Shaw Environmental and Infrastructure Engineering of New York, P.C.
13 British American Boulevard
Latham, New York 12110-1405
Phone: 518-783-1996
Fax: 518-783-8397

FINAL FEASIBILITY STUDY REPORT
CAMP SUMMIT
FULTON, NEW YORK

DEC Site No. 4-48-006

Shaw Project No. 830271

March 2, 2004

Prepared for:
Department of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by:
Shaw Environmental and Infrastructure Engineering of New York, P.C.
13 British American Boulevard
Latham, New York 12110

Written/Submitted by:	Reviewed/Approved by:
Karie Henning	
Karie Henning, E.I.T. Project Engineer	Daniel Servetas, P.E. Senior Project Manager
Marc Flanagan Project Manager/Geologist	David C. Stahl, P.E. Program Manager

X:\Reports\197\DEC\Multi Sites\Summit\FS\FINAL\Text.doc

TABLE OF CONTENTS:

1.0 INTRODUCTION 1
1.1 PURPOSE AND ORGANIZATION 1
1.2 BACKGROUND INFORMATION 2
1.2.1 Site Description 2
1.2.2 Site History 3
1.3 SUMMARY OF INVESTIGATIONS 4
1.3.1 Historical Site Assessments/Investigations 4
1.3.2 Geology and Hydrogeology 5
1.3.3 Nature and Extent of Contamination 6
1.3.3.1 Surface Soil Results 8
1.3.3.2 Sediment Soil Results 9
1.3.3.3 Shallow Test Pit Soil Results 10
1.3.3.4 Test Pit Soil Results 12
1.3.3.5 Monitoring Well and Soil Boring Results 15
1.3.3.6 Groundwater Analytical Results 17
1.3.3.7 Biota Analytical Results 19
1.3.3.8 Summary 19
1.4 SUMMARY OF QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT 21
1.4.1 Exposure Setting 22
1.4.2 Chemicals of Potential Concern 22
1.4.3 Identification of Exposure Pathways 23
1.4.4 Conclusions 26
1.4.5 Step IIA Fish and Wildlife Impact Analysis 27
1.4.5.1 Contaminant-Specific Impact Assessment 27
1.4.5.2 Conclusions 27
2.0 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES 28
2.1 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS 28
2.2 REMEDIAL ACTION OBJECTIVES 31
2.2.1 Remedial Action Objectives for Soil 32
2.2.2 Remedial Action Objectives for Groundwater 33
3.0 IDENTIFICATION AND SCREENING OF REMEDIAL ACTION TECHNOLOGIES 34
3.1 IDENTIFICATION AND SCREENING OF GENERAL RESPONSE ACTIONS 34
3.1.1 No Action 35
3.1.2 Institutional and/or Engineering Controls 35
3.1.3 Containment 35
3.1.4 Excavation 35
3.1.5 Disposal 36
3.1.6 In-situ Treatment 36
3.1.7 Ex-situ Treatment 36
3.2 IDENTIFICATION AND PRELIMINARY SCREENING OF TECHNOLOGY TYPES AND PROCESS OPTIONS 36
3.2.1 No Action 36

3.2.2 Institutional and/or Engineering Controls 37
3.2.3 Containment 38
3.2.4 Excavation 40
3.2.5 Disposal 40
3.2.6 In-situ Treatment 41
3.2.7 Ex-situ Treatment 43
3.3 EVALUATION OF RETAINED TECHNOLOGIES 47
3.3.1 No Action 48
3.3.2 Institutional and/or Engineering Controls 48
3.3.3 Containment 49
3.3.4 Excavation 51
3.3.5 Disposal 53
3.3.6 Ex-Situ Treatment 54
3.4 SUMMARY 55
4.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES 57
4.1 ALTERNATIVE 1 – NO ACTION 57
4.2 ALTERNATIVE 2 – LIMITED ACTION 57
4.3 ALTERNATIVE 3 – EXCAVATION AND OFF-SITE DISPOSAL 58
4.4 ALTERNATIVE 4 – EXCAVATION AND ON-SITE CONSOLIDATION WITH LIMITED OFF-SITE DISPOSAL 62
5.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES 67
5.1 ALTERNATIVE 1 – NO ACTION 69
5.1.1 Overall Protection of Human Health and the Environment 69
5.1.2 Compliance with ARARs 69
5.1.3 Short-term Effectiveness 69
5.1.4 Long-term Effectiveness and Permanence 69
5.1.5 Reduction of Toxicity, Mobility, and Volume 70
5.1.6 Implementability 70
5.1.7 Cost 70
5.1.8 Summary 70
5.2 ALTERNATIVE 3 – EXCAVATION AND OFF-SITE DISPOSAL 70
5.2.1 Overall Protection of Human Health and the Environment 73
5.2.2 Compliance with ARARs 73
5.2.3 Short-Term Effectiveness 73
5.2.4 Long-Term Effectiveness 74
5.2.5 Reduction of Toxicity, Mobility, and Volume 74
5.2.6 Implementability 74
5.2.7 Cost 75
5.2.8 Summary 75
5.3 ALTERNATIVE 4 – EXCAVATION AND ON-SITE CONSOLIDATION WITH LIMITED OFF-SITE DISPOSAL 75
5.3.1 Overall Protection of Human Health and the Environment 78
5.3.2 Compliance with ARARs 79
5.3.3 Short-Term Effectiveness 79
5.3.4 Long-Term Effectiveness 80
5.3.5 Reduction of Toxicity, Mobility, and Volume 80

5.3.6 Implementability 80
5.3.7 Cost 81
5.3.8 Summary 82

6.0 COMPARATIVE ANALYSIS 83

6.1 COMPARATIVE ANALYSIS OF RETAINED REMEDIAL ALTERNATIVES 83
6.1.1 Overall Protection of Human Health and the Environment 83
6.1.2 Compliance with SCGs and ARARs 84
6.1.3 Short-Term Effectiveness 85
6.1.4 Long-Term Effectiveness 85
6.1.5 Reduction of Toxicity, Mobility, and Volume 86
6.1.6 Implementability 86
6.1.7 Cost 87

