raised in summer), its location relative to the Lockport locks to the northeast, and its confluence with Tonawanda Creek to the southwest (Tonawanda Creek provides the headwaters for the Erie Canal). In the area of the Guterl Steel Site, the Erie Canal flows from west to east (i.e., from the Niagara River toward Lockport).

Surface Water (Native)

A total of 12 surface water samples were collected from the Erie Canal. Surface water samples were collected from the mid-point of the water column from three equally-spaced sample points located along four transects as shown on RI Report Figure 3-17.

All samples appear to have only background concentrations of the radiological COPCs and are below screening levels used in the RI (USEPA MCL) for radium and uranium.

Sediment (Native)

Twelve sediment samples were collected from the Erie Canal. The sediment samples were collocated with the surface water samples.

None of the samples was found to contain concentrations of contaminants greater than the background concentrations, and all have SORs less than one (Table 5-1).

5.2 Data Gaps

IA03 (Landfill) was unable to be sampled because surface water was not available. IA04C and IA05B were not sampled based on historical information but surface water was found on site during the RI for both sites. Neither was sampled for surface water because it was assumed the surface water would not flow off-site. The following DQOs (as originally numbered in Section 1.3) have been met:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium and the media and locations in which they are present).

4c. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

11. Determine whether surface water and sediments have been impacted by isotopic uranium, thorium, and radium above screening levels.

13. Determine if isotopic uranium, thorium, and radium has contaminated underground utilities.

19. Gather sufficient data to complete a Baseline HHRA for human health and a SLERA.

5.3 Additional Recommended Data Collection

No radiological contamination was found in surface water exceeding the screening levels used in the RI (USEPA MCLs) for radium and uranium, and all sediment samples had SORs less than one; therefore, no further data collection is recommended.

6.0 BUILDINGS DATA ASSESSMENT

This section evaluates the data for the following:

- Building surfaces surveys
- Building contents surveys
- Structural integrity evaluations
- Asbestos-containing materials surveys
- Sewer/utilities data assessment

6.1 Building Surfaces Surveys

6.1.1 RI Radiological Survey Program

The integrated survey design proposed for the RI combined scanning surveys with direct (i.e., static) measurements and field (i.e., swipe) sampling. The level of survey effort was determined by the potential for contamination as indicated by the survey unit classification as presented in the *Sampling and Analysis Plan, Volume 1: Field Sampling Plan for the Former Guterl Specialty Steel Corporation* (USACE, 2007a):

- Class 1 survey areas received scanning over 100 percent of the survey area combined with direct measurements and sampling based on evaluation of current data in conjunction with prior data (e.g., placing sampling locations on a systematic grid to fill general data gaps and/or selecting biased locations to further investigate and bound prior survey data).

- Class 2 survey areas received scanning over a portion of the survey area based on the potential for contamination combined with direct measurements and sampling based on a systematic grid to a lesser degree than performed in a Class 1 area (approximately 25 percent of the Class 1 total).

- Class 3 survey units received judgmental scanning/randomly located direct measurements and sampling based on a systematic grid to a lesser degree than performed in Class 2 areas (approximately 25 percent of the Class 2 total).

The primary objective of the building characterization effort conducted for the RI was to provide data sufficient to plan future actions such as decontamination, demolition, radioactive waste disposal, or final status surveys. The survey design was not necessarily intended to conclusively demonstrate compliance with regulatory standards (Final Status Survey), although data may ultimately be used to support that purpose.

For the purposes of the surveys for the RI, building interior surfaces included floors, walls (above and below 2 meters (m), ceilings, structural surfaces, sub-floor surfaces, trench sidewalls and surfaces, manufacturing components (for example, forges and baths that remain in the buildings), and other overhead surfaces were surveyed. This effort was performed because the Guterl Steel Site operating history and previous surveys indicated contamination in all of these areas.

6.1.1.1 Class 1 Surfaces

Floors were 100-percent surveyed with a floor monitor and other surfaces were 100-percent scanned with an appropriate instrument. A swipe test and static measurement were taken at the location of the highest concentration detected by scanning in each 1-m (3.2 ft) grid square or other surface. If no contamination was detected, a swipe test and static measurement were taken at the center of the grid square.

Exposure rate measurements at 1-m (3.2 ft) from the floor and other surfaces were performed at a frequency of one systematic measurement per every 4 m^2 (43 ft^2).

Although the RI states the above, the surveys presented in the RI (Appendix T) do not show swipe tests or static measurements at the density of a 1-m (3.2 ft) grid. No documentation of scanning was provided.

6.1.1.2 Class 2 Surfaces

Vertical and horizontal surfaces where radioactive material would likely accumulate (e.g., air exhaust vents and horizontal surfaces where dust would settle) were surveyed. To assure a reasonable coverage of these surfaces, an average of at least 1 measurement location per 20 m^2 (215 ft^2) of surface area was selected, with a minimum of 30 measurement locations on each vertical or horizontal surface. The surface was first scanned to identify the presence of any elevated activity levels followed by the measurement.

Scanning covered at least 25 percent of the surface. If scans or measurements indicated residual activity exceeding 25 percent of the screening level, the surface was considered potentially contaminated and the surface exhibiting such levels was surveyed in the same manner as Class 1 surfaces to determine whether reclassification was necessary.

Exposure rate measurements at 1 m (3.2 ft) from floor and other surfaces were performed at a frequency of one systematic measurement per every 16 m^2 (172 ft^2).

6.1.1.3 Class 3 Surfaces

Multi-Agency Radiation Survey and Site Investigation Manual notes, "Class 3 survey units receive judgmental scanning and randomly located measurements." Therefore, Class 3 surfaces were surveyed similar to Class 2 surfaces but to a lesser extent based on the professional judgments of the Project Health Physicist. For example, if upper walls and ceilings are contaminated, they are likely to be contaminated uniformly from dust deposition, so one or two measurements may adequately characterize these Class 3 areas.

As a general guideline for the beginning of the survey, the survey coverage of Class 3 areas was approximately 5 percent to 10 percent of the area and the number of samples per unit area was approximately one-fourth of the number for Class 2 areas (i.e., one measurement location per 80 m^2).

6.1.2 Summary of RI Radiological Surveys

The following sections compare the RI data to project-specific Derived Concentration Guideline Levels (DCGL) which are developed by the Buffalo USACE (2011). These project-specific DCGLs are the surface concentration in disintegrations per minute (dpm) per 100 square centimeters (cm^2) (15.5 in^2) that will result in 25 mrem/year to the limiting receptor (Construction Worker). These surface concentrations were determined using a site-specific radionuclide mixture, determined from soil sample results, and take into consideration the radionuclide emissions/disintegration and the effect of beta backscatter on the measured results. These project-specific DCGLs are presented in Table 6-1.

Table 6-2 presents a summary of the static measurement data and shows that 994 or (20 percent) of the total static 4,885 measurements exceeded the project-specific DCGLs. Of the approximately 4,500 swipes taken for removable contamination, only 2 were above the project-specific DCGLs, indicating essentially all contamination on building surfaces is fixed.

The following sections summarize the data for the buildings listed in Table 6-2.

6.1.2.1 Building 1

No radiological surveys were conducted in the basement of Building 1, which was flooded throughout the RI; this observation was consistent with prior investigation reports (ORISE, 1999 and USACE, 2001b).

Contamination greater than project-specific DCGLs for building surfaces was detected in Building 1. Of the 225 locations measured, 9 exceeded the total beta DCGL. The maximum concentration measured was 239 dpm/100 square centimeters (cm^2) total alpha and 20,830 dpm/100 cm^2 total beta.

Contamination greater than the removable project-specific DCGLs for building surfaces was not detected in Building 1. The maximum measured removable surface concentration was (60 ± 20) dpm/100 cm^2 removable beta.

6.1.2.2 Building 2

Contamination greater than the project-specific DCGLs for building surfaces was detected in Building 2. Of the 1,380 locations measured, 2 exceeded the total alpha DCGL and 68 exceeded the total beta DCGL. The maximum surface concentration measured was 3,915 dpm/100cm^2 total alpha and 140,456 dpm/100 cm^2 total beta.

Contamination greater than the removable project-specific DCGLs for building surfaces was not detected in Building 2. The maximum measured removable surface concentration was (18 ± 13) dpm/100 cm^2 removable beta.

6.1.2.3 Building 3

Contamination greater than the project-specific DCGLs for building surfaces was detected in Building 3. Of the 1,571 locations measured, 2 exceeded the total alpha DCGL and 510 exceeded the total beta DCGL. The maximum surface concentration measured was 40,998 dpm/100 cm^2 total alpha and 146,023 dpm/100 cm^2 total beta.

Contamination greater than the removable total beta DCGL for building surfaces was detected in Building 3. One ceiling location exceeded the total beta DCGL. The maximum measured removable surface concentration was (280 ± 50) dpm/100 cm^2 removable beta.

6.1.2.4 Buildings 4/9

Contamination greater than the project-specific DCGLs for building surfaces was detected in Buildings 4/9. Of the 813 locations measured, 211 exceeded the total beta DCGL. None exceeded the total alpha DCGL. The maximum surface concentration measured was 178 dpm/100 cm^2 total alpha and 30,528 dpm/100 cm^2 total beta.

Contamination greater than the removable project-specific DCGLs for building surfaces was not detected in Buildings 4/9. The maximum measured removable surface concentration was (45 ± 20) dpm/100 cm^2 removable beta.

6.1.2.5 Building 5

The survey program was limited in Building 5, a former electrical switch/control room, due to the configuration and contents of the building. This building contains a suspended metal grate floor that runs the long-axis of the building; abandoned control switches and meters line the walls and subfloor areas.

No contamination greater than the project-specific DCGLs for building surfaces was detected in Building 5. Of the 28 locations measured, none exceeded total alpha DCGL or the total beta DCGL. The maximum surface concentration measured was 12 dpm/100 cm^2 total alpha and 1,138 dpm/100 cm^2 total beta.

Contamination greater than the removable DCGLs for building surfaces was not detected in Building 5. The maximum measured removable surface concentration was (6 ± 9) dpm/100 cm^2 removable beta.

6.1.2.6 Building 6

Contamination on building surfaces was detected on the outside surfaces of Building 6; no measurements were taken inside Building 6 because of elevated radiological exposure measurements.

Of the 39 outside locations measured, 2 exceeded the total beta DCGL, but none exceeded the total alpha DCGL. The maximum surface concentration measured was 117 dpm/100 cm^2 total alpha and 1,622 dpm/100 cm^2 total beta.

Contamination greater than the removable DCGLs for building surfaces was not detected on the outside of Building 6. The maximum measured removable surface concentration was (8 ± 10) dpm/100 cm^2 removable alpha.

6.1.2.7 Building 7

Laboratory work surfaces, floors, and common areas within the building interior were surveyed.

Only one interior location with contamination greater than the project-specific DCGLs for building surfaces was detected in Building 7. Of the 60 locations measured, one exceeded the total beta DCGL and none exceeded the total alpha DCGL. The maximum surface concentration measured was 17 dpm/100 cm^2 total alpha and 1,744 dpm/100 cm^2 total beta.

6.1.2.8 Building 8

Similar to Building 6, a detailed interior survey was not conducted in Building 8 due to elevated radiological exposure measurements. A limited floor survey was performed.

Contamination greater than the project-specific DCGLs for building surfaces was detected on both interior and exterior surfaces of Building 8. Of the 75 locations measured, none exceeded the total alpha DCGL and 11 exceeded the total beta DCGL. The maximum surface concentration measured was 539 dpm/100 cm^2 total alpha and 50,237 dpm/100 cm^2 total beta.

Contamination greater than the removable DCGLs for building surfaces was not detected in Building 8. The maximum measured removable surface concentration was (170 ± 40) dpm/100 cm^2 removable beta.

6.1.2.9 Building 24

Both removable and total contamination greater than the project-specific DCGLs for building surfaces was detected in Building 24. Of the 541 locations measured, 172 exceeded the total beta DCGL. None exceeded the total alpha DCGL. The maximum surface concentration measured was 919 dpm/100 cm^2 total alpha and 124,476 dpm/100 cm^2 total beta.

Contamination greater than the removable DCGLs for building surfaces was detected in Building 24. One swipe sample exceeded the removable beta DCGL, but none exceeded the removable alpha DCGL. The maximum measured removable surface concentration was (260 ± 50) dpm/100 cm^2 removable beta.

6.1.2.10 Building 35

Contamination greater than the project-specific DCGLs for building surfaces was detected in Building 35. Of the 123 locations measured, 6 exceeded the total beta DCGL, but none exceeded the total alpha DCGL. The maximum surface concentration measured was 73 dpm/100 cm^2 total alpha and 2,918 dpm/100 cm^2 total beta.

Contamination greater than the removable DCGLs for building surfaces was not detected in Building 35. The maximum measured removable surface concentration (see Table 4-8 in the RI Report) was (8 ± 10) dpm/100 cm^2 removable beta.

6.1.3 Building Surfaces Human Health Risk Summary

The RESRAD-Build code was used for the HHRA to estimate doses for the building interiors. An annual dose limit of 25 mrem/yr (at year zero) was selected based on criteria in the USEPA document “Establishment of Cleanup Levels for CERCLA Sites with Radioactive

Contamination" (USEPA, 1997). As indicated by the data in Table 6-3, seven EUs had annual dose estimates greater than 25 mrem/yr (at year zero).

Radiation doses were estimated in the RI Report to provide additional information to support the decision-making process and to evaluate compliance with radiation protection standards (USEPA, 1999b). Radiation doses were estimated by multiplying the intake by the appropriate dose conversion factor in mrem/pCi. The estimated radiological dose from sediment, surface water, and groundwater coupled with the dose calculated with RESRAD and RESRAD-Build, is presented in Table 6-13 of the RI Report and summarized in Table 6-3.

6.1.3.1 Current Dose

The resultant doses (excluding contributions from background) for many of the EUs exceeded the 25 mrem/yr exposure limit. The dose estimates for each exposure unit are presented in the following paragraphs for sampled concentrations at time (t) of 0 years (t=0). A brief discussion of the ROCs contributing to high dose and the receptors that could potentially receive the highest doses is included. Current dose estimates including contributions from background are presented on Table 6-13 of the RI Report.

Building 1: Potential annual doses from exposure to ROCs in EU1 (Building 1) ranged from 0.1 mrem/yr for a juvenile trespasser to 12 mrem/yr for an on-site worker to 591 mrem/yr for a future construction worker. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 2: Potential annual doses from exposure to ROCs in EU2 (Building 2) ranged from 0.5 mrem/yr for a juvenile trespasser to 14 mrem/yr for an on-site worker to 470 mrem/yr for a future construction worker. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 3: Potential annual doses from exposure to ROCs in EU3 (Building 3) ranged from 0.8 mrem/yr for a juvenile trespasser to 56 mrem/yr for a future construction worker to 120 mrem/yr for an on-site worker. The highest potential dose is from ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Buildings 4/9: Potential annual doses from exposure to ROCs in EU4 (Buildings 4/9) ranged from 0.3 mrem/yr for a juvenile trespasser to 14 mrem/yr for a future construction worker to 30 mrem/yr for an on-site worker. The highest potential dose is from ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 5: Potential annual doses from exposure to ROCs in EU5 (Building 5) ranged from 0.02 mrem/yr for a juvenile trespasser to 3 mrem/yr for an on-site worker to 25 mrem/yr for a future construction worker. Building materials were the only medium sampled at EU5. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 6: Potential annual doses from exposure to ROCs in EU6 (Building 6) ranged from 3.8 mrem/yr for a juvenile trespasser to 58 mrem/yr for an on-site worker to 84 mrem/yr for a future construction worker. Results from static Beta scans of EU6 building materials determined that ROC levels of the building materials were less than background; risk from building materials is zero. Dose evaluation of EU6 soil and sediment determined that potential dose from external exposure to the floor (soil) exceeded the 25 mrem/yr exposure limit with ROCs ^{228}Th, ^{228}Ra, and ^{226}Ra contributing the greatest potential dose.

Building 8: Potential annual doses from exposure to ROCs in EU7 (Building 8) ranged from 48 mrem/yr for a juvenile trespasser to 556 mrem/yr for a future construction worker to 765 mrem/yr for an on-site worker. The highest potential dose is from external exposure to soil with ROCs ^{238}U and ^{235}U contributing the greatest potential dose.

Building 24: Potential annual doses from exposure to ROCs in EU8 (Building 24) ranged from 0.4 mrem/yr for a juvenile trespasser to 19 mrem/yr for a future construction worker to 65 mrem/yr for an on-site worker. The highest potential dose is from ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 35: Potential annual doses from exposure to ROCs in EU9 (Building 35) ranged from 0.2 mrem/yr for a juvenile trespasser to 4 mrem/yr for an on-site worker to 17 mrem/yr for a future construction worker. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U, ^{238}U, and ^{232}Th contributing the greatest potential dose.

6.1.3.2 Selected Future Dose

As contamination transports and decays, the concentrations of contaminants in each EU may change, resulting in future doses that may be different than doses estimated from currently sampled concentrations. RESRAD and RESRAD-Build incorporate contaminant fate and transport and were used to model future doses for each receptor over selected years. The maximum groundwater concentration of ^{238}U leaching from soil contamination was predicted by RESRAD at t=58 and contributes to the potential dose peak exhibited in many of these EUs. Selected future doses (excluding contributions from background) for each receptor are presented for each EU in the following section with time (t) presented in years. Future dose estimates including contributions from background are presented on Table 6-13 of the RI Report.

Building 1: Predicted annual doses from exposure to ROCs in EU1 (Building 1) diminish over time with 0.1 dropping to 0.032 mrem/yr at t=0 and t=25, respectively, for a juvenile trespasser. Similarly, predicted dose for the on-site worker drops from 12 to 8.6 mrem/yr at t=0 and t=25, respectively. However, predicted dose for the hypothetical construction worker remains at 591 mrem/yr for t=0 and t=1 and then drops to 0 mrem/yr at t=25, when building material contamination has eroded away. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 2: Predicted annual doses from exposure to ROCs in EU2 (Building 2) diminish over time with juvenile trespasser dose dropping from 0.5 to 0.15 mrem/yr at t=0 and t=1,000, respectively. Similarly, predicted doses for the on-site worker drop from 14 to 2.3 mrem/yr at t=0 and t=1,000, respectively. Predicted dose for the hypothetical construction worker drops from 470 to 2.9 mrem/yr at t=0 and t=1,000, respectively. Predicted dose for the construction worker also displays a small peak of 19 mrem/yr at t=58 years, due to ^{238}U soil contamination leaching to groundwater. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 3: Predicted annual doses from exposure to ROCs in EU3 (Building 3) diminish from 0.8 to 0.04 mrem/yr at t=0 and t=1,000, respectively, for a juvenile trespasser. Similarly, predicted doses for the on-site worker diminish from 120 to 0.6 mrem/yr at t=0 and t=1,000, respectively. Conversely, while predicted dose for the hypothetical construction worker diminishes from 55 to 1.7 mrem/yr at t=0 and t=1,000, respectively, peak dose of 105 mrem/yr occurs at t=58; the time predicted by RESRAD for peak ^{238}U contamination in groundwater from soil leaching.

Buildings 4/9: Predicted annual doses from exposure to ROCs in EU4 (Buildings 4/9) diminish over time with juvenile trespasser dose dropping from 0.3 to 0.061 mrem/yr at t=0 and t=1,000, respectively. Similarly, predicted doses for the on-site worker drop from 30 to 0.9 mrem/yr at t=0 and t=1,000, respectively. Predicted dose for the hypothetical construction worker drops from 14 to 1.3 mrem/yr at t=0 and t=1,000, respectively. Predicted dose for the construction worker also displays a small peak of 11 mrem/yr at t=58 years, due to ^{238}U soil contamination leaching to groundwater. The highest potential dose is from ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 5: Predicted annual doses from exposure to ROCs in EU5 (Building 5) diminish from 0.02 to 0.0026 mrem/yr at t=0 and t=25, respectively, for a juvenile trespasser and from 3 to 0.57 mrem/yr at t=0 and t=25, respectively, for an on-site worker. Predicted dose for the hypothetical construction worker remained steady with 25 mrem/yr at t=0 dropping slightly to 24 mrem/yr at t=25. Building materials were the only medium sampled at EU5. The highest potential dose to construction workers is from inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 6: Predicted annual doses from exposure to ROCs in EU6 (Building 6) dropped (slightly) from 3.8 to 3.6 mrem/yr at t=0 and t=1,000, respectively, for a juvenile trespasser and from 58 to 54 mrem/yr at t=0 and t=1,000, respectively, for an on-site worker. Potential dose to the hypothetical construction worker rises from 84 mrem/yr at t=0, peaks at 117 mrem/yr at t=58, and settles to 49 mrem/yr at t=1,000. Results from static Beta scans of EU6 building materials determined that ROC levels of the building materials were less than background; risk from building materials is 0. Potential dose from external exposure to the floor (soil) drove the dose estimate with ROCs ^{228}Th, ^{228}Ra, and ^{226}Ra contributing the greatest potential dose.

Building 8: Predicted annual doses from exposure to ROCs in EU7 (Building 8) dropped from 48 to 0.72 mrem/yr at t=0 and t=1,000, respectively, for a juvenile trespasser and from 765 to 11 mrem/yr at t=0 and t=1,000, respectively, for the on-site worker. Potential dose for the construction worker rose from 556 mrem/yr at t=0, peaked at 6,481 mrem/yr at t=58, and settled at 55 mrem/yr at t=1,000. The highest potential dose is from external exposure to soil with ROCs ^{238}U and ^{235}U contributing the greatest potential dose.

Building 24: Predicted annual doses from exposure to ROCs in EU8 (Building 24) dropped from 0.4 to 0.04 mrem/yr at t=0 and t=1,000, respectively, for a juvenile trespasser and from 65 to 0.6 mrem/yr at t=0 and t=1,000, respectively, for an on-site worker. Similarly, potential dose to the future construction worker dropped from 19 to 10 to 1.7 mrem/yr at t=0, t=58, and t=1,000, respectively. Potential dose is primarily from ingestion and inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose.

Building 35: Predicted annual doses from exposure to ROCs in EU9 (Building 35) dropped from 0.2 to 0.09 mrem/yr at t=0 and t=1,000, respectively, for a juvenile trespasser and from 3.7 to 1.3 mrem/yr at t=0 and t=1,000, respectively, for an on-site worker. Potential dose to the future construction worker dropped from 17 to 15 mrem/yr at t=0 and t=58, respectively, and settled at 5.5 mrem/yr at t=1,000. The highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U, ^{238}U, and ^{232}Th contributing the greatest potential dose.

6.1.4 Evaluation of Building Survey Data

The following sections provide a summary of the surface areas exceeding the project-specific DCGLs (presented in Section 6.1.2) and having an exposure-point concentration greater than 25 mrem/yr (as presented in Section 6.1.3).

6.1.4.1 Building 1

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (591 mrem/yr for a future construction worker), with inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding project-specific DCGLs: 9 of 225 (4%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Class 3 Interior Upper Walls and Ceilings: 3 of 70 measurements (4%)
  - Exterior/Outer Walls: 3 of 35 measurements (9%)
  - Work Room Class 1 Floors: 3 of 7 measurements (43%)
  - Class 1 floor locations accounted for three of the values that exceeded the project-specific DCGL but six of the locations were located on structural surfaces (upper walls, ceilings, and exterior wall surfaces.

6.1.4.2 Building 2

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (470 mrem/yr for a future construction worker), with inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding project-specific DCGLs: 68 of 1,362 (5%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Ceiling Cross Beams Class 1 Area: 6 of 20 measurements (30%)
  - Center Section
    - Floors: 1 of 94 measurements (1%)
    - Roof: 7 of 90 measurements (8%)

    - Walls: 9 of 42 measurements (21%)
    - Class 1, Floor Hot Spot No. 2: 2 of 20 measurements (10%)
    - Class 1, Floor Hot Spot No. 3: 5 of 24 measurements (21%)
  - Exterior Walls North, East, South, West: 19 of 81 measurements (23%)
  - North and Center Section Class 1 Floors: 1 of 19 measurements (5%)
  - North Section Roof: 4 of 45 measurements (9%)
  - Railroad Tunnel between Building 2 and Building 3: 1 of 60 measurements (2%)
  - Rooms 2, 3, 9, 10, 11, 12, 13: 1 of 20 measurements (5%)
  - South Section
    - Interior Lower Walls: 3 of 33 measurements (9%)
    - West Side Oven Hood: 6 of 12 measurements (50%)
  - West Side
    - Door No. 11 Entry Surfaces: 1 of 20 measurements (5%)
    - Door No. 15 Entry Surfaces: 1 of 10 measurements (10%)
    - Door No. 19 Entry Surfaces (Class 3 Area): 1 of 16 measurements (6%)

- 70% of the locations in Building 2 that exceed the project-specific DCGLs are located on structural members such as:
  - Exterior walls
  - Interior walls
  - Ceiling cross beams
  - Roof
- The remaining locations exceeding project-specific DCGLs are located on:
  - Floors
  - Equipment.

6.1.4.3 Building 3

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (120 mrem/yr for an on-site worker), with ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 510 of 1,571 (32%) static measurements exceeded the project-specific DCGLs

- The following surfaces exceeded the project-specific DCGLs:
  - Ceiling Surfaces
    - Between Building 6 and Building 8: 25 of 25 measurements (100%)
    - Cross Beams and Lights: 83 of 171 measurements (49%)
  - East Side
    - Door No. 3 Entry Surfaces: 2 of 20 measurements (10%)
  - Floor
    - Hot Spot No. 3: 13 of 20 measurements (65%)
    - Hot Spot No. 4: 17 of 28 measurements (61%)
    - Hot Spot No. 5: 20 of 20 measurements (100%)
  - North and South Sections
    - Class 2 Floors: 44 of 263 measurements (17%)
    - Class 1 Floor: 144 of 246 measurements (59%)
    - Re-Class 1 Ceiling Surfaces: 67 of 90 measurements (74%)
  - Overhead Cranes: 6 of 15 measurements (40%)
  - Rollers East Wall: 10 of 10 measurements (100%)
  - South Section
    - Floor Hot Spot No. 2: 20 of 20 measurements (100%)
    - Floor Hot Spot No. 6: 20 of 20 measurements (100%)
    - Furnace Stacks: 1 of 12 measurements (8%)
    - Hot Spot No. 1: 6 of 20 measurements (30%)
    - Trench, Columns, and Room Walls: 13 of 50 measurements (26%)
    - East Side Furnaces: 2 of 20 measurements (10%)
  - Trench Wall Surfaces: 1 of 20 measurements (5%)
  - Walls: 4 of 133 measurements (3%)
  - Class 2 walls: 4 of 10 measurements (40%)
  - Furnaces/boilers and Rollers: 8 of 21 measurements (67%)

- Survey locations that exceed the project-specific DCGLs are located on both the floors and the structural surfaces, including:
  - Floors: entire building
  - Interior lower walls: entire building with the exception of the southwest wall and the south wall
  - Interior upper wall: the only exceedences were located on the far north wall
  - Ceilings: entire building

6.1.4.4 Buildings 4/9

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (30 mrem/yr for an on-site worker), with ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 211of 813 (26%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Center
    - Class 1 Floor: 31 of 125 measurements (25%)
    - Class 1 Floor: 1 of 12 measurements (8%)
    - Furnace Exhaust: 4 of 12 measurements (33%)
  - Door One North: 1 of 14 measurements (7%)
  - Loading Dock and Walls: 14 of 48 measurements (15%)
  - Northeast Ceiling Strut: 9 of 12 measurements (38%)
  - Rolling Mill Trench Walls: 1 of 31 measurements (3%)
  - South
    - Wall Roof Surfaces: 2of 25 measurements (8%)
    - Furnace No. 2: 8 of 34 measurements (24%)
  - Western Center
    - Class 1 Floors: 62 of 142 measurements (44%)
    - Class 2 Ceiling: 20 of 60 measurements (33%)
    - Class 2 Floors: 49 of 177 measurements (28%)
  - Western North and South Furnaces No. 1 and No. 2: 10 of 48 measurements (21%)
- Survey locations that exceed the project-specific DCGLs are located at the following areas:
  - Floors: entire building
  - Lower walls: entire building
  - Ceiling: east half of ceiling.

6.1.4.5 Building 5

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (25 mrem/yr for a future construction worker), with inhalation exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 0 of 28 (0%) static measurements exceeded the project-specific DCGLs

Note: Because the floors in Building 5 are dirt, no static count surveys were conducted.

6.1.4.6 Building 6

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (84 mrem/yr for a future construction worker); dose evaluation of soil and sediment determined that potential dose from external exposure to the floor (soil) exceeded the 25 mrem/yr exposure limit with ROCs ^{228}Th, ^{228}Ra, and ^{226}Ra contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 2 of 39 (5%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Exterior Wall Surfaces: 2 of 39 measurements (5%)
- Survey locations that exceed the project-specific DCGL are located at the following areas:
  - Western edge of the roof

Note: No samples were taken from the interior of the building because initial readings indicated contamination levels were too high for sampling.

6.1.4.7 Building 7

Note: Surveys were performed and documented for Building 7, which is not identified in site maps. It is assumed to be a portion of the Building 6/8 complex. The results are presented here but no risk assessment was specifically presented in the RI Report for this location. Minimal contamination was found in this location.

The following is a summary of the data presented in the RI Report:

- The following surfaces exceeded the project-specific DCGLs:
  - Lab Work Surface: 1 of 60 measurements (2%).

6.1.4.8 Building 8

The following is a summary of the data presented in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (765 mrem/yr for an on-site worker); the highest potential dose is from external exposure to soil with ROCs ^{238}U and ^{235}U contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 11 of 75 (15%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Floor Surfaces: 11 of 13 measurements (85%)
- Survey locations that exceed the project-specific DCGLs are located at the following area:
  - Floor surfaces: 8 contamination points centrally located in the building and 3 points in the north and northwest portions of the building.

Note: Limited sampling was conducted in the interior of Building 8 because initial readings indicated contamination levels were too high for sampling.

6.1.4.9 Building 24

The following is a summary of the data presented previously and in the RI Report:

- Dose assessment at time t=0: RESRAD-Build analysis shows a dose greater than 25 mrem/yr (65 mrem/yr for an on-site worker); the highest potential dose is from ingestion exposure to building materials with ROCs ^{234}U and ^{238}U contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 172 of 541 (32%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Column Pedestal Surfaces: 67 of 80 measurements (84%)

  - Floor Surfaces
    - Hot Spot No. 2: 19 of 20 measurements (95%)
    - Hot Spot No. 1: 10 of 24 measurements (42%)
  - Interior Ceiling Surfaces: 57 of 125 measurements (46%)
  - Roofing Joist Surfaces: 3 of 8 measurements (38%)
  - North Section Upper and Lower Wall Surfaces: 1 of 50 measurements (2%)
  - Floor Surfaces
    - Northeast Section: 3 of 63 measurements (5%)
    - Southern: 12 of 60 measurements (20%)

- With the exception of the a few expected floor locations, the majority of the measurements in excess of the project-specific DCGLs were on building structural surfaces (column pedestals, interior ceiling surfaces, and roofing floor joists).

6.1.4.10 Building 35

- The following is a summary of the data presented in the RI Report:
- Dose assessment at time t=0: RESRAD-Build analysis shows a dose less than 25 mrem/yr (17 mrem/yr for an on-site worker); the highest potential dose is from inhalation exposure to building materials with ROCs ^{234}U, ^{238}U, and ^{232}Th contributing the greatest potential dose
- Distribution of surfaces exceeding the project-specific DCGLs: 6 of 123 (5%) static measurements exceeded the project-specific DCGLs
- The following surfaces exceeded the project-specific DCGLs:
  - Exterior Walls: 2 of 8 measurements (25%)
  - Interior Walls and Floors: 4 of 35 measurements (11%)
- The limited number of locations that exceeded the project-specific DCGLs were primarily located on the interior and exterior walls of the building.

6.1.5 Data Gap Assessment

The data available for the building materials and contents meet the following RI DQOs (as originally numbered in Section 1.3) for building materials:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium and the media and locations in which they are present).

4d. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

9. Define nature and extent of isotopic uranium, thorium, and radium in surface soils, subsurface soils, and buildings to support risk assessment (using NRC screening levels for human health and DOE guidance for ecological [DOE, 2002]) and development and evaluation of FS alternatives (volume determination).

19. Gather sufficient data to complete a Baseline HHRA for human health and a SLERA.

The following list provides a summary of possible data collection gaps for the Excised Area buildings:

- Building 1 – Survey of basement not performed; limited surveys of Work Room at south end performed
- Building 6 – No measurements were taken on inside surfaces of Building 6, including under the floor plates, because of elevated radiological exposure measurements
- Building 8 – Only 13 measurements were taken on inside surfaces of Building 8 because of elevated radiological exposure measurements
- General – No data are present concerning the ability to decontaminate the building surfaces.

6.1.6 Recommended Additional Data Collection

No additional radiological surveys are necessary. Sufficient data has been obtained to support potential options in the FS.

However, should removal technologies be evaluated as part of the FS, tests of these technologies may be necessary to evaluate their effectiveness in removing the fixed contamination.

6.2 Building Contents Surveys

6.2.1 RI Assessment Program

As part of the RI, an inventory and volume estimate of building contents was performed to support FS alternatives and evaluations. Inventories were performed both inside and outside of Buildings 1, 2, 3, 4/9, 5, and 35. A detailed survey was not conducted in Buildings 6 or 8 due to elevated radiological exposure measurements; however, a sketch depicting the machinery in Buildings 6 and 8 is included in Appendix A of the RI Report (USACE, 2010a).

6.2.2 Summary of Findings

A summary of the building contents survey is presented in Appendix E-2 of the RI Report. The summary includes a table (reproduced as Table 6-4) describing and quantifying inventoried features paired with associated photographic documentation and sketches. Typical materials inventoried included, but were not limited to, miscellaneous metal, wood, electrical, and paper debris, machinery, overhead cranes, and miscellaneous materials (e.g. steel rolls, wood, fire brick, and asbestos).

6.2.3 Data Gap Assessment

The data available for the building materials and contents meets the following RI DQO (as originally numbered in Section 1.3) for building materials:

15. Conduct an inventory of building content/structures to support FS alternatives and evaluations.

As noted previously, a detailed survey was not conducted of the contents in Buildings 6 or 8 due to elevated radiological exposure measurements.

6.2.4 Recommended Additional Data Collection

The ORISE report included in Appendix A of the RI Report, as well as the table in Appendix E-2 of the RI Report (reproduced as Table 6-4) provide adequate information for estimating the quantity of equipment and other items in the buildings. No further investigation is recommended.

6.3 Structural Integrity Assessments

6.3.1 Structural Evaluations and Comments

As part of the RI, a structural survey of the Excised Area buildings (IA01/IA02) was conducted in February 2006 for the purpose of assessing whether the buildings were sufficiently stable for investigation personnel to conduct RI-related investigations without undue risk associated with the condition of the buildings. The assessment determined that the structural condition of the buildings was sufficient for RI-related investigations to proceed without undue risk associated with the structural integrity of the buildings. Information associated with this survey was incorporated into the Site Safety and Health Plan (USACE, 2007c).

The 2006 inspection conducted for the RI confirmed the findings of the structural inspection conducted in October 2000 by USACE as part of the PA/SI. Overall, that inspection recommended:

> "Although the value or potential of any of these buildings is unknown, recommend serious consideration of demolition of building since rehabilitation and retrofitting of these structures will be substantially cost prohibitive, apart from any remediation that is performed. Additionally, the costs to investigate and characterize each building may be quite substantial, not to mention any temporary repairs or rehabilitations these buildings may require during remediation."

The following sections present the specific conclusions and recommendations of the structural inspection conducted in 2000.

6.3.1.1 Building 1

Loose parts of the corrugated metal roof create a non-structural hazard. Extreme care should be practiced when inside this larger bay area. The lower level should be investigated with only the proper caution and personal protective equipment (PPE). This area should also be roped off to avoid someone stumbling down the stairs. The structural integrity of exterior and masonry wall and interior steel frame system appeared adequate. A detailed evaluation of the roof trusses was not performed since access up to the trusses was not possible. No apparent structural deficiencies were discovered with Building 1. Non-structural deficiencies are the major concern.

6.3.1.2 Building 2

No significant structural distresses were identified in Building 2.

6.3.1.3 Building 3

No significant structural distresses were identified in Building 3. Recommend roping off the exterior southeast area of this building until the smokestack is brought down.

6.3.1.4 Buildings 4/9

No significant structural deficiencies were identified. Access to this building should not be limited solely due to structural and non-structural deficiencies.

6.3.1.5 Building 5

No significant structural deficiencies were identified. Access to this building should not be limited solely due to structural and non-structural deficiencies.

6.3.1.6 Buildings 6 and 8

A more detailed structural inspection, with the correct PPE and Health Physicist supervision, is required for both these buildings if more information is desired.

6.3.1.7 Building 35

No significant structural deficiencies were present. Access to this building should not be limited solely due to structural and non-structural deficiencies.