7.0 RECOMMENDED ALTERNATIVE 88

7.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT 91
7.2 COMPLIANCE WITH ARARS 92
7.3 SHORT-TERM EFFECTIVENESS 92
7.4 LONG-TERM EFFECTIVENESS 93
7.5 REDUCTION OF TOXICITY, MOBILITY, AND VOLUME 93
7.6 IMPLEMENTABILITY 93
7.7 COST 94
7.8 SUMMARY 95

8.0 REFERENCES 96

TABLES:

1 Surface Soil Analytical Results
2 Sediment Analytical Results
3 Test Pit Soil Analytical Results
4 Soil Boring and Monitoring Well Soil Analytical Results
5 Groundwater Analytical Results
6 Biota Analytical Results
7 Standards, Criteria, and Guidelines Evaluation
8 Remedial Action Objectives for Soil
9 Technology Evaluation Summary for Soil

FIGURES:

1 Site Location Map
2 Geologic Cross Section Map
3 Groundwater Contour Map (2002)
4 Treatment Building Area Surface Soil Analytical Results
5 Satellite Areas Soil Analytical Results
6 Pond Area Sediment Analytical Results

7 Treated Lumber Staging Area Test Pit Soil Analytical Results
8 Treatment Building Area Test Pit Soil Analytical Results
9 Treatment Building Area Subsurface Soil Analytical Results
10 Groundwater Analytical Map
11 Sample Location and Site Map
12 Excavation of Impacted Soil Satellite Areas
13 Excavation of Impacted Soil Treatment Building Area
14 Excavation of Impacted Soil Treated Lumber Staging Area
15 Excavation and On-Site Consolidation Remedial Alternative 4

APPENDICES:

A Qualitative Human Health Exposure Assessment
B Fish and Wildlife Impact Assessment (Step IIA)
C Remedial Alternative Cost Estimates

LIST OF ACRONYMS:

APEG	Alkali Polyethylene Glycolate
ARARS	Applicable or Relevant and Appropriate Requirements
AST	Aboveground Storage Tank
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	Bioconcentration Factor
bgs	Below Ground Surface
CAA	Clean Air Act
CCA	Chromated Copper Arsenate
CDD	Chlorinated Dibenzo-p-dioxin
CDF	Chlorinated Dibenzofuran
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
CWA	Clean Water Act
DS&HM	Division of Solid and Hazardous Materials
ECL	Environmental Conservation Law
FRTR	Federal Remediation Technologies Roundtable
FS	Feasibility Study
GAC	Granular Activated Carbon
GRA	General Response Action
HASP	Health and Safety Plan
HRC	Hydrogen Release Compound
HTTD	High Temperature Thermal Desorption
IPC	Inclined Plate Clarifier
ISCO	In-Situ Chemical Oxidation
ISTD	In-Situ Thermal Desorption
kg	Kilogram
L	Liter
LDR	Land Disposal Restriction
LPCS	Low Permeability Cover System
LTTD	Low Temperature Thermal Desorption
µg	Micrograms
mg	Milligrams
NCP	National Contingency Plan
NFESC	Naval Facilities Engineering Service Center
ng	Nanogram
NYSDCS	New York State Department of Correctional Services
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCP	Pentachlorophenol
PI	Preliminary Investigation
ppb	Parts per Billion (ug/L), (ug/kg)
PPE	Personal Protective Equipment

ppm	Parts per Million (mg/L), (mg/kg)
ppt	Parts per Trillion (ng/L), (ng/kg)
PRG	Preliminary Remediation Goal
QEA	Qualitative Human Health Exposure Assessment
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
Registry	New York State Registry of Inactive Hazardous Waste Disposal Sites
RfD	Reference Dose
RI	Remedial Investigation
SCG	Standards, Criteria and Guidelines
SDWA	Safe Drinking Water Act
Shaw	Shaw Environmental, Inc.
SPLP	Synthetic Precipitation Leaching Procedure
SVOC	Semivolatile Organic Compound
TAGM	Technical and Administrative Guidance Memorandum
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

Shaw Environmental and Infrastructure Engineering of New York, P.C. (Shaw) has prepared this Feasibility Study (FS) on behalf of the New York State Department of Environmental Conservation (NYSDEC) for Camp Summit New York State Superfund Site (Site # 4-48-006), Fulton, New York. Camp Summit (the Site) is a state owned crew headquarters and incarceration facility located in the Town of Fulton, Schoharie County, New York (**Figure 1**).

The submittal of this Feasibility Study represents the completion of activities set forth in the Remedial Investigation and Feasibility Study (RI/FS) Work Plan for the Site (Shaw, September 2001). The conclusions and recommendations presented within this FS are based on the characterization of the Site as presented in the Preliminary Investigation (PI) Report (NYSDEC, August 1998) and the Remedial Investigation Report (RI) (Shaw, January 2004).

1.1 Purpose and Organization

The purpose of this FS is to develop and evaluate potential remedial options that reduce, to the maximum extent practicable, potential risks to human health and the environment attributable to the occurrence of regulated substances at the Site and to allow for the future development and/or continued use of the property.

This FS report is designed to provide the reader with a summary of the remedial investigation and exposure assessment and guide the reader through the development of the Remedial Action Objectives (RAOs) and evaluation of the remedial alternatives to address these RAOs. To that purpose this FS is divided into the following sections:

- **Section 1.0** introduces and describes the organization of the FS and summarizes the data generated during historic site assessment activities. These activities were carried out to characterize the nature and extent of soil and groundwater impacts (including the delineation of “source areas”, residual materials and to identify potential migration pathways both on-and off-site). **Section 1.4** identifies chemicals of potential concern at the Site and assesses the risk to human health associated with current and future activities at the Site based upon existing soil and groundwater quality data.
- **Section 2.0** identifies RAOs at the Site. **Section 2.1** discusses pertinent Federal and State guidelines for site remediation. **Section 2.2** identifies areas of the Site requiring

remedial action according to media type and presents qualitative and quantitative RAOs for each media.

- **Section 3.0** identifies and evaluates technologies that have the potential to remediate contaminants at the Site. **Section 3.1** discusses general, media-specific actions that satisfy the remedial action objectives identified in **Section 2.2**. **Section 3.2** describes specific technologies that could be used to address impacted media at the Site and assesses them according to technical effectiveness and implementability. Technologies that were determined to be technically effective and implementable are further evaluated with respect to effectiveness and cost in **Section 3.3**.
- **Section 4.0** combines the technologies retained from the technology evaluation into remedial alternatives. **Sections 4.1** through **4.4** describe the process options involved in each alternative and assesses them with regard to effectiveness, implementability, and cost.
- **Section 5.0** presents a detailed analysis of each retained alternative with respect to the CERCLA screening criteria: overall protection of human health and the environment; compliance with Applicable or Relevant and Appropriate Requirements (ARARs); long-term effectiveness and permanence; reduction of toxicity, mobility, and volume; short-term effectiveness; implementability; and cost.
- **Section 6.0** provides a comparative analysis of the alternatives retained from **Section 5.0** with respect to overall protection of human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume; short-term effectiveness; implementability; and cost.
- **Section 7.0** provides an overview of the selected alternatives for treatment of impacted media, including the involved process components.
- **Section 8.0** lists references utilized in the development of this document.

1.2 Background Information

1.2.1 Site Description

The Camp Summit Site, an incarceration facility, is located in the Town of Fulton, Schoharie County, New York (**Figure 1**). More specifically, the Site is located in a New York State Reforestation Area known as the Schoharie County Reforestation Area No. 6, Proposal G located in a rural area in the foothills of the Catskill Mountains. The property includes the former wood treatment area, the satellite areas off of the access road to the shooting ranges, and the incarceration facility. The facility is operated by the New York State Department of Correctional Services (NYSDCS), but is located on property under the jurisdiction of the NYSDEC Division of Lands and Forests. Camp Summit is bordered on the southeast by additional New York State land. The remainder of the property is bordered by private property, some of which is used for residential purposes. The local topography is characteristic of a former glaciated region, with hills and valleys. An on-site pond feeds a tributary of Panther Creek. The tributary is a Class C (fish propagation) stream and Panther Creek is a Class C (TS) (trout spawning) stream. A NYSDEC Regulated Wetland is located approximately 0.5 miles southeast of the Site.

Based on the results of the Preliminary Investigation and Remedial Investigation, the entire Site is considered an area of concern, with specific areas requiring remediation. These areas include the former treatment building area, the treated lumber storage area, the drum rinse area, and several satellite areas off of the access road leading to the shooting range.

1.2.2 Site History

Camp Summit is a large complex of NYSDEC crew headquarters and a NYSDCS active incarceration facility. The incarceration facility is operated by the NYSDCS, but is located on property managed by the NYSDEC. Work activities formerly performed by the inmates at Camp Summit included the operation of a sawmill and wood treatment facility. Wood treatment operations were conducted from approximately 1962 until 1975. The Site is located in the Town of Fulton, Schoharie County, New York (**Figure 1**).

The operation of the wood treatment facility and sawmill provided lumber and round poles for NYSDEC construction and maintenance projects. The pole treatment plant pre-dates the Division of Operations and was originally under the jurisdiction of the Division of Lands and Forests, Regional Forester. The pole treatment plant is no longer in operation.

The pole treatment plant was constructed from 1962 to 1964 as a dip tank process. Initial treatment, which began during the fall of 1964, and continued for approximately one year, used copper napthenate. The process consisted of soaking poles and lumber in copper naphthenate-filled dip tanks, hanging the wood over the tanks to allow a majority of the treating material to drip off, and transporting the treated wood on a small rail cart to drip and dry in a staging area outside the building.

Pentachlorophenol (PCP) was recommended for the use in the wood treatment process in late 1965 or early 1966. PCP was mixed with fuel oil at an approximate ratio of one to eleven (1/11), and poles were treated in a manner identical to the copper naphthenate process. The plant was shut down in July of 1975 due to a fish kill in the on-site pond. The fish kill reportedly was a result of the flow of “product” through the pond to Panther Creek. The camp water supply was tested in November 1975 and found not to contain PCP. The remaining PCP product and PCP dip tanks were transferred off-site in July 1977.

Following the discontinuation of wood treatment activities, several incidents involving potential exposure of employees to contaminants from the wood treatment process were reported by NYSDEC employees (*Preliminary Investigation Report* NYSDEC, September 1998). In October 1997 the Division of Operations recommended that the NYSDEC perform a preliminary site investigation and sampling of the water supply well at Camp Summit. Representatives from the Divisions of Operations, Environmental Enforcement, and Environmental Remediation participated in a site walkover as part of a scoping effort for future investigations. The Division of Operations requested the assistance of the Division of Environmental Remediation in the investigation of Camp Summit in January 1998. As a result of this request, the Division of Environmental Remediation initiated a preliminary site investigation. Based on the findings of this PI, it was concluded that the Site should be added to the State's Registry of Inactive Hazardous Waste Disposal Sites. In December of 1999, the Site was listed on the Registry as a Class 2 site; A Class 2 site represents a "significant threat" to public health and/or the environment. Shaw was contracted to perform an RI/FS at the Site to augment data generated during the PI. The results of these assessment activities are summarized in **Section 1.3** and **1.4**.

1.3 Summary of Investigations

The following sections present a summary of investigations performed at Camp Summit and discussion of their findings.