6.3.2 Data Gap Assessment

The data available for the structural assessment of the buildings meets the following RI DQO (as originally numbered in Section 1.3):

4d. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

As noted previously, the scope of the structural assessment was limited to evaluating if the buildings were sufficiently stable for RI-related investigations. Potential data gaps exist concerning:

- Access to almost all the roof trusses supporting the roof were inaccessible, therefore no detailed structural inspection was performed.
- The structural integrity of the buildings following any soil excavation conducted in and near the buildings was not evaluated.
- The structural integrity of the buildings for scabbling or limited demolition activities was not evaluated.
- The structural integrity of the buildings should an adjacent building be demolished was not evaluated.

6.3.3 Recommended Additional Data Collection

Although data gaps are identified, they are not significant for development and evaluation of alternatives in the FS. The existing studies do provide an overall assessment of each building which can be used along with visual observations from the site walk to evaluate potential remedial alternatives. Depending on the alternative selected, additional structural data may be needed for a potential remedial design.

6.4 Asbestos Containing Materials Surveys

6.4.1 RI Assessment Program

A survey for presumed asbestos-containing materials (PACM) was conducted in Buildings 1, 2, 3, 4/9, 5, 6, 8, and 35 as part of the RI on June 21 and 22, 2007. The presence of PACM in the Excised Area buildings was identified and an asbestos air monitoring program was implemented to determine the appropriate health and safety requirements for RI-related investigations in the Excised Area buildings. All of the air sample results came back below the Occupational Safety and Health Administration (OSHA) permissible exposure limit and the clearance levels established by the USEPA (i.e., based on the air sample results, the workers performing RI-related investigations would not be exposed to asbestos concentrations in excess of permissible OSHA or USEPA levels).

6.4.2 Summary of Findings

Appendix E for the RI Report presents the results of the asbestos survey and air monitoring. Table 6-5 identifies PACM found during the survey along with approximate amounts. It should be noted that the quantity is only an estimate given the nature of the field measurements and the significantly damaged state of the insulation.

The following sections summarize the findings of the asbestos survey.

6.4.2.1 Building 1

Boxed insulation was present in the Work Room; the boxes were labeled with "85 percent Magnesia". In addition, 3 linear meters (LM) (10 linear ft [LF]) of PACM was present on piping between Buildings 1 and 2, at the northwest end of Building 1. Magnesia pipe insulation was made from magnesia alba or magnesium carbonate which is an inorganic product that was for many years used in medicine (milk of magnesia) and in other various manufacturing. Asbestos fibers was one material with which was mixed and it acted as a binder to give strength and cohesion to the magnesia sludge which then could be cast or molded into standard shapes and dried. The optimum mix became 85 percent magnesia and 15 percent asbestos fibers. The principle type of asbestos fiber was chrysotile though amosite and crocidolite were also used. This material can be handled similar to all other PACM when remediating the site.

6.4.2.2 Building 2

The boiler room in this building contains two asbestos piles from deteriorating pipe insulation that has fallen off the pipes. All of the pipes (approximately 365 LM [1,200 LF]) in this room were in poor condition, with the asbestos insulation no longer held together with a protective coating.

A tank in the middle of the room, on the second level, was covered in PACM; this coating is deteriorating.

6.4.2.3 Building 3

Approximately 150 LM (500 LF) of piping in this room was presumed to have PACM insulation.

The door areas (approximately 1 m by 2 m [3 ft by 6 ft]) on two large kilns were filled with PACM. Two of the doors were breaking apart and the bricks were damaged.

Pipe insulation on pipes leading from three outdoor tanks to the south side of Building 3 was presumed to be asbestos-containing material (ACM).

6.4.2.4 Buildings 4/9

Approximately 21 LM (71 LF) of PACM was found on piping in these buildings.

6.4.2.5 Building 6

Approximately 44 LM (146 LF) of PACM was found on piping in this building.

6.4.2.6 Building 8

This building had several pipes (approximately 12 LM [400 LF]) where the insulation was in very bad condition. Insulation had fallen off the pipes in large chunks, some of which were darkened from the dirt on the floor.

6.4.2.7 Building 35

This building did not contain any PACM pipe insulation. However, the panels on the building may be Transite panels containing asbestos.

6.4.3 Data Gap Assessment

The data available for the building materials and contents meets the following RI DQO (as originally numbered in Section 1.3) for building materials:

14. Determine the magnitude of any comingled chemical contamination to support establishing transportation and disposal requirements (e.g., waste classification) and associated costs to be included in various FS alternatives.

Although ACM is not considered chemical contamination, it does have specific transportation and disposal requirements, which are addressed under this DQO.

Potential data gaps related to asbestos investigations include:

- General methodology:

  - Quantity determination: the survey was conducted for RI worker safety and did not quantify precise lengths and locations of PACM
  - ACM confirmation: the determination of PACM was based on visual observations and was not confirmed by laboratory analysis of representative samples

- Equipment: the asbestos survey did not evaluate PACM in the machinery (e.g., in gaskets, blocks, refractory)
- Building panels: the asbestos survey did not evaluate the presence of asbestos in building panels.

6.4.4 Recommended Additional Data Collection

The data presented previously are believed to be adequate for the purposes of the FS. Overall, the extent of PACM in piping, machinery, and building panels is not significant and the estimates presented previously provide a reasonable basis for the FS. Hence, no additional investigation is believed to be necessary.

6.5 Sewer/Utilities Data Assessment

6.5.1 RI Assessment

IA08 site utility surface water (i.e., aqueous phase) and sediment (i.e., non-aqueous phase) sampling was performed in IA01, IA02, and IA04. A visual survey documenting sewers, drains, and trenches within these investigative areas was completed as a preliminary activity. The visual survey identified more features than anticipated in the FSP. Therefore, based on the relative distribution of sample quantities proposed in the FSP and an assessment of features identified in the visual survey, a revised list of IA08 surface water and sediment sample locations was developed. The revised list was designed to collect representative samples from features (drains, trenches, sewers) with the highest potential of containing MED/AEC-related constituents. As a result, not all sewers, drains, or trenches identified in the visual survey were discretely sampled; i.e., features that could reasonably be expected to be of similar nature were logged but just one representative sample was collected. RI Report Table 3-55 presents a summary of planned versus actual IA08 surface water and sediment sample locations. RI Report Table 3-56 and Table 3-57 present the sample identification numbers and summary of analyses for IA08 surface water and sediment samples, respectively.

IA08 sample locations are shown on RI Report Figure 3-16. RI Report Table 3-58 presents IA08 feature descriptions, physical characteristics, and an estimate (when possible) of the volume of solid and aqueous wastes contained therein. RI Report Figure 2-12 shows storm sewer, sanitary sewer, and former industrial water intake locations; representative features were sampled as part of the IA08 sampling program.

Procedures for surface water and sediment sampling were completed as outlined in the FSP and in accordance with EM 200-1-3 C.3, *Surface Water Sampling* and EM 200-1-3 C.5, *Sediment Sampling*.

At sample locations where surface water was present, surface water samples were collected by directly dipping and filling the appropriate sample bottles from the feature. At sample locations, where the surface water was below arms reach, the sample was collected by using a stainless steel cup connected to a 3 m (10-ft) steel pole. At IA04D the surface water sample was collected by using a peristaltic pump and dedicated tubing. The surface water samples were analyzed at the off-site laboratory by alpha spectroscopy short count (uranium and thorium COPCs), and USEPA Method 903.0/904 (^{226}Ra and ^{228}Ra).

At sample locations where sediment was present, sediment samples were collected using a stainless steel cup connected to a 3 m (10-ft) steel pole, unless otherwise noted. At each sample location, the sediment was transferred into a stainless steel bowl, characterized, and homogenized with a stainless steel trowel prior to placement in the appropriate sample container(s). The sediment samples were analyzed at the off-site laboratory by gamma spectroscopy (uranium, thorium, and radium COPCs), alpha spectroscopy short count (uranium and thorium COPCs), and USEPA Method 903.0/904 (^{226}Ra and ^{228}Ra).

Sample preparation and handling was conducted in accordance with Section 6 and Section 7 of the FSP. Surface water and sediment samples were analyzed at the off-site laboratory. Sampling equipment was decontaminated in accordance with the FSP and the required quality assurance/ quality control samples were collected accordance with the FSP/QAPP.

6.5.1.1 IA01 – Excised Area Buildings

Features identified in IA01 buildings consisted of covered and/or open utility, drainage, furnace trenches, pits, basins, sewers and drains, and a flooded basement. These features were located throughout seven buildings within the Excised Area, including Buildings 1, 2, 3, 4/9, 6, 8, and 24.

Building 1

A combined total of six surface water samples and seven sediment samples were collected from Building 1; samples were collected on September 11, 2007, October 24, 2007, and November 8, 2007. Four surface water/sediment sample pairs were initially collected from the flooded basement as planned in the FSP. The initial sample data were reviewed and were found to contain elevated COPCs. As a result, an additional two surface water/sediment sample pairs were collected. One "sediment" sample was collected from the ground surface in the alleyway between Building 1 and Building 2 below a drain pipe that originates in the workroom at the south end of Building 1 (sample ID A08-B1-SL-001); surface water was not present; therefore, only a sediment sample was collected. The surface soil sample below the drain pipe was collected with a stainless steel trowel.

Building 2

Two surface water samples and three sediment samples were collected from Building 2 features on September 26, 2007. In two locations, a surface water/sediment sample pair was collected. At the remaining one location (open floor trench), surface water was not present so only a sediment sample was collected.

Building 3

A combined total of 13 surface water and 14 sediment samples were collected from Building 3; samples were collected on September 26, 2007, October 1, 2007, and October 3, 2007. In 12 locations, a surface water/sediment sample pair was collected. At two of the remaining three locations, surface water was not present (furnace pit and north section of double basin); at the third location sediment was not present (south side of double basin).

Building 4/9

Five surface water/sediment sample pairs were collected from Building 4/9 on September 27, 2007.

Building 6 and Building 8

Two sediment samples were collected from Building 6 on October 4, 2007; no surface water was observed in Building 6.

Two surface water/sediment sample pairs were collected from Building 8 on October 4, 2007.

Building 24

Seven sediment samples were collected from covered utility trenches in Building 24 on September 25, 2007; no surface water was observed in the covered trenches. The sediment samples were collected using a stainless steel trowel.

6.5.1.2 IA02 – Building Exterior Areas

Features associated with IA02 included catch basins, down spouts, stormwater drainage swales, and an oil/water separator. A combined total of four surface water and ten sediment samples were collected from these features on September 28, 2007 and October 3, 2007. In four locations, a surface water/sediment sample pair was collected from each feature. At the remaining six locations, surface water was not present and only a sediment sample was collected. The sediment sample at the oil/water separator was collected using a Ponar dredge sampler.

6.5.1.3 IA04A, IA04B, IA04C and IA04D – Allegheny Ludlum Corporation Property

No IA08 features were identified in IA04A or IA04B; therefore, no IA08 samples were obtained. IA08 features identified within IA04C and IA04D included a storm sewer, a pump house sump, and a basin of undetermined use. Sampling activities in IA04C and IA04D are described in the following subsections.

6.5.1.4 IA04C – Area South of Allegheny Ludlum Corporation Operations

Two surface water/sediment sample pairs were collected from IA08 features within IA04C on September 28, 2007. The sediment samples were collected by using a stainless steel cup connected to a 3 m (10-ft) steel pole.

6.5.1.5 IA04D – Area South of IA02

One surface water/sediment sample pair was collected from the former Erie Canal pump house reservoir east of Ohio Street on September 28, 2007. The sediment sample was collected using a Ponar dredge sampler. A second sediment sample was collected from this feature on October 11, 2008, because the laboratory indicated that the original sample had insufficient volume for analysis. The re-sample was collected using the same methodology as the first sample and was assigned the original sample ID, as no analysis had been performed on the initial sediment sample.

6.5.2 Summary of Findings

Investigative Area IA08 was created during FSP development to manage data associated with potentially contaminated materials located in site-wide utilities such as floor drains, pits, sewers, and oil/water separators. The materials in these features are not considered to be available to the environment in their present location and condition; i.e., the materials are contained in concrete lined or other contained systems. A secondary purpose for evaluating site-wide utilities as a dedicated IA was to evaluate the potential for off-site migration of contaminants via the utilities (e.g., water recirculation system) or via the trenches or bedding materials (e.g., groundwater discharge and migration pathways). Therefore, the term “non-native” is emphasized for IA08 surface water and sediment samples to distinguish these materials from naturally occurring, environmentally-available surface water and sediment (e.g., IA09 Erie Canal).

6.5.2.1 Sediments

Data Evaluation

RI Report Figure 4-30 presents the locations and analytical data for IA08 non-native sediment sample locations.

In general, elevated IA08 activity occurs in the same general areas as elevated soil activity. That is, the occurrence of elevated IA08 sample data can be attributed to migration of local materials to the local utility feature.

None of the sediment samples from the utilities exceed the soil PRGs for ^{238}U or ^{232}Th.

6.5.2.2 Surface Water (Site Utilities)

Data Evaluation

RI Report Figure 4-29 presents the locations and analytical data for IA08 non-native surface water sample locations. In general, elevated IA08 activity occurs in the same general areas as elevated soil activity. That is, the occurrence of elevated IA08 sample data can be attributed to migration of local materials to the local utility feature.

RI Report Table 4-142 shows the radium and uranium concentrations shown on Figure 4-29 converted to concentrations suitable for comparison with screening levels used in the RI (USEPA MCL).

Sixteen of the 34 samples show elevated concentrations of ^{234}U, ^{235}U, and ^{238}U that exceed the screening levels used in the RI (USEPA MCL) for total uranium (^{234}U, ^{235}U, plus ^{238}U). Since the ^{230}Th concentrations for these samples are at background levels, it appears that these samples are contaminated with MED/AEC uranium. It is important to note that these are not environmental locations. These are isolated, contained man-made features holding water that will not be used for human purposes, such as drinking, watering, or irrigation.

6.5.3 Recommendations for Additional Data Collection

Since fairly extensive sampling of the site utilities was conducted and none of the sediment samples exceeded the PRGs and the water was generally under or only slightly above the screening levels used in the RI (USEPA MCLs) for total uranium, the utilities have been adequately characterized and additional sampling is not recommended. The following RI DQOs (as originally numbered in Section 1.3) have been met:

1. Determine the nature and extent of MED/AEC-related constituents present at the Guterl Steel Site (i.e., uranium, thorium, and radium and the media and locations in which they are present).

4e. Provide sufficient characterization data to allow completion of subsequent FS, remedial design, and remedial action.

6. Identify the underground utility system within the Guterl Steel Site, including if possible, utilities in place at the time of AEC contracted efforts and utilities installed after the AEC contracted efforts. Includes utilities both between the building and within the buildings.

13a. Determine if isotopic uranium, thorium, and radium has contaminated underground utilities (on site).

19. Gather sufficient data to complete a Baseline HHRA for human health and an SLERA.

However, at the TPP meeting there was a discussion of possibly sampling the manholes located along Ohio Street, where the Guterl utilities leave the site. This would mainly be done to confirm that there are no worker safety issues in the manholes as a result of MED/AEC activities at the site. Therefore, sampling of the water and sediment at the two manholes along the eastern edge of the Guterl property should be considered. DQO objective 13b is established to address off-site underground utilities.

7.0 SUMMARY OF FINDINGS AND RECOMMENDATIONS

7.1 Summary of Findings

7.1.1 Soil

A total of 1,785 soil samples were analyzed at the on-site laboratory by gamma spectroscopy. A total of 138 of the 1,785 soil samples analyzed at the on-site field screening laboratory (7.7 percent) were sent to the fixed analytical laboratory for gamma spectroscopic analysis for the RI COPCs.

The results show that the horizontal extent of locations with SOR greater than one are well delineated. The horizontal extent of SOR greater than one was calculated to be 1.19 ha (2.95 ac). The average depth to bedrock was calculated in each area where SOR greater than one (generally between 1 and 2 m (3 and 6 ft). This was used to calculate the approximate volume at each area. The total volume of soil with SOR greater than one was estimated to be 19,500 m^3 (25,500 yd^3). All borings were advanced as deep as possible (refusal), meaning the vertical delineation of soil contamination has been determined to the extent possible in the areas sampled.

7.1.2 Groundwater

7.1.2.1 Plume Delineation

- Horizontal delineation of the total uranium plume in the shallow weathered/fractured bedrock is incomplete at the downgradient edge of the plume, specifically at locations between the site and Erie Canal to the southeast and between the site and the quarry to the southwest.

- Vertical delineation of the total uranium plume is incomplete. It has not been determined if and to what depth the deeper bedrock is contaminated with uranium, beyond the contamination documented in the shallow weathered/fractured bedrock wells installed to depths of up to 7 m (23 ft) bgs.

- The total uranium plume depicted in the RI based on the two 2007 sampling events, and the data from the 2009 sampling, does not provide sufficient information about the stability of uranium groundwater plume.

7.1.2.2 Flow through Deep Bedrock

- Shallow bedrock is intensely weathered and fractured. The deepest well is 7 m (23 ft) in depth. It is undetermined what constitutes the vertical hydrogeologic boundary for groundwater flow; that is, whether the deeper bedrock is massive and therefore providing a barrier to flow or is fractured and has significant joints and bedrock planes that are conduits for groundwater flow.

7.1.2.3 External Hydrologic Controls on Site Groundwater

- A 242 ha (600-ac) dolostone quarry is located to the southwest of the site and is currently being used to mine the Lockport dolomite limestone formation. It is one of the largest quarries in New York State. The quarry operations require dewatering to remove groundwater and ensure dry work conditions for the mining of dolostone. The effect of dewatering on the site groundwater flow is reflected in the groundwater elevation contour maps presented in the RI.

- Information on other groundwater extraction in vicinity of the site is necessary. The NYSDEC 2000 report titled *Immediate Investigative Work Assignment Area, Guterl Excised Area*, shows an extraction well to the west of the site. During the site walk, it was mentioned that there is an off-site pump and treat system.

- Data are needed on how the site groundwater interacts with the Erie Canal. Canal water elevations during different seasons may be used to determine whether site groundwater flows into or under the canal at various times of the year.

7.1.2.4 Aquifer Characterization

- Slug tests were performed to determine the hydraulic conductivity of the shallow weathered/fractured bedrock during the RI.

- Additional hydraulic conductivity data should be obtained at any additional off-site monitoring wells and deep bedrock wells to be installed to determine hydraulic conductivity variability between different aerial locations and depths in order to build a representative groundwater flow model.

7.1.2.5 Geochemistry

- The presence and the distribution of VOC contamination in groundwater are of interest because the redox conditions of groundwater are affected by the presence of the VOCs and as a consequence affect the mobility of uranium in groundwater. It is relevant during the FS to factor in the co-mingling of the VOC and uranium plumes.

- The mobility of uranium in groundwater is most sensitive to pH, redox conditions, and the concentrations of carbonate, which is a strong complexing agent for the oxidized hexavalent form of uranium. Of these parameters, redox is the most important because local redox conditions control the valence state of uranium which can be either +4 (tetravalent) or +6 (hexavalent). The solubility of hexavalent uranium is about six orders of magnitude higher than the solubility of tetravalent uranium. Redox conditions at the site are currently based on DO and ORP measurements performed in the field. These field measurements are qualitative at best, because they are subject to interferences from contamination of reducing samples with atmospheric oxygen.

- Uranium K_ds are key parameters that affect the predicted transport rates in groundwater models. The uranium K_ds used in the RI modeling were based on laboratory measurements of site-specific samples. Five samples representing native soil outside of the contaminated area, native soil underlying the contaminated area, contaminated soil/fill, and bedrock were tested. The test results yielded a wide range of values but are consistent with literature values from similar environments. These site-specific K_ds are adequate for modeling the transport of uranium along flow paths.

- It is recommended that additional sorption tests be performed to determine the desorption (leaching) of uranium from contaminated soil by infiltrating precipitation. These tests should be performed using contaminated soil from the site and synthetic rain water, as used in the Synthetic Precipitation Leach Procedure (USEPA Method 1312).

7.1.3 Surface Water and Sediment

Surface water and sediment samples were collected from the Erie Canal (12 locations) and sediment samples were collected in the landfill area (five locations - no surface water was present). All surface water samples met the screening levels used in the RI (USEPA MCLs) for drinking water. Though certain investigation areas did contain sediment samples that exceeded background levels, all had SOR values less than one.

7.1.4 Buildings

The data assessment for the buildings included the building surfaces, the building contents, the structural integrity, asbestos containing materials, and the sewer lines/utilities.

7.1.4.1 Building Surfaces

A summary of the static measurement data shows that 994 (approximately 20 percent) of the total static 4,855 measurements exceeded the project-specific total contamination project-specific DCGLs. Of the approximately 4,500 swipes taken for removable contamination, only 2 were above project-specific removable DCGLs, indicating the vast majority of contamination on interior building surfaces is fixed.

The following sections summarize the data for the buildings.

Building 1

No radiological surveys were conducted in the basement of Building 1, which was flooded throughout the RI; this observation was consistent with prior investigation reports (ORISE, 1999 and USACE, 2001b).

Of the 225 locations measured, 9 exceeded the project-specific DCGLs.

Building 2

Of the 1,380 locations measured, 68 exceeded the project-specific DCGLs.

Building 3

Of the 1,571 locations measured, 510 exceeded the project-specific DCGLs.

Buildings 4/9

Of the 813 locations measured, 211 exceeded the project-specific DCGLs.

Building 5

Of the 28 locations measured, no measurements exceeded the project-specific DCGLs.

Building 6

Contamination on building surfaces was detected on the outside surfaces of Building 6. No measurements were taken inside Building 6 because of elevated radiological exposure measurements.

Of the 39 locations measured, 2 exceeded the project-specific DCGLs.

Building 8

Similar to Building 6, a detailed survey was not conducted in Building 8 due to elevated radiological exposure measurements.

Of the 75 locations measured, 11 exceeded the project-specific DCGLs.

Building 24

Of the 541 locations measured, 172 exceeded the project-specific DCGLs.

Building 35

Of the 123 locations measured, 6 exceeded the project-specific DCGLs.

7.1.4.2 Building Contents

A summary of the building contents survey is presented in Appendix E-2 of the RI Report. The summary includes a table describing and quantifying inventoried features paired with associated photographic documentation and sketches. The RI Report summary table is provided in Table 6-4.

7.1.4.3 Structural Integrity

As part of the RI, a structural survey of the Excised Area buildings was conducted in February 2006 for the purpose of assessing whether the buildings were sufficiently stable for investigation personnel to conduct RI-related investigations without undue risk associated with the condition of the buildings. The assessment determined that the structural condition of the buildings was sufficient for RI-related investigations to proceed without undue risk associated with the structural integrity of the buildings.

The 2006 inspection confirmed the findings of the structural inspection conducted in October 2000 by USACE as part of the PA/SI. Overall, that inspection recommended:

> "Although the value or potential of any of these buildings is unknown, recommend serious consideration of demolition of building since rehabilitation and retrofitting of these structures will be substantially cost prohibitive, apart from any remediation that is performed. Additionally, the costs to investigate and characterize each building may be quite substantial, not to mention any temporary repairs or rehabilitations these buildings may require during remediation."

7.1.4.4 Asbestos Containing Materials

A survey for PACM was conducted in Buildings 1, 2, 3, 4/9, 5, 6, 8, and 35 as part of the RI on June 21 and 22, 2007. The presence of PACM in the Excised Area buildings was identified, mostly consisting of pipe insulation. The quantities were relatively small, generally less than 150 LM (500 LF) per building.

7.1.4.5 Sewers/Utilities

In general, elevated activity in the sediments and water found in the site sewers and utility features occurs in the same general areas as elevated soil activity. None of the sediment samples from the utilities exceed the soil PRGs for ^{238}U or ^{232}Th. Sixteen of the 34 samples had concentrations of total uranium above the USEPA MCL which was used to screen the data in the RI Report. It is important to note that these are not environmental locations. These are isolated, contained man-made features holding water that will not be used for human purposes, such as drinking, watering, or irrigation.

7.2 Summary of Recommendations

7.2.1 Soil

No additional data collection is recommended for soil at the Guterl Steel Site.

7.2.2 Groundwater

7.2.2.1 Monitoring Well Installation

Core Logging

The core samples obtained during the recommended borings, including the monitoring wells to complete plume delineation and the deep bedrock stratigraphic borings to Rochester Shale, should be logged. Features to be recorded include observations regarding fracture and joint occurrence, inclinations, encrustations or fillings in joints (with clay, gypsum etc.) and water loss.

In order to define the bottom boundary condition for the groundwater flow model, it is necessary to determine the bottom elevation of the bedrock strata through which groundwater flow occurs in the dolostone underneath the site. It is recommended that two of the borings are cored to the Rochester Shale to help define the lithology and fracture zones beneath the site prior to installing the deep monitoring wells.

On-site Monitoring Wells

Eight on-site locations are recommended for installing new deep bedrock wells. These monitoring well locations coincide with shallow weathered/fractured bedrock wells MW-2, MW13S/D, MW-19, MW-26, MW-602D, MW-604D, MW-605D, and MW-607D where groundwater exceedences of total uranium MCL were documented during the RI or during the 2009 and 2010 post RI groundwater sampling events.

There were two other locations where the shallow groundwater has been documented to exceed the MCLs during the RI; however, these eight locations will provide adequate information to delineate the on-site extent of groundwater contamination.

Property Boundary/Off-Site wells

Five locations are recommended for installing shallow and deep pairs of bedrock monitoring wells. The off-site deep wells may not be necessary if the on-site deep wells do not show uranium MCL exceedences.

7.2.2.2 Well Sampling and Analytical Parameters

In order to fill the data gaps, the following sampling and analyses are recommended, along with a list of analytical parameters where applicable:

Annual Sampling 2011

The 2011 annual sampling should be conducted in the late spring or early summer to coincide with the annual high groundwater high elevations. In addition to the existing on-site wells, each of the newly installed on-site and off-site monitoring wells should be sampled (54 wells total). Field parameters should be measured and include groundwater elevation, temperature, pH, DO, ORP, turbidity, and specific conductivity.

The monitoring wells should be sampled for the following parameters:

- Total uranium – filtered and unfiltered
- Isotopic uranium– filtered and unfiltered
- Anions – chloride, fluoride, sulfate, nitrate, nitrite, and ortho-phosphate– unfiltered
- General chemistry – alkalinity, TDS – unfiltered
- Chlorinated solvent VOCs – those known to be present from previous sampling, TCE, 1,2-DCE, vinyl chloride, 1,1,1-TCA, and 1,1-DCA
- TAL metals – filtered and unfiltered

In addition, the 16 wells where VOCs are known to be present from previous sampling by the NYSDEC (NYSDEC 2008), all newly installed wells and seeps shall be analyzed for VOCs (unfiltered).

Supplemental Sampling 2011

A longer record of groundwater sampling is necessary to evaluate the stability of the uranium plume and the effect of seasonal groundwater fluctuation on total uranium concentrations and mobility in groundwater. It is recommended to perform high frequency monitoring starting immediately after the annual 2011 sampling event to supplement the annual monitoring program with continuous transducer based monitoring of water levels, pH, DO, and ORP to help determine the stability of redox conditions and the effect of seasonal water level changes on redox and uranium concentrations.

7.2.2.3 External Hydraulic Controls

- Contact the dolostone quarry operator to obtain information regarding:
  - Litho-stratigraphic record from the quarry borings
  - Current groundwater extraction rates
  - Seasonal extraction schedules
  - Dewatered water-level elevations
  - Current and future permitted drawdowns
  - Location and flow rates of discharge to the Erie Canal
- Contact NYSDEC to obtain information regarding any off-site groundwater withdrawal that may affect the site groundwater elevations and flow.
- Contact the New York State Canal Corporation to obtain available information on water levels in the Erie Canal during different seasons and any information on geology at the canal section near the site.
- Surface water elevations - The canal is drained during the winter so the flow system in vicinity of the canal changes seasonally. It is recommended that a staff gage be installed in or near the canal to make surface water-level readings at the same time water-level readings are recorded in the monitoring wells for use in establishing the vertical hydraulic gradients from/to the canal.

7.2.2.4 Aquifer Testing

- Additional slug tests should be conducted at any newly installed monitoring well. The data should be analyzed to calculate the localized hydraulic conductivities at individual locations.

7.2.3 Surface Water and Sediment

No additional data collection is recommended for surface water and sediment at the Guterl Steel Site.

7.2.4 Buildings

No additional data collection is recommended for the buildings, as discussed in the following sections.

7.2.4.1 Building Surfaces

No additional radiological surveys are necessary. Sufficient data has been obtained to support potential options in the FS.

7.2.4.2 Building Contents

The ORISE report included in Appendix A of the RI Report, as well as the table in Appendix E-2 of the RI Report provide adequate information for estimating the quantity of equipment and other items in the buildings.

7.2.4.3 Structural Integrity

The previous two structural integrity inspections are sufficient for development and evaluation of remedial alternatives in the FS and no additional assessment is recommended.

7.2.4.4 Asbestos

The data presented previously are believed to be adequate for the purposes of the FS. Overall, the extent of PACM in piping, machinery, and building panels is not significant and the estimates presented previously provide a reasonable basis for the FS.

7.2.4.5 Sewers/Utilities

Since fairly extensive sampling of the site utilities was conducted and none of the sediment samples exceeded the PRGs and the water generally was generally under or only slightly above the screening levels used in the RI (USEPA MCLs) for total uranium, the utilities have been adequately characterized.

At the TPP meeting there was a discussion of possibly sampling the manholes located along Ohio Street, where the Guterl Site utilities leave the property. This would mainly be done to confirm that there are no worker safety issues in the manholes as a result of MED/AEC activities at the site. Therefore, sampling of the water and sediment at the two manholes along the eastern edge of the Guterl Steel Site property should be considered.

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TABLES

TABLE 2-1

Proposed Cleanup Levels for Radionuclides in Soils
Based on 10 CFR 20
(Total of 25 mrem/year All Pathways)
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

ROC	CASRN	Construction Worker (pCi/g)
Th-232[a]	013968-55-3	6.40E+00
Total U[b]	N/A	6.40E+02
U-238[c]	007440-61-1	3.1E+02

NOTES:
Values represent minimum of RESRAD calculated Industrial Use PRG at years 0 or 1000 (year of peak dose per nuclide group).
Groundwater was not considered a drinking water source during development of these values.
[a]PRGs for Th-232 include Ra-228 and Th-228 contribution to dose at time 0.
[b]PRG for Total U includes contribution to dose from U-234, U-235, and U-238, assuming natural abundance of uranium isotopes (in ratio of U-234:U-235:U-238 1:0.046:1).
[c]U-238 can be used as surrogate for Total U DCGL by multiplying Total U DCGL by U-238's activity fraction (0.489).
The sum of fractions rule applies so that the dose limit is not exceeded when more than a single radionuclide is present in soils.

ABBREVIATIONS:

CASRN = Chemical Abstract Services Registry Number

ROC = radionuclide of concern

DCGL = Derived Concentration Guideline Level

N/A = not applicable

pCi/g = picocurie(s) per gram

PRG = Preliminary Remediation Goal

TABLE 5-1

Sum of Ratios Evaluation of Sediment Data from Landfill Area and Erie Canal
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Landfill								
	^{232}Th				^{238}U		SOR	
	Concentration		Ratio		Conc.	Ratio		
Sample ID	Alpha	Gamma	Alpha	Gamma	Alpha	Alpha	A-A	G-A
A03-SD-001	0.6	0.9	0.09	0.14	2.8	0.01	0.10	0.15
A03-SD-002	1.0	0.9	0.16	0.14	1.6	0.01	0.16	0.15
A03-SD-003	0.7	0.7	0.11	0.11	1.5	0.00	0.11	0.11
A03-SD-004	0.71	0.7	0.11	0.11	1.0	0.00	0.11	0.11
A03-SD-005	1.0	1.3	0.16	0.20	2.5	0.01	0.16	0.21
A03-SD-006	0.52	0.31	0.08	0.05	3.0	0.01	0.09	0.06

Erie Canal								
	^{232}Th				^{238}U		SOR	
	Concentration		Ratio		Conc.	Ratio		
Sample ID	Alpha	Gamma	Alpha	Gamma	Alpha	Alpha	A-A	G-A
A09-SD-001	0.55	0.7	0.09	0.11	0.58	0.00	0.09	0.11
A09-SD-002	0.61	0.5	0.10	0.08	0.68	0.00	0.10	0.08
A09-SD-003	0.77	0.5	0.12	0.08	0.74	0.00	0.12	0.08
A09-SD-004	0.7	0.6	0.11	0.09	0.56	0.00	0.11	0.10
A09-SD-005	0.68	0.7	0.11	0.11	0.54	0.00	0.11	0.11
A09-SD-006	0.63	0.7	0.10	0.11	0.64	0.00	0.10	0.11
A09-SD-007	0.69	0.5	0.11	0.08	0.47	0.00	0.11	0.08
A09-SD-008	0.65	0.50	0.10	0.08	0.58	0.00	0.10	0.08
A09-SD-009	1.1	0.8	0.17	0.13	0.77	0.00	0.17	0.13
A09-SD-010	0.7	0.5	0.11	0.08	0.73	0.00	0.11	0.08
A09-SD-011	0.7	0.67	0.11	0.10	0.54	0.00	0.11	0.11
A09-SD-012	0.8	0.7	0.13	0.11	0.7	0.00	0.13	0.11

Data from RIR Tables 4-89 and 4-145.
All concentration in pCi/g.
Calculated using PRGs of 6.4 pCi/g for 232Th and 310 pCi/g for 238U
A-A = SOR calculated from ^{232}Th Alpha and ^{238}U Alpha
G-A = SOR calculated from ^{232}Th Gamma and ^{238}U Alpha
The G-A SOR was calculated because there wasn't any Gamma data for ^{238}U

TABLE 6-1

Project-Specific Derived Concentration Guideline Levels (DCGL)
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

	Levels[a] (dpm/100cm^2)	
	Total[b]	**Removable**
Alpha	1,200	240
Beta	1,512	252

Notes:

[a] DCGLs developed by USACE Buffalo District to determine instrument response to limit dose to 25 mrem/year to an onsite construction worker.

[b] Fixed plus removable contamination (as measured by a static measurement)

TABLE 6-2

Evaluation of Screening Level Surveys for IA01 Buildings[a] against Site-Specific DCGLs[b]
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Building	Number of Locations Measured	Static Measurements[c] ($dpm/100cm^2$)					
		Number exceeding DCGL		Alpha		Beta	
		total alpha	total beta	average	maximum	average	maximum
1	225		9	2	239	217	20,830
2	1,380	2	68	22	3,915	361	140,456
3	1,571	2	510	55	40,998	3,477	146,023
4/9	813		211	5	178	1,055	30,528
5	28			-1	12	594	1,138
6	39		2	22	117	-6	1,622
7	60		1	-2	17	378	1,744
8	75		11	46	539	3,195	50,237
24	541		172	28	919	5,628	124,476
35	123		6	2	73	277	2,918
	4,855	**4**	**990**	**29**	**40,998**	**2,119**	**146,023**

Notes:

[a] Results taken from RIR Appendix T

[b] DCGLs developed by USACE Buffalo District to determine instrument response to limit dose to 25 mrem/year to an onsite construction worker.

[c] No swipe measurement results exceeding project-specific DCGLs were identified during review of hard-copy results available in RIR

TABLE 6-3

RESRAD-Build Dose Assessment at Time t=0 for Buildings[a]
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Exposure Unit	Net Total Dose (mrem/year)	Receptor	Net Building Surface Dose (mrem/year)	Net Soil Dose (mrem/year)
EU1 (Building 1)	591	Construction Worker	591	--
EU2 (Building 2)	469	Construction Worker	462	7.47
EU3 (Building 3)	120	On-site Worker	118	2.12
EU4 (Buildings 4/9)	30	On-site Worker	27.3	2.26
EU5 (Building 5)	25	Construction Worker	24.5	--
EU6 (Building 6)	84	Construction Worker	--[b]	84.2
EU7 (Building 8)	764	On-Site Worker	97.9[b]	666
EU8 (Building 24)	65	On-Site Worker	63.6	1.07
EU9 (Building 35)	18	Construction Worker	9.6	8.75

Notes:
[a] Data excerpted from RIR Table 6-13

[b] A detailed survey was not conducted due to elevated radiological exposure measurements

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
Building 1							
North Room of Building 1, Facing North	F1	misc. debris	wood & metal	10 m³ (10 yd³) wood 2 m³ (2 yd³) metal		None	Low
Center Room of Building 1	F2	misc. equipment & debris (includes smelters & furnaces)	wood & metal	5 m³ (5 yd³) wood 10 m³ (10 yd³) metal	2 smelters and 3 furnaces in this room	None	Low
Small Elevated Work Room in Southwest Corner or Building 1	F3	asbestos materials & misc. debris	asbestos material, wood, metal	3 m³ (3 yd³)		None	Low
South Room of Building 1	F4	misc. debris	wood & metal	5 m³ (5 yd³)	includes debris in small room at southern extent of Building 1	None	Low
Building 2							
Building 2 (North Section), Main Room	F1	15-ton overhead crane	metal	-----			Medium
Building 2 (North Section), Main Room	F2	chemical vats & associated piping	metal	20 m x 10 m x 2 m (65 ft x 30 ft x 6ft)	not field measured, estimated from ORISE drawings and field photo		Low
Building 2 (North Section), Main Room	F3	misc. debris	wood & metal	5 m³ (5 yd³)			Low
Building 2 (North Section), Main Room	F4	misc. equipment & debris	wood & metal	1 m (1 yd) wood 10 m³ (10 yd³) metal			Low
Boiler Room, Building 2 (North Section)	F5	2 boilers	metal	0.2 m x 17 m x 16m (2/3 ft x 56 ft x 53 ft)	dimensions estimated from URS drawing and field photo	100740-S-124	< criteria on boilers and in room
Boiler Room, Building 2 (North Section)	F6	misc. debris	wood & metal	4 m³ (4 yd³)	debris on east side of boiler room		Low

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
North Part of Building 2 (Center Section)	F7	misc. debris (including pipe racks)	wood & metal	1 m^3 (1 yd^3) wood 20 m^3 (20 yd^3) metal			Low
Middle Part of Building 2 (Center Section)	F8	misc. debris	wood & metal	20 m^3 (20 yd^3)			Low
Middle Part of Building 2 (Center Section)	F9	fire bricks	bricks	12 m^3 (12 yd^3)			Low
Southern Part of Building 2 (Center Section)	F10	misc. debris	wood & metal	10 m^3 (10 yd^3)			Low
Southern Part of Building 2 (Center Section)	F11	ceramic material	ceramic	10 m^3 (10 yd^3)			Low
Southern Part of Building 2 (Center Section)	F12	15-ton overhead crane	metal	-----			Medium
Room South of the Locker Room, Building 2 (Center Section)	F13	misc. debris	wood & metal	10 m^3 (10 yd^3) wood 5 m^3 (5 yd^3) metal			Low
Locker Room, Building 2 (Center Section)	F14	lockers	metal	20 m^3 (20 yd^3)		100740-S-190	1 of 4 floor measurements > criteria
Offices on East Side of Building 2 (Center Section)	F15	misc. debris	wood & metal	10 m^3 (10 yd^3)			Low
2 Shop Areas, SW Corner, Building 2 (Center Section)	F16	misc. debris	wood & metal	10 m^3 (10 yd^3) wood 5 m^3 (5 yd^3) metal	estimates include both shop rooms		Low
Building 2 (South Section)	F17	furnace	metal	3 m x 2 m x 12 m (8 ft x 6 ft x 40 ft)		10074-S-344	Most measurements > criteria

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
Building 2 (South Section)	F18	paperwork	paper	5 m^3 (5 yd^3)			Medium
Building 2 (South Section)	F19	misc. debris	wood & metal	5 m^3 (5 yd^3)			Medium
Building 2 (South Section)	F20	work benches	wood	5 m^3 (5 yd^3)			Medium
Building 2 (South Section)	F21	furnace	metal	6 m x 6 m x 3 m (20 ft x 20 ft x 10 ft)		10074-S-314 10077-S-315	< criteria
Building 2 (South Section)	F22	fire bricks	brick	10 m^3 (10 yd^3)			Medium
Building 2 (South Section)	F23	misc. debris	wood & metal	5 m^3 (5 yd^3)			Medium
East Room in Building 2 (South Section)	F24	misc. electrical material	electrical/metal	4 m^3 (4 yd^3)			Low
Southwest Corner of Building 2 (South Section)	F25	3 silos	metal	1 @ 6 m x 3 m (20 ft tall x 10 ft diameter) 2 @ 6 m x 3 m (18 ft tall x 8 ft diameter)			Medium
Southwest Corner of Building 2 (South Section)	F26	misc. equipment	metal	2 m x 2 m x 4 m (6 ft x 6 ft x 12 ft)			Medium
Paper Room in Southeast Section of Building 2	F27	paperwork	paper	10 m^3 (10 yd^3)			Low
Building 3							
West Side of Building 3 (NW Corner)	F1	steel cylinders	metal	(100 pieces) 0.6 m x0.6 m x 3 cm (2 ft long x 2 ft diameter x 1 inch thick)			High
North Entrance to Building 3, Overhead	F2	5-ton overhead crane	metal	-----			High
East Side of Building 3 (North Section)	F3	misc. debris	wood & metal	2 m^3 (2 yd^3)			High

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
East Side of Building 3 (North Section)	F4	steel furnaces	metal	(2 units) each 3 m x 6 m x 5 m (8 ft x 20 ft x 15 ft)			High
East Side of Building 3 (North Section)	F5	metal machinery (hoods, grinders, misc.)	metal	5 m^3 (5 yd^3)			High
Northeast Corner of Building 3	F6	misc. equipment & debris	wood & metal	2m^3 (2 yd^3)			High
East Side of Building 3 (North Section), across from Building 8	F7	steel rolls	metal	55 @ 2 m x 0.5 m (5 ft long x 1.5 ft diameter) 37@ 1 m x 0.5 m (4 ft long x 1.5 ft diameter) 5 @ 3 m x 0.5 m (8 ft long x 1.5 ft diameter)		100740-S-130	all measurements > criteria
West Side of Building 3 (North Section), next to Building 6	F8	steel rolls	metal	73 @ 3 m x 0.05 m (4-8 ft long x 1.5-2 ft diameter)		100740-S-129	measurements < criteria
East Side of Building 3 (North Section), across from Feature 8 (F8)	F9	misc. equipment & debris	wood & metal	3 m^3 (3 yd^3)			High
East Side of Building 3 (North Section), across from Building 6	F10	misc. equipment & debris	wood & metal	2 m^3 (2 yd^3) wood 6 m^3 (6 yd^3) metal			High
South of Feature 10 (F10)	F11	misc. equipment & debris	metal	15 m^3 (15 yd^3) equipment 2 m^3 (2 yd^3) debris			High
East Side of Building 3, below Hopper Tracks	F12	cabinets & cafeteria heater	metal	3 m^3 (3 yd^3)			Low
Building 3 (E-W Oriented Trench)	F13	misc. debris	wood & metal	1 m^3 (1 yd^3) wood 1m^3 (1 yd^3) metal			High
South Section of Cafeteria	F14	cafeteria kitchen	metal	5 m^3 (5 yd^3)			Low

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
N-S Oriented Trench (South Section Building 3)	F15	trench rubble	wood & metal	2 m³ (2 yd³) wood 15 m³ (15 yd³) metal			High
East Side of Building 3 (South Section), next to N-S Oriented Trench	F16	3 furnaces	brick & metal	3 @ 4 m x 3 m x 9 m (12 ft x 8 ft x 30 ft)		100740-S-129	several measurements > criteria
East Side of Building 3 (South Section), next to N-S Oriented Trench	F17	misc. debris	wood & metal	5 m³ (5 yd³)	yardage is cumulative for debris located between the 3 furnaces in Feature 16 (F16)		High
East Side of Building 3 (South Section), near Southern Extent of N-S Oriented Trench	F18	furnace	brick & metal	8 m x 5 m x 2 m (25 ft x 15 ft x 6 ft)	northeast of press in Feature 19 (F19)		High
East Side of Building 3 (South Section), near Southern Extent of N-S Oriented Trench	F19	press	metal with concrete base	6 m x 5 m x 1 m (20 ft x 15 ft x 4 ft)			High
South End of Building 3	F20	steel rolls	metal	85 @ 1 m x 0.3 m (4 ft long x 1 ft diameter) 10 @ 1 m x 0.5 m (4 ft long x 1.5 ft diameter) 9 @ 2 m x 0.5 m (6 ft long x 2 ft diameter) 8 @ 4 m x 1 m (12 ft long x 2.5 ft diameter)			High
Small Room in Southeast Corner of Building 3	F21	misc. debris	wood & metal	2 m³ (2 yd³) wood 2 m³ (2 yd³) metal			High

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
Small Room at South End of Building 3	F22	equipment (steel rolls, lathes)	metal	50 @ 1 m x 0.3 m (3-4 ft long x 1 ft diameter) 3 lathes each 2 m x 2 m x 6 m (5 ft x 6 ft x 20 ft)			High
Buildings 4/9							
Southeast Corner of Building 49	F1	furnace & fume hood	brick & metal	8 m x 8 m x 8 m (25 ft x 25 ft x 25 ft)			Medium
Southeast Corner of Building 49	F2	misc. debris	wood & metal	3 m^3 (3 yd^3)			Medium
East Side of Building 49	F3	furnace & fume hood	brick & metal	12 m x 6 m x 6 m (40 ft x 20 ft x 20 ft)		100740-S-097	Several measurements > thorium criteria
east side of Building 49	F4	unknown steel equipment	metal	3 m x 3 m x 3 m (10 ft x 10 ft x 10 ft)			Medium
Northeast Corner of Building 49	F5	electrical transformer	metal	5 m x 2 m x 3 m (15 ft x 5 ft x 8 ft)			Medium
Northeast Corner of Building 49	F6a	misc. debris	wood & metal	2 m^3 (2 yd^3)			Medium
Northeast Corner of Building 49	F6b	5-ton overhead crane	metal	-----			High
North Side of Building 49	F7	3 choppers (saws) & misc. debris	metal	3 choppers each 2 m x 2 m x 2 m (5 ft x 5 ft x 5 ft) 1 m^3 (1 yd^3) wood and metal			Medium
Northwest Corner of Building 49	F8	misc. equipment & debris	metal	5 m^3 (5 yd^3)			Medium
Loading Dock in Building 49	F9	fire bricks & metal roll & misc. equipment & misc. debris	brick	fire brick @ 2 m^3 (2 yd^3) metal roll, 1 @ 2 m x 0.5 m (6 ft long x 2 ft diameter) debris @ 2 m^3 (2 yd^3) equip. @ 3 m x 2 m x 3 m (8 ft x 6 ft x 10 ft)			Medium

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
Central Area of Building 49	F10	5-ton overhead crane	metal	-----			High
Central Area of Building 49	F11	furnace/heater blower	metal	2 m x 1 m x 3 m (6 ft x 4 ft x 8 ft)			Medium
Central Area of Building 49	F12	furnace	metal	4 m x 4 m x 2 m (12 ft x 12 ft x 6 ft)			Medium
Central Area of Building 49	F13	Press	metal	4 m x 1 m x 3 m (12 ft x 4 ft x 8ft)			Medium
Central Area of Building 49	F14	metal cutter	metal	1 m x 2 m x 3 m (4 ft x 6 ft x 8 ft)			Medium
Southern Portion of Building 49	F15	misc. metal debris	metal	7 m^3 (7 yd^3)	green ferns growing in same general area where debris located		Medium
Southern Portion of Building 49	F16	2 furnaces	metal	2 m x 12 m x 3 m (7 ft x 40 ft x 10 ft)		100740-S-099	Several measurements > thorium criteria
Southern Portion of Building 49	F17	press	metal	9 m x 1 m x 2 m (30 ft x 4 ft x 5 ft)			Medium
Southern Portion of Building 49	F18	misc. metal & debris	metal	5 m^3 (5 yd^3)			Medium
Southern Portion of Building 49	F19	5-ton crane	metal	-----			High
Southeast Corner of Building 49	F20	metal gear assembly	metal	2 m x 3 m x 3 m (6 ft x 8 ft x 8 ft)	bottom of feature goes down into trench		Medium
Southeast Corner of Building 49	F21	misc. debris (including 4 rolls, lockers, & refrigerator)	metal	4 rolls @ 2 m x 0.5 m (5 ft long x 1.5 ft diameter)			Medium
Trench in the Central-East Side of Building 49	F22	misc. debris	wood & metal	2 m^3 (2 yd^3) wood 3 m^3 (3 yd^3) metal	debris in and around trench		Medium

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
North and South Sides of Trench in Central-East Sides of Building 49	F23	metal heaters and associated duct work on N & S sides of trench	metal	7 m^3 (7 yd^3)			Medium
Building 5							
Inside Building 5	F1	electrical equipment	metal	2/3 of building: 260 m^2 (2800 ft^2)			Low
Building 6							
Intersection Area of Buildings 3, 6, & 8	F1	furnace	brick & metal	2 m x 4 m x 3 m (6 ft x 12 ft x 8 ft)	not field measured, dimensions estimated from ORISE drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
Intersection Area of Buildings 3, 6, & 8	F2	furnace	brick & metal	6 m x 4 m x 3 m (20 ft x 12 ft x 8 ft)	not field measured, dimensions estimated from ORISE drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 6 from Outside Exclusion Zone in Building 3	F3	roll mill	metal	17 m x 3 m x 2 m (55 ft x 10 ft x 6 ft)	not field measured, dimensions estimated from ORISE drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 6 from Outside Exclusion Zone in Building 3	F4	steel rolls	metal	20 racks of 10 rolls per rack each 1 m x 0.5 m (4 ft long x 1 ft diameter)	not field measured, dimensions estimated from Building 6 entrance and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 6 from Outside Exclusion Zone in Building 3	F5	misc. debris	wood	5 m^3 (5 yd^3)	not field measured, dimensions estimated from Building 6 entrance and photo.	Gamma exposure rate survey (10/29/2007)	High
Building 8							

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
At Entrance of Building 8 looking to the west (southern most 1 of 3)	F1	furnace	brick & metal	6 m x 4 m x 3 m (20 ft x 12 ft x 8 ft)	not field measured, dimensions estimated from drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 8 from Outside Exclusion Zone in Building 3	F2	furnace	brick & metal	6 m x 4 m x 3 m (20 ft x 12 ft x 8 ft)	not field measured, dimensions estimated from drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 8 from Outside Exclusion Zone in Building 3	F3	steel rolls & misc. equipment	metal	10 rolls @ 2 m x 0.5 m (6 ft long x 1.5 ft diameter) + unknown amount misc. equipment & debris	not field measured, dimensions estimated from drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
View of Building 8 from Outside Exclusion Zone in Building 3	-----	misc. equipment & debris	metal equip. Wood & metal debris	-----	not field measured, dimensions estimated from drawings and photo.	Gamma exposure rate survey (10/29/2007)	High
Building 35							
West Side of Building 35	F1	misc. wood shelves and benches	wood	2 m^3 (2 yd^3)			Low
Northeast Corner of Building 35	F2	misc. debris	wood & metal	5 m^3 (yd^3)			Low
Center of Building 35, Overhead	F3	5-ton overhead crane	metal	-----			Low
Outside							
Outside Building 2, East of the Boiler Room, next to the Railroad Tracks	F1	grinding stones	grinding stones	10 m^3 (10 yd^3)			Low
Outside Building 2, East of the Boiler Room, next to the Railroad Tracks	F2	100 misc. steel rolls & gears	metal	----			Medium

TABLE 6-4

Building Contents Inventory
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

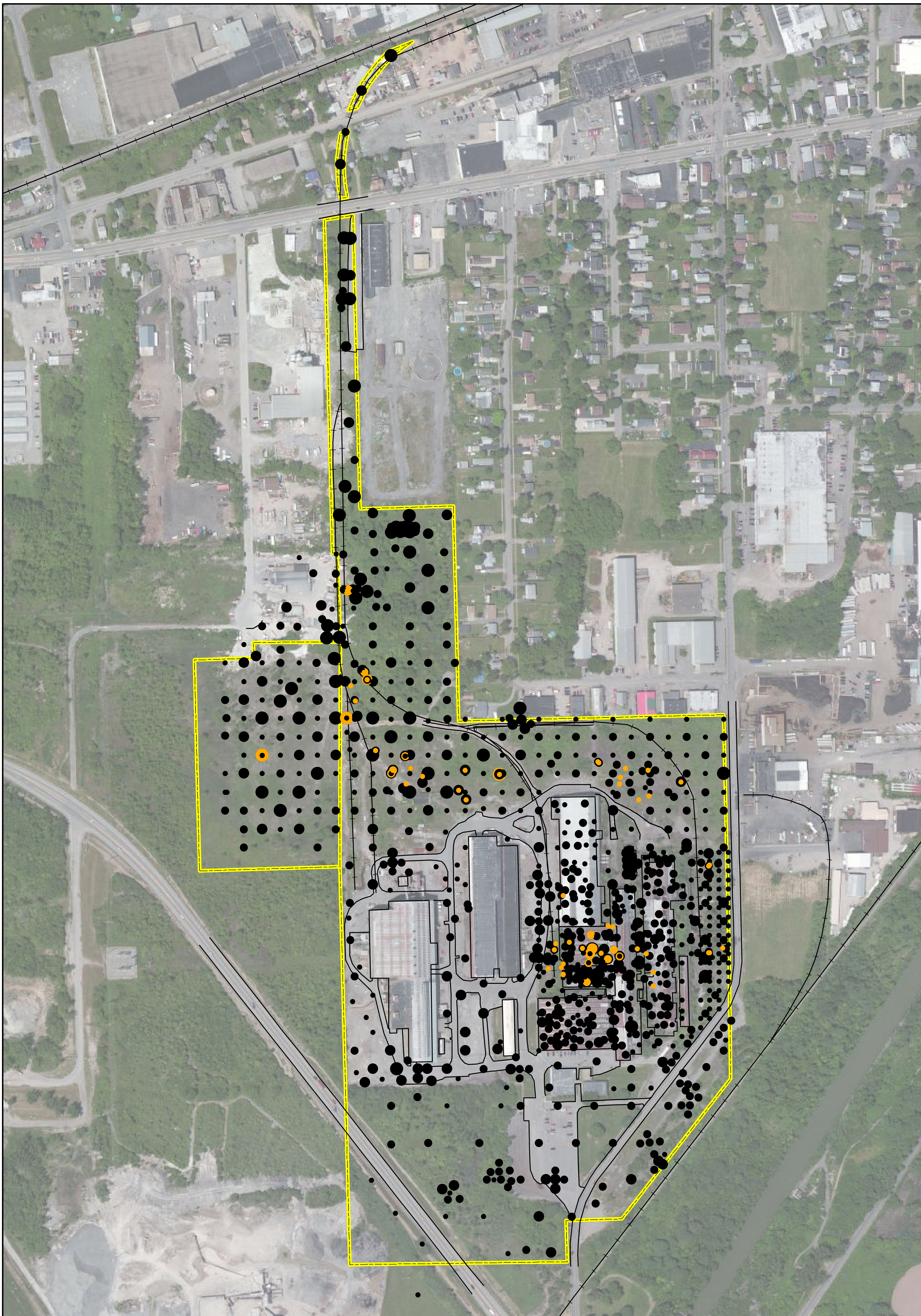
Location within Building	Feature Number	Feature/Item	Material	Approximate Dimension or Volume	Notes	Contamination Surveys	Contamination Probability
North Side of Building 2	F3	crushed fiberglass tank	fiberglass	5 m^3 (5 yd^3)			Low
North Side of Building 2	F4	metal tanks	metal	1 @ 4 m x 3 m (12 ft long x 10 ft diameter) 1 @ 5 m x 3 m (15 ft long x 10 ft diameter)			Low

TABLE 6-5

Summary of Potential Asbestos-Containing Material on Piping
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York

Building	Horizontal Insulation	Vertical Insulation	Approximate Total Insulation
1	~3 linear meter (LM) (10 linear feet [LF[) outside, with a pile of debris on the wall where the pipes enter	None	~3 LM (10 LF)
2	~370 LM (1,200 LF)	~6 LM (20 LF)	~376 LM (1,220 LF)
Between 2 and 3	~35 LM (120 LF) in passage between Buildings 2 and 3	None	~35 LM (120 LF)
3	~150 LM (500 LF)	None	~152 LM (500 LF)
4	~20 LM (65 LF)	None	~20 LM (65 LF)
6	~40 LM (140 LF)	~2 LM (6 LF)	~42 LM (146 LF)
8	~120 LM (400 LF)	None	~120 LM (400 LF)
9	~2 LM (6 LF) on top of bathroom	None	~2 LM (6 LF)
35	None	None	None
Total	~740 LM (2,441 LF)	~8 LM (26 LF)	~748 LM (2,467 LF)

FIGURES



Legend

- Guterl Site Boundary
- Guterl Buildings

Sum of Ratios by Depth

0-6"	6-30"	30-54"	> 54"	
●	●	●	●	SOR < 1
●	●	●	●	SOR >= 1

$$\frac{C_x}{SL} = \frac{Concentration}{Screening\ Level}$$

$$SOR = \frac{C_{Th232}}{6.4\ pCi/g} + \frac{C_{Ur238}}{310\ pCi/g}$$

Data Sources: Off-site ORISE gamma spectroscopy;
On-site RI gamma spectroscopy;
SOR Equations based on PRGs.
PRGs based on industrial reuse.

0 75 150 300
Feet

United States Army Corps of Engineers
Buffalo District

BUILDING STRONG

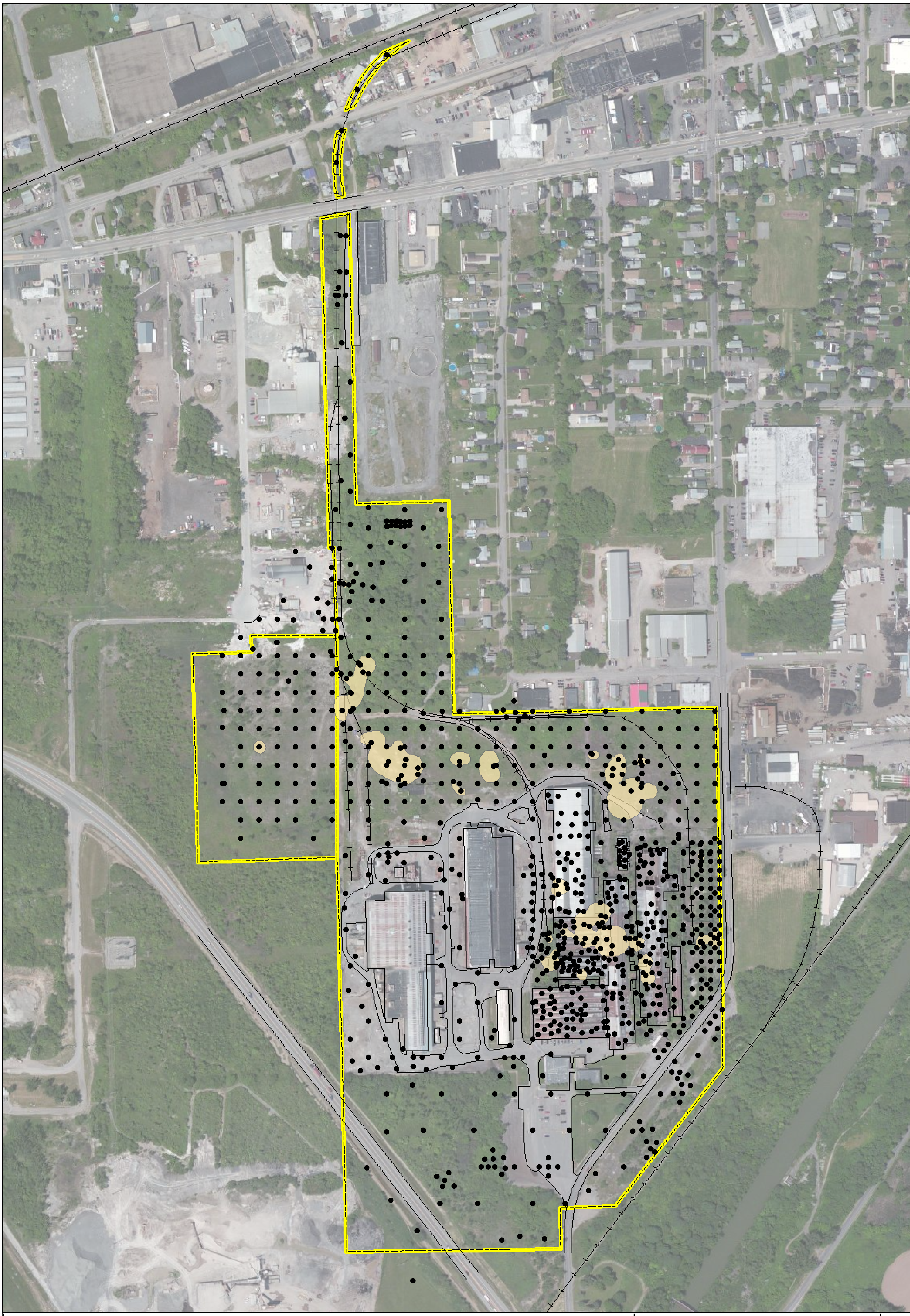
N W E S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

SOR for Soil Data
from ORISE and RI Reports

Date:	Scale:	Figure No. :
11/16/2011	1 inch = 333 feet	3-1

Filename: Guterl_084_AllSORInBuild_Soil_20111116.pdf



Legend

- Sample Location
- Sum of Ratios > 1 (Modeled)
- Guterl Site Boundary
- Guterl Buildings

0 75 150 300 Feet

United States Army Corps of Engineers
Buffalo District

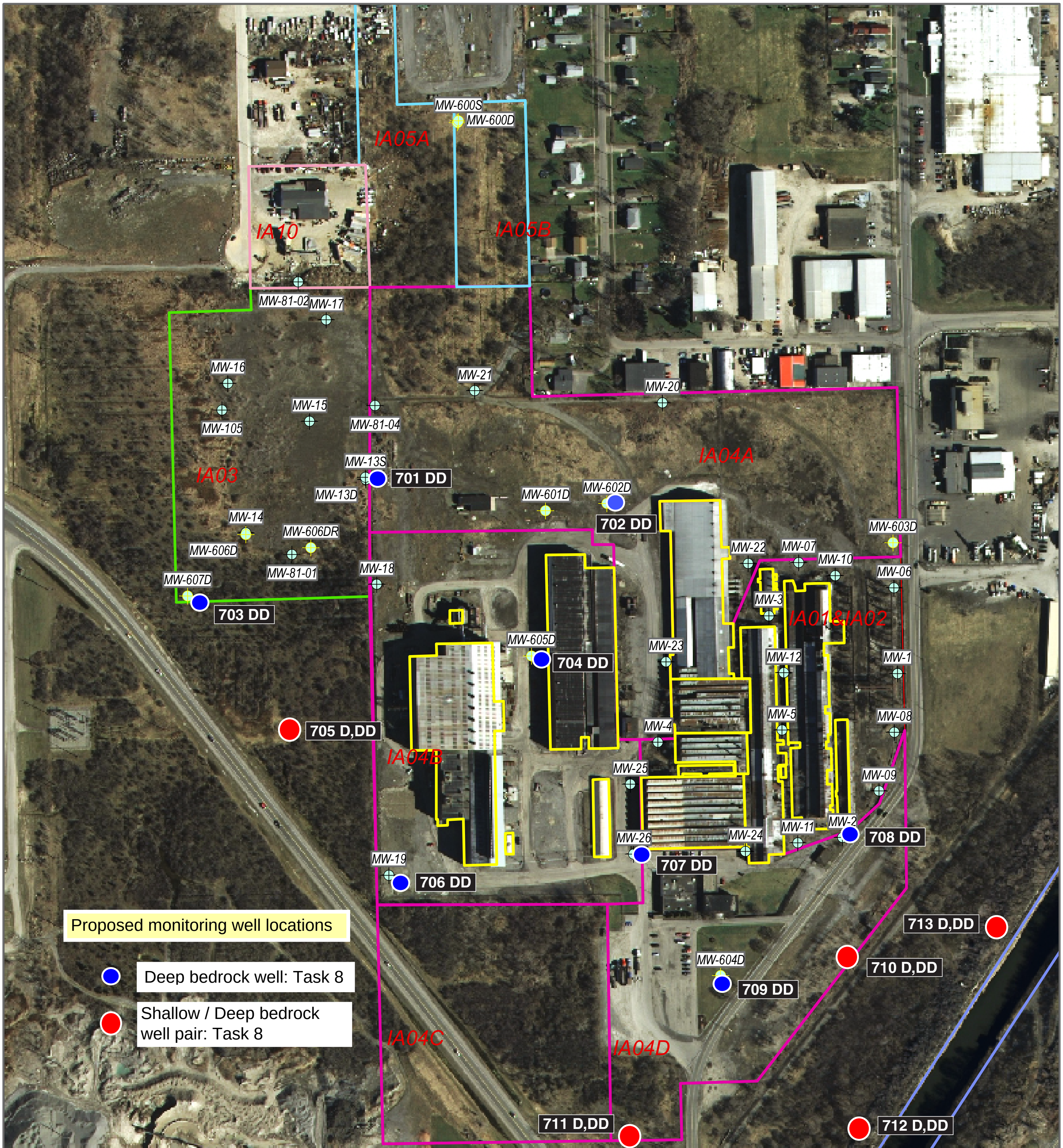
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Modeled Areas Where SOR > 1

Date:	Scale:	Figure No. :
11/16/2011	1 inch = 333 feet	3-2

Filename: Guterl_092_AllSORInBuild_SurfaceModel_20111116.pdf



Monitoring Wells

- Remedial Investigation Wells
- Other Wells
- Guterl Site Boundary

- IA01 - Excised Area - Building Surfaces and Interiors
- IA02 - Excised Area - Building Exteriors
- IA03 - Landfill Area
- IA04 - NCIDA Property
- IA05 - Railroad Right-of-Way
- IA09 - Erie Canal
- IA10 - Lot 7.1
- Guterl Buildings

Note:
MW-1 through MW-5 and MW-105 (NYSDEC, 1997)
MW-06 through MW-26 (NYSDEC, 2006)
MW-600 through MW-607 (Earth Tech, 2007)
MW-81-01, MW-81-02 and MW-81-04 (SLC, 1981)

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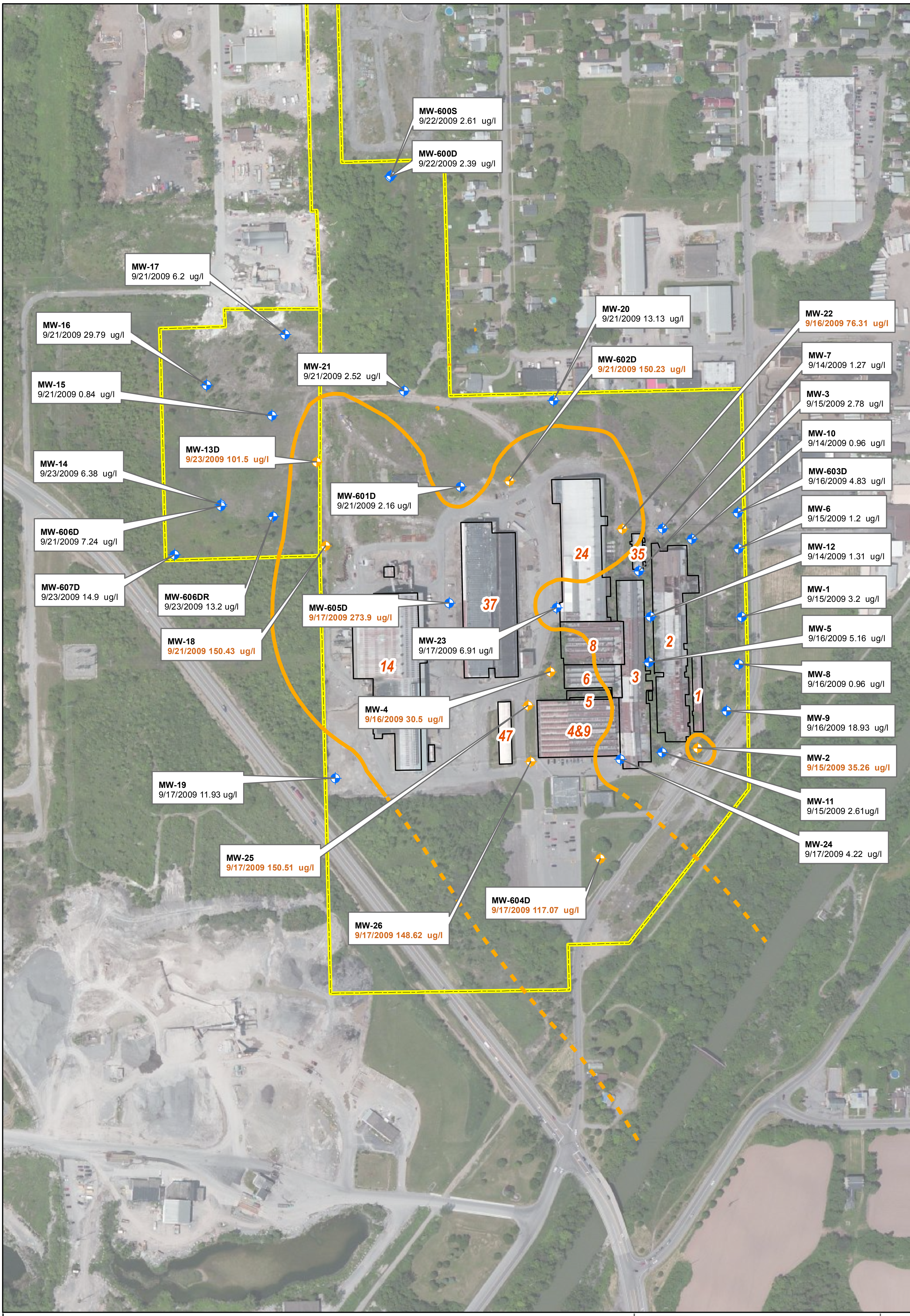
GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

DATA GAP INVESTIGATION
PROPOSED MONITORING WELL LOCATIONS

01/16/11	Scale: 1 inch = 350 feet	Figure No. : 4-1



Legend

Total Uranium (Unfiltered) in Groundwater Samples

- < 30 µg/l
- >= 30 µg/l
- Extent of Groundwater > 30 µg/l
- Guterl Buildings
- Guterl Site Boundary

µg/l = micrograms per liter

0 75 150 300 Feet

United States Army Corps of Engineers
Buffalo District
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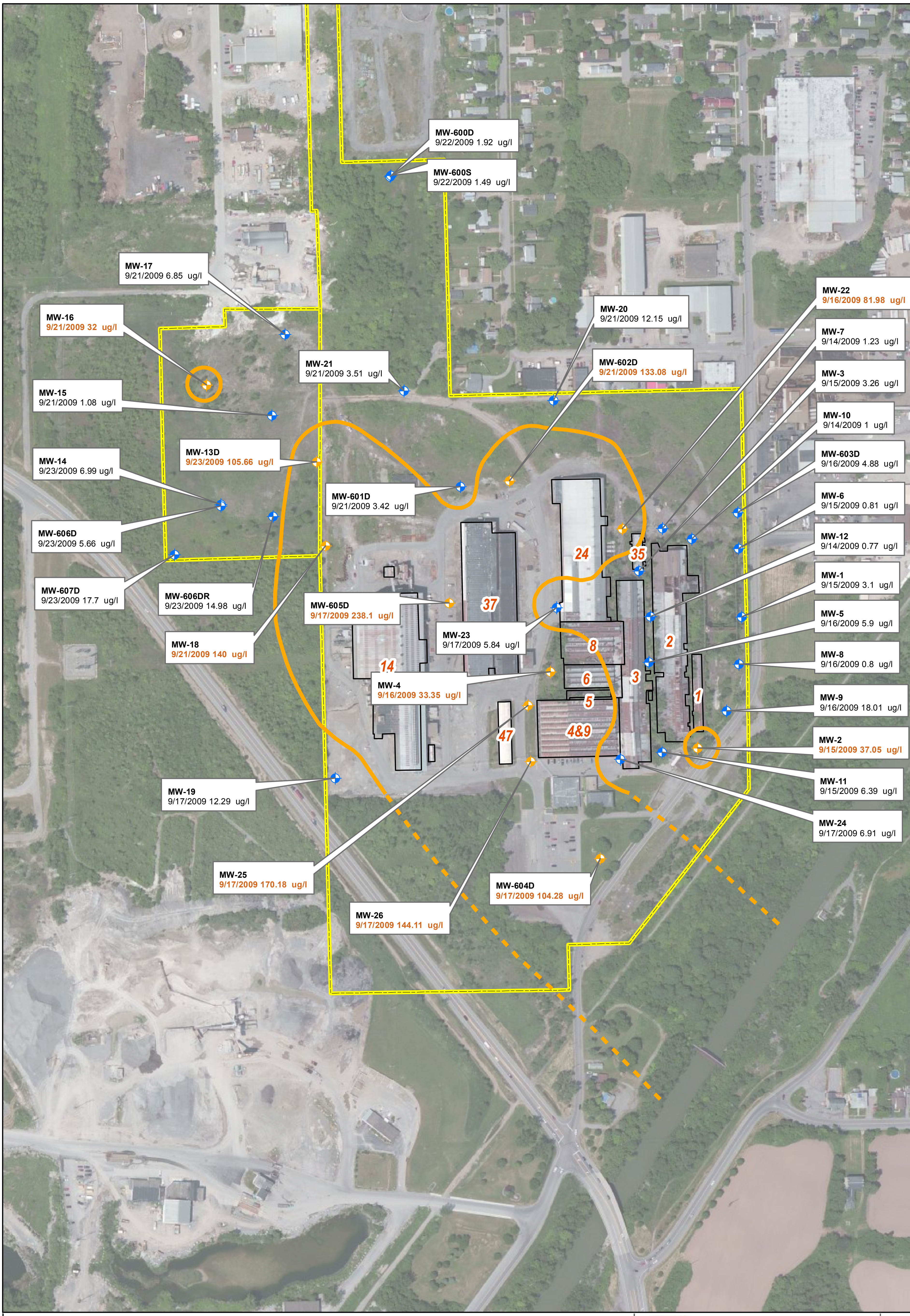
GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Total Uranium (Unfiltered) in Groundwater
(September 2009)