1.3.1 Historical Site Assessments/Investigations

In April of 1998 the NYSDEC finalized a work plan for the PI of the Camp Summit Site. The PI was planned in response to reports of PCP use as part of the historic wood treatment operations that were conducted at the Site. The objective of the PI was to determine whether hazardous waste was disposed at the Site, and to evaluate the extent of that contamination, if existing. The PI was initiated in April 1998; the final *Preliminary Investigation Report* was issued by the NYSDEC in June 1999. Data generated from this report was used in the technical evaluation conducted during the subsequent RI and is included on **Tables 1** through **6** and the appropriate figures for comparison and discussion purposes.

Based on the results of the PI, Shaw Environmental Inc. (Shaw), prepared *Remedial Investigation and Feasibility Study (RI/FS) Work Plan* (dated October 4, 2001) to further characterize site conditions, determine the lateral and vertical distribution of the Contaminants of Concern (COCs), to accurately evaluate the potential risk to human health and/or the environment, and to determine the potential need for remedial action. Field activities associated with this Work Plan were conducted between November 2001 and January 2002. Shaw conducted additional remedial investigation activities at the Site between July 21 and July 30, 2003. The results of all site investigative activities are presented in the RI (Shaw, January 2004) and are summarized below.

1.3.2 Geology and Hydrogeology

Regional Geology

The Site is underlain by bedrock from the Gilboa and Hamilton Formations of the Middle Devonian. The Gilboa and Hamilton Formations are typically 325 feet and 2,175 feet thick, respectively. They consist of gray, medium to fine grained sandstone; thin bedded siltstone; and dark gray shale. The most common overburden found in the area is glacial till, a heterogeneous mixture of fragments ranging in size from boulders to clay particles. The till (also known as boulder clay or hardpan) was deposited beneath an ice sheet, and is comprised mainly of fragments of local bedrock eroded during glaciation. The till in this area also contains boulders and cobbles of resistant rock which were transported by the ice from areas farther north. Therefore, while a majority of the coarse material found in the till is comprised of sandstone and limestone, cobbles and pebbles of metamorphic and igneous rock from the Adirondacks are common. The till found in the area has a high clay content due to the large amount of shale and limestone exposed in Schoharie County and the Mohawk Valley to the north.

Site Specific Geology

Depth to bedrock across the Site varies greatly, ranging from zero to 95 feet or more below ground surface (bgs). This is evident by the visible rock outcrops in the shale quarry and the water supply well logs documenting 21 to 95 feet of overburden. Water supply well logs for supply wells located at the correctional facility reported the bedrock as brown rock, blue and gray sandstone, and blue shale. The overburden was described as brown and gray hardpan, boulders, and gray clay. The wells range in depth from 250 to 610 feet bgs.

Observations of the shallow overburden were made during the test pit investigation. In general, the top two feet of overburden consists of broken gray shale that ranges in size from gravel to boulders. Intermixed within the shale is brown silt and sand. This surface layer is likely fill material placed as a base for buildings and for staging treated and untreated lumber. A shale quarry located on the southeast portion of the Site is the likely source of the fill material.

Beneath the fill is very dense glacial till consisting of clay, sand, silt, and shale cobbles and boulders varying in color; including orange, gray, tan, and brown. A geologic cross section is shown on **Figure 2**.

Regional Hydrogeology

The Camp Summit property is located approximately 10 miles from the Schoharie Creek, which is the nearest discharge point for Panther Creek. Regionally, groundwater would be anticipated to flow toward the Schoharie Creek. Shallow groundwater in the area of the Site is typically found in coarser-grained glacially derived sediments or as perched water over deposits of fined-grained sediments of lower permeability.

Site Specific Hydrogeology

Groundwater occurs primarily in the lenses of sand and gravel within the till unit. Although these lenses appear to be discontinuous, they are likely hydraulically connected to some degree through fractures in the till. Vertical fractures found within the till would also yield to unconfined groundwater conditions observed at the Site. Shallow groundwater recharge occurs through the infiltration of precipitation. Groundwater discharge, if present, appears to occur to the on-site pond.

Groundwater is known to exist in the bedrock based on the production well logs for the Site. It is expected that confined or semi-confined conditions exist within the bedrock. It was not determined if groundwater within the till and bedrock is hydraulically connected; however, this interconnectedness could reasonably be expected in areas where bedrock is relatively shallow or in areas where vertical fractures bifurcate the entire overburden aquifer. This interconnectedness was not observed during field work conducted by Shaw.

Depth to groundwater ranged from 4 to 20 feet bgs during the latest groundwater sampling event. Gauging data indicates that groundwater flows in a northeasterly direction, generally following surface topography in the direction of the pond. A groundwater contour map is shown on **Figure 3**.

1.3.3 Nature and Extent of Contamination

This section presents a summary of the analytical results from the surface, sediment, and subsurface soils, and groundwater samples collected at the Site. For screening and discussion purposes only, these results are compared to published New York State standards and/or screening criteria.

Soil criteria from the NYSDEC's *Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels HWR 4046* (TAGM 4046) was used for comparison of the surface and subsurface soil results. This document does not include soil clean-up objectives for dioxins and furans. Therefore, for the purposes of this report, and to be consistent with the previous investigation report for the Site, 1 ppb 2,3,7,8-Tetrachloro-dibenzo-p-dioxin (TCDD) equivalence has been used as the soil screening level. The NYSDEC has used 1 ppb 2,3,7,8-TCDD equivalence as a remediation goal at other hazardous waste sites.

For the remaining COCs (VOCs, SVOCs and metals), TAGM 4046 was used for screening soils and *Division of Water Technical and Operational Guidance Series 1.1.1* (TOGS 1.1.1) was used for screening groundwater. The soil clean-up objective listed in TAGM 4046 for PCP is 1 ppm for protection of groundwater. Consistent with the PI Report prepared for this Site, this value has been adopted as a groundwater protection screening level for soil. The New York State Department of Health (NYSDOH) has recommended a screening level of 1.0 ppm PCP for the protection of human health be adopted. This value is based on a one in a million risk to children in a residential setting (a conservative value given that the Site is not considered residential).