Date:	Scale:	Figure No. :
11/17/2011	1 inch = 300 feet	4-2

Filename: Guterl_090_GWTotUr_2009_20111117.pdf



Legend

Total Uranium (Filtered) in Groundwater Samples

- < 30 µg/l
- >= 30 µg/l
- Extent of Groundwater > 30 µg/l
- Guterl Buildings
- Guterl Site Boundary

µg/l = micrograms per liter

0 75 150 300 Feet

United States Army Corps of Engineers
Buffalo District

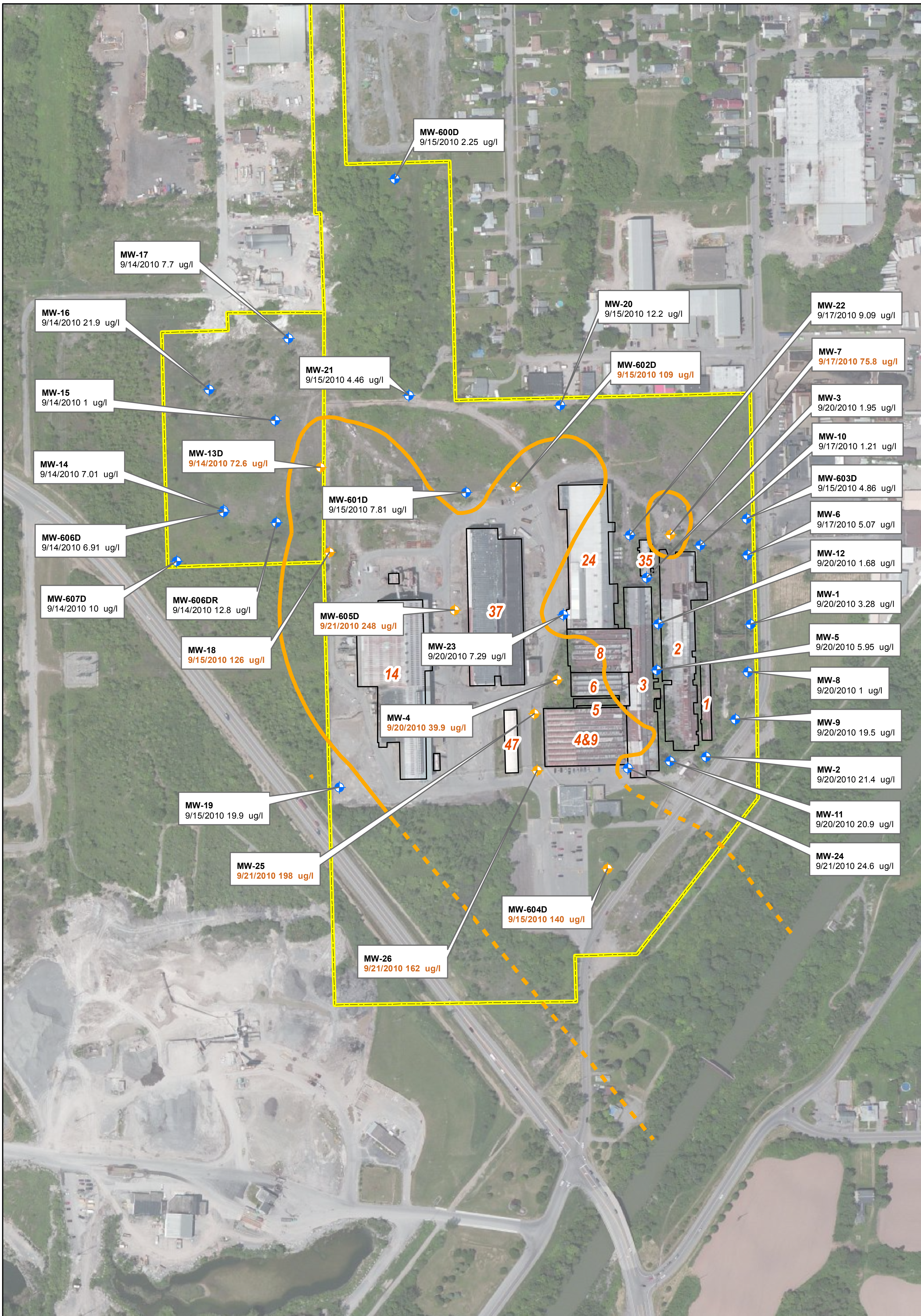
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Total Uranium (Filtered) in Groundwater
(September 2009)

Date:	Scale:	Figure No. :
11/17/2011	1 inch = 300 feet	4-3

Filename: Guterl_091_GWTotUrDis_2011_20111117.pdf



Legend

Total Uranium (Unfiltered) in Groundwater Samples

- < 30 µg/l
- >= 30 µg/l
- Extent of Groundwater > 30 µg/l
- Guterl Buildings
- Guterl Site Boundary

µg/l = micrograms per liter

0 75 150 300 Feet

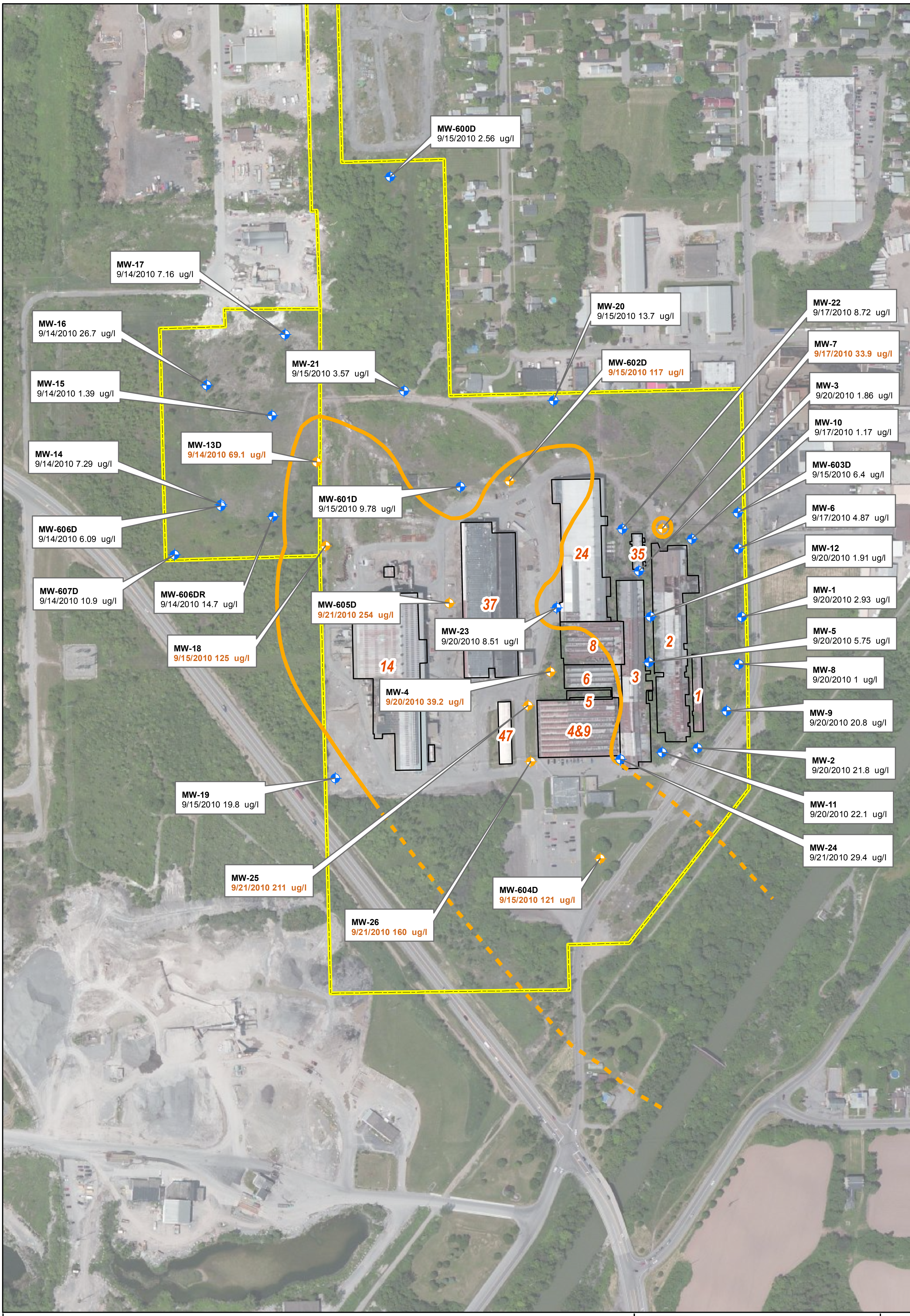
United States Army Corps of Engineers
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Total Uranium (Unfiltered) in Groundwater
(September 2010)

Date:	Scale:	Figure No. :
11/17/2011	1 inch = 300 feet	4-4

Filename: Guterl_088_GWTotUr_2010_20111117.pdf



Legend

Total Uranium (Filtered) in Groundwater Samples

- < 30 µg/l
- >= 30 µg/l
- Extent of Groundwater > 30 µg/l
- Guterl Buildings
- Guterl Site Boundary

µg/l = micrograms per liter

0 75 150 300 Feet

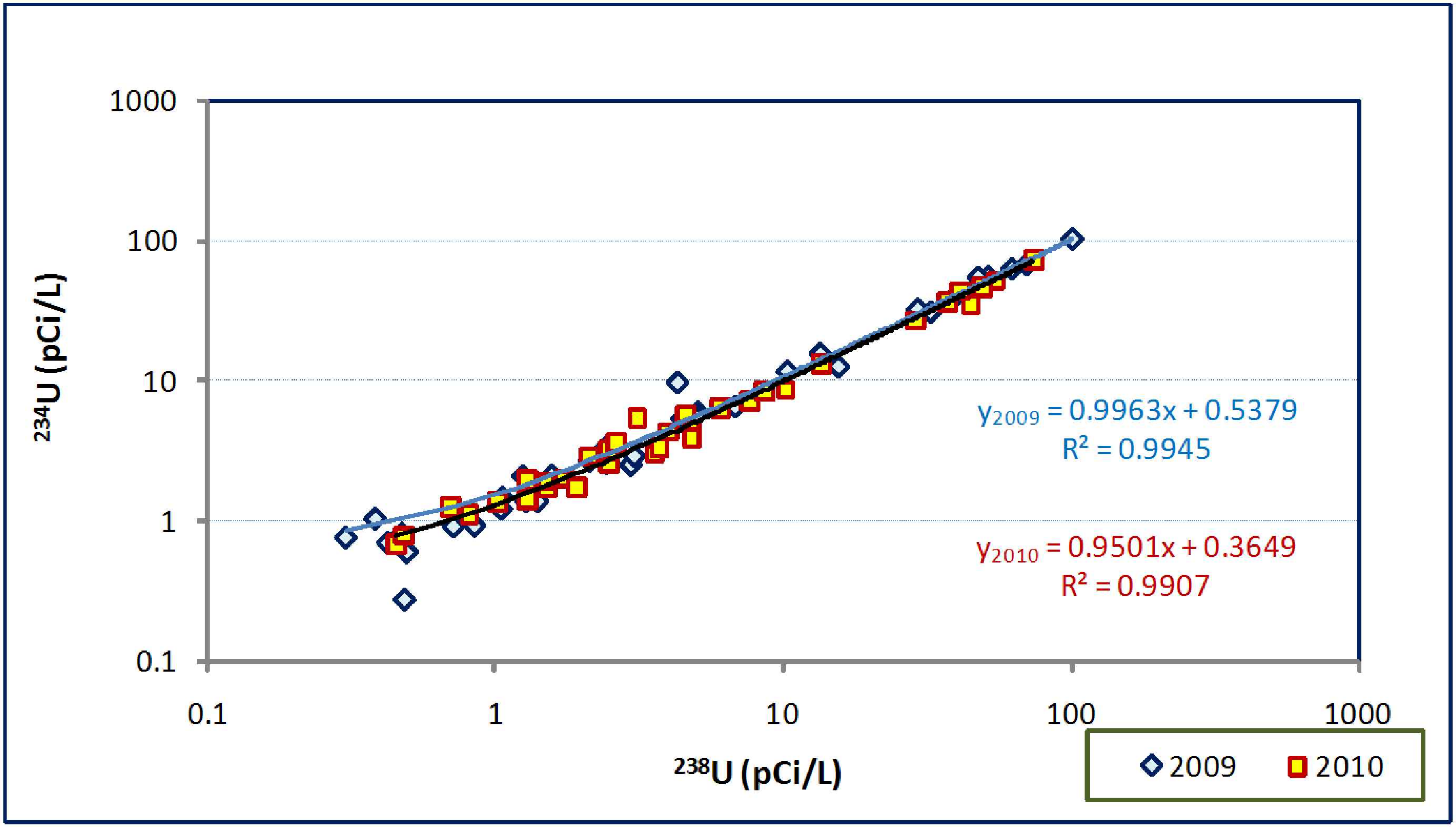
United States Army Corps of Engineers
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Total Uranium (Filtered) in Groundwater
(September 2010)

Date:	Scale:	Figure No. :
11/17/2011	1 inch = 300 feet	4-5

Filename: Guterl_089_GWTotUrDis_2010_20111117.pdf



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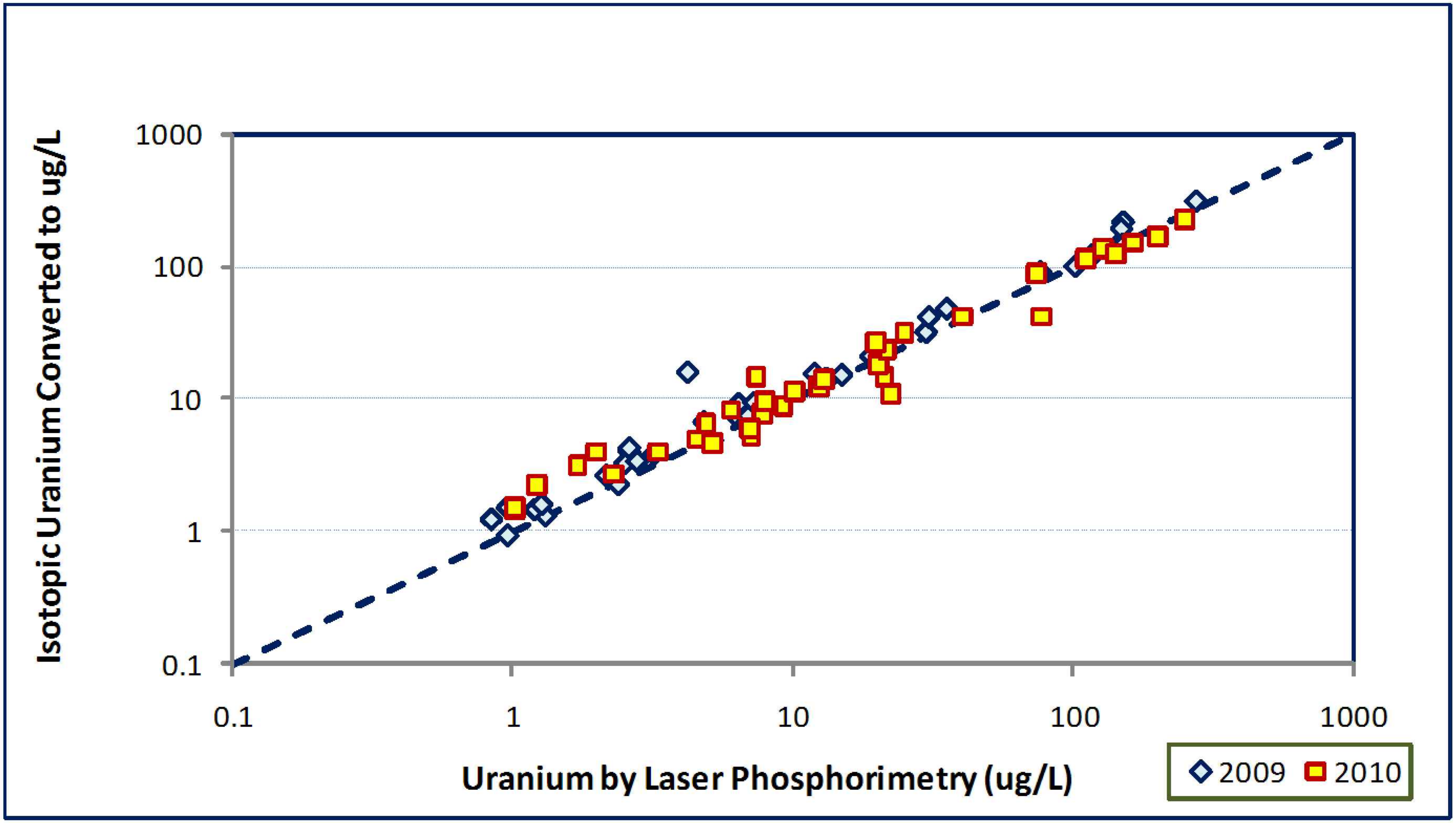
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

^{234}U vs. ^{238}U Activities in Unfiltered Samples

Date:	Scale:	Figure No.:
11/17/2011	NO SCALE	4-6

M. Najar - 140416-01.dwg - Thursday, 11/17/11 - 2:43 PM



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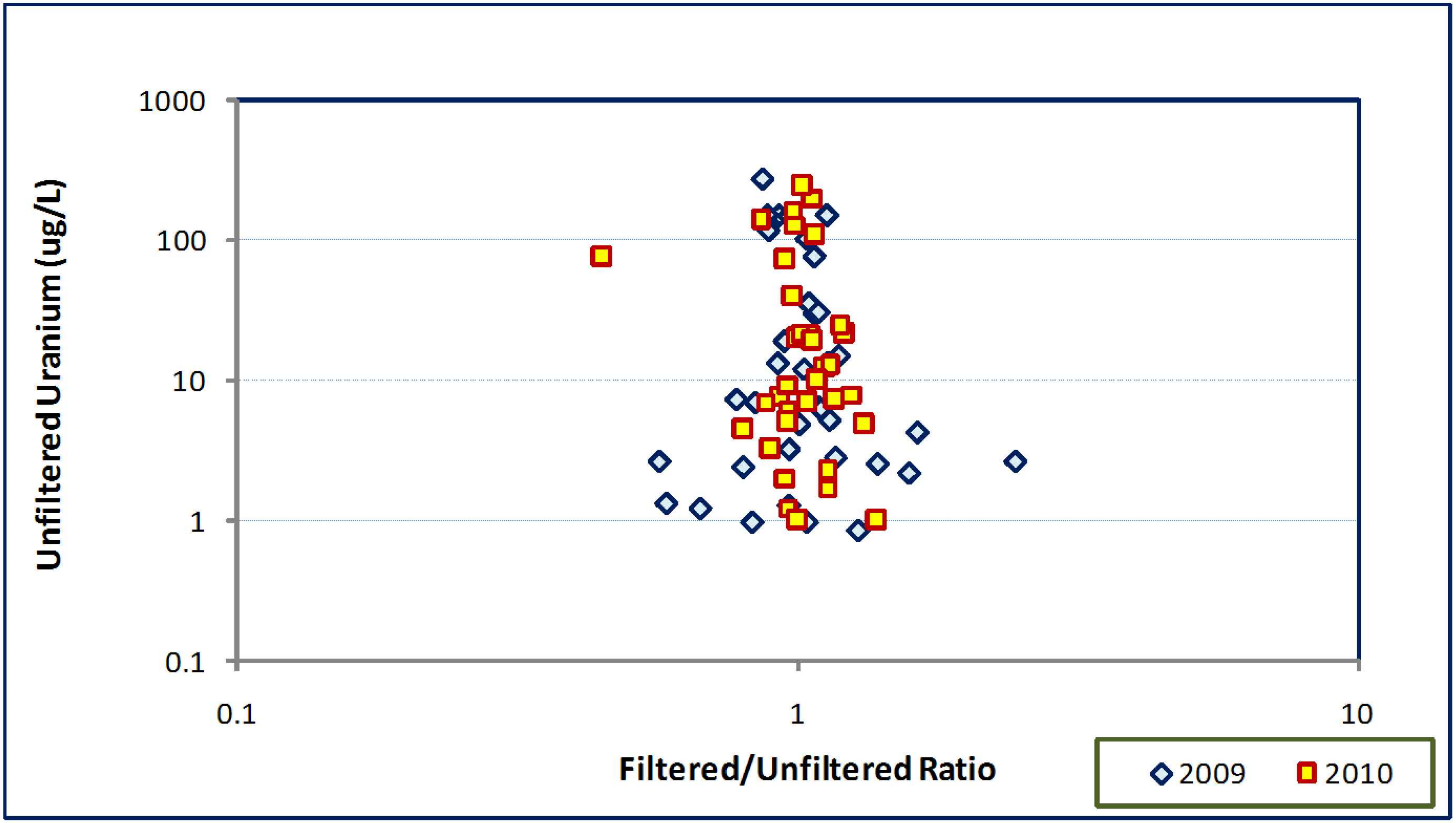
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Comparison of Uranium Concentrations via Alpha Spectroscopy and Laser Phosphorimetry in Unfiltered Samples

Date:	Scale:	Figure No.:
11/17/2011	NO SCALE	4-7

M. Najar - 140416-01.dwg - Thursday, 11/17/11 - 12:31 PM



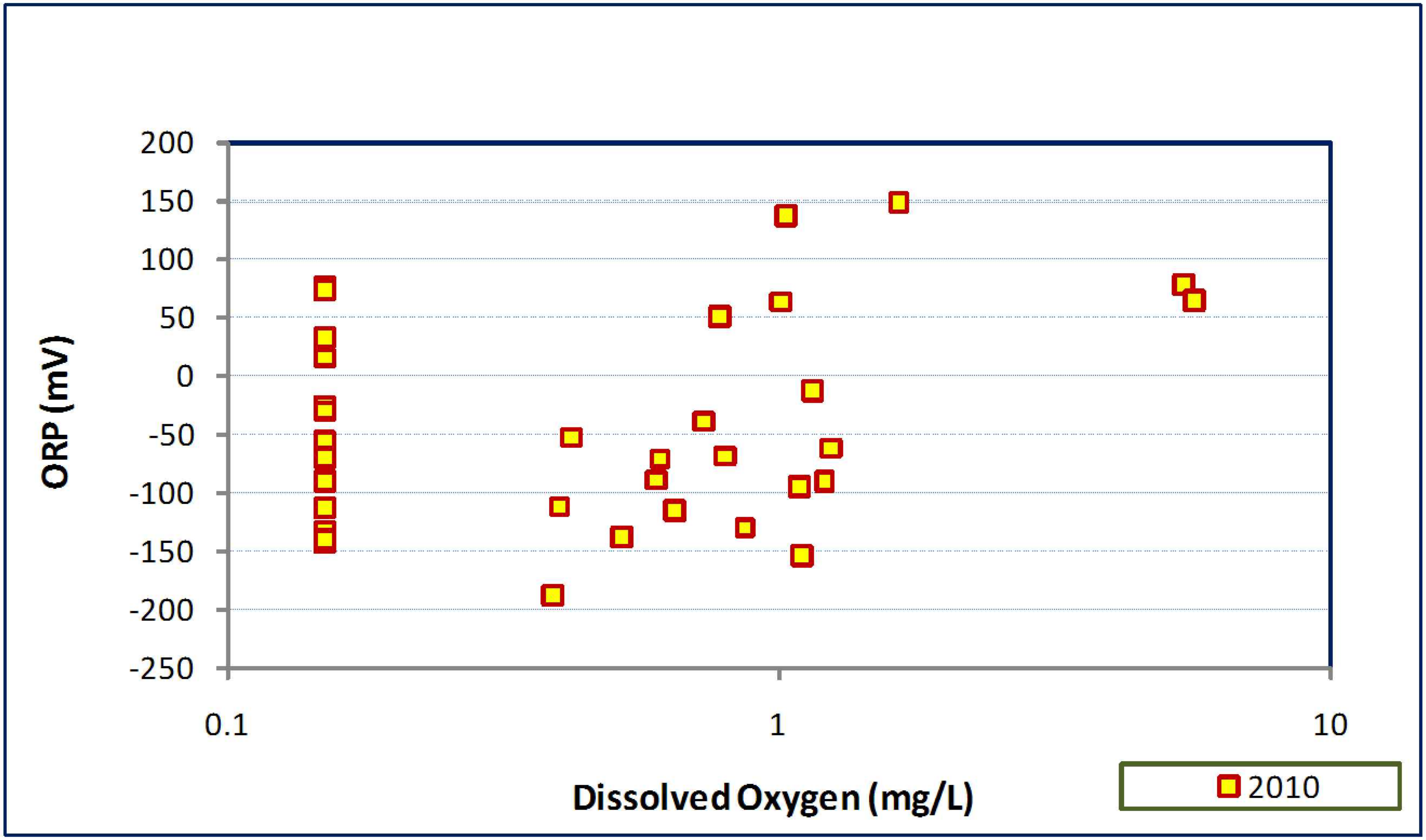
United States Army Corps of Engineers
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Unfiltered Uranium vs. Filtered/Unfiltered Ratios

Date:	Scale:	Figure No.:
11/17/2011	NO SCALE	4-8

M. Najar - 140416-01.dwg - Thursday, 11/17/11 - 12:31 PM



United States Army Corps of Engineers
Buffalo District
BUILDING STRONG

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

Dissolved Oxygen vs. Oxidation-Reduction Potential in 2010 Samples

Date:	Scale:	Figure No.:
11/17/2011	NO SCALE	4-9

M. Najar - 140416-01.dwg - Thursday, 11/17/11 - 12:32 PM

APPENDIX A

REMEDIAL INVESTIGATION REPORT TABLES

TABLE 3-55
SUMMARY OF PLANNED vs. ACTUAL SURFACE WATER AND SEDIMENT SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Area	FSP Estimated Locations per Area	Actual Locations per Area	Actual Surface Water Sample Quantity Per Area	Actual Sediment Sample Quantity Per Area
IA03	6	6	0	6
IA09	12	12	12	12
Subtotal	**18**	**18**	**12**	**18**
Interior Areas (IA01)				
IA08 (outside IA01)	6	13	7	13
Building 1 (basement)	4	7	6	7
Building 2	0	3	2	3
Building 3	8	14	13	14
Building 4/9	4	5	5	5
Building 6	2	2	0	2
Building 8	2	2	2	2
Building 24	6	7	0	7
Subtotal	**32**	**53**	**35**	**53**
Estimated Total (w/out contingency)	**50**	**71**	**47**	**71**
Contingency (20%)	**10**	**0**	**0**	**0**
TOTAL (including contingency)	**60**	**71**	**47**	**71**

Notes:
FSP = Field Sampling Plan

TABLE 3-56
SUMMARY OF IA08 SURFACE WATER SAMPLES AND ANALYSES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

	Analytical Methods[a]				
	Gamma Spec	Alpha Spec		GFPC	
Sample ID	Gamma Ra-226 & Hits By DOE GA-01-R Mod	Iso URANIUM (SHORT CT) DOE A-01-R MOD	Iso THORIUM (SHORT CT) DOE A-01-R MOD	Radium 226 by EPA 903_0 MOD	Radium 228 by GFPC EPA 904 MOD
A08-A01-SW-001		X	X	X	X
A08-A01-SW-004		X	X	X	X
A08-A01-SW-005		X	X	X	X
A08-A01-SW-006		X	X	X	X
A08-A01-SW-056 (duplicate of A08-A01-SW-006)		X	X	X	X
A08-A01-SW-007		X	X	X	X
A08-A01-SW-011		X	X	X	X
A08-A01-SW-012		X	X	X	X
A08-B04&B09-SW-001		X	X	X	X
A08-B04&B09-SW-002		X	X	X	X
A08-B04&B09-SW-003		X	X	X	X
A08-B04&B09-SW-004		X	X	X	X
A08-B04&B09-SW-005		X	X	X	X
A08-B1-SW-001		X	X	X	X
A08-B1-SW-002		X	X	X	X
A08-B1-SW-003		X	X	X	X
A08-B1-SW-004		X	X	X	X
A08-B1-SW-005		X	X	X	X
A08-B1-SW-006		X	X	X	X
A08-B2-SW-001		X	X	X	X
A08-B2-SW-003		X	X	X	X
A08-B3-SW-001[b]	X			X	X
A08-B3-SW-003		X	X	X	X
A08-B3-SW-004		X	X	X	X
A08-B3-SW-005		X	X	X	X
A08-B3-SW-006		X	X	X	X
A08-B3-SW-056 (duplicate of A08-B3-SW-006)		X	X	X	X
A08-B3-SW-007		X	X	X	X
A08-B3-SW-008		X	X	X	X
A08-B3-SW-009		X	X	X	X
A08-B3-SW-011		X	X	X	X
A08-B3-SW-012		X	X	X	X
A08-B3-SW-013		X	X	X	X
A08-B3-SW-014		X	X	X	X
A08-B3-SW-015		X	X	X	X
A08-B8-SW-001		X	X	X	X
A08-B8-SW-002		X	X	X	X
Subtotals	1	36	36	37	37
QA/QC	NA	2	2	2	2
Environmental Samples	1	34	34	35	35

Notes:
[a] Analyses by Test America Laboratories (formerly STL Inc.) St. Louis, Missouri
[b] Oil Sample (A08-B3-SW-001): Requested the following analysis that were unable to be run - Iso URANIUM (SHORT CT) DOE A-01-R MOD and Iso THORIUM (SHORT CT) DOE A-01-R MOD. The lab substituted Gamma Ra-226 & Hits By DOE GA-01-R Mod analysis.
Alpha Spec = Alpha Spectroscopy
CT = Count
DOE = Department of Energy
EPA = Environmental Protection Agency
Gamma Spec = Gamma Spectroscopy
GFPC = Gas Flow Proportional Counting
NA = Not Applicable
QA/QC = Quality Assurance/Quality Control

TABLE 3-57
SUMMARY OF IA08 SEDIMENT SAMPLES AND ANALYSES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

	Analytical Methods[a]					
	Gamma Spec	Alpha Spec		GFPC		
Sample ID	Gamma Ra-226 & Hits By DOE GA-01-R Mod	Iso URANIUM (SHORT CT) DOE A-01-R MOD	Iso THORIUM (SHORT CT) DOE A-01-R MOD	Radium 226 by EPA 903_0 MOD	Radium 228 by GFPC EPA 904 MOD	Moisture, Percent (160_3)
A08-A01-SD-001R	X	X	X	X	X	
A08-A01-SD-002	X	X	X	X	X	
A08-A01-SD-003	X	X	X	X	X	
A08-A01-SD-004	X	X	X	X	X	
A08-A01-SD-005	X	X	X	X	X	
A08-A01-SD-006	X	X	X	X	X	
A08-A01-SD-056 (dup of A08-A01-SD-006)	X	X	X	X	X	
A08-A01-SD-007	X	X	X	X	X	
A08-A01-SD-008	X	X	X	X	X	
A08-A01-SD-009	X	X	X	X	X	
A08-A01-SD-010	X	X	X	X	X	
A08-A01-SD-011	X	X	X	X	X	
A08-A01-SD-012	X	X	X	X	X	
A08-A01-SD-013	X	X	X	X	X	
A08-B04&B09-SD-001	X	X	X	X	X	
A08-B04&B09-SD-002	X	X	X	X	X	
A08-B04&B09-SD-003	X	X	X	X	X	
A08-B04&B09-SD-004	X	X	X	X	X	
A08-B04&B09-SD-005	X	X	X	X	X	
A08-B1-SL-001[b]	X	X	X	X	X	
A08-B1-SD-001	X	X	X	X	X	
A08-B1-SD-002	X	X	X	X	X	
A08-B1-SD-003	X	X	X	X	X	
A08-B1-SD-004	X	X	X	X	X	
A08-B1-SD-005	X	X	X	Note C	Note C	
A08-B1-SD-006	X	X	X	X	X	
A08-B24-SD-001	X	X	X	X	X	X
A08-B24-SD-002	X	X	X	X	X	X
A08-B24-SD-003	X	X	X	X	X	X
A08-B24-SD-004	X	X	X	X	X	X
A08-B24-SD-005	X	X	X	X	X	X
A08-B24-SD-006	X	X	X	X	X	X
A08-B24-SD-007	X	X	X	X	X	X
A08-B2-SD-001	X	X	X	X	X	
A08-B2-SD-002	X	X	X	X	X	
A08-B2-SD-003	X	X	X	X	X	
A08-B3-SD-002	X	X	X	X	X	
A08-B3-SD-003	X	X	X	X	X	
A08-B3-SD-004	X	X	X	X	X	
A08-B3-SD-005	X	X	X	X	X	
A08-B3-SD-006	X	X	X	X	X	

TABLE 3-57
SUMMARY OF IA08 SEDIMENT SAMPLES AND ANALYSES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

	Analytical Methods[a]					
	Gamma Spec	Alpha Spec		GFPC		
Sample ID	**Gamma Ra-226 & Hits By DOE GA-01-R Mod**	**Iso URANIUM (SHORT CT) DOE A-01-R MOD**	**Iso THORIUM (SHORT CT) DOE A-01-R MOD**	**Radium 226 by EPA 903_0 MOD**	**Radium 228 by GFPC EPA 904 MOD**	**Moisture, Percent (160_3)**
A08-B3-SD-056 (dup of A08-B3-SD-006)	X	X	X	X	X	
A08-B3-SD-007	X	X	X	X	X	
A08-B3-SD-008	X	X	X	X	X	
A08-B3-SD-009	X	X	X	X	X	
A08-B3-SD-010	X	X	X	X	X	
A08-B3-SD-011	X	X	X	X	X	
A08-B3-SD-012	X	X	X	X	X	
A08-B3-SD-013	X	X	X	X	X	
A08-B3-SD-014	X	X	X	X	X	
A08-B3-SD-015	X	X	X	X	X	
A08-B6-SD-001	X	X	X	X	X	
A08-B6-SD-002	X	X	X	X	X	
A08-B6-SD-052 (dup of A08-B6-SD-002)	X	X	X	X	X	
A08-B8-SD-001	X	X	X	X	X	
A08-B8-SD-002	X	X	X	X	X	

Subtotals	56	56	56	55	55	7
QA/QC Sample Totals	3	3	3	3	3	NA
Environmental Sample Totals	53	53	53	52	52	7

Notes:
[a] Analyses by Test America Laboratories (formerly STL Inc.) St. Louis, Missouri
[b] Sample mislabeled with "SL" ID. Collected below drain, between Buildings 1 and 2.
[c] Analyses not requested/not performed for these samples
Alpha Spec = Alpha Spectroscopy
CT = Count
DOE = Department of Energy
EPA = Environmental Protection Agency
Gamma Spec = Gamma Spectroscopy
GFPC = Gas Flow Proportional Counting
QA/QC = Quality Assurance/Quality Control