The groundwater standard for total phenolic compounds listed in TOGS 1.1.1 is 1.0 ppb. Here again, to be consistent with the PI Report, and because PCP is the only phenolic compound detected in the groundwater at the Site, a groundwater screening level of 1.0 ppb has been used.

Finally, 6 NYCRR Part 700-705 lists a groundwater standard of 0.0007 parts per trillion (ppt) for 2,3,7,8-TCDD. This value has been adopted as the groundwater screening level, with the other forms of dioxins and furans normalized to 2,3,7,8-TCDD using the USEPA's toxicity equivalence factors (TEFs).

Sediment sample results were compared to screening criteria provided in the NYSDEC's *Technical Guidance for Screening Contaminated Sediments*, January 1999. Sediment criteria are presented as micrograms of contaminant per gram of organic carbon in sediment (ug/g OC). For each sample, the screening level is calculated based on TOC measured in the sample. A location specific benchmark was calculated since TOC was not consistent among the samples.

The 2,3,7,8-TCDD fish concentration data was compared to risk calculations which evaluate possible effects on wildlife through the consumption of fish contained in the NYSDEC's *Division of Fish, Wildlife and Marine Resources Technical Guidance for Screening Contaminated Sediments,* which is based on *The Niagara River Biota Contamination Project: Fish Flesh*

Criteria for Piscivorous Wildlife, A.J. Newell et al., July 1987, NYSDEC Technical Report 87-3. The criteria listed are 3.0 ppt.

1.3.3.1 Surface Soil Results

Sixty-seven surface soil samples were collected during the PI and RI and analyzed for SVOCs, metals, and dioxins. Three surface samples (BGM-1, BGM-2 and BGM-3) were collected during the 2003 RI investigative activities to determine background concentrations of metals at the Site. In July 2003 and November 2003, a total of 10 samples (BGM03-1 through BGM03-10) were collected to determine background concentrations for both SVOC and dioxins. A summary of the analytical results is summarized in **Table 1** and is presented on **Figures 4** and **5**.

Thirty-four of the surface soil samples collected were analyzed for SVOCs. Analytical results indicated several SVOCs detected at various concentrations. PCP was the only SVOC detected above the TAGM 4046 guidance value. Six surface soil samples (SS-6, SS-7, SS-12, SS-16, SS-19 and SS-22), located northeast of Building 49, reported concentrations of PCP above the TAGM 4046 guidance value. Concentrations of PCP in these surface soil samples range from 1.6 ppm (SS-6) to 6.3 ppm (SS-16). PCP was detected above the method detection limit, but below the TAGM 4046 guidance value, in eight additional samples (SS-1, SS-3, SS-12, SS-17, SS-18, SS-23, SS-24 and SS-25) northeast of Building 49 at levels between 0.38 ppm (SS-1) to 0.660 ppm (SS-24)

Seven surface soil samples (SS-4, SS-8, SS-9, SS-25, SS-26, SS-29, and SS-32,) collected from the area just south of Building 50 and one sample (SS-37) collected near the former drum rinsing area reported PCP concentrations greater than the TAGM 4046 guidance value. PCP concentrations ranged from 1.4 ppm (SS-8) to 253 ppm (SS-32). The remaining surface soil samples exhibited PCP concentrations well below the TAGM 4046 guidance value.

A total of 24 surface soil samples collected from former treatment areas were analyzed for metals. For discussion purposes, the results of the "on-site” samples were compared to the average value for each metal from the background samples or to the TAGM 4046 guidance value for metals. Results from “on-site” samples that exceeded the TAGM 4046 metal guidance values or the average value of the background samples are shaded on **Table 1**.

Analytical results reported at least one metal in exceedance of the TAGM 4046 guidance value or average background level. Beryllium and calcium most frequently exceeded the TAGM or “background” levels (23 out of 24 samples). Other metals detected above TAGM 4046 or background levels include nickel, potassium, zinc, lead, copper, magnesium, antimony, arsenic, chromium and manganese. Surface soil sample SS-14 collected northeast of Building 49, and SS-26, collected from the shooting range area, contained the most metal analytes above their average background concentrations (15 of the 23 metals reported by analysis).

No surface soil samples collected exhibited barium, cadmium, sodium or vanadium concentrations above the TAGM 4046 guidance values or the average background concentration.

In addition, 37 of the 54 surface soil samples collected were analyzed for dioxins. Analytical results of the samples were compared to Technical Equivalence Factors (TEFs) for individual congeners. Six samples (SS-25, SS-38, SS-12, SS-17, SS-19 and SS-23) exhibited 2,3,7,8-TCDD equivalence concentrations above the 1 ppb screening level. Three of the six samples (SS-25, SS-38, and SS-19) with 2,3,7,8-TCDD equivalence concentrations above the screening level also possessed PCP concentrations above the TAGM 4046 guidance value.

No dioxins, furans, SVOCs or PCP were detected above pertinent action levels or guidance values in the background samples.

1.3.3.2 Sediment Soil Results

A total of 37 sediment samples were collected from 27 sampling locations from the on-site pond and the seasonal overflow area along the northwest corner for SVOCs, metals, dioxins, and total organic carbon (TOC) analysis. The analytical results are summarized on **Table 2** and presented on **Figure 6**.

All sediment samples collected were analyzed for SVOCs. SVOCS, including PCP, were not detected above the guidance criteria (as set forth in the NYSDEC guidance document *Technical Guidance for Screening Contaminated Sediments,* January 1999) in any of the sediment soil samples collected.

Of the sediment samples collected, four samples (SED03-1 through SED03-4) were analyzed for metals. Three metals, arsenic, chromium, and copper were designated contaminants of concern during the PI. Of these three metals, arsenic detected most frequently above the guidance criteria. Arsenic concentrations ranged from 6.4 ppm (SED03-1) to 12.1 ppm (SED03-2). Chromium and copper were not detected above the guidance criteria in any of the four samples collected for metals analysis. Even though arsenic was detected at an elevated concentration, arsenic does not appear to pose any significant environmental effect to the pond or biota present in the pond.

Additional metals detected above their associated guidance criteria included calcium, magnesium, manganese, nickel, and zinc. These concentrations can be contributed to the lithology of the area as discussed in the background sample results discussed above.

Sixteen sediment samples collected were analyzed for dioxins. Of the 16 samples analyzed, two sediment samples collected during the PI (SED-3 and SED-10A) exhibited elevated 2,3,7,8 TCDD equivalence values.

1.3.3.3 Shallow Test Pit Soil Results

A total of 30 shallow test pits (STP) were excavated south of Building 51 within the former lumber storage treatment area. The soil collected was sent for SVOC, metals and dioxin analysis. The analytical results are summarized in **Table 3** and presented on **Figure 7**.

Fill material (primarily shale and shale debris) was present in several shallow test pits and appeared to be widespread across the Site (as evident in the deeper test pits). This is consistent with reports of shale derived from satellite areas of the Site being used as a fill material.

All 30 of the shallow test pits were analyzed for SVOCs. Several SVOC compounds were detected in 19 of the 30 test pit samples. PCP was the only SVOC detected above the TAGM 4046 guidance value. Shallow test pits STP-18, STP-19, STP-21 and STP-22 all exhibited PCP concentrations above the TAGM 4046 guidance value. PCP concentrations ranged from 1.6 ppm (STP-18) to 26 ppm (STP-19). These two test pits (STP-18 and STP-19) were located within the former lumber storage area and northwest of Building 52. These elevated concentrations of PCP found within the lumber storage area and northwest of Building 52 suggest that historic site processes contributed to subsurface impact to soil in these areas.

Sixteen of the test pit soil samples were sent for metals analysis. For discussion purposes, the results of the shallow test pit samples were compared to TAGM 4046 and the average background value (guidance criteria) for each metal (as observed in surface soil samples). Results from shallow test pit samples that exceeded the higher concentration of the two criteria are shaded on **Table 2**. When the data was evaluated by this method, all 16 shallow test pit samples had at least one analyte that exceeded the guidance criteria.

Of the three metals of concern (arsenic, chromium, and copper), arsenic was detected above the guidance criteria in six (STP-3, STP-13, STP-15, STP-25, STP-26, and STP-27) of the 16 shallow test pit soil samples collected. Arsenic concentrations ranged from 9.4 ppm (STP-3) to

13.9 ppm (STP-25) within these shallow test pit samples. Chromium was detected above guidance criteria in 12 (STP-1, STP-5, STP-7, STP-9, STP-10, STP-13, STP-15, STP-19, STP-20, STP-23, STP-25, and STP-26) of the 16 shallow test pit samples collected for metals analysis. Concentrations of chromium ranged from 19.3 ppm (STP-5) to 24.3 ppm (STP-10). Eleven (STP-1, STP-7, STP-9, STP-10, STP-13, STP-15, STP-17, STP-19, STP-20, STP-25, and STP-26) of the 16 shallow test pit samples collected for metals analysis exhibited concentrations of copper above the guidance criteria. Copper concentrations ranged from 12.3 ppm (STP-15 and STP-17) to 23.8 ppm (STP-10). These elevated concentrations suggest that historic site operations have impacted the surface soils in the former treated lumber storage area.

Calcium, nickel, and potassium were the analytes that exceeded the guidance criteria for metals most frequently. These three analytes were detected above the guidance criteria in all 16 shallow test pit soil samples collected. Calcium was also observed in abundance in the surface soil samples collected. As stated above, the occurrence of calcium in the shallow test pits can be contributed to the minerals present in the glacial till and bedrock found in the area of the Site. Potassium is a metal found in abundance in basement rock and can be excused for similar reasons. Furthermore, given the continued use of off-site fill to raise the grade on-site, these exceedances in guidance criteria can be contributed to non-site specific processes (i.e., they are not related to the wood treatment process).

As described above, TAGM 4046 does not include a soil clean-up objective for dioxins and furans, but a screening level of 1 ppb (ng/g) has been used at other hazardous waste sites and has been adopted as a screening concentration for the Camp Summit site. Also as described above, because 2,3,7,8-TCDD is the most toxic form of dioxin, the USEPA has established factors that equate the toxicity for other dioxin and furan congeners to that of 2,3,7,8-TCDD. Therefore, the concentrations of dioxin and furan results are discussed in this report as the 2,3,7,8-TCDD-equivalance by reporting the exceedance of the 1 ppb (ng/g) screening concentration rather than by reporting each individual congener.

A total of 17 shallow test pit samples were sent for laboratory analysis of dioxins. While several congeners were detected in several of the samples, only STP-17 and STP-19 exhibited a 2,3,7,8-TCDD equivalence above the 1 ppb screening level at an equivalence concentration of 1.3861 and 1.8969 ppb respectively. The elevated 2,3,7,8-TCDD equivalence in STP-19 (1.8969 ppb) is consistent with the elevated PCP concentrations detected in this sample. Both STP-17 and STP-19 are located in the former treated lumber storage area and north of Building 52.

1.3.3.4 Test Pit Soil Results

A total of 48 test pits were excavated across the Site. A total of 53 samples were collected from the 48 locations for SVOC, VOC, metals, and dioxin analysis. The test pit analytical results are summarized on **Table 3** and presented on **Figures 5, 7,** and **8**.

Soils that were visually impacted and or contained elevated PID readings, odor, or other anomalies were collected for laboratory analysis. At least one sample from each test pit was submitted for analysis for SVOCs (with the exception of TP-2, TP-4 and TP-10 at the request of the NYSDEC representative). A total of 27 of the samples exhibiting the most evidence of contamination were submitted for analysis for dioxins. Additionally, soil from TP-1 and TP-16 was submitted for laboratory analysis of metals at the request of the NYSDEC representative.