TABLE 3-58
IA08 - SURFACE WATER (AQUEOUS) AND SEDIMENT (NON-AQUEOUS) SAMPLES - SAMPLE ID, DATE and DIMENSIONS
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID	Date Collected	Media	IA08 Location	Feature Description	Feature Dimension (length-ft)	Feature Dimension (width-ft)	SW Depth (inches)	SD Thickness (inches)
A08-B1-SW-001	9/11/2007	SW	Building 1	Flooded Basement; W side of S room	-	-	12	4
A08-B1-SW-002	9/11/2007	SW	Building 1	Flooded Basement; at tunnel	-	-	12	4
A08-B1-SW-003	9/11/2007	SW	Building 1	Flooded Basement; NW corner of N room	-	-	12	4
A08-B1-SW-004	9/11/2007	SW	Building 1	Flooded Basement; W side of center room	-	-	12	4
A08-B1-SW-005	10/24/2007	SW	Building 1	Flooded Basement; center of S room	-	-	12	4
A08-B1-SW-006	10/24/2007	SW	Building 1	Flooded Basement; center of N room	-	-	12	4
A08-B1-SD-001	9/11/2007	SD	Building 1	Flooded Basement; W side of S room	-	-	-	-
A08-B1-SD-002	9/11/2007	SD	Building 1	Flooded Basement; at tunnel	-	-	-	-
A08-B1-SD-003	9/11/2007	SD	Building 1	Flooded Basement; NW corner of N room	-	-	-	-
A08-B1-SD-004	9/11/2007	SD	Building 1	Flooded Basement; W side of center room	-	-	-	-
A08-B1-SD-005	10/24/2007	SD	Building 1	Flooded Basement; center of S room	-	-	-	-
A08-B1-SD-006	10/24/2007	SD	Building 1	Flooded Basement; center of N room	-	-	-	-
A08-B1-SL-001	11/8/2007	Soil	Building 1	Drain Pipe; on ground surface below feature	-	-	-	-
A08-B2-SW-001	9/26/2007	SW	Building 2	Rectangular Basin; E side of S section	4.5	3.2	26	2
A08-B2-SW-003	9/26/2007	SW	Building 2	Round Manhole; NE corner of center section	1.5 (diameter)	-	24	10
A08-B2-SD-001	9/26/2007	SD	Building 2	Rectangular Basin; E side of S section	4.5	3.2	26	2
A08-B2-SD-002	9/26/2007	SD	Building 2	Floor Trench; W side N section	117	1	-	2
A08-B2-SD-003	9/26/2007	SD	Building 2	Round Manhole; NE corner of center section	1.5 (diameter)	-	24	10
A08-B3-SW-001	9/26/2007	SW	Building 3	Rectangular double basin; E side of S section (S basin)	4	2	12	-
A08-B3-SW-003 10/1/2007		SW	Building 3	Covered Floor Trench; N side of S section (E side of trench)	98	6	18	6
A08-B3-SW-004	10/1/2007	SW	Building 3	Covered Floor Trench; N side of S section (W side of trench)	98	6	18	6
A08-B3-SW-005	10/1/2007	SW	Building 3	Open Floor Trench; center of S section (N side of trench)	52	4.7	48	6
A08-B3-SW-006 (A08-B3-SW-056[a])	10/1/2007	SW	Building 3	Open Floor Trench; center of S section (NW side of trench)	8	8	18	3
A08-B3-SW-007	10/1/2007	SW	Building 3	Open Floor Trench; center of S section (SW side of trench)	18	9.0	18	3
A08-B3-SW-008	10/1/2007	SW	Building 3	Open Floor Trench; center of S section (S side of trench)	42	4.7	48	6
A08-B3-SW-009	10/1/2007	SW	Building 3	Square covered basin; S side of S section	4	3	17	6
A08-B3-SW-011	10/3/2007	SW	Building 3	Furnace pit; E side of S section	11	3	51/B[b]	6/B[b]
A08-B3-SW-012	10/3/2007	SW	Building 3	Furnace pit; E side of S section	9	3	98	6
A08-B3-SW-013	10/3/2007	SW	Building 3	Furnace pit; E side of S section	11	3	A/36[b]	A/6[b]
A08-B3-SW-014	10/3/2007	SW	Building 3	Furnace pit; E side of S section	8	3	40	6
A08-B3-SW-015	10/3/2007	SW	Building 3	Furnace pit; E side of S section	11	3	8/3[b]	6/6[b]
A08-B3-SD-002	9/26/2007	SD	Building 3	Rectangular double basin; E side of S section (N basin)	4	4	-	2
A08-B3-SD-003	10/1/2007	SD	Building 3	Covered Floor Trench; N side S section (E side of trench)	98	6	18	6
A08-B3-SD-004	10/1/2007	SD	Building 3	Covered Floor Trench; N side S section (W side of trench)	98	6	18	6
A08-B3-SD-005	10/1/2007	SD	Building 3	Open Floor Trench; center of S section (N side of trench)	52	4.7	48	6
A08-B3-SD-006 (A08-B3-SD-056[a])	10/1/2007	SD	Building 3	Open Floor Trench; center of S section (NW side of trench)	8	8	18	3
A08-B3-SD-007	10/1/2007	SD	Building 3	Open Floor Trench; center of S section (SW side of trench)	18	9	18	3
A08-B3-SD-008	10/1/2007	SD	Building 3	Open Floor Trench; center of S section (S side of trench)	42	4.7	48	6
A08-B3-SD-009	10/1/2007	SD	Building 3	Square covered basin; S side of S section	4	3	17	6
A08-B3-SD-010	10/1/2007	SD	Building 3	Furnace pit; SE corner of S section	2.8	1.3	-	6
A08-B3-SD-011	10/3/2007	SD	Building 3	Furnace pit; E side of S section	11	3	51/B	6/B
A08-B3-SD-012	10/3/2007	SD	Building 3	Furnace pit; E side of S section	9	3	98	6
A08-B3-SD-013	10/3/2007	SD	Building 3	Furnace pit; E side of S section	11	3	A/36[b]	A/6[b]
A08-B3-SD-014	10/3/2007	SD	Building 3	Furnace pit; E side of S section	8	3	40	6
A08-B3-SD-015	10/3/2007	SD	Building 3	Furnace pit; E side of S section	11	3	8/3[b]	6/6[b]

TABLE 3-58
IA08 - SURFACE WATER (AQUEOUS) AND SEDIMENT (NON-AQUEOUS) SAMPLES - SAMPLE ID, DATE and DIMENSIONS
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID	Date Collected	Media	IA08 Location	Feature Description	Feature Dimension (length-ft)	Feature Dimension (width-ft)	SW Depth (inches)	SD Thickness (inches)
A08-B04&B09-SW-001	9/27/2007	SW	Building 4 & 9	Vault; S side	6	6	5	4
A08-B04&B09-SW-002	9/27/2007	SW	Building 4 & 9	Covered N-S Floor Trench; (S end of trench)	60	2.3	64	6
A08-B04&B09-SW-003	9/27/2007	SW	Building 4 & 9	Open N-S Floor Trench (northern of 2 open trenches)	36	4	43	6
A08-B04&B09-SW-004	9/27/2007	SW	Building 4 & 9	Open Rectangular Basin	12	6	3	1
A08-B04&B09-SW-005	9/27/2007	SW	Building 4 & 9	Open N-S Floor Trench (southern of 2 open trenches)	36	4	32	6
A08-B04&B09-SD-001	9/27/2007	SD	Building 4 & 9	Vault; S side	6	6	5	4
A08-B04&B09-SD-002	9/27/2007	SD	Building 4 & 9	Covered N-S Floor Trench; (S end of trench)	60	2.3	64	6
A08-B04&B09-SD-003	9/27/2007	SD	Building 4 & 9	Open N-S Floor Trench (Northern of 2 open trenches)	36	4	43	6
A08-B04&B09-SD-004	9/27/2007	SD	Building 4 & 9	Open Rectangular Basin	12	6	3	1
A08-B04&B09-SD-005	9/27/2007	SD	Building 4 & 9	Open N-S Floor Trench (southern of 2 open trenches)	36	4	32	6
A08-B6-SD-001	10/4/2007	SD	Building 6	Inaccessible due to health and safety reasons	-	-	-	-
A08-B6-SD-002	10/4/2007	SD	Building 6	Inaccessible due to health and safety reasons	-	-	-	-
A08-B8-SW-001	10/4/2007	SW	Building 8	Inaccessible due to health and safety reasons	-	-	-	-
A08-B8-SW-002	10/4/2007	SW	Building 8	Inaccessible due to health and safety reasons	-	-	-	-
A08-B8-SD-001	10/4/2007	SD	Building 8	Inaccessible due to health and safety reasons	-	-	-	-
A08-B8-SD-002	10/4/2007	SD	Building 8	Inaccessible due to health and safety reasons	-	-	-	-
A08-B24-SD-001	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SW Area	50	1.7	-	2
A08-B24-SD-002	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SW Area	30	1.7	8	2
A08-B24-SD-003	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SW Area	21	1.7	-	2
A08-B24-SD-004	9/25/2007	SD	Building 24	Covered E-W Floor Trench in N Area	90	1.7	-	2
A08-B24-SD-005	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SE Area	48	1.7	-	2
A08-B24-SD-006	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SE Area	80	1.7	-	6
A08-B24-SD-007	9/25/2007	SD	Building 24	Covered E-W Floor Trench in SE Area	50	1.7	-	2
A08-A01-SW-001	9/28/2007	SW	IA02	Pump House Reservoir	28	21	16	Unable to Determine
A08-A01-SW-004	9/28/2007	SW	IA02	Unknown (large vault)	12	4.8	32	13
A08-A01-SW-005	9/28/2007	SW	IA02	Outfall into drainage swale; W side Bldg 9	-	-	-	-
A08-A01-SW-006 (A08-A01-SW-056[a])	9/28/2007	SW	IA02	Catch Basin	3	3	9	10
A08-A01-SW-007	9/28/2007	SW	IA02	Catch Basin	3	2	1	1
A08-A01-SW-011	10/3/2007	SW	IA02	Oil/water Separator	12	9	96	12
A08-A01-SW-012	9/28/2007	SW	IA02	Sewer Manhole	-	-	-	-
A08-A01-SD-001	10/3/2007	SD	IA04D	Pump House Reservoir	28	21	16	Unable to Determine
A08-A01-SD-001R	10/11/2007	SD	IA04D	Pump House Reservoir (resample due to low sample volume)	28	21	16	Unable to Determine
A08-A01-SD-002	9/28/2007	SD	IA01	Catch Basin; S side Bldg 3	2	2	-	Unable to Determine
A08-A01-SD-003	9/28/2007	SD	IA02	Down Spout; S side of Bldg 9	-	-	-	-
A08-A01-SD-004	9/28/2007	SD	IA04C	Vault	12	4.8	32	13
A08-A01-SD-005	9/28/2007	SD	IA04D	Outfall into drainage swale; W side Bldg 9	-	-	-	-
A08-A01-SD-006 (A08-A01-SD-056[a])	9/28/2007	SD	IA04A	Catch Basin	3	3	9	10
A08-A01-SD-007	9/28/2007	SD	IA04A	Catch Basin			-	
A08-A01-SD-008	9/28/2007	SD	IA04A	Catch Basin	3	2	-	6
A08-A01-SD-009	9/28/2007	SD	IA02	Catch Basin	1.8 (Top diameter)	2.8 (Bottom diameter)	2	8
A08-A01-SD-010	9/28/2007	SD	IA02	Catch Basin	2	2	-	18
A08-A01-SD-011	10/3/2007	SD	IA02	Oil/water Separator	12	9	96	12
A08-A01-SD-012	9/28/2007	SD	IA04C	Sewer Manhole	-	-	-	-
A08-A01-SD-013	9/28/2007	SD	IA02	Catch Basin	1.7	1.7	-	20

Notes:
[a] Field Duplicate Sample
[b] Furnaces have 2 sides, presented in table as (SideA/SideB). If no number is given for one side, it was inaccessible.
Bldg - Building
ft = feet
N - north, S - south, E - east, W - west
SD - Sediment
SW - Surface Water
SL - Sample collected immediately below drain pipe (inadvertantly labeled SL).

TABLE 4-84
COPC CONCENTRATIONS IN IA03 SURFACE SOIL SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/g)[b]													
	^{226}Ra		^{228}Ra		^{228}Th	^{230}Th	^{232}Th			^{234}U	^{235}U		^{238}U	
	GFPC	Gamma	GFPC	Gamma	Alpha	Alpha	Alpha	Gamma	On-site	Alpha	Alpha	Gamma	Alpha	On-site
A03SL-001-01	—	—	—	—	—	—	—	—	0.6 ± 0.4	—	—	—	—	1.9 ± 1.1
A03SL-002-01	—	—	—	—	0.8 ± 0.3	1.4 ± 0.4	1.1 ± 0.3	—	1.00 ± 0.17	1.4 ± 0.3	0.07 ± 0.06	—	1.3 ± 0.3	2.6 ± 0.6
A03SL-003-01	—	—	—	—	—	—	—	—	0.6 ± 0.3	—	—	—	—	1.7 ± 0.7
A03SL-004-01	—	—	—	—	—	—	—	—	0.4 ± 0.2	—	—	—	—	1.9 ± 0.7
A03SL-005-01	—	—	—	—	—	—	—	—	0.9 ± 0.3	—	—	—	—	2.1 ± 1.1
A03SL-006-01	—	— — —			—	—	—	—	0.57 ± 0.17	—	—	—	—	3.4 ± 0.7
A03SL-007-01	—	— — —			—	—	—	—	0.69 ± 0.17	—	—	—	—	2.1 ± 0.5
A03SL-008-01	—	— — —			—	—	—	—	0.53 ± 0.18	—	—	—	—	2.8 ± 0.7
A03SL-009-01	1.8 ± 0.3	0.81 ± 0.14	1.3 ± 0.5	1.0 ± 0.2	1.4 ± 0.3	1.3 ± 0.3	1.1 ± 0.3	1.0 ± 0.2	1.2 ± 0.3	2.1 ± 0.4	0.10 ± 0.07	0.05 ± 0.20	2.3 ± 0.4	3.5 ± 1.4
A03SL-010-01	—	— — —			—	—	—	—	0.54 ± 0.16	—	—	—	—	2.1 ± 0.7
A03SL-011-01	—	—	—	—	1.5 ± 0.3	1.5 ± 0.3	1.7 ± 0.3	—	2.5 ± 0.3	2.6 ± 0.4	0.10 ± 0.08	—	2.6 ± 0.4	3.3 ± 0.8
A03SL-012-01	—	— — —			—	—	—	—	0.67 ± 0.15	—	—	—	—	1.9 ± 0.6
A03SL-013-01	—	— — —			—	—	—	—	0.92 ± 0.18	—	—	—	—	2.0 ± 0.7
A03SL-014-01	—	— — —			—	—	—	—	0.30 ± 0.14	—	—	—	—	2.0 ± 0.6
A03SL-015-01	—	— — —			—	—	—	—	0.50 ± 0.13	—	—	—	—	1.9 ± 0.7
A03SL-016-01	—	— — —			—	—	—	—	0.55 ± 0.15	—	—	—	—	2.1 ± 0.7
A03SL-017-01	—	— — —			—	—	—	—	0.46 ± 0.17	—	—	—	—	3.0 ± 1.0
A03SL-018-01	0.85 ± 0.15	1.4 ± 0.3	0.85 ± 0.15	0.8 ± 0.2	1.2 ± 0.3	1.0 ± 0.2	1.0 ± 0.3	0.8 ± 0.2	1.3 ± 0.3	3.2 ± 0.5	0.11 ± 0.08	0.4 ± 0.3	3.5 ± 0.5	3.3 ± 0.7
A03SL-019-01	—	— — —			—	—	—	—	0.61 ± 0.14	—	—	—	—	1.5 ± 0.6
A03SL-020-01	—	— — —			—	—	—	—	0.82 ± 0.17	—	—	—	—	3.0 ± 0.8

TABLE 4-84
COPC CONCENTRATIONS IN IA03 SURFACE SOIL SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/g)[b]													
	^{226}Ra		^{228}Ra		^{228}Th	^{230}Th	^{232}Th			^{234}U	^{235}U		^{238}U	
	GFPC	Gamma	GFPC	Gamma	Alpha	Alpha	Alpha	Gamma	On-site	Alpha	Alpha	Gamma	Alpha	On-site
A03SL-021-01	—	— — —			0.45 ± 0.17	2.6 ± 0.4	0.58 ± 0.19	—	0.69 ± 0.15	4.7 ± 0.6	0.25 ± 0.11	—	4.4 ± 0.6	4.5 ± 1.0
A03SL-022-01	—	— — —			—	—	—	—	0.52 ± 0.16	—	—	—	—	4.2 ± 0.8
A03SL-023-01	—	— — —			—	—	—	—	0.55 ± 0.15	—	—	—	—	2.5 ± 0.7
A03SL-024-01	—	— — —			—	—	—	—	0.44 ± 0.14	—	—	—	—	7.6 ± 1.0
A03SL-025-01	—	— — —			—	—	—	—	0.34 ± 0.12	—	—	—	—	2.7 ± 0.9
A03SL-026-01	—	— — —			0.46 ± 0.16	0.8 ± 0.2	0.52 ± 0.17	—	0.53 ± 0.14	10.6 ± 1.1	0.48 ± 0.17	—	11.0 ± 1.2	8.7 ± 1.2
A03SL-027-01	—	— — —			0.46 ± 0.17	0.64 ± 0.20	0.61 ± 0.19	—	0.58 ± 0.18	4.4 ± 0.6	0.19 ± 0.10	—	4.8 ± 0.6	4.7 ± 0.9
A03SL-028-01	—	— — —			0.41 ± 0.11	0.49 ± 0.12	0.39 ± 0.10	—	0.32 ± 0.13	6.2 ± 0.5	0.33 ± 0.09	—	6.1 ± 0.5	5.6 ± 0.8
A03SL-029-01	—	— — —			0.60 ± 0.18	0.9 ± 0.2	0.44 ± 0.15	—	0.30 ± 0.15	5.6 ± 0.7	0.18 ± 0.09	—	6.2 ± 0.7	5.5 ± 0.7
A03SL-030-01	—	— — —			—	—	—	—	0.47 ± 0.13	—	—	—	—	2.4 ± 0.6
A03SL-031-01	—	— — —			0.53 ± 0.16	0.9 ± 0.2	0.45 ± 0.15	—	0.48 ± 0.14	24 ± 2	1.0 ± 0.2	—	24 ± 2	15.5 ± 1.3
A03SL-032-01	—	— — —			—	—	—	—	0.48 ± 0.13	—	—	—	—	3.0 ± 0.6
A03SL-033-01	—	— — —			0.56 ± 0.17	0.9 ± 0.2	0.42 ± 0.14	—	0.50 ± 0.15	5.9 ± 0.7	0.26 ± 0.11	—	6.2 ± 0.7	5.5 ± 1.2
A03SL-034-01	—	— — —			—	—	—	—	0.47 ± 0.19	—	—	—	—	2.9 ± 0.8
A03SL-035-01	—	— — —			0.46 ± 0.20	0.47 ± 0.19	0.20 ± 0.12	—	0.09 ± 0.13	6.9 ± 0.8	0.31 ± 0.13	—	7.6 ± 0.9	4.0 ± 1.2
A03SL-036-01	1.0 ± 0.2	0.9 ± 0.3	0.6 ± 0.3	0.5 ± 0.3	0.72 ± 0.18	1.0 ± 0.2	0.73 ± 0.18	0.5 ± 0.3	0.7 ± 0.3	3.5 ± 0.5	0.13 ± 0.08	0.0 ± 0.5	3.7 ± 0.5	4.9 ± 1.2
A03SL-037-01	—	— — —			1.3 ± 0.3	0.82 ± 0.20	1.0 ± 0.2	—	1.3 ± 0.2	7.5 ± 0.9	0.30± 0.13	—	7.4 ± 0.8	7.1 ± 1.2
A03SL-038-01	0.67 ± 0.20	—	0.2 ± 0.2	—	0.50 ± 0.16	0.75 ± 0.20	0.28 ± 0.12	—	0.45 ± 0.15	56 ± 5	3.2 ± 0.5	—	58 ± 5	40 ± 2
A03SL-039-01	—	— — —			—	—	—	—	0.25 ± 0.13	—	—	—	—	4.0 ± 1.0

TABLE 4-84
COPC CONCENTRATIONS IN IA03 SURFACE SOIL SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/g)[b]													
	^{226}Ra		^{228}Ra		^{228}Th	^{230}Th	^{232}Th			^{234}U	^{235}U		^{238}U	
	GFPC	Gamma	GFPC	Gamma	Alpha	Alpha	Alpha	Gamma	On-site	Alpha	Alpha	Gamma	Alpha	On-site
A03SL-040-01	0.40 ± 0.15	—	0.3 ± 0.2	—	0.56 ± 0.17	0.65 ± 0.18	0.40 ± 0.14	—	0.30 ± 0.12	5.8 ± 0.7	0.34 ± 0.13	—	5.8 ± 0.7	6.3 ± 0.8
A03SL-041-01	—	— — —			—	—	—	—	0.75 ± 0.15	—	—	—	—	2.8 ± 0.7
A03SL-042-01	—	—	—	—	1.1 ± 0.2	1.2 ± 0.2	1.0 ± 0.2	—	0.91 ± 0.19	4.1 ± 0.5	0.26 ± 0.12	—	4.2 ± 0.5	6.7 ± 1.0
A03SL-201-01	—	— — —			—	—	—	—	0.45 ± 0.17	—	—	—	—	2.5 ± 0.7
A03SL-202-01	—	— — —			—	—	—	—	0.47 ± 0.15	—	—	—	—	1.7 ± 0.5
A03SL-203-01	1.9 ± 0.3	—	1.5 ± 0.4	—	1.6 ± 0.3	1.1 ± 0.3	1.4 ± 0.3	—	2.6 ± 0.4	1.4 ± 0.3	0.04 ± 0.05	—	1.4 ± 0.3	3.9 ± 1.0
A03SL-204-01	—	—	—	—	—	—	—	—	0.5 ± 0.2	—	—	—	—	2.1 ± 0.7
A03SL-205-01	—	— — —			—	—	—	—	0.44 ± 0.17	—	—	—	—	2.2 ± 0.7
A03SL-206-01	—	— — —			—	—	—	—	0.79 ± 0.19	—	—	—	—	2.8 ± 0.8
A03SL-207-01	—	— — —			—	—	—	—	0.38 ± 0.15	—	—	—	—	2.8 ± 0.8
A03SL-208-01	—	—	—	—	—	—	—	—	0.6 ± 0.3	—	—	—	—	3.4 ± 0.9
A03SL-209-01	0.8 ± 0.2	—	0.20 ± 0.19	—	0.66 ± 0.18	1.0 ± 0.2	0.52 ± 0.16	—	0.59 ± 0.18	14.5 ± 1.4	0.8 ± 0.2	—	15.9 ± 1.5	10.3 ± 1.4
A03SL-210-01	—	— — —			—	—	—	—	0.49 ± 0.15	—	—	—	—	3.0 ± 0.7
A03SL-214-01	—	— — —			—	—	—	—	0.28 ± 0.15	—	—	—	—	2.0 ± 0.6
A03SL-215-01	—	— — —			—	—	—	—	0.44 ± 0.16	—	—	—	—	2.5 ± 0.7
A03SL-216-01	—	— — —			—	—	—	—	0.58 ± 0.14	—	—	—	—	1.3 ± 0.7
A03SL-217-01	—	— — —			0.58 ± 0.17	0.75 ± 0.19	0.63 ± 0.17	—	0.56 ± 0.15	3.3 ± 0.5	0.11 ± 0.08	—	3.3 ± 0.5	4.3 ± 0.7
A03SL-218-01	—	— — —			—	—	—	—	0.59 ± 0.15	—	—	—	—	3.8 ± 0.7
A03SL-220-01	—	— — —			—	—	—	—	0.44 ± 0.15	—	—	—	—	2.7 ± 0.7

TABLE 4-84
COPC CONCENTRATIONS IN IA03 SURFACE SOIL SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/g)[b]													
	^{226}Ra		^{228}Ra		^{228}Th	^{230}Th	^{232}Th			^{234}U	^{235}U		^{238}U	
	GFPC	Gamma	GFPC	Gamma	Alpha	Alpha	Alpha	Gamma	On-site	Alpha	Alpha	Gamma	Alpha	On-site
A03SL-221-01	1.1 ± 0.3	—	0.7 ± 0.4	—	0.58 ± 0.17	0.65 ± 0.18	0.73 ± 0.19	—	1.5 ± 0.3	3.7 ± 0.5	0.12 ± 0.08	—	3.9 ± 0.5	3.7 ± 1.1
A03SL-222-01	—	— — —			—	—	—	—	0.56 ± 0.16	—	—	—	—	2.0 ± 0.8
A03SL-223-01	—	—	—	—	—	—	—	—	0.7 ± 0.2	—	—	—	—	2.9 ± 0.9
A03SL-224-01	0.8 ± 0.2	—	0.3 ± 0.3	—	0.77 ± 0.20	1.0 ± 0.2	1.1 ± 0.2	—	0.46 ± 0.18	11.1 ± 1.1	0.68 ± 0.19	—	11.9 ± 1.2	10.1 ± 1.7
A03SL-225-01	—	— — —			—	—	—	—	0.31 ± 0.13	—	—	—	—	2.6 ± 0.9
A03SL-226-01	—	0.52 ± 0.12	—	0.42 ± 0.14	0.56 ± 0.16	1.0 ± 0.2	0.68 ± 0.18	0.42 ± 0.14	0.64 ± 0.14	5.7 ± 0.7	0.18 ± 0.10	0.22 ± 0.18	6.7 ± 0.8	6.3 ± 1.4
A03SL-228-01	0.9 ± 0.2	—	0.6 ± 0.3	—	0.54 ± 0.18	0.52 ± 0.17	0.41 ± 0.15	—	0.48 ± 0.14	7.6 ± 0.8	0.35 ± 0.14	—	7.9 ± 0.9	5.7 ± 1.1
A03SL-230-01	—	— — —			—	—	—	—	0.33 ± 0.17	—	—	—	—	2.2 ± 0.7
A03SL-231-01	0.67 ± 0.18	—	0.8 ± 0.3	—	0.54 ± 0.17	0.9 ± 0.2	0.51 ± 0.16	—	0.69 ± 0.14	20.8 ± 2.0	1.0 ± 0.2	—	20.4 ± 1.9	14.7 ± 1.6
A03SL-232-01	0.73 ± 0.18	—	0.8 ± 0.4	—	0.67 ± 0.19	1.0 ± 0.2	0.53 ± 0.17	—	0.69 ± 0.17	4.8 ± 0.6	0.35 ± 0.13	—	5.2 ± 0.6	5.7 ± 0.7
A03SL-233-01	0.84 ± 0.20	—	0.8 ± 0.4	—	0.72 ± 0.19	0.85 ± 0.20	0.83 ± 0.20	—	0.54 ± 0.14	4.4 ± 0.6	0.34 ± 0.13	—	4.8 ± 0.6	5.9 ± 0.8
A03SL-234-01	0.85 ± 0.20	—	0.8 ± 0.4	—	0.9 ± 0.2	0.9 ± 0.2	0.8 ± 0.2	—	0.99 ± 0.18	3.6 ± 0.5	0.16 ± 0.09	—	4.4 ± 0.6	4.5 ± 0.8
A03SL-236-01	—	— — —			—	—	—	—	1.03 ± 0.20	—	—	—	—	2.2 ± 0.7
A03SL-237-01	1.0 ± 0.2	—	1.2 ± 0.4	—	1.3 ± 0.3	0.9 ± 0.2	1.0 ± 0.2	—	1.0 ± 0.3	5.9 ± 0.7	0.22 ± 0.10	—	6.3 ± 0.7	8.6 ± 1.1
A03SL-239-01	—	— — —			0.7 ± 0.2	0.63 ± 0.20	0.54 ± 0.18	—	0.50 ± 0.14	7.5 ± 0.8	0.41 ± 0.14	—	7.4 ± 0.8	4.4 ± 1.1
A03SL-240-01	—	— — —			—	—	—	—	0.17 ± 0.12	—	—	—	—	4.0 ± 1.0
A03SL-241-01	—	— — —			—	—	—	—	0.68 ± 0.17	—	—	—	—	3.8 ± 0.9

Notes:

[a] Laboratory duplicate and field duplicate results are combined with original sample results using weighted averaging.

[b] GFPC denotes Gas Flow Proportional Counting, Gamma denotes Gamma Spectroscopy, Alpha denotes Alpha Spectroscopy, Onsite denotes On Site Gamma Spectroscopy

TABLE 4-136
COMPARISON OF FIELD PARAMETERS FROM SAMPLING EVENTS
GUTERL GROUNDWATER WELLS
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Well ID	Collect Date	pH (std. unit)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (C)	ORP (mV)	Depth to Water
MW-1	Aug-07	7.08	1.903	1.2	0.23	16.32	-6	7.2
MW-1	Nov-07	6.93	1.81	1.18	0.41	13.53	-23.4	6.98
MW-1	Jun-08	7.15	3.86	-0.53	0.08	11.3	-20	6.3
MW-2	Aug-07	8.95	0.55	0.24	0.29	15.56	-19.9	8.68
MW-2	Nov-07	7.44	0.57	0.81	0.43	14.53	-203.5	8.65
MW-2	Mar-08	7.06	1.32	4.6	0.00	6.63	-42	8.10
MW-2	Jun-08	7.25	0.67	1.26	2.24	12.6	-165	8.49
MW-3	Aug-07	8.14	0.731	clear	0.17	13.95	16.2	6.3
MW-3	Nov-07	6.86	0.747	6.9	0.16	13.55	-91.2	5.85
MW-3	Jun-08	7.11	1.27	15.1	1.11	10.70	-89	5.00
MW-4	Aug-07	7.56	0.58	0.58	0.18	16.71	49.6	5.78
MW-4	Nov-07	7.3	0.65	0.69	0.31	13.24	19.3	5.95
MW-4	Mar-08	note 1	0.56	1.1	0.42	5.99	77	4.30
MW-4	Jun-08	7.32	0.64	0.72	0.00	12.1	86	4.85
MW-5	Aug-07	7.32	0.745	0.33	0.17	12.84	-57.7	5.73
MW-5	Nov-07	6.95	0.7	2.31	0.17	12.47	-94.4	5.74
MW-5	Jun-08	6.78	0.745	1.32	0.00	8.9	-121	4.94
MW-6	Aug-07	7.08	0.921	1.4	0.23	15.3	19.8	7.75
MW-6	Nov-07	6.85	1.042	3.4	0.45	13.35	-19.7	7.40
MW-6	Jun-08	7.12	1.29	-0.45	1.57	12.5	55	6.51
MW-07	Jun-08	6.97	0.9	2.07	1.68	14.7	-83	16.94
MW-08	Aug-07	7.1	1.47	1.06	0.26	14.29	-70.6	9.45
MW-08	Nov-07	6.89	1.56	1.15	0.17	13.7	-157.2	9.04
MW-08	Mar-08	6.80	1.72	4.8	0.00	7.30	-24	8.10
MW-08	Jun-08	7.13	3.26	-1.93	0.93	11.8	-94	8.74
MW-09	Aug-07	8.42	0.595	1.3	0.2	15.71	-143.1	8.78
MW-09	Nov-07	7.06	0.69	4.6	0.2	13.07	-157.6	8.77
MW-09	Jun-08	6.97	0.802	0	0	11.7	-135	8.55
MW-10	Jun-08	6.93	0.91	4.29	1.73	13.4	-59	7.5
MW-11	Aug-07	7.38	1.121	1.37	0.29	16.04	-94.7	9.63
MW-11	Nov-07	6.89	1.255	1.51	0.17	14.64	-94.8	9.55
MW-11	Jun-08	6.87	1.19	0.53	0	13.4	-101	9.42
MW-12	Jun-08	7.23	0.753	1.39	0	10.9	-77	5.89
MW-13D	Aug-07	7.43	1.332	0.5	0.23	16.89	-34.9	8.68
MW-13D	Nov-07	7.28	1.25	1.33	0.39	12.06	-32	9.15
MW-13D	Jun-08	7.25	1.33	-2.66	0.23	12.6	165	5.40
MW-14	Aug-07	7.39	1.188	2	0.29	16.95	-70.3	8.28
MW-14	Nov-07	7.19	1.392	3.5	0.48	13.31	-68.3	8.44
MW-14	Jun-08	7.11	1.71	1.44	0.08	13.2	-108	5.46
MW-15	Aug-07	11.01	0.707	5.02	1.26	15.69	-152.2	12.5
MW-15	Nov-07	8.67	1.337	44	0.5	12.73	-142.3	13.15
MW-15	Jun-08	9.61	1.08	1.75	1.08	12.9	-135	8.91
MW-16	Aug-07	7.39	1.12	1.26	0.29	16.04	-94.9	10.08
MW-16	Nov-07	7.01	1.49	0.98	0.49	13.64	-3.6	9.60
MW-16	Mar-08	7.19	1.33	17.8	0.00	3.66	135	5.86
MW-16	Jun-08	7.71	1.71	-0.67	0.89	12.6	8	6.39
MW-17	Jul-07	7.31	2.163	5	0.45	19.43	-35.7	9.6
MW-17	Nov-07	7.17	2.515	9.8	0.89	13.49	-72.9	10.02
MW-17	Jun-08	7.4	2.62	4.03	1.09	12.9	-71	6.23
MW-18	Aug-07	7.44	1.324	0.35	0.18	16.59	51.3	8.39
MW-18	Nov-07	7	1.094	8.18	0.45	12.74	31.2	8.45
MW-18	Jun-08	7.07	1.23	0.62	4.35	16.6	57	5.61
MW-19	Aug-07	7.2	0.932	0.28	1.83	17.58	-50.7	9.58
MW-19	Nov-07	6.97	0.992	0.45	1.88	14.48	--	10.55
MW-19	Jun-08	7.06	1.11	0.64	2.05	13.8	25	7.21
MW-20	Aug-07	7.16	0.941	1.34	0.98	18.63	-25.7	9.55
MW-20	Nov-07	7.06	0.935	1.74	0.99	13.32	55.6	9.38
MW-20	Jun-08	6.93	0.634	0.3	0.96	13.6	16	8.39

TABLE 4-136
COMPARISON OF FIELD PARAMETERS FROM SAMPLING EVENTS
GUTERL GROUNDWATER WELLS
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Well ID	Collect Date	pH (std. unit)	Specific Conductance (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature (C)	ORP (mV)	Depth to Water
MW-21	Aug-07	7.41	1.849	0.3	0.21	15.63	57.8	13.57
MW-21	Nov-07	7.33	2.064	2.15	0.33	13.76	-114.8	13.77
MW-21	Jun-08	7.32	2.08	-1.75	0.2	10.6	-106	11.09
MW-22	Aug-07	7.27	0.608	0.44	0.2	17.5	16.1	7.55
MW-22	Nov-07	6.89	0.662	1.39	0.2	13.34	-122.5	7.40
MW-22	Jun-08	6.98	0.772	1.21	0.01	13.2	-142	6.52
MW-23	Aug-07	7.14	0.619	0.92	0.3	16.72	-15.5	6.52
MW-23	Nov-07	7	0.612	1.39	0.42	13.04	-8.9	6.40
MW-23	Jun-08	6.96	0.694	0.31	0	12.6	-70	5.44
MW-24	Aug-07	7.31	0.486	0.68	0.37	20.27	-143.7	3.85
MW-24	Nov-07	7.2	0.628	0.61	0.24	15.01	-159.2	4.17
MW-24	Jun-08	6.92	1.24	2.63	0	11.7	-78	3.61
MW-25	Mar-08	6.97	9.39	1.3	0.00	1.92	192	1.22
MW-25	Jun-08	6.9	6.59	0.73	0.00	13.2	117	2.09
MW-26	Aug-07	7.33	3.545	1.25	0.29	17.32	53.9	3.07
MW-26	Nov-07	7.09	2.418	1.81	0.25	13.58	-26.3	3.80
MW-26	Jun-08	6.96	4.91	0.69	0.00	13.4	-25	2.59
MW-600D	Aug-07	6.99	12.76	1.1	0.19	14.52	116	12.68
MW-600D	Nov-07	6.57	15.87	1.3	0.26	13.15	7.2	11.55
MW-600D	Mar-08	note 1	5.80	3.0	0.28	5.18	64	6.05
MW-600D	May-08	7.08	4.29	0.0	0.16	13.57	81	8.61
MW-601D	Aug-07	8.38	1.24	1.05	0.23	17.43	-29.3	10.95
MW-601D	Nov-07	7.16	1.79	1.64	0.27	13.67	-158.1	10.80
MW-601D	Mar-08	note 1	1.65	3.4	0.25	9.92	-201	8.38
MW-601D	May-08	~7.0	1.29	0.0	0.11	11.68	-285	9.52
MW-601D	Jun-08	6.99	1.75	1.94	3.06	15.8	-160	9.49
MW-602D	Aug-07	7.56	1.92	0.67	0.17	16.73	-14.3	10.16
MW-602D	Nov-07	7.03	1.56	5.14	0.24	13.64	-43.4	9.95
MW-602D	Mar-08	6.97	0.59	16.6	5.37	14.65	149	8.02
MW-602D	Jun-08	6.99	1.1	0.6	0.03	14	-70	8.89
MW-603D	Aug-07	7.66	1.34	0.94	0.17	15.83	41.4	7.46
MW-603D	Nov-07	7.05	1.07	4.02	0.25	13.64	-14.4	7.14
MW-603D	Mar-08	note 1	0.80	21	0.34	6.17	7	5.01
MW-603D	May-08	6.79	0.84	0.1	0.20	14.40	-29	6.65
MW-603D	Jun-08	7.12	1.12	1.92	1.51	13.6	-70	6.54
MW-604D	Aug-07	7.36	1.30	0.45	0.18	17.1	30.3	5.81
MW-604D	Nov-07	7.15	1.60	1.39	0.28	13.89	37.9	7.62
MW-604D	Mar-08	6.98	2.04	5.1	1.07	12.34	174	4.63
MW-604D	Jun-08	6.91	3.24	0.78	0.00	12.2	60	5.96
MW-605D	Aug-07	7.31	0.97	0.43	0.27	17.61	0.2	4.03
MW-605D	Nov-07	7.09	1.07	9.55	0.25	14	-15.5	4.12
MW-605D	Mar-08	note 1	1.04	3.0	0.21	10.16	87	1.9
MW-605D	May-08	7.01	0.89	0.5	0.24	15.55	88	2.44
MW-605D	Jun-08	7.0	1.08	4.5	0.00	12	96	2.29
MW-606DR	Nov-07	7.16	2.17	13.2	0.56	11.67	-76.9	8.31
MW-606DR	Jun-08	7.0	2.41	4.77	1.72	15.4	-107	5.14
MW-607D	Aug-07	8.95	1.39	0.42	0.17	15.66	-97.5	8.49
MW-607D	Nov-07	6.91	1.72	9.18	0.21	13.2	-186	7.90
MW-607D	Mar-08	note 1	1.37	380	0.31	3.72	-94	3.39
MW-607D	May-08	6.99	1.26	0.1	0.29	12.95	-97	4.79
MW-607D	Jun-08	6.97	1.42	0.94	0.46	11.9	-1.57	5.24

Notes:

Note 1 - pH sonde used for these readings was acting erroneously; therefore, results are considered invalid.

Readings in 2007 taken by Earth Tech; readings in March and May, 2008, taken by USACE; readings in June, 2008, taken by MACTEC.

pH reading at well MW-601D taken May 2008 using litmus paper due to pH meter malfunction.

TABLE 4-143
COPC CONCENTRATIONS IN IA09 SURFACE WATER SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/L)[b]							
	^{226}Ra	^{228}Ra	^{228}Th	^{230}Th	^{232}Th	^{234}U	^{235}U	^{238}U
A09-SW-001	0.13 ± 0.11	0.4 ± 0.5	0.4 ± 0.3	0.4 ± 0.3	-0.02 ± 0.09	0.14 ± 0.14	—	0.13 ± 0.14
A09-SW-002	0.07 ± 0.13	-0.2 ± 0.5	0.20 ± 0.17	0.13 ± 0.13	0.02 ± 0.07	0.22 ± 0.16	-0.01 ± 0.06	0.21 ± 0.14
A09-SW-003	0.15 ± 0.13	1.1 ± 0.6	0.19 ± 0.17	0.4 ± 0.2	-0.02 ± 0.08	0.02 ± 0.06	-0.01 ± 0.07	0.17 ± 0.13
A09-SW-004	0.17 ± 0.14	0.7 ± 0.6	0.23 ± 0.19	0.13 ± 0.13	0.03 ± 0.08	0.24 ± 0.15	-0.01 ± 0.05	0.25 ± 0.15
A09-SW-005	0.07 ± 0.12	0.8 ± 0.6	0.25 ± 0.18	0.21 ± 0.16	0.07 ± 0.10	0.16 ± 0.13	-0.01 ± 0.06	0.09 ± 0.09
A09-SW-006	0.09 ± 0.15	0.3 ± 0.5	0.14 ± 0.13	0.10 ± 0.11	-0.01 ± 0.05	0.24 ± 0.18	0.00 ± 0.08	0.15 ± 0.14
A09-SW-007	0.10 ± 0.13	0.5 ± 0.6	0.27 ± 0.18	0.09 ± 0.11	-0.01 ± 0.05	0.16 ± 0.14	—	0.17 ± 0.13
A09-SW-008	0.12 ± 0.09	0.5 ± 0.3	0.26 ± 0.12	0.16 ± 0.09	0.03 ± 0.05	0.16 ± 0.09	0.04 ± 0.06	0.14 ± 0.09
A09-SW-009	0.07 ± 0.11	0.4 ± 0.5	0.12 ± 0.12	0.10 ± 0.13	0.01 ± 0.07	0.17 ± 0.14	—	0.13 ± 0.11
A09-SW-010	0.07 ± 0.14	0.3 ± 0.4	0.3 ± 0.2	0.18 ± 0.16	0.05 ± 0.08	0.24 ± 0.15	—	0.09 ± 0.10
A09-SW-011	0.14 ± 0.16	0.4 ± 0.5	0.07 ± 0.11	0.19 ± 0.14	-0.01 ± 0.06	0.09 ± 0.11	0.02 ± 0.07	0.10 ± 0.11
A09-SW-012	0.20 ± 0.17	0.3 ± 0.5	0.17 ± 0.17	0.16 ± 0.17	-0.01 ± 0.07	0.18 ± 0.14	0.06 ± 0.10	0.11 ± 0.11

Notes:

[a] Laboratory duplicate and field duplicate results are combined with original sample results using weighted averaging.

[b] Uranium and thorium isotopes determined by alpha spectroscopy; radium isotopes determined by gas flow proportional counting.

TABLE 4-145
COPC CONCENTRATIONS IN IA09 SEDIMENT SAMPLES
REMEDIAL INVESTIGATION FORMER GUTERL SPECIALTY STEEL CORPORATION FUSRAP SITE

Sample ID [a]	Concentration (pCi/g)[b]													
	^{226}Ra		^{228}Ra		^{228}Th	^{230}Th	^{232}Th			^{234}U	^{235}U		^{238}U	
	GFPC	Gamma	GFPC	Gamma	Alpha	Alpha	Alpha	Gamma	On-site	Alpha	Alpha	Gamma	Alpha	On-site
A09-SD-001	1.1 ± 0.3	0.9 ± 0.3	0.6 ± 0.4	0.7 ± 0.3	0.69 ± 0.20	0.67 ± 0.20	0.55 ± 0.18	0.7 ± 0.3	—	0.59 ± 0.17	0.02 ± 0.04	0 ± 14	0.58 ± 0.17	—
A09-SD-002	—	0.9 ± 0.3	—	0.5 ± 0.3	0.54 ± 0.17	0.9 ± 0.2	0.61 ± 0.18	0.5 ± 0.3	—	0.61 ± 0.17	0.02 ± 0.04	0.1 ± 0.4	0.68 ± 0.18	—
A09-SD-003	0.9 ± 0.2	0.33 ± 0.15	0.8 ± 0.4	0.5 ± 0.2	0.9 ± 0.2	0.9 ± 0.2	0.77 ± 0.20	0.5 ± 0.2	—	0.60 ± 0.17	0.09 ± 0.07	0 ± 2	0.74 ± 0.19	—
A09-SD-004	—	0.65 ± 0.20	—	0.6 ± 0.2	0.8 ± 0.2	0.8 ± 0.2	0.7 ± 0.2	0.6 ± 0.2	—	0.72 ± 0.19	0.05 ± 0.06	0.2 ± 0.4	0.56 ± 0.16	—
A09-SD-005	1.0 ± 0.2	0.5 ± 0.2	0.7 ± 0.4	0.7 ± 0.3	0.8 ± 0.2	0.9 ± 0.2	0.68 ± 0.20	0.7 ± 0.3	—	0.65 ± 0.18	0.04 ± 0.05	0.1 ± 0.3	0.54 ± 0.16	—
A09-SD-006	—	0.9 ± 0.2	—	0.7 ± 0.3	0.63 ± 0.19	0.8 ± 0.2	0.63 ± 0.18	0.7 ± 0.3	—	0.52 ± 0.16	—	0 ± 3	0.64 ± 0.18	—
A09-SD-007	1.0 ± 0.3	0.7 ± 0.2	0.7 ± 0.5	0.5 ± 0.3	0.65 ± 0.19	1.0 ± 0.3	0.69 ± 0.19	0.5 ± 0.3	—	0.65 ± 0.18	0.02 ± 0.04	0.2 ± 0.3	0.47 ± 0.15	—
A09-SD-008	0.98 ± 0.17	1.11 ± 0.19	0.9 ± 0.3	0.50 ± 0.18	0.74 ± 0.20	0.60 ± 0.18	0.65 ± 0.19	0.50 ± 0.18	—	0.8 ± 0.2	0.08 ± 0.07	0.1 ± 0.2	0.58 ± 0.18	—
A09-SD-009	—	1.2 ± 0.3	—	0.8 ± 0.3	1.1 ± 0.3	1.0 ± 0.3	1.1 ± 0.3	0.8 ± 0.3	—	0.9 ± 0.2	0.06 ± 0.06	0.1 ± 0.3	0.77 ± 0.20	—
A09-SD-010	—	0.9 ± 0.3	—	0.5 ± 0.3	0.8 ± 0.2	0.7 ± 0.2	0.7 ± 0.2	0.5 ± 0.3	—	0.76 ± 0.20	0.03 ± 0.04	0.1 ± 0.3	0.73 ± 0.19	—
A09-SD-011	1.00 ± 0.18	0.78 ± 0.14	0.6 ± 0.4	0.67 ± 0.16	0.7 ± 0.2	0.9 ± 0.2	0.7 ± 0.2	0.67 ± 0.16	—	0.67 ± 0.19	0.07 ± 0.06	0.14 ± 0.19	0.54 ± 0.16	—
A09-SD-012	—	1.1 ± 0.2	—	0.7 ± 0.3	1.0 ± 0.4	0.8 ± 0.3	0.8 ± 0.3	0.7 ± 0.3	—	0.8 ± 0.3	0.05 ± 0.08	-0.1 ± 1.0	0.7 ± 0.3	—

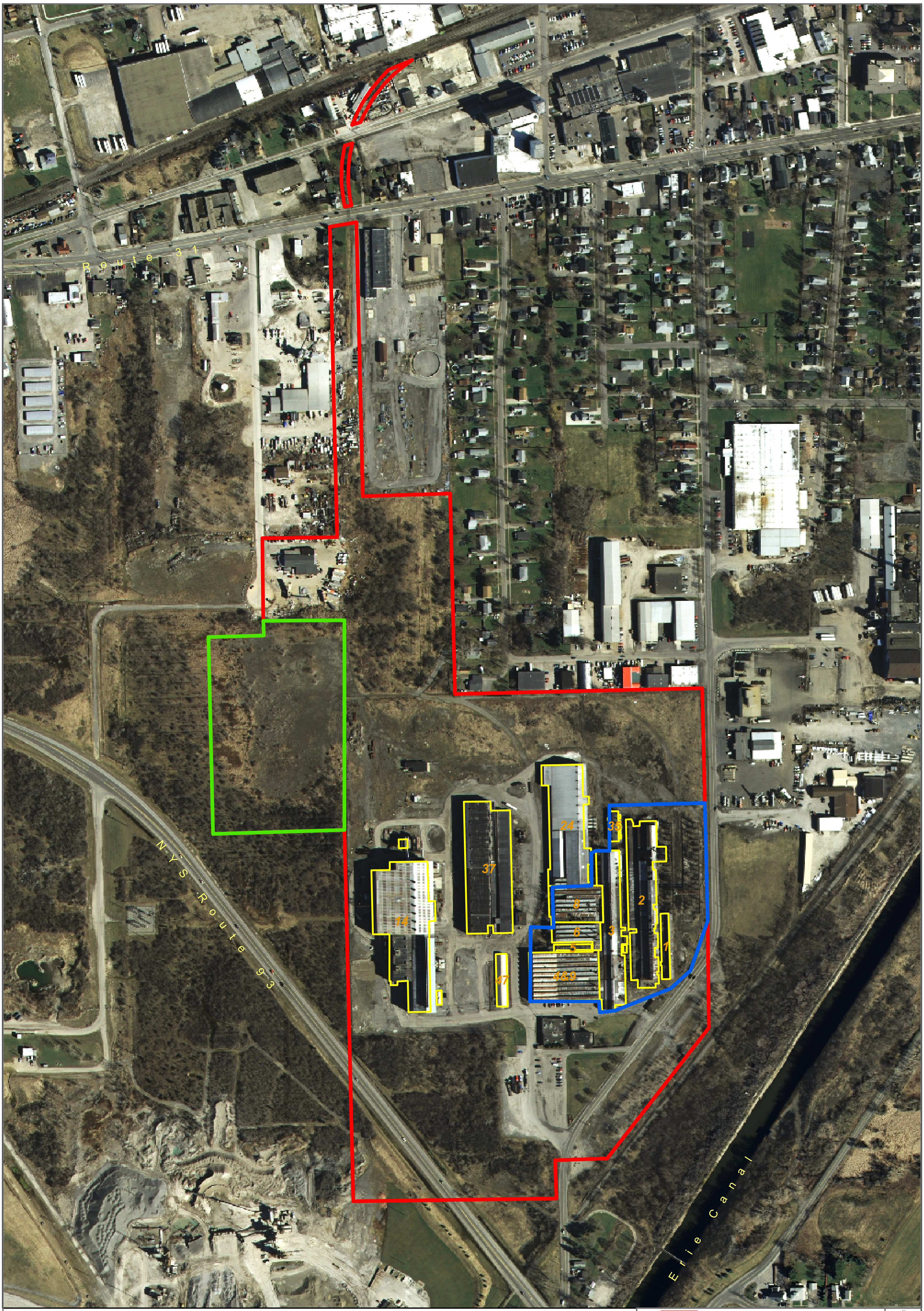
Notes:

[a] Laboratory duplicate and field duplicate results are combined with original sample results using weighted averaging.

[b] GFPC denotes Gas Flow Proportional Counting, Gamma denotes Gamma Spectroscopy, Alpha denotes Alpha Spectroscopy, Onsite denotes On Site Gamma Spectroscopy

APPENDIX B

REMEDIAL INVESTIGATION REPORT FIGURES



Guterl Landfill Boundary
Guterl Excised Area Boundary
Guterl NCIDA Boundary
37 Guterl Buildings

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

SITE PLAN

Date:	Scale:	Figure No. :
6/2/09	1 inch = 350 feet	1-2

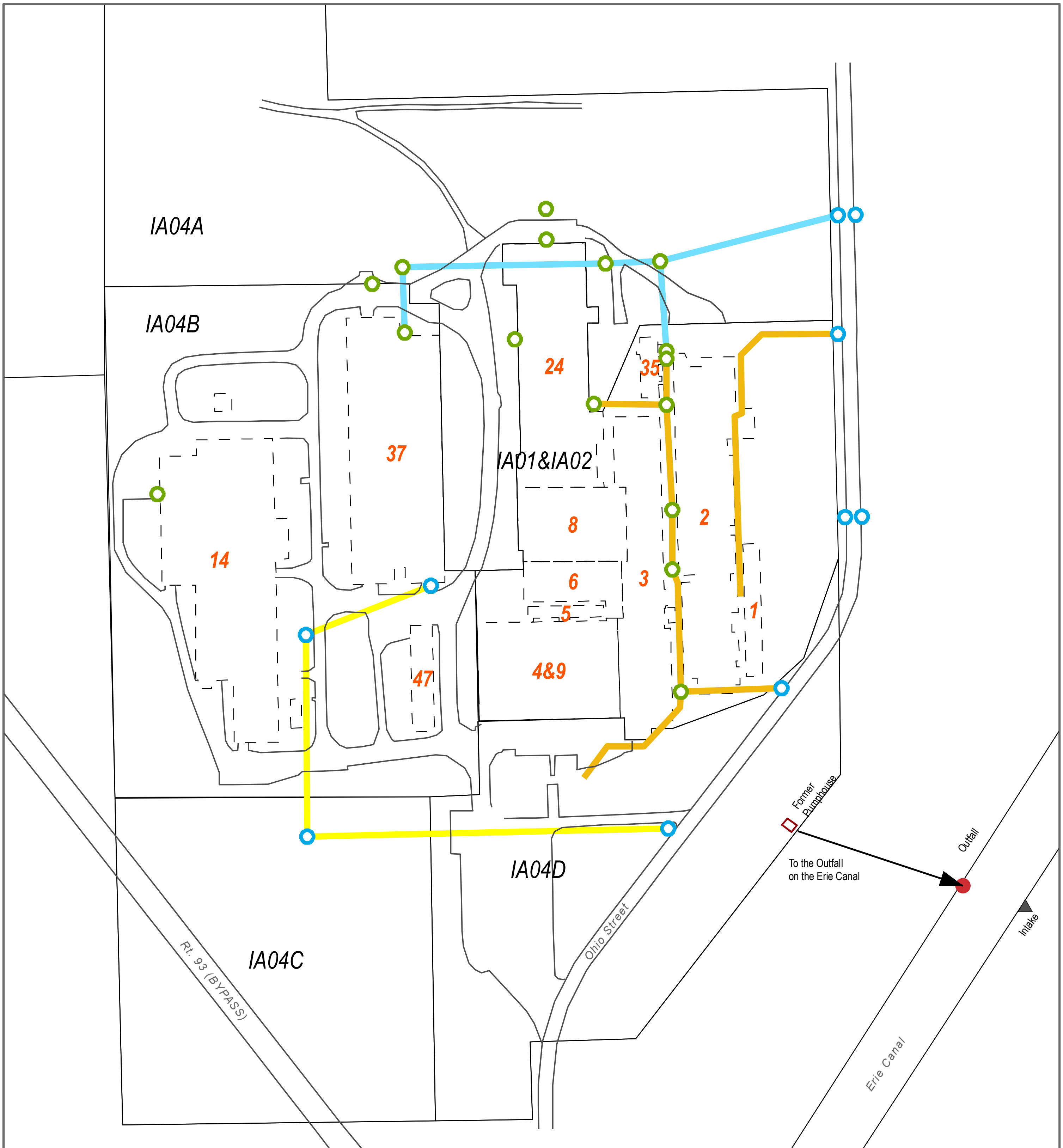
IA01 - Excised Area - Building Surfaces and Interiors
IA02 - Excised Area - Building Exteriors
IA03 - Landfill Area
IA04 - NCIDA Property
IA05 - Railroad Right-of-Way
IA09 - Erie Canal
IA10 - Lot 7.1
Guterl Buildings

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

INVESTIGATIVE AREAS

Date:	Scale:	Figure No. :
11/10/09	1 inch = 650 feet	1-3



Legend

- Catch Basin
- Manhole
- Pumphouse
- Paved Areas
- Combined Storm Sanitary Sewer
- Sanitary Sewer
- Storm Sewer
- 5 Guterl Buildings
- IAs
- Summit Street - City of Lockport Emergency Water Intake
- Former Guterl Steel Industrial Water Pump House Intake and Oil/Water Separator Outfall

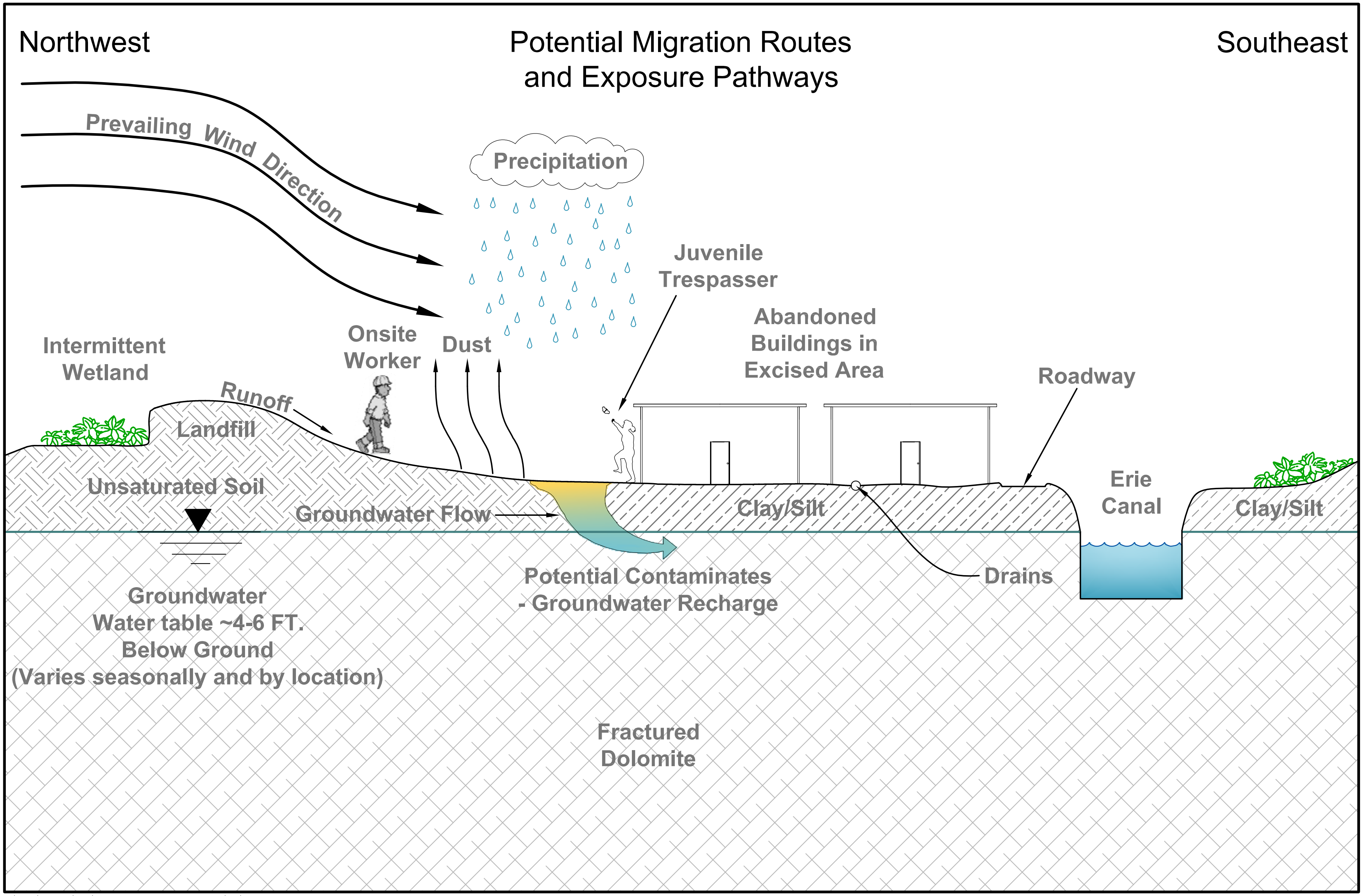
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

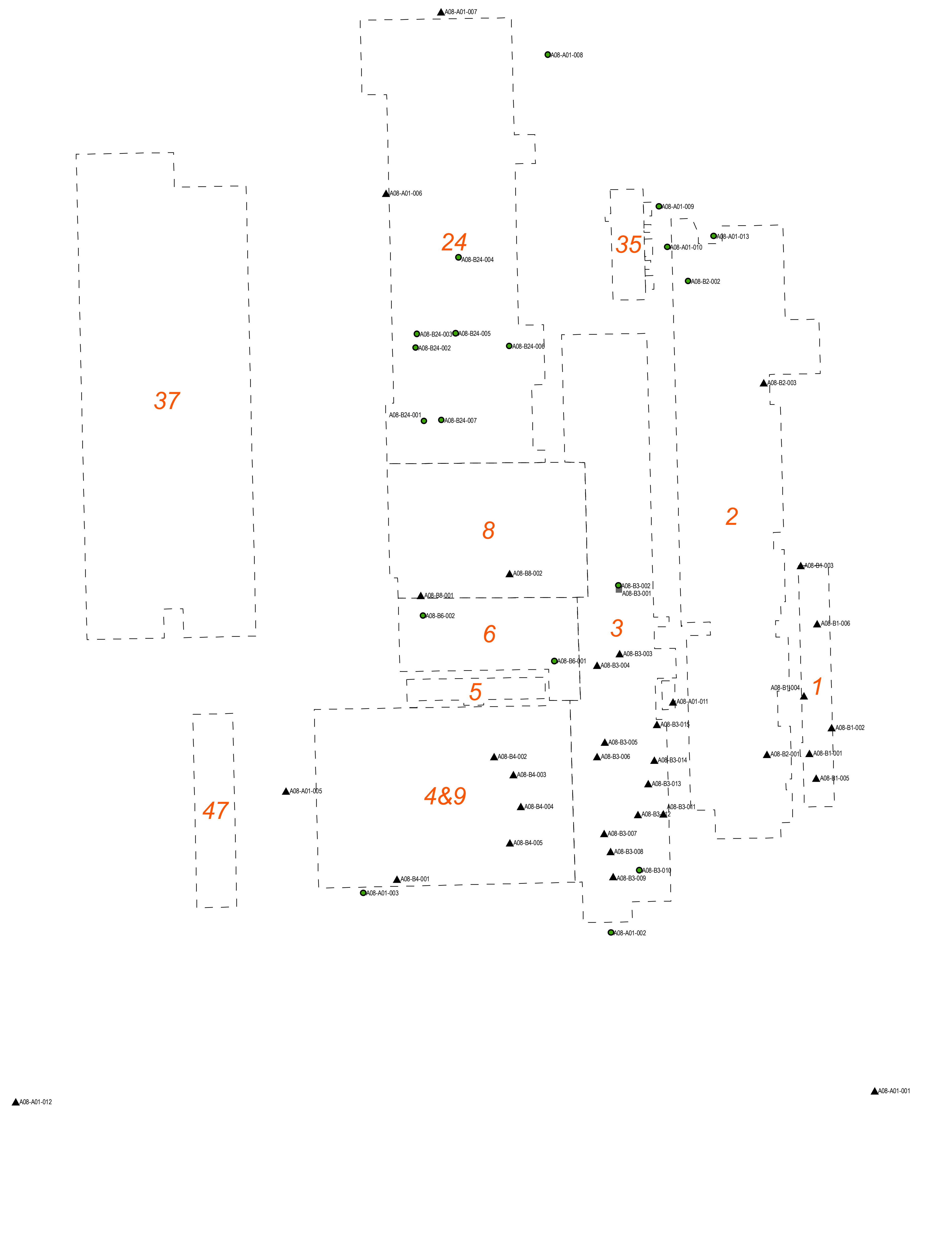
SEWER LINES

Date:	Scale:	Figure No. :
11/10/09	1 inch = 200 feet	2-12

Figure 2-14
Conceptual Site Model
Guterl Specialty Steel
Lockport, NY



L/work/100740/cad/guterl special steel rev.dwg 11/11/09



- Sediment Only
- Sediment and Surface Water
- Surface Water Only
- Buildings

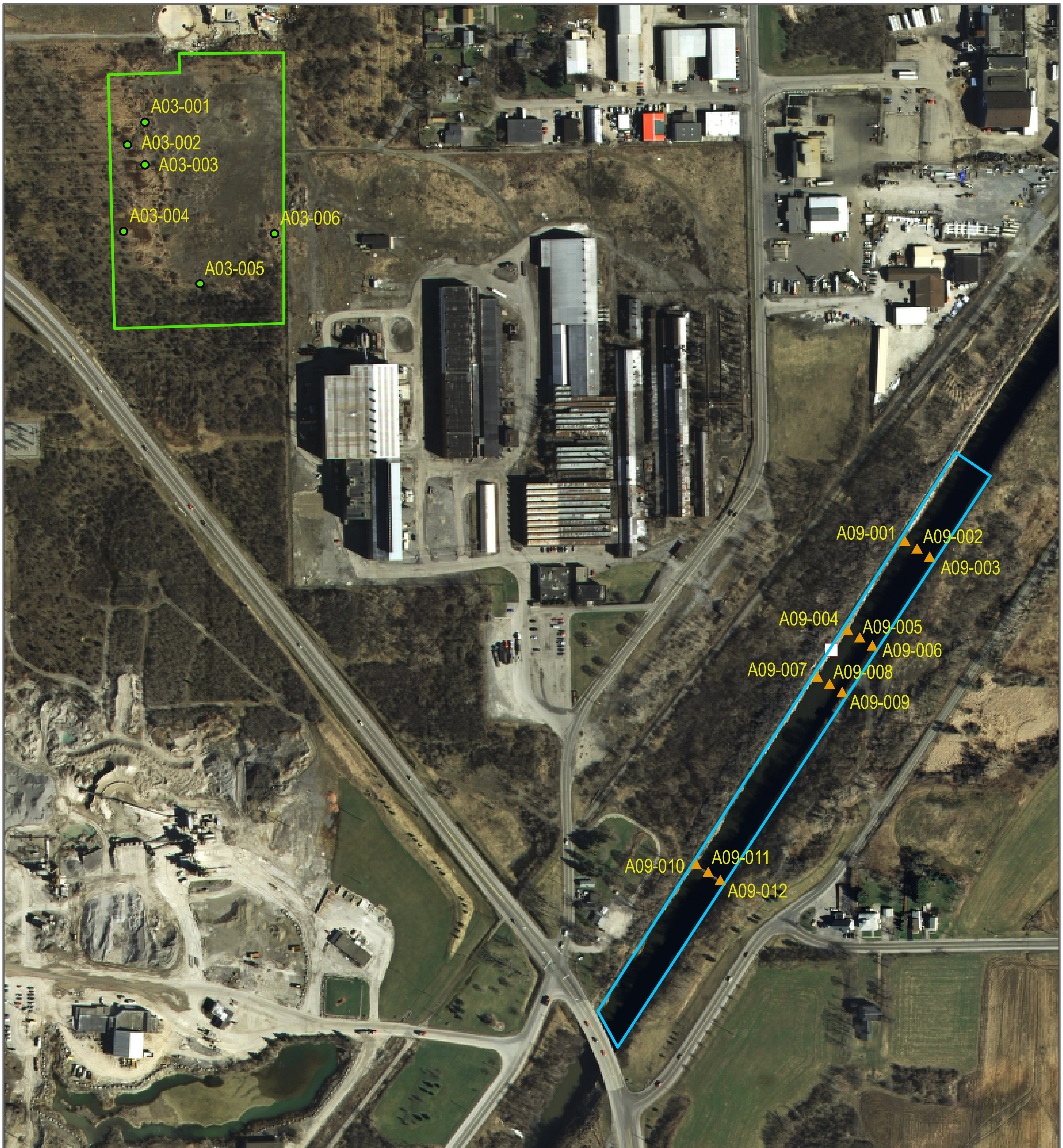
United States Army Corps of Engineers
Buffalo District

N W E S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

A08 SURFACE WATER AND SEDIMENT
SAMPLE LOCATIONS

Date:	Scale:	Figure No. :
11/10/09	1 inch = 100 feet	3-16



Sediment and Surface Water Sample Locations

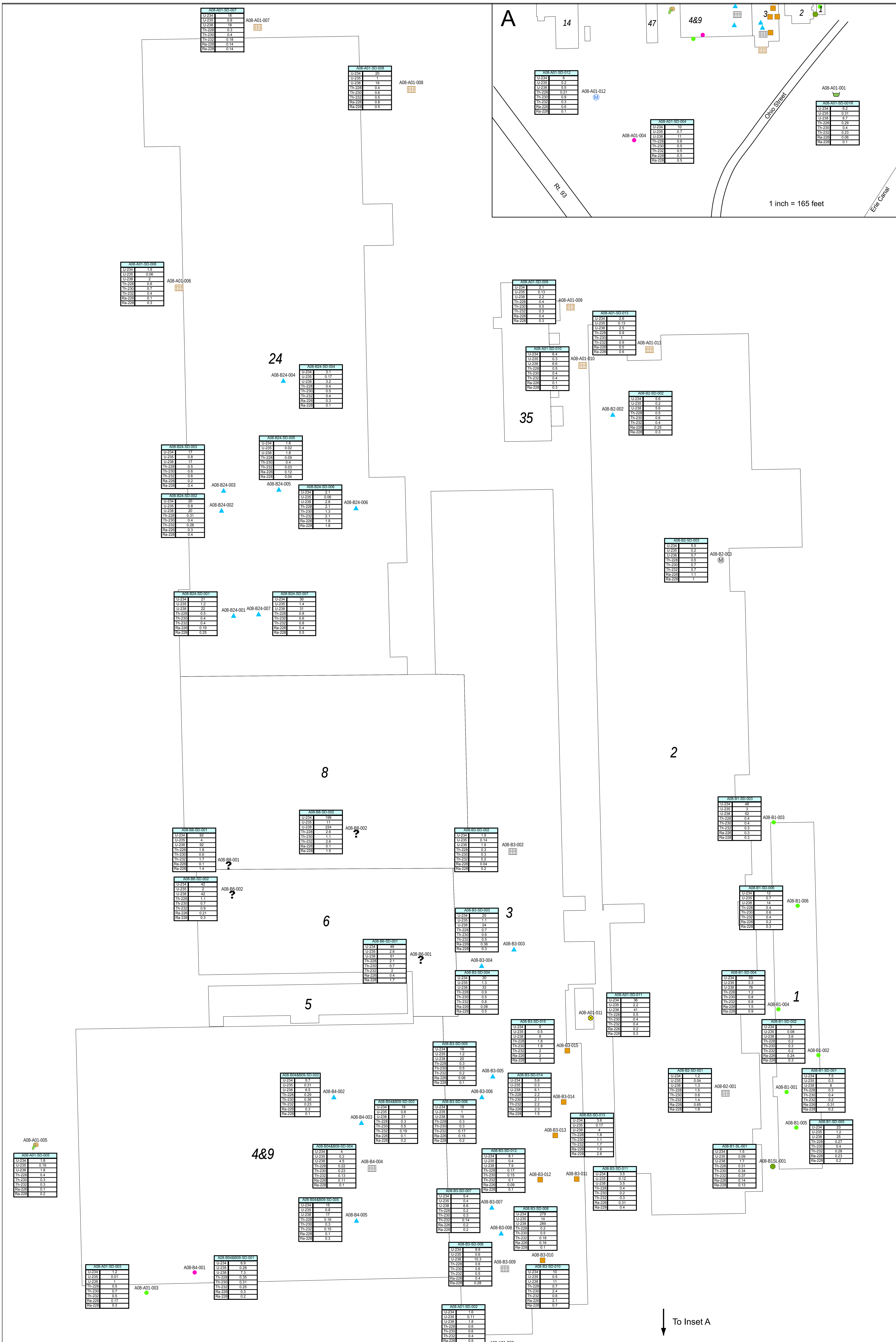
- Sediment Only
- Sediment and Surface Water
- IA03 - Landfill Area
- IA09 - Erie Canal Southeast of Site
- Former Guterl Steel Industrial Water Pump House Intake and Oil/Water Separator Outfall

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

REMEDIAL INVESTIGATION
SURFACE WATER AND SEDIMENT SAMPLES
IA03 AND IA09

Date:	Scale:	Figure No. :
11/10/09	1 inch = 400 feet	3-17



Sediment Sample Locations

Feature Descriptions

- Basement
- Basin
- Catch Basin
- Vault
- Drain Pipe
- Floor Trench
- Furnace pit
- Inaccessible
- Oil/Water Separator
- Outfall
- Pumphouse Reservoir
- Sewer Manhole
- Manhole
- Buildings

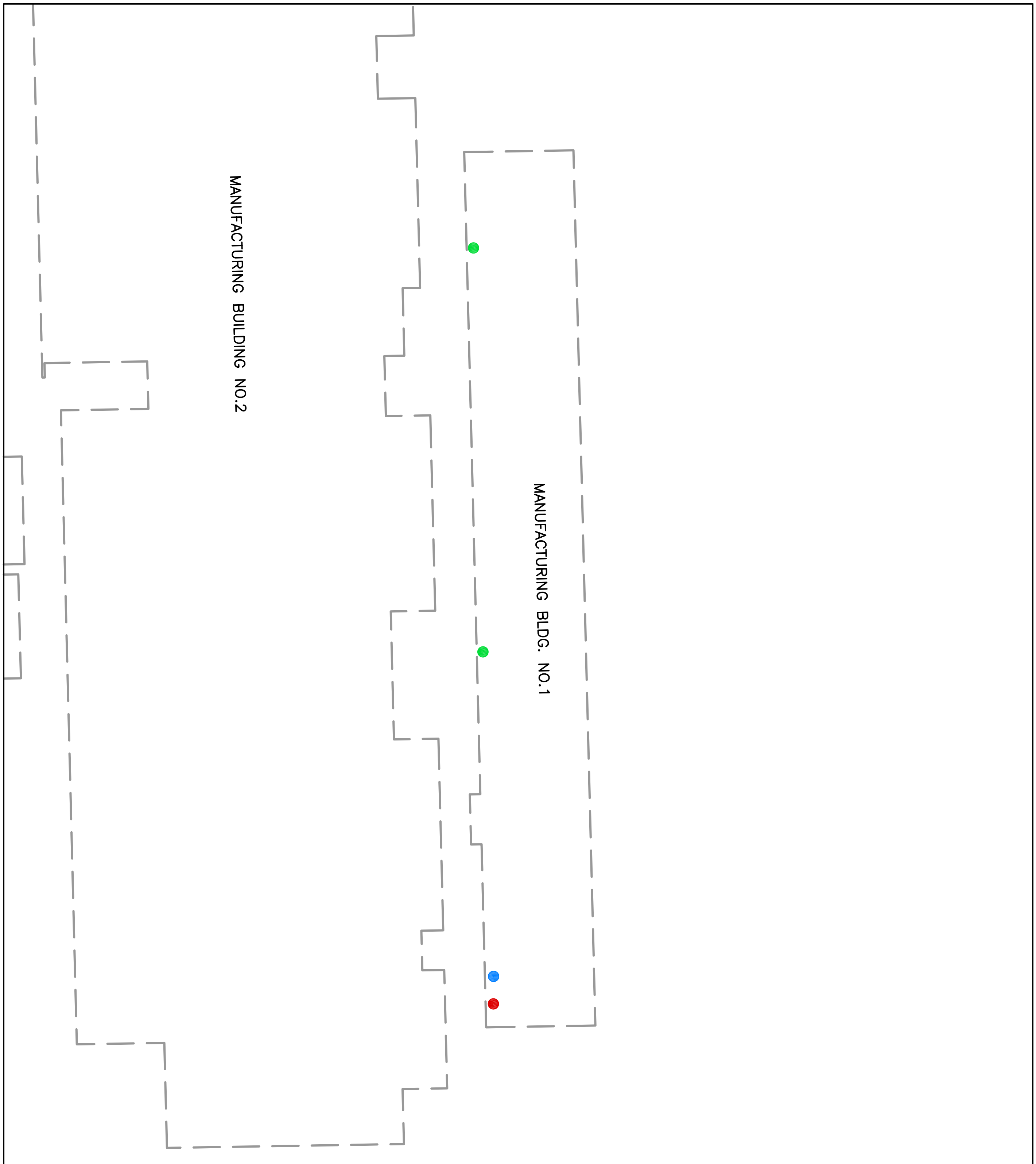
Notes:
pCi/g – picocuries per gram
All radiological results are presented in pCi/g.
U-235 concentration includes U-236, if present.
U-234, U-235, U-238, Th-228, Th-230, and Th-232 were analyzed by alpha spectroscopy.
Ra-226 and Ra-228 were analyzed by gamma spectroscopy.