The following paragraphs discuss the test pit excavations and analytical results of the collected soils.

Test pits TP-1 and TP-2 were excavated in response to the GPR survey (GPR Area 1). Three rusted drums and other debris were uncovered approximately 28 inches bgs in TP-1. Photoionization detector (PID) readings of 813 ppm were recorded within this pit. Shale fill was also noted in the test pit. At the request of the NYSDEC representative, samples were sent to the laboratory for analysis of VOCs and pesticides in addition to SVOCs, dioxins and metals. Undisturbed soils were noted in TP-2, which was excavated approximately 100 feet northeast of TP-1. No issues of potential concern were noted within TP-2.

Test pit TP-3 was excavated in GPR Area 2. Metal banding along with wood debris was found at depths up to 6 feet bgs in the test pit.

Test pits TP-4 through TP-11 were excavated in the shale pit disposal area. Wood and other debris such as tires and metal banding were observed in several test pits (TP-4, TP-6, TP-8, TP-9, and TP-11) and an empty, rusted drum was encountered in TP-11. No elevated PID readings were noted in any of the test pits installed in this area.

Test pits TP-12 and TP-13 were installed south of Building 53 in response to the GPR investigation (GPR Area 3). Metal banding, believed to be the source of the GPR anomaly, was discovered in both pits. Both test pits contained non-native fill to about four (4) feet bgs.

Test pits TP-14, TP-15, TP-16 and TP-17 were located in the former drum rinse area. TP-16 was a long, shallow trench running north-south and TP-14, TP-15, TP-17 branched west into the woods. TP-14 contained drum lids on the surface and unimpacted overburden soils (based upon field observations). TP-15 was excavated to 4 feet bgs. The overburden soils were stained in the 2- to 3-foot interval, exhibiting PID readings of 384 PPM. TP-16 contained stained soils with a petroleum-like odor and elevated PID readings.

Test Pits TP-18, TP-35 and TP-36 were excavated in the area of the shooting range backstop. No visual impacts were noted in this area.

TP03-1 through TP03-4 are located between Buildings 51 and 50. Excavated soils consisted of light brown, brown, orange and gray clayey silt, shale, organics, gray silt and clay and light brown to brown till. A concrete slab was also encountered in TP03-3. Test pits TP03-1, TP03-2 and TP03-4 did not encounter any groundwater nor have PID detections. Groundwater was noted percolating into TP03-3 under the concrete slab at approximately 2.5 feet bgs. The highest PID reading in this test pit was 13.7 ppm.

Test pits TP03-5 through TP03-8 and TP03-11 were excavated in the woods between the gravel road and Building 53, directly south of Building 52. Each test pit was excavated to a depth of 2-3 feet bgs. Excavated soils consisted of brown and gray silt, clay, shale and organics. Till was encountered in TP03-5, TP03-7 and TP03-8. Decaying wood was noted in TP03-7 and TP03-8. Concrete was found in TP03-7. Groundwater was not encountered in any of these test pits. There were also no PID detections from these test pit soils.

Test pits TP03-9 and TP03-10 are located between Buildings 50 and 52. TP03-9 is located perpendicular to Building 52. Soils in this excavation were topsoil, shale organics, clayey silt, silt and till. The highest PID detection from the south end of the excavation was 50.1 ppm. There were no PID detections from the north end of the excavation. A soil sample was collected from both the north and south ends of the excavation. Groundwater was encountered at approximately five feet bgs in the south end of the excavation. TP03-10 is located perpendicular to TP03-9 in the south end of the TP03-9 excavation where strong odors and PID readings were noted. It extends nine feet east and west of TP03-9. Soil in the west end of the excavation consisted of sandy silt, clay, shale, organics, silty clay, clayey silt and till. The soil consisted of sandy silt, clay, shale, organics and clayey silt in the east end of the excavation. A strong odor was noted throughout the excavation with the highest PID reading in this excavation at 8.1 ppm. Groundwater was only noted in the intersection of TP03-9 and TP03-10.

Soil excavated from TP03-1 through TP03-11 was temporarily staged on plastic sheeting next to the excavation. All test pits were backfilled with the excavated soils in a reverse manner (i.e., last out, first in). The backhoe was manually cleansed of all foreign material above the test pit. The backhoe bucket was then steam cleaned over the decontamination pad.

Soils that were visually impacted and or contained elevated PID readings, odor, or other anomalies were collected for laboratory analysis. At least one sample from each test pit was submitted for analysis for SVOCs (with the exception of TP-2, TP-4 and TP-10 at the request of the NYSDEC representative). A total of 27 of the samples exhibiting the most evidence of contamination were submitted for analysis for dioxins. Additionally, soil from TP-1 and TP-16 was submitted for laboratory analysis of metals at the request of the NYSDEC representative.

Four of the 53 test pit samples collected (TP-1, TP –16, TP-32, and TP-33) were sent for laboratory analysis of VOCS. Total VOC concentrations ranged from 318 ppm (TP-16) to 58,717 ppm (TP-1). Acetone, 2-butanone, methylene chloride and total xylenes were detected in TP-1 in concentrations above TAGM 4046 guidance values. Total xylenes were in exceedance of TAGM 4046 guidance values in TP-33. Test Pit TP-1 is located in a former satellite disposal area (GPR Area 1) and TP-33 is located just east of the railroad slab attached to the former treatment building. These elevated concentrations suggest that site-related processes have impacted the subsurface soil in these areas.