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

NON-NATIVE SEDIMENT SAMPLE RESULTS - IA08

Date:	Scale:	Figure No. :
11/10/09	1 inch = 32 feet	4-30



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 1
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 40 feet	4-31

C:\WORK\San Antonio\Figure 4-31 Bldg1 Lower Surfaces.dwg, 11/12/2009 9:54:27 AM, stubblefieldr

MEASUREMENT/SAMPLING LOCATIONS

- ● >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- ● >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- ● >15,000 dpm/100 cm^2 ß
- * >1,000 dpm/100 cm^2 α

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

N W E S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 2
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 50 feet	4-32

C:\WORK\San Antonio\Figure 4-32 Bldg2 Lower Surfaces.dwg, 11/12/2009 9:54:46 AM, stubblefieldr

MEASUREMENT/SAMPLING LOCATIONS

- ● >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- ● >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- ● >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

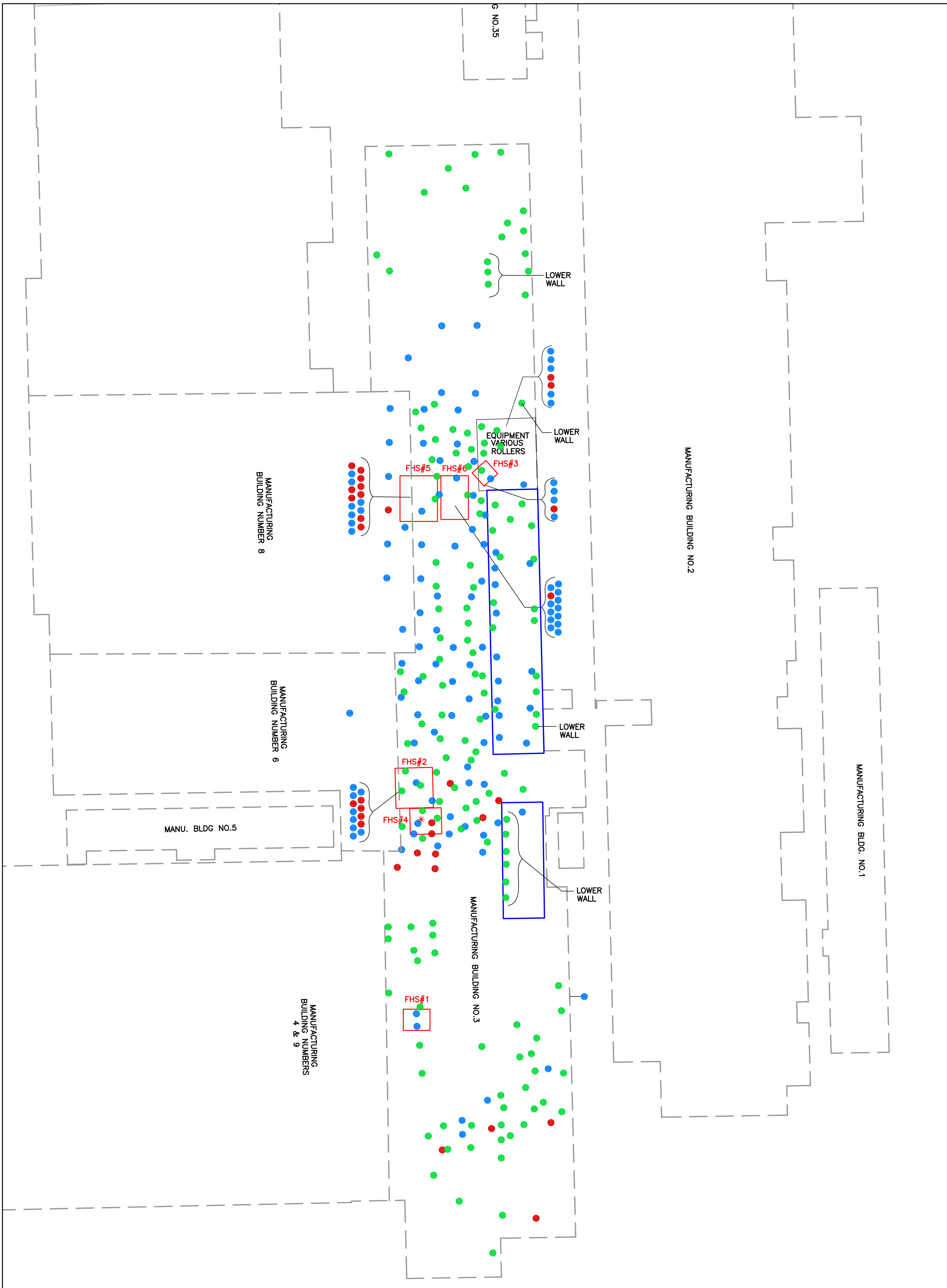
N W E S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 2
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
UPPER SURFACES

Date:	Scale:	Figure No.:
8/20/09	1 inch = 50 feet	4-33

C:\WORK\San Antonio\Figure 4-33 Bldg2 Upper Surfaces.dwg, 11/12/2009 9:55:42 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green dot) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue dot) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red dot) >15,000 dpm/100 cm^2 ß
- (red asterisk) >1,000 dpm/100 cm^2 α
- FHS# Floor Hot Spot
- (blue line) Class 2 Area

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 3
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 50 feet	4-34

C:\WORK\San Antonio\Figure 4-34 Bldg3 Lower Surfaces.dwg, 11/12/2009 9:56:47 AM, stubblefieldr

MEASUREMENT/SAMPLING LOCATIONS

- >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- >15,000 dpm/100 cm^2 ß
- * >1,000 dpm/100 cm^2 α

Refer to Appendix T for Building Survey Data.

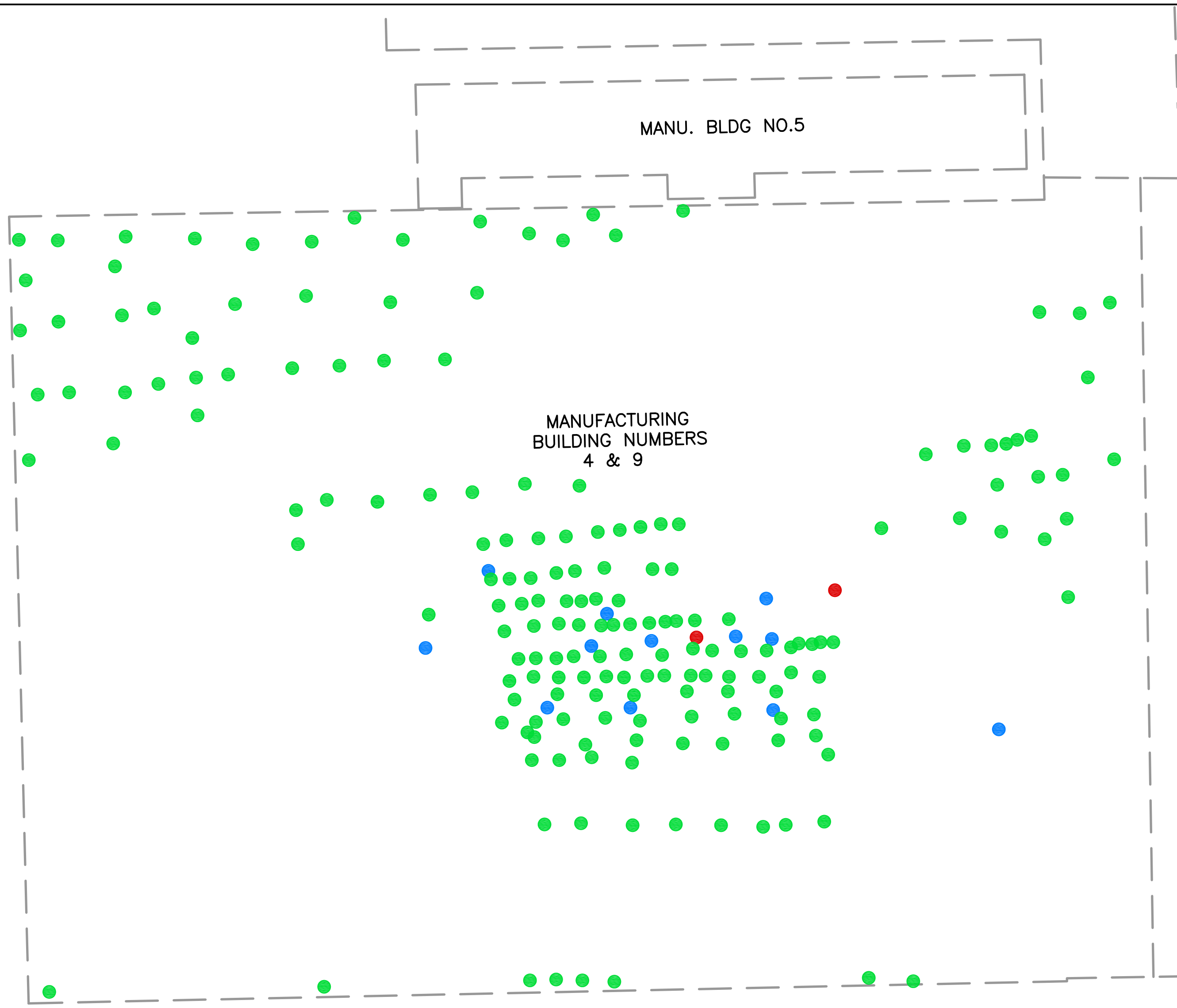
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 3
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
UPPER SURFACES

Date:	Scale:	Figure No.:
8/20/09	1 inch = 50 feet	4-35

C:\WORK\San Antonio\Figure 4-35 Bldg3 Upper Surfaces.dwg, 11/12/2009 9:58:20 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

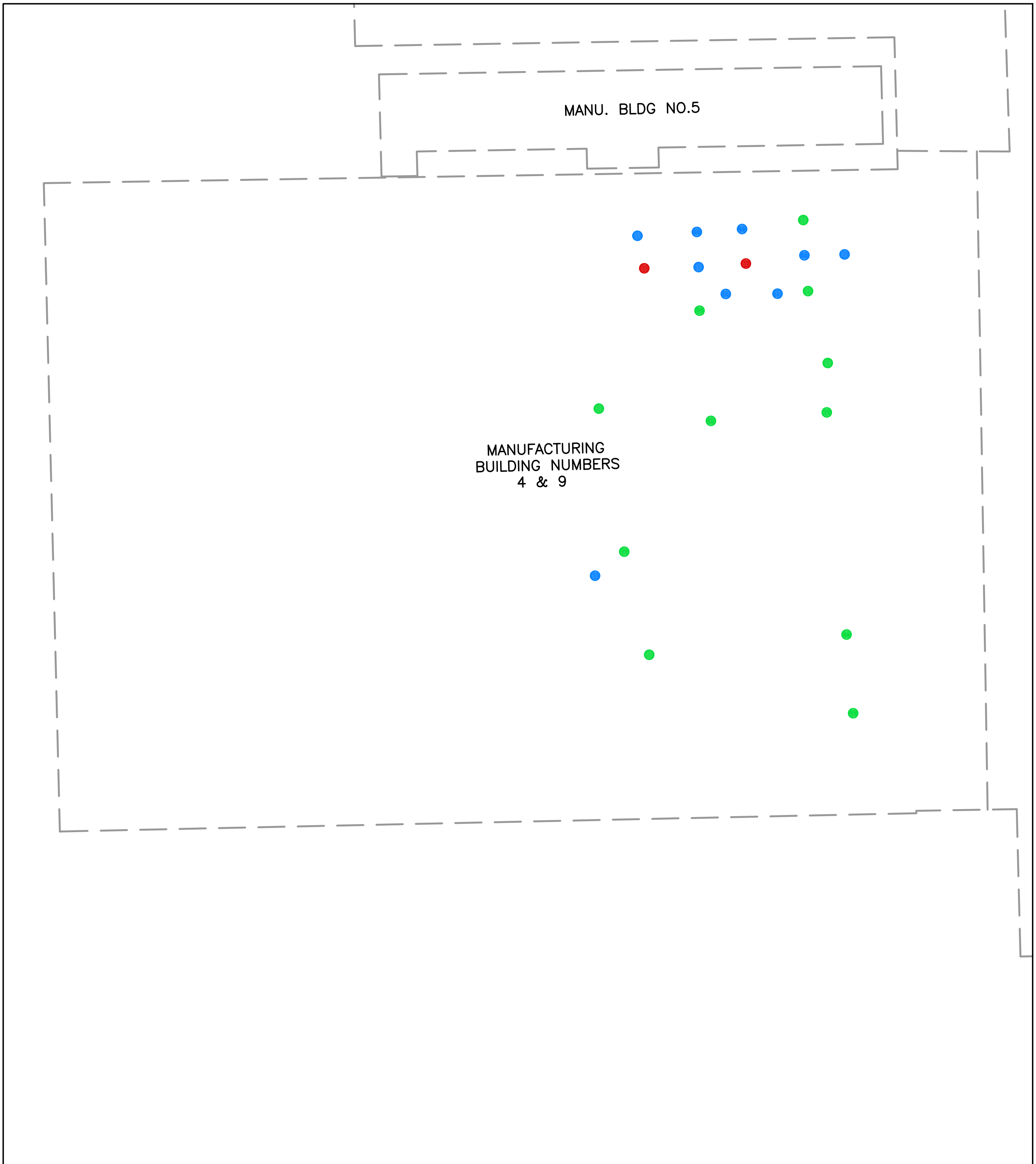
Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDINGS 4 AND 9
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOOR, LOWER WALLS, AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 40 feet	4-36



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

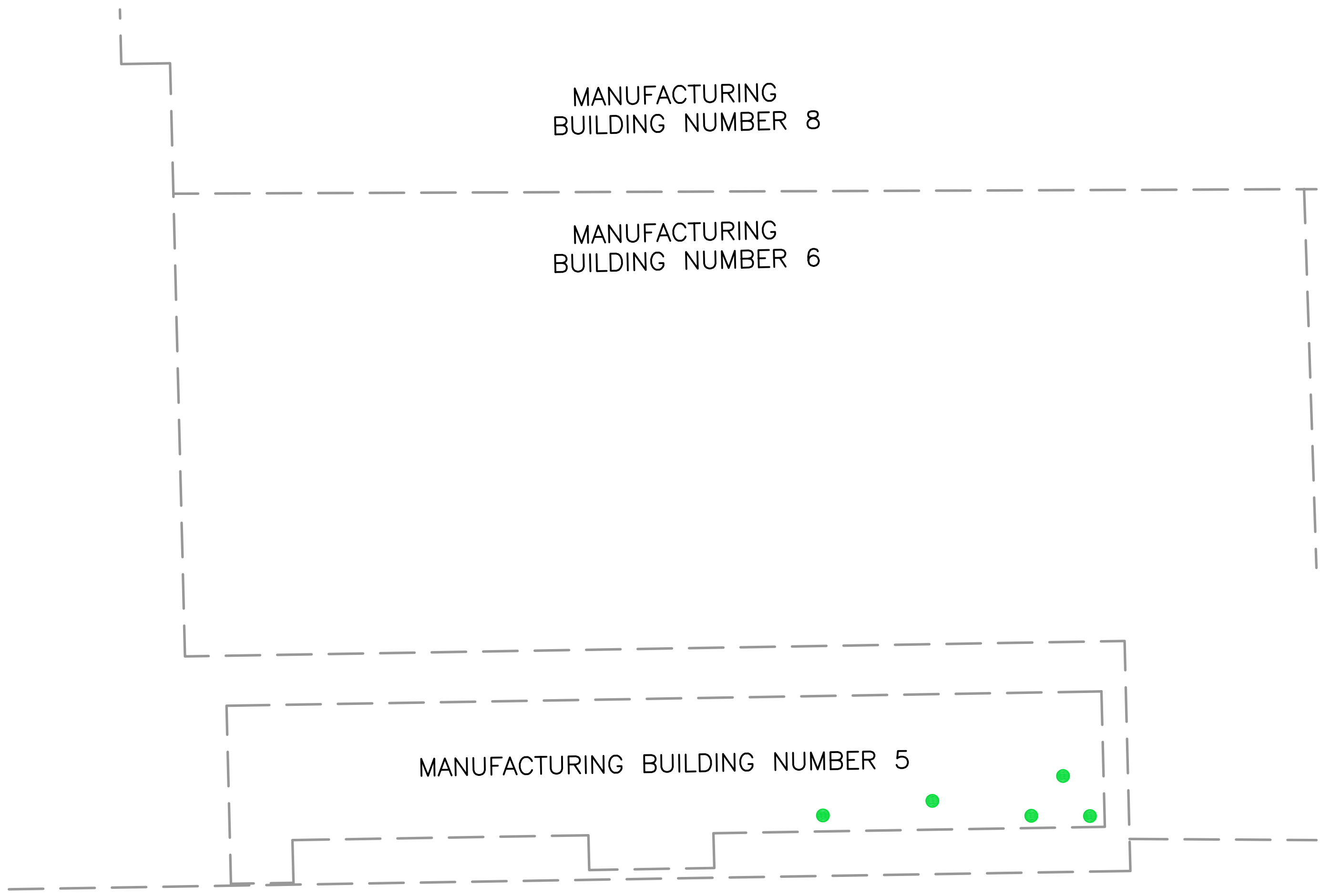
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDINGS 4 AND 9
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
UPPER SURFACES

Date:	Scale:	Figure No.:
8/20/09	1 inch = 40 feet	4-37

C:\WORK\San Antonio\Figure 4-37 Bldg4and9 Upper Surfaces.dwg, 11/12/2009 10:00:24 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

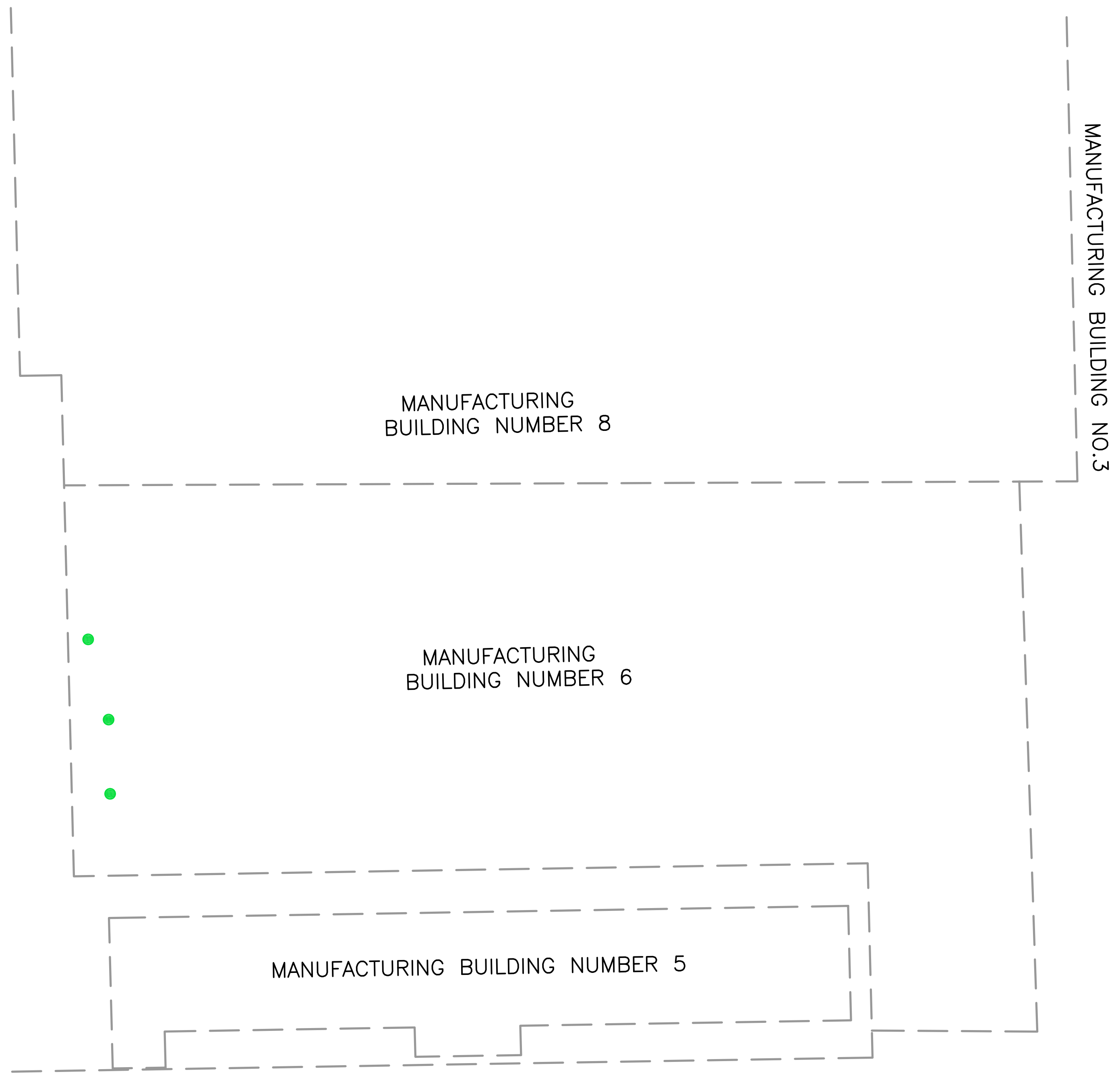
United States Army Corps of Engineers
Buffalo District

N
W E
S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 5
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
CEILING

Date:	Scale:	Figure No.:
8/20/09	1 inch = 30 feet	4-38



MEASUREMENT/SAMPLING
LOCATIONS

- >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

N W E S

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 6
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
EXTERIOR WALLS AND ROOF

Date:	Scale:	Figure No.:
8/20/09	1 inch = 30 feet	4-39

C:\WORK\San Antonio\Figure 4-39 Bldg6 Exterior Surfaces.dwg, 11/12/2009 10:03:55 AM, stubblefieldr

MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm$_2$ ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm$_2$ ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

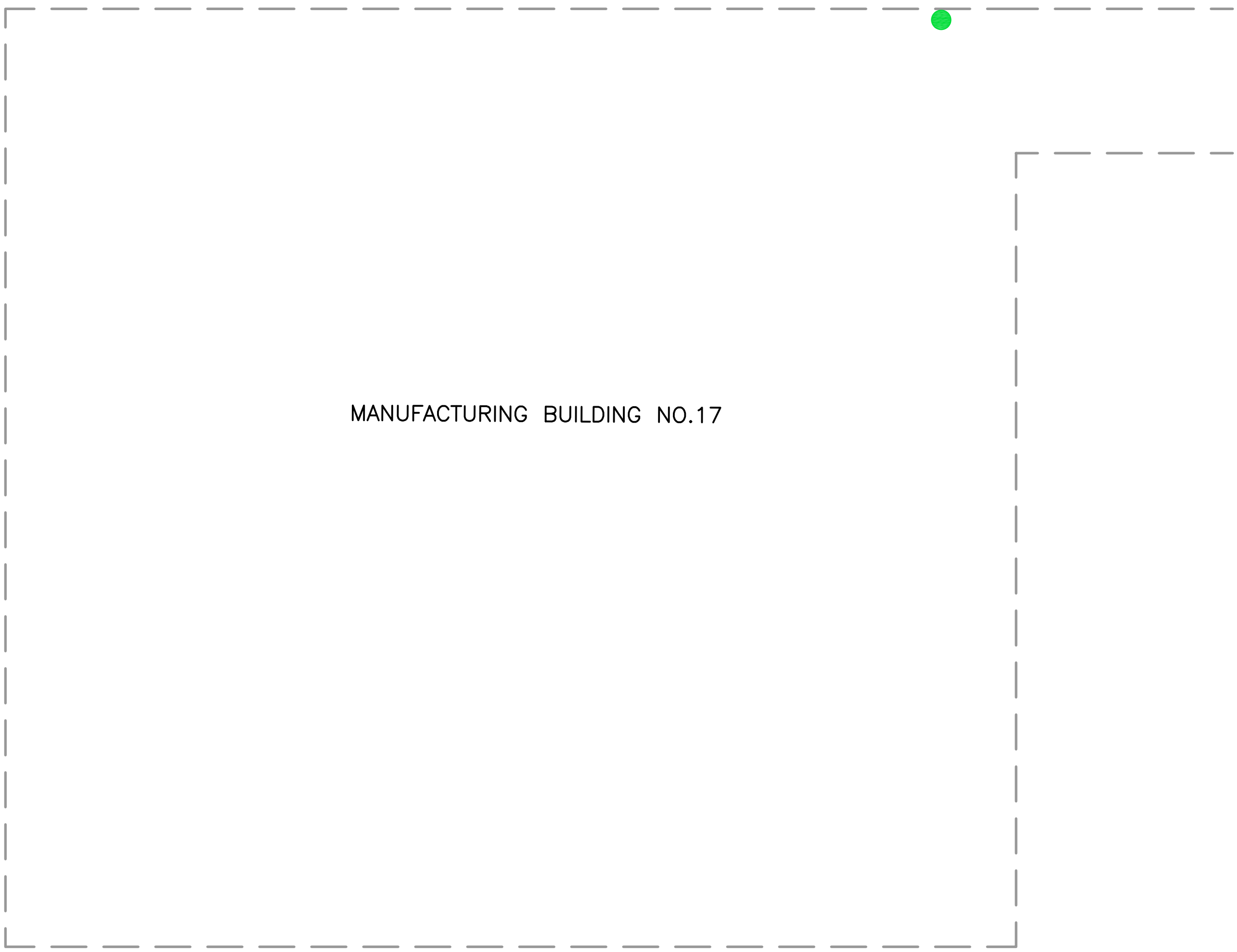
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 8
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS, AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 40 feet	4-40

C:\WORK\San Antonio\Figure 4-40 Bldg8 Lower Surfaces.dwg, 11/12/2009 10:05:19 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

N
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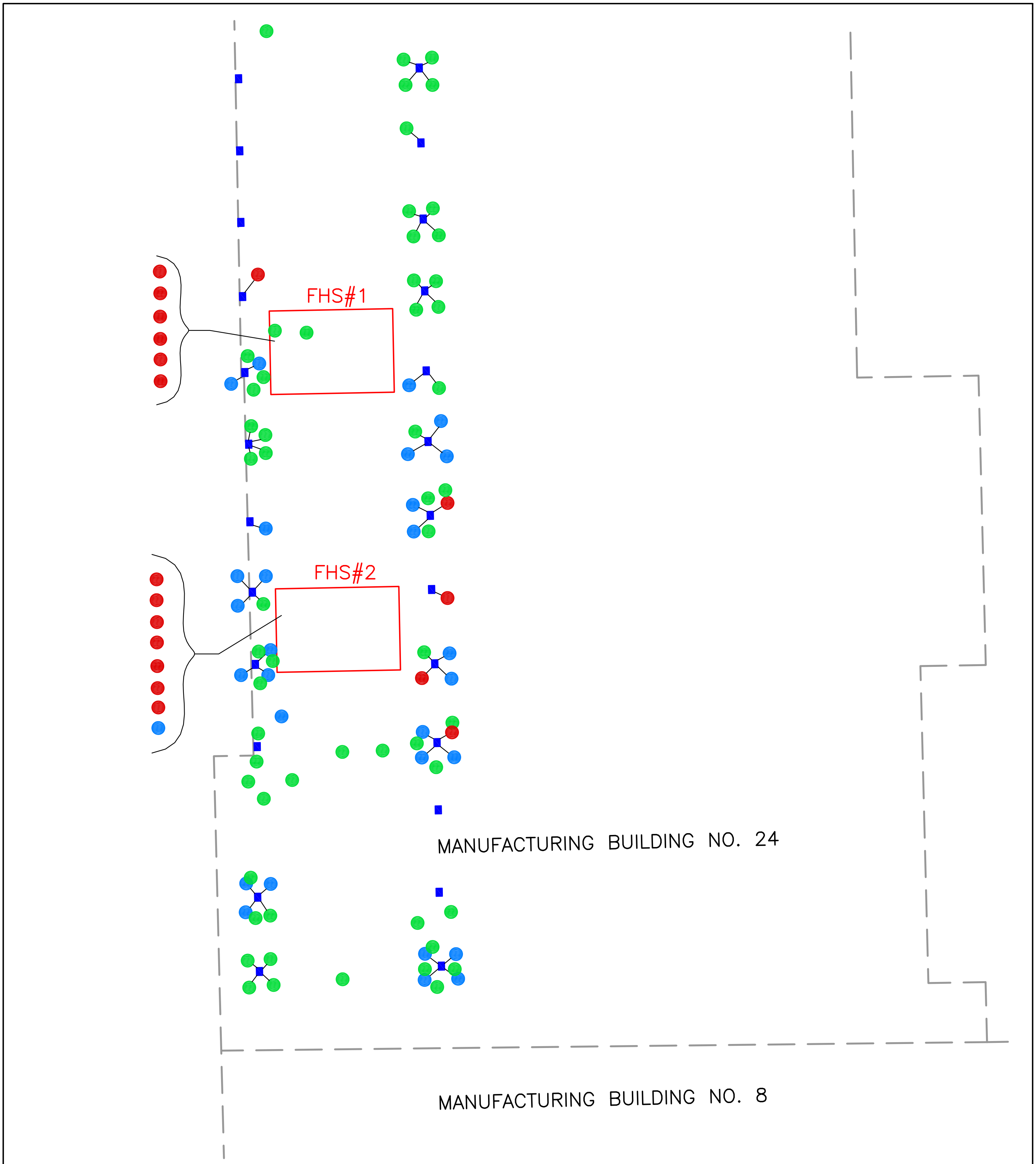
GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 17
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS, AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 20 feet	4-41

C:\WORK\San Antonio\Figure 4-41 Bldg17 Lower Surfaces.dwg, 11/12/2009 10:13:31 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- >15,000 dpm/100 cm^2 ß
- Column
- FHS# Floor Hot Spot

Refer to Appendix T for Building Survey Data.

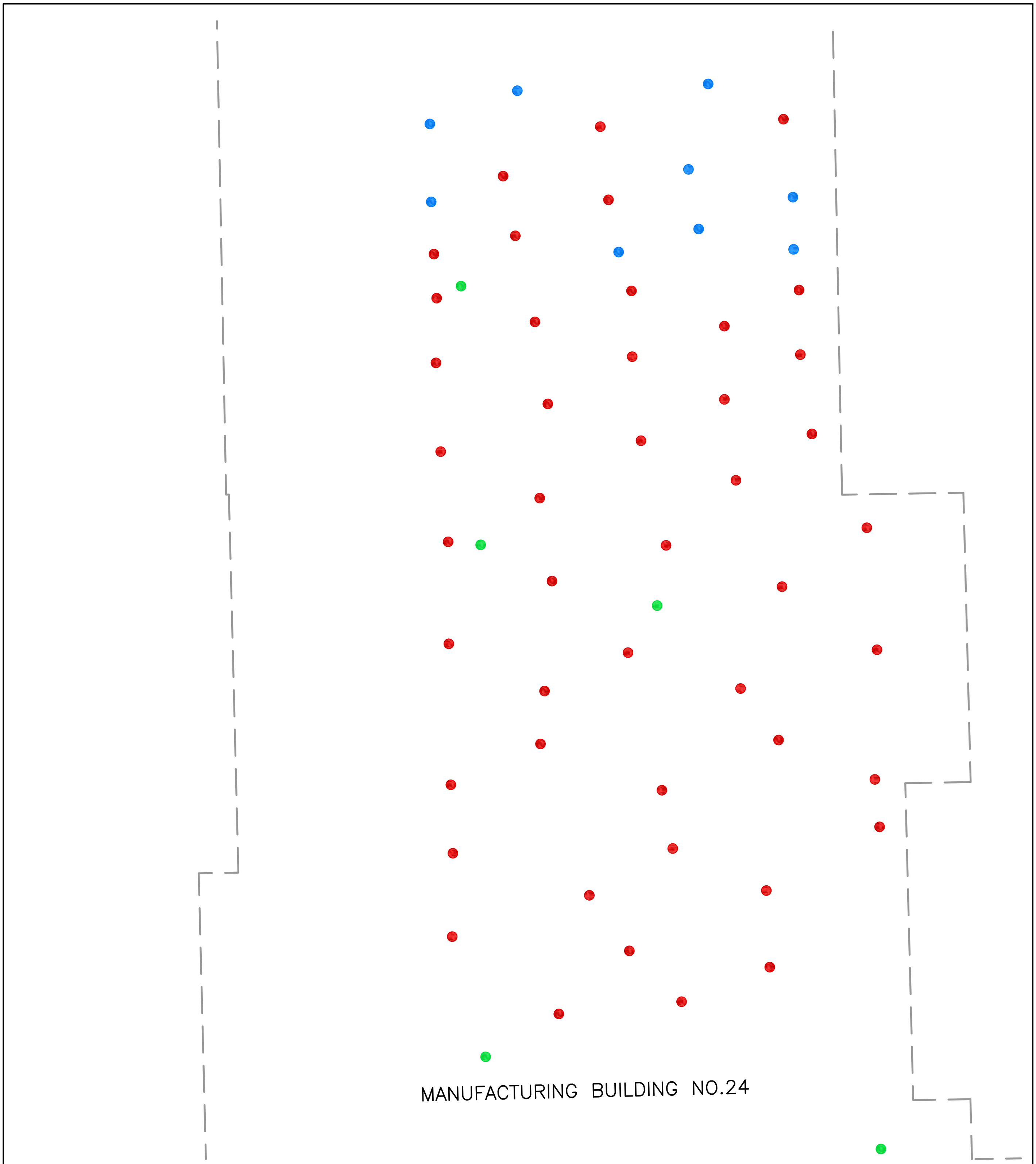
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 24 - SOUTHWEST AREA
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOOR, LOWER WALLS, EQUIPMENT AND COLUMNS

Date:	Scale:	Figure No.:
8/20/09	1 inch = 30 feet	4-42

C:\WORK\San Antonio\Figure 4-42 Bldg24 Lower Surfaces.dwg, 11/12/2009 10:15:11 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

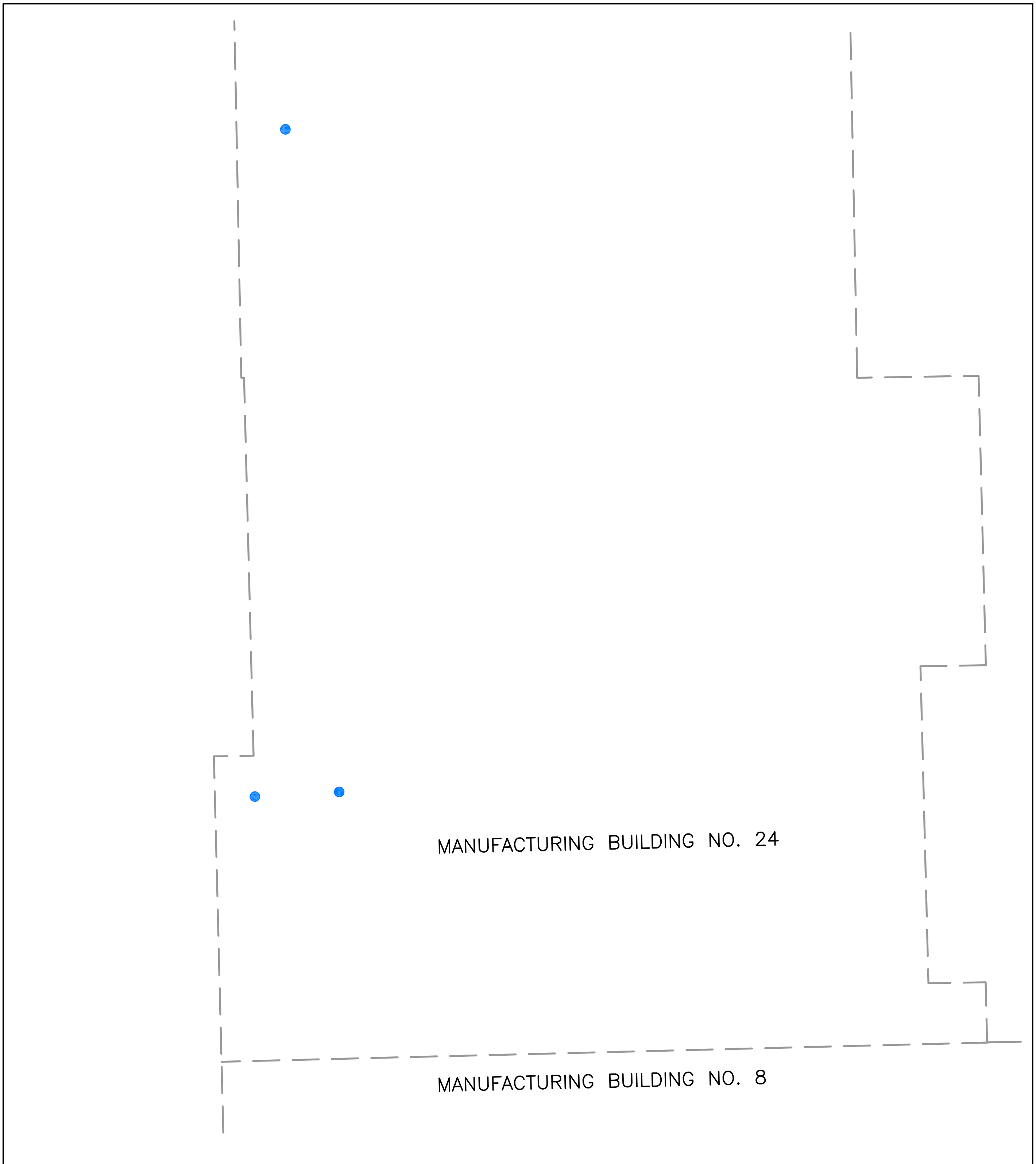
Refer to Appendix T for Building Survey Data.

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 24 - SOUTHEAST AREA
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
CEILING SURFACES

Date:	Scale:	Figure No.:
8/20/09	1 inch = 30 feet	4-43



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

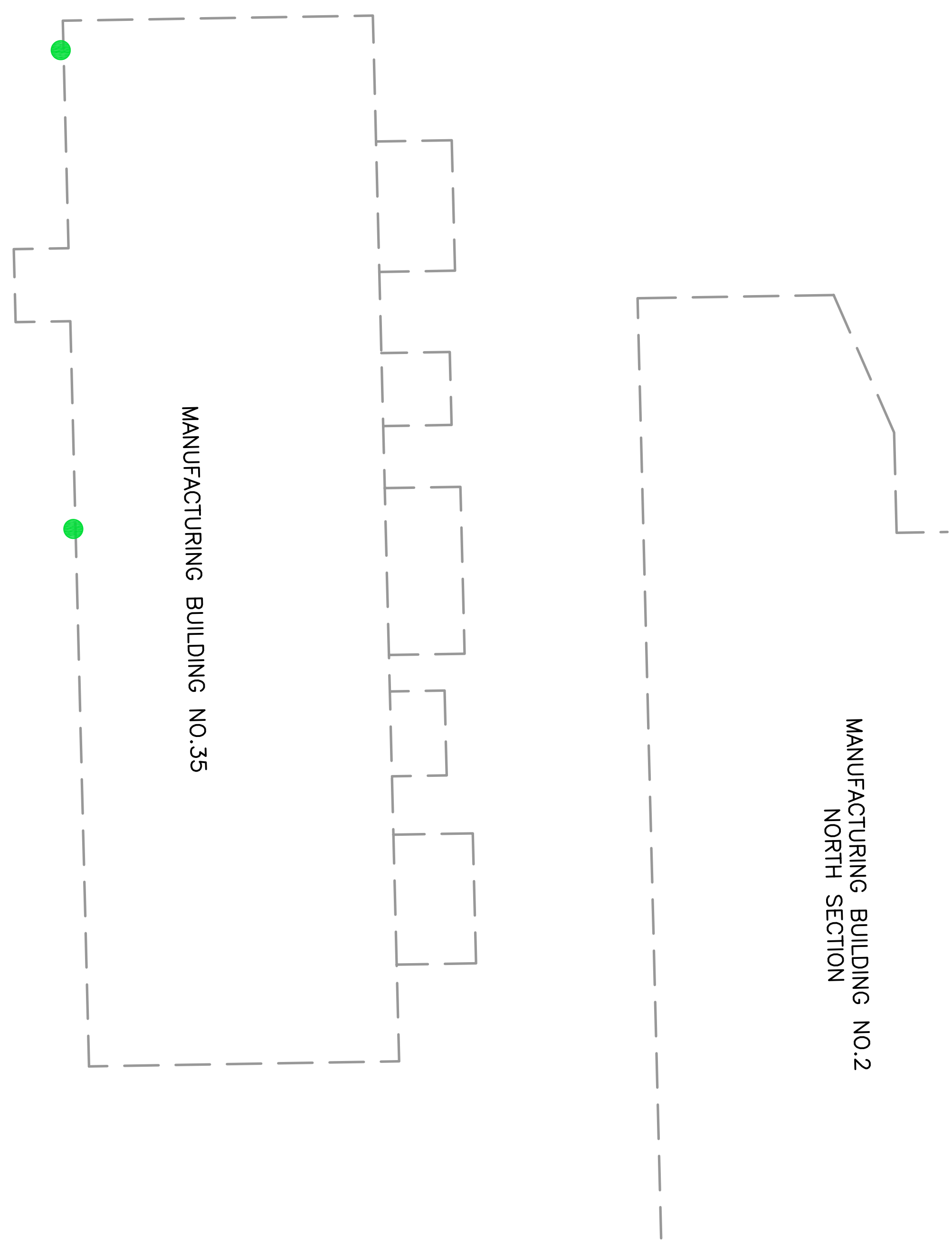
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 24
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
EXTERIOR ROOF

Date:	Scale:	Figure No.:
6/22/09	1 inch = 30 feet	4-44

C:\WORK\San Antonio\Figure 4-44 Bldg24 Exterior Roof.dwg, 11/12/2009 10:16:51 AM, stubblefieldr



MEASUREMENT/SAMPLING LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

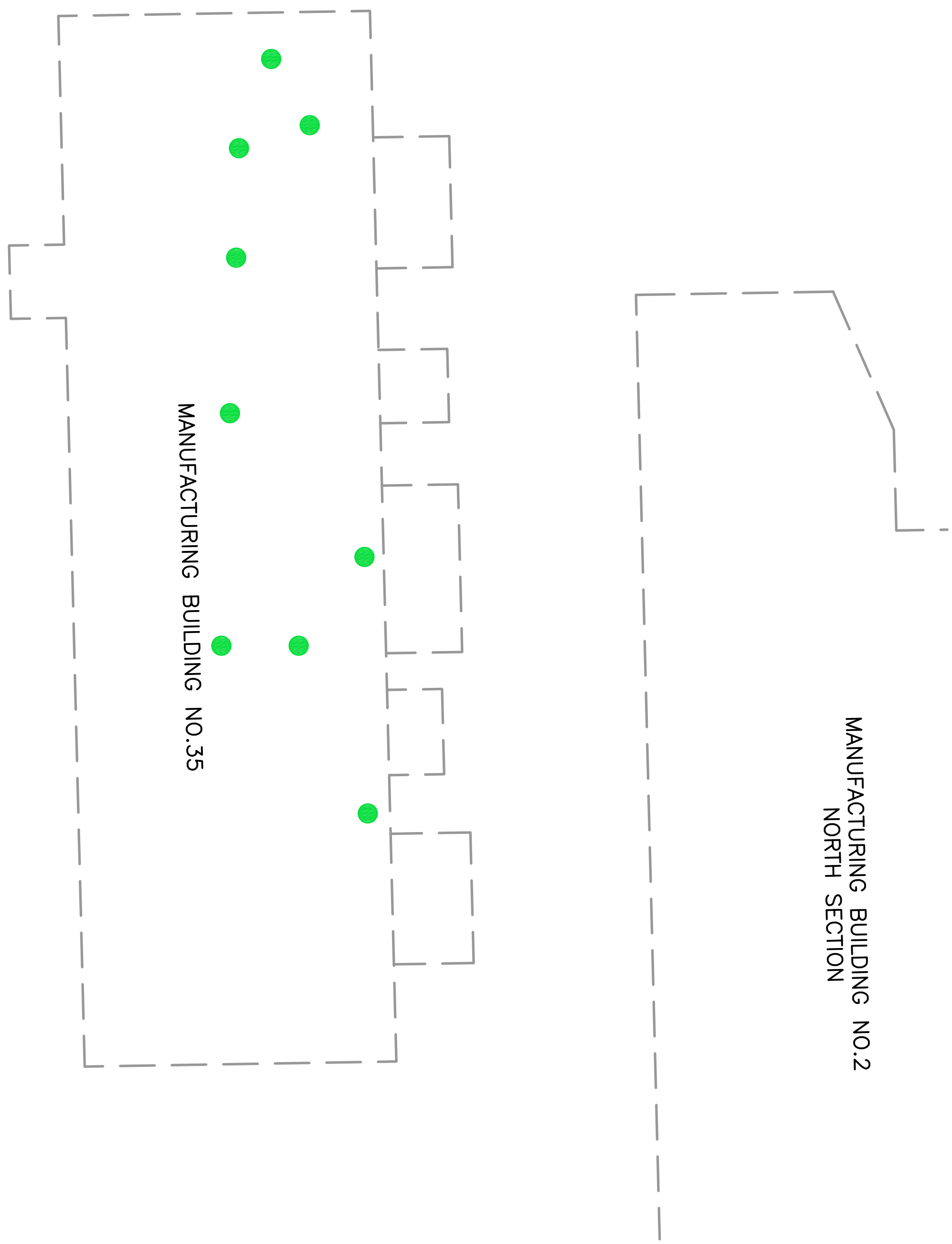
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 35
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
EXTERIOR WALLS AND ROOF

Date:	Scale:	Figure No.:
8/20/09	1 inch = 20 feet	4-45

C:\WORK\San Antonio\Figure 4-45 Bldg35 Exterior Surfaces.dwg, 11/12/2009 10:17:52 AM, stubblefieldr



MEASUREMENT/SAMPLING
LOCATIONS

- (green) >1,000 and ≤ 5,000 dpm/100 cm^2 ß
- (blue) >5,000 and ≤ 15,000 dpm/100 cm^2 ß
- (red) >15,000 dpm/100 cm^2 ß

Refer to Appendix T for Building Survey Data.

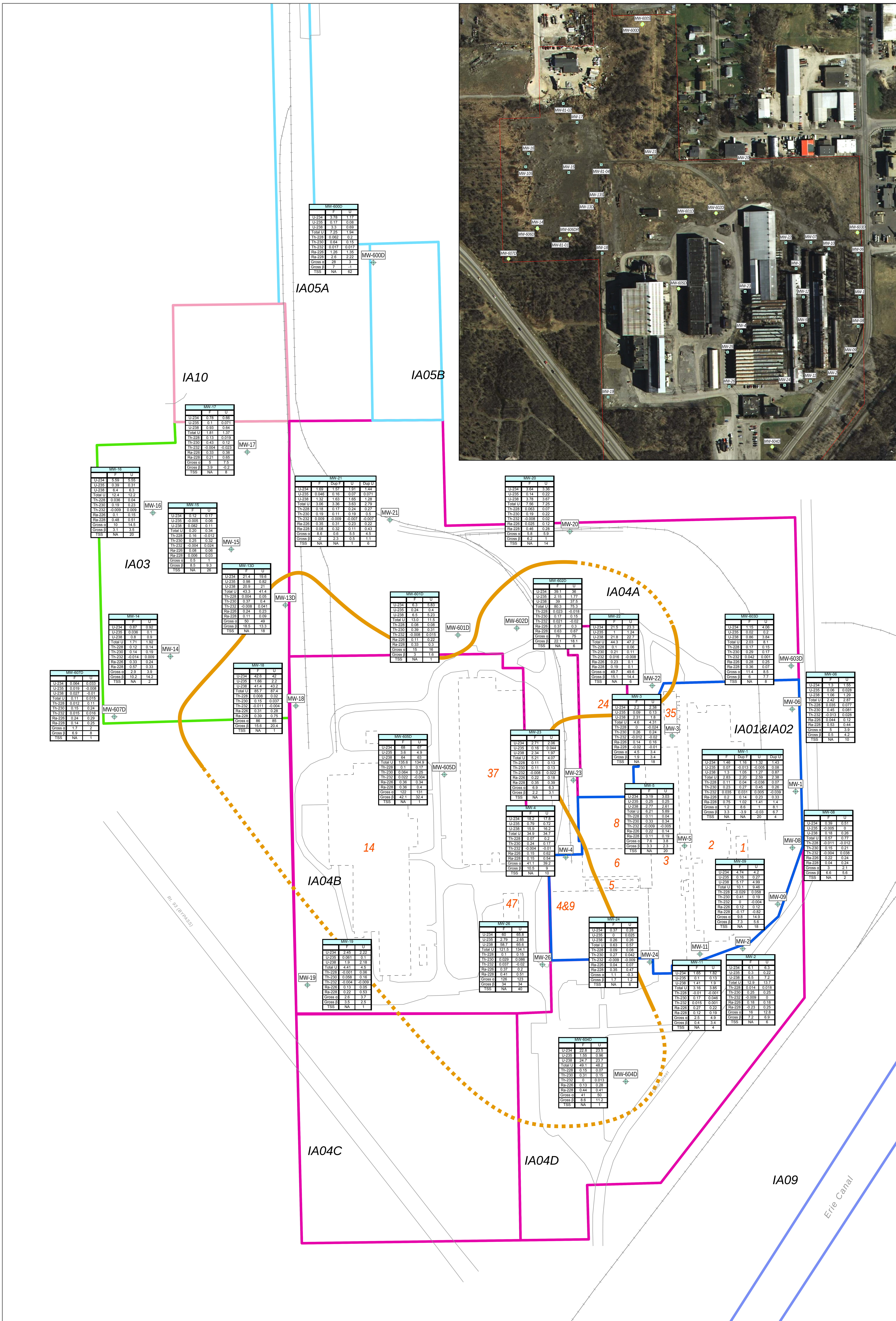
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

BUILDING 35
DIRECT MEASUREMENT AND SAMPLING LOCATIONS
SCREENING LEVEL EXCEEDANCES
FLOORS, LOWER WALLS AND EQUIPMENT

Date:	Scale:	Figure No.:
8/20/09	1 inch = 20 feet	4-46

C:\WORK\San Antonio\Figure 4-46 Bldg35 Lower Surfaces.dwg, 11/12/2009 10:18:56 AM, stubblefieldr



- Monitoring Wells
- Former Rail Lines
- Paved Areas
- 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
- IA09 - Erie Canal
- IA10 - Lot 7.1

Total Uranium Contour Exceeding MCL

Line represents the EPA drinking water MCL for total Uranium of 30 ug/L (40 CFR 141.66), which is equivalent to 27 pCi/L. Total Uranium isopleth was developed using the data from unfiltered samples.

All radiological results are presented in pCi/L.
Total Suspended Solids (TSS) presented in mg/L.
U-235 concentration includes U-236, if present.
Uranium and thorium isotopes analyzed by alpha spectroscopy.
Radium isotopes analyzed by gas flow proportional counting (GFPC).

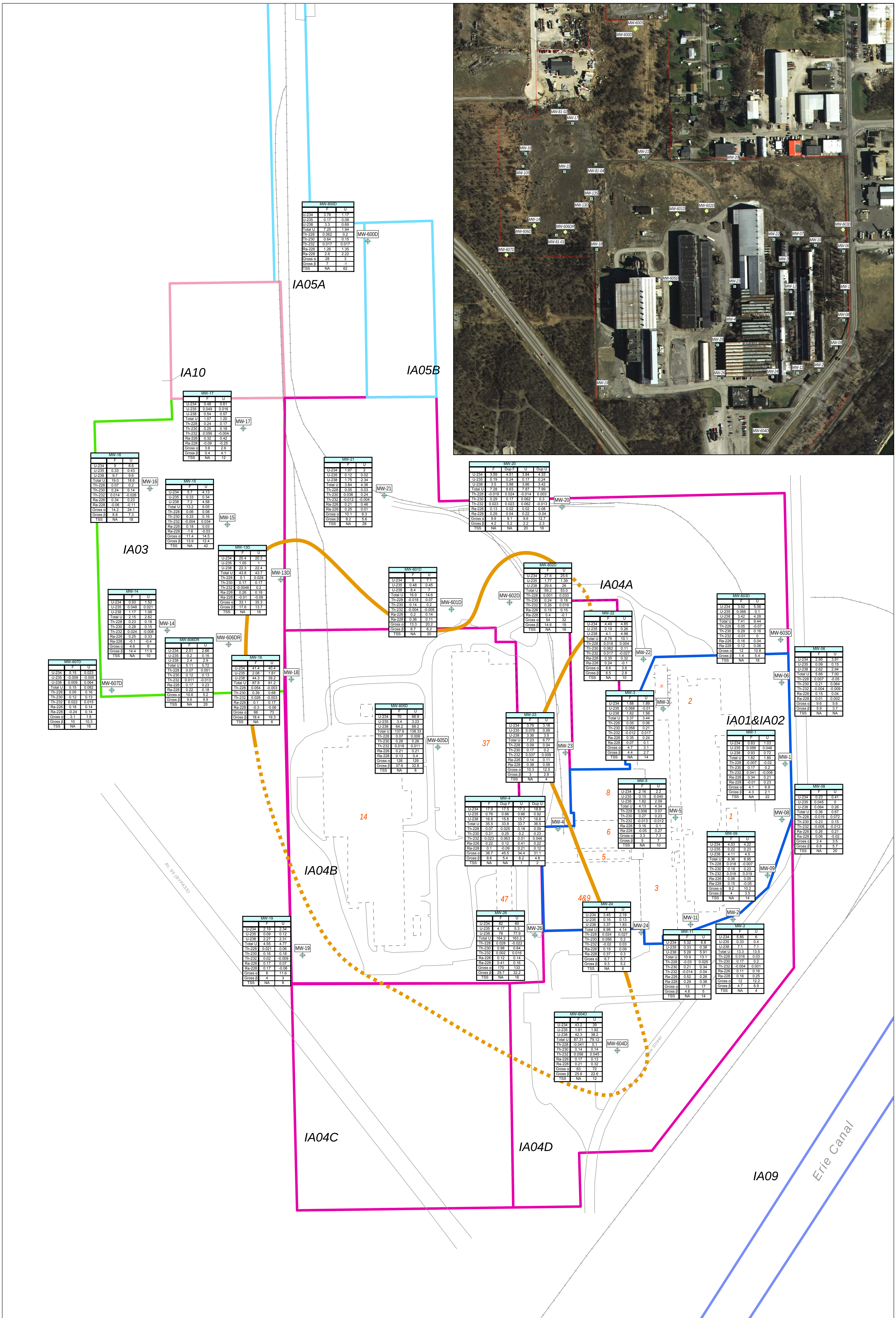
α - Alpha	Dup - Duplicate
β - Beta	NA - Not Analyzed
F - Filtered	pCi/L - picocuries per liter
U - Unfiltered	mg/L - milligrams per liter

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

GROUNDWATER SAMPLE RESULTS - JULY/AUGUST 2007

Date:	Scale:	Figure No. :
11/10/09	1 inch = 120 feet	4-47



⌖	Monitoring Wells
—+—	Former Rail Lines
——	Paved Areas
⌐ _ _ ¬	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
- IA09 - Erie Canal
- IA10 - Lot 7.1

Total Uranium Contour Exceeding MCL

Line represents the EPA drinking water MCL for total Uranium of 30 ug/L (40 CFR 141.66), which is equivalent to 27 pCi/L. Total Uranium isopleth was developed using the data from unfiltered samples.

All radiological results are presented in pCi/L.
Total Suspended Solids (TSS) presented in mg/L.
U-235 concentration includes U-236, if present.
Uranium and thorium isotopes analyzed by alpha spectroscopy.
Radium isotopes analyzed by gas flow proportional counting (GFPC).

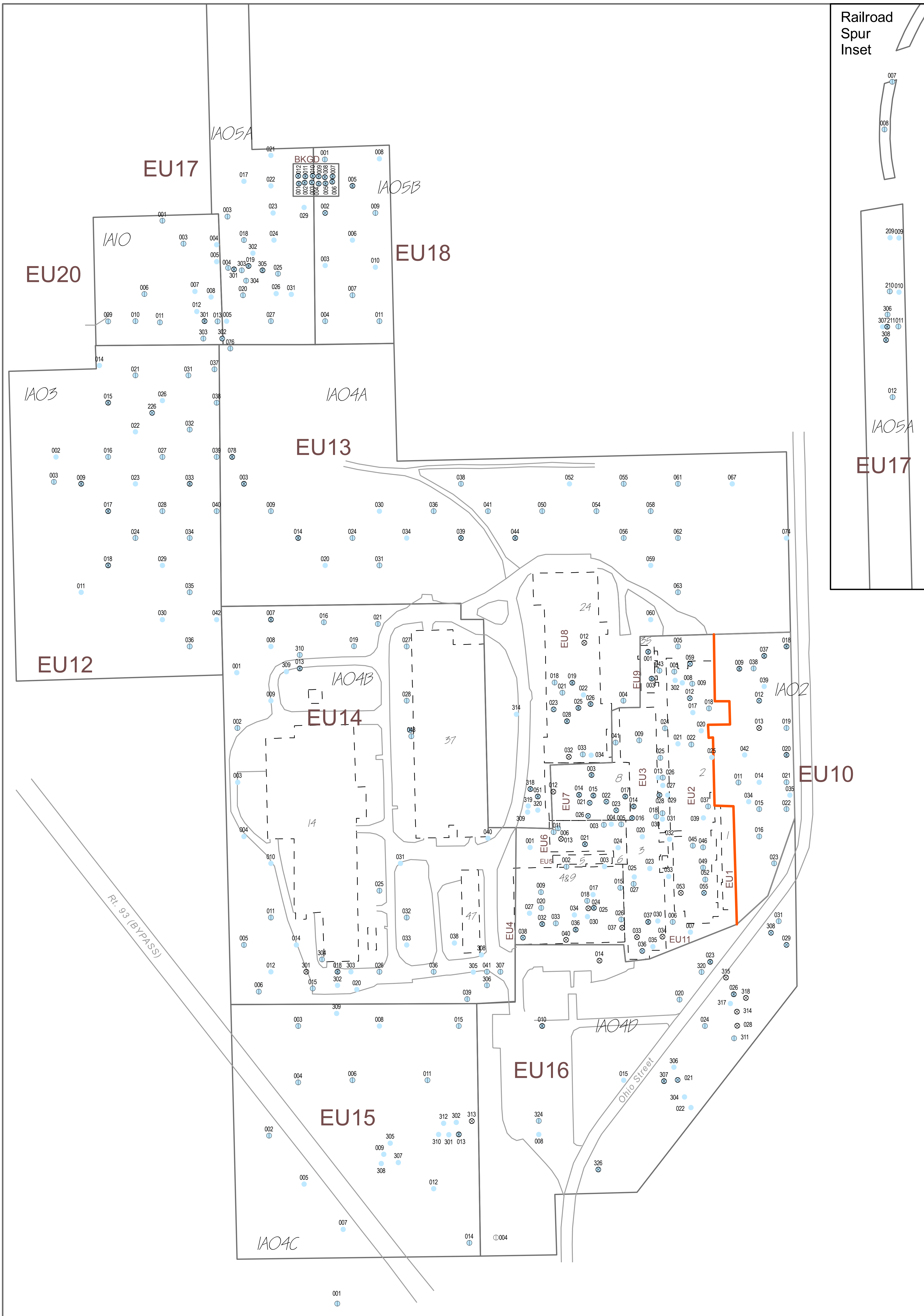
α - Alpha	Dup - Duplicate
β - Beta	NA - Not Analyzed
F - Filtered	pCi/L - picocuries per liter
U - Unfiltered	mg/L - milligrams per liter

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

GROUNDWATER SAMPLE RESULTS - NOVEMBER 2007

Date:	Scale:	Figure No. :
11/10/09	1 inch = 120 feet	4-48



Radium Analysis
Gamma Spectroscopy Analysis
Alpha Spectroscopy Analysis
EU10-EU11 Boundary
Paved Areas
EU 19 Exposure Units (EU)
37 Guterl Buildings

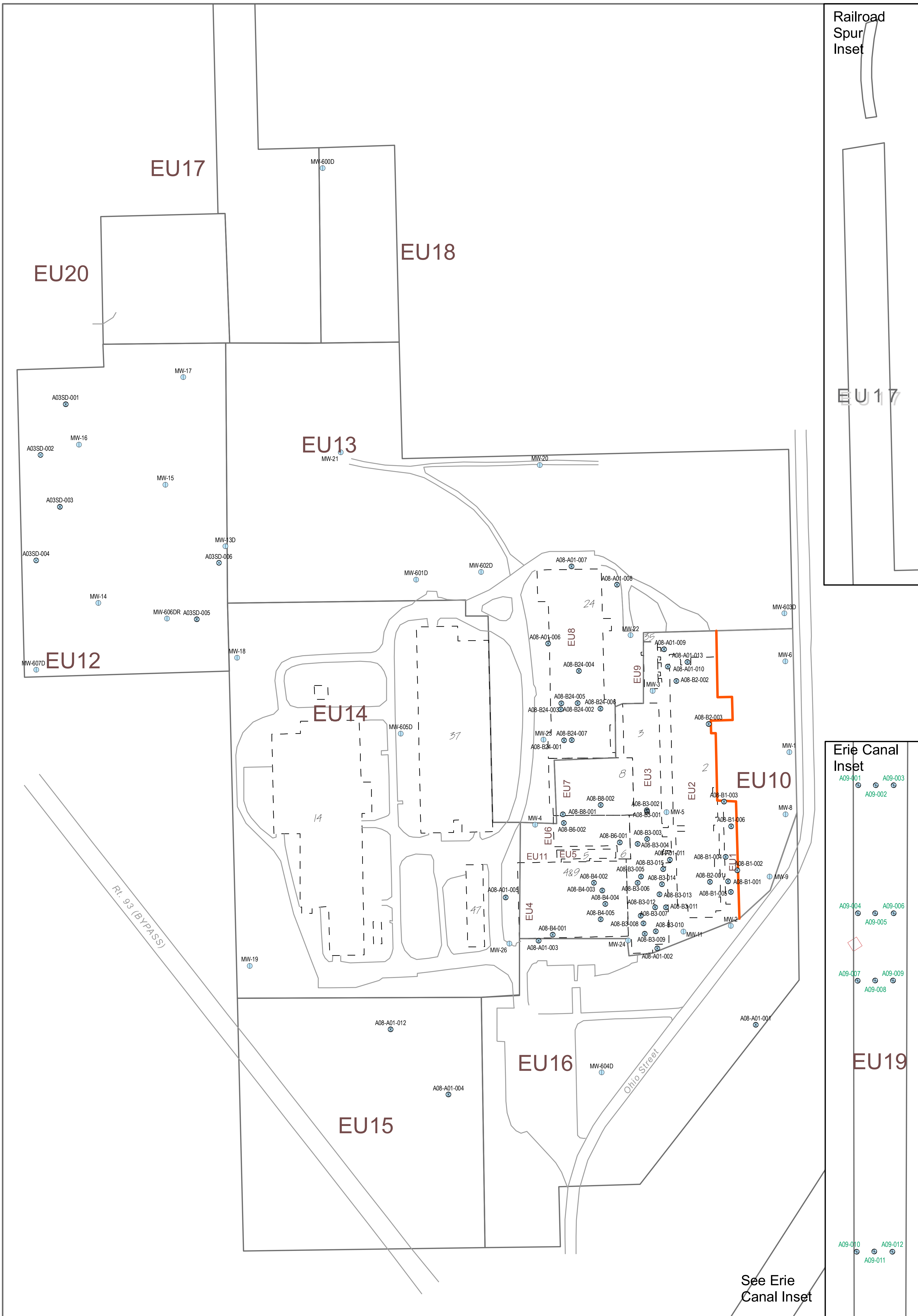
Station IDs:
IA-Station Number (e.g., A02-001)
Building No.-Station Number (e.g., B24-008)

United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

EXPOSURE UNITS FOR THE
BASELINE RISK ASSESSMENT
SOIL SAMPLES

Date:	Scale:	Figure No. :
11/10/09	1 inch = 225 feet	6-1



- Radium Analysis
- Gamma Spectroscopy Analysis
- Alpha Spectroscopy Analysis
- EU10-EU11 Boundary
- Paved Areas
- Guterl Buildings
- Exposure Units (EU)
- Former Guteral Steel Industrial Water Pump House Intake and Oil/Water Separator Overflow Outfall

Native sediment samples are identified by a green station ID, e.g. A9-001

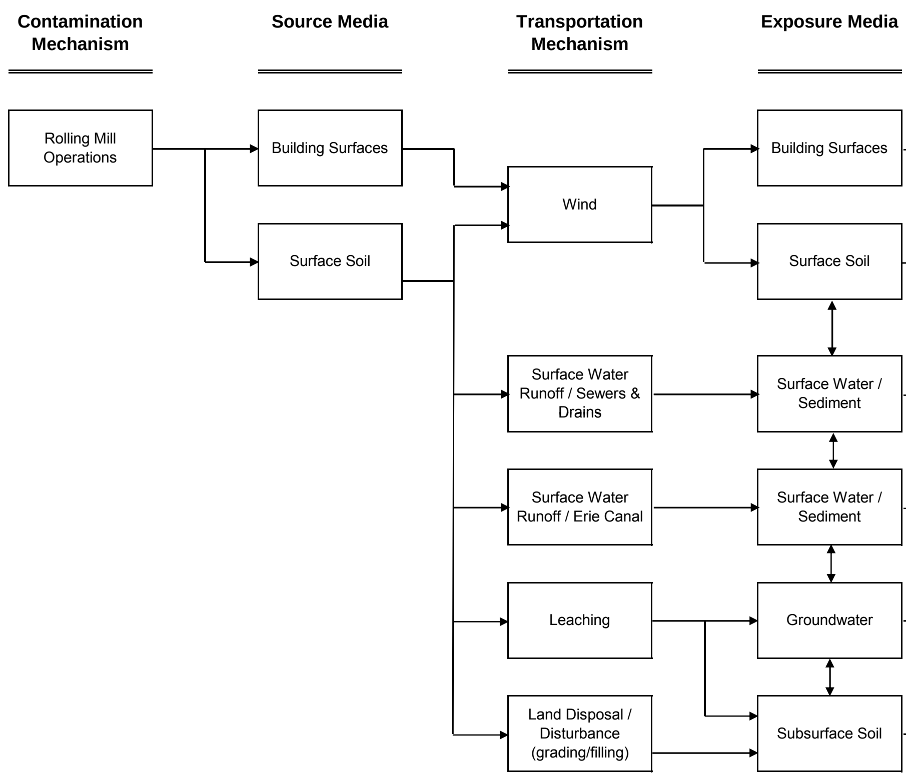
United States Army Corps of Engineers
Buffalo District

GUTERL SPECIALTY STEEL CORPORATION
LOCKPORT, NY

EXPOSURE UNITS FOR THE BASELINE RISK ASSESSMENT SEDIMENT, SURFACE WATER, AND GROUNDWATER SAMPLES

Date:	Scale:	Figure No. :
11/10/09	1 inch = 225 feet	6-2

Figure 6-3
Generalized Conceptual Site Model
Potential Pathways for Human Exposure
Former Guterl Specialty Steel Corporation FUSRAP Site
Lockport, New York



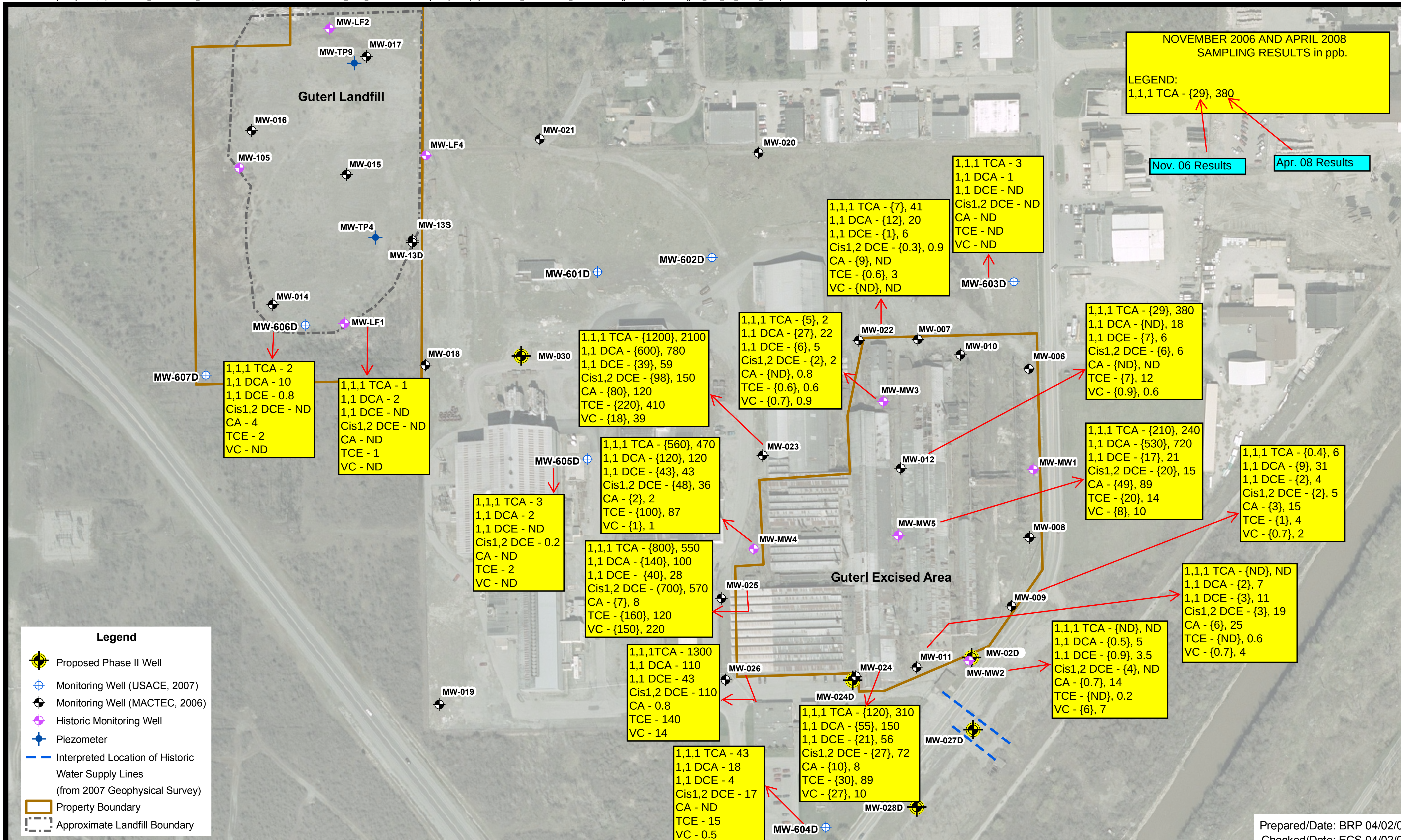
Exposure Routes	Human Receptors: Current – Juvenile Trespasser	Current – Onsite Worker	Future – Construction Worker	Future – Onsite Worker	Future – Hypothetical Onsite Resident
Ingestion					----
Dermal Contact	Note 1	Note 1	Note 1	Note 1	----
Inhalation (Fugitive Dust)					----
External Radiation					----
Ingestion					
Dermal Contact	Note 1	Note 1	Note 1	Note 1	Note 1
Inhalation (Fugitive Dust)					
External Radiation					
Ingestion of Produce	----	----	----	----	
Ingestion					----
Dermal Contact	Note 1	Note 1	Note 1	----	----
Ingestion		----	----	----	
Dermal Contact	Note 1	----	----	----	Note 1
Ingestion	----	----		----	
Dermal Contact	----	----	Note 1	----	Note 1
Ingestion	----	----		----	
Dermal Contact	----	----	Note 1	Note 1	Note 1
Inhalation (Fugitive Dust)	----	----		----	
External Radiation	----	----		----	
Ingestion of Produce	----	----	----	----	

Potentially Complete Exposure Pathway	
Incomplete Exposure Pathway	----

Note 1: Dermal contact with this medium is possible for this receptor but is not significant for the radionuclides present at this site because of their very low absorption rates. Therefore, this exposure route will not be evaluated quantitatively in the human health risk assessment.

APPENDIX C

NYSDEC NOVEMBER 2006 AND APRIL 2008
VOC RESULTS



Niagra County color digital orthoimagery (2002) obtained from New York State GIS Clearinghouse at: http://www.nysgis.state.ny.us

NYSDEC
GUTERL STEEL
LOCKPORT, NEW YORK

MACTEC

2008 Groundwater Sampling Locations and Planned Phase II RI Monitoring Wells

Project 3612-06-2057 Figure 1