A total of 50 test pit samples collected across the Site were analyzed for SVOCs. PCP was detected above the TAGM 4046 guidance value in seven of the 50 test pit samples (TP-1, TP-12, TP-32, TP-33, TP03-7W, TP03-9N, and TP03-10E). Test pit TP-12 and TP03-7W are located in GPR Area 3, TP-32 is located northwest of the former treatment building, TP-33 is located adjacent to the east side of the former treatment building railroad slab and TP-03E is located between buildings 50 and 52. PCP concentrations ranged from 1.2 ppm (TP-12) to 130 ppm (TP-1). TP-1 is located in area GPR-1, while the remaining test pit locations are located on-site in the former treatment areas.

Several SVOCs were detected in three (TP-18, TP-32, TP-33) test pit soil samples above the TAGM 4046 guidance values. Total SVOC concentrations in these three samples ranged from 3.32 ppm (TP-18) to 115 ppm (TP-32). The elevated concentrations observed at TP-18 (shooting range area) can be contributed to wood debris and high organics in soil as observed during the excavation of TP-18. Test pits TP-32 and 33, however, are located in the former treatment process area and can most likely be caused by the former treatment processes on-site.

Eighteen test pit soil samples (TP-1, TP-16, and TP03-1 through TP03-11E) were collected from the former treatment areas and the area of GPR-1 (TP-1) for metals analysis. All samples collected for metals analysis exhibited concentrations above the guidance criteria (TAGM 4046 and background averages) for at least one metal. Of the three metals of concern (arsenic, chromium, and copper) arsenic was detected above the guidance criteria in 16 of the 18 test pit samples (those mentioned above with the exception of TP03-1 and TP03-9S). Concentrations for arsenic ranged from 9.9 ppm (TP03-8) to 28.6 ppm (TP-1). Chromium concentrations exceeded the guidance criteria in all the test pit samples collected for metals analysis with the exception of TP03-9S. Chromium concentrations ranged from 19.6 ppm (TP03-11E) to 37.2 ppm (TP-1). Copper was detected above the guidance criteria in all the samples collected for metals analysis. Concentration of copper ranged from 11.8 ppm (TP03-6SW) to 125 ppm (TP-16). The elevated concentrations of COCs suggest that historic site operations have impacted the subsurface soil in these areas.

Calcium, magnesium, nickel, potassium, and sodium were also detected above background levels in all 18 test pit soil samples. The elevated concentrations could be attributed to the lithology and fill found in this area of the Site.

A total of 32 test pit soil samples were collected and sent for the laboratory analysis of dioxins. Only three test pit soil samples (TP-1, TP-3, and TP03-9S) of the 32 samples analyzed contained 2,3,7,8-TCDD equivalence above the 1 ppb screening level. Test pits TP-1 (GPR Area 1) and TP- 3 (GPR Area 2) exhibited concentrations for 2,3,7,8-TCDD equivalence of 7.41 ppb and 1.3564 ppb, respectively. The 2,3,7,8-TCDD equivalence for TP03-9S (former treated lumber storage area) was 1.7483 ppb.

Only one test pit soil sample (TP-33) was collected for analysis of pesticides. Concentrations of 4,4 DDD and 4,4 DDT exceeded the TAGM 4046 guidance value in TP-33 with values of 37 ppm and 20 ppm, respectively.

The analytical data generated during the test pit program show that the primary adsorbed impacts were observed around the rail car slab, TP-12 and TP-32 (northwest of the former treatment building).

1.3.3.5 Monitoring Well and Soil Boring Results

A total of 56 subsurface soil samples were collected from 41 soil boring locations across the Site and analyzed for VOCs, SVOCs, metals, dioxins, and pesticides. Thirteen of the 41 borings were completed as monitoring wells (MW-2 through MW-14). A summary of the soil borings completed during the RI is provided below:

- A weathered fuel-like odor and a sheen was noted in four (SB-1, 2, 3 and MW-6) of seven soil borings installed through the former treatment building slab. No odor or sheen was detected in SSB03-9, SSB-3-10 or SSB03-14.

- Soil borings SB-4, SB-5, SB-6 and MW-7 were installed in the location of the former NYSDEC building. Borings SB-5, SB-6 and SB-7 exhibited a fuel-like odor with PID readings up to 110 ppm. The borings were dry to a depth of 16 feet bgs. Water was detected in SB-4 at approximately 8 feet bgs.
- Soil borings SB-7 and MW-9 were installed in the parking lot, northwest of the former NYSDEC building and the former treatment building. Neither location exhibited visual or olfactory evidence of impacts.
- MW-8 is located west of the former treatment building and the former NYSDEC building. Soils from this boring to a depth of 20 feet bgs did not exhibit any visual evidence of impacts.
- Two additional monitoring wells/borings (MW-10 and MW-11) were installed south of Building 53 at the request of the NYSDEC representative. The location of these borings was determined by the on-site NYSDEC representative based upon observations of impacts during test pitting activities. The soils collected from both of the borings did not exhibit any visual evidence of impacts.
- Soil borings SSB03-8 and SSB03-7 are located west of the railroad slab near the former treatment building. A strong odor was noted from 3 feet bgs to 10 feet bgs in SSB03-8. A slight sheen was noted at the 4 to 6 feet interval in this boring. No odor or sheen was noted in SSB03-7.
- Monitoring wells MW-12, MW-13 and MW-14 located east, northeast and northwest of the RR slab next to the former treatment building showed no visual or olfactory signs of contamination. Wells were set at 14, 20, and 22 feet bgs.

Eight of the 56 soil samples collected were analyzed for VOCs. There were no exceedances of TAGM 4046 in any of the eight samples sent for VOC analysis.

A total of 55 of the 56 soil samples collected were sent for SVOC analysis. SVOCs were sporadically detected above TAGM 4046 guidance values in 28 of the 55 soil samples. PCP was detected at concentrations above TAGM 4046 guidance values in 17 of the 55 soil samples sent for SVOC analysis. PCP concentrations ranged from 1.8 ppm (SB-5, 2-4') to 820 ppm at sample B7-3 which is located in the northwest corner of Building 49. Total SVOC concentrations ranged from 0.692 ppm (B1-1) to 8,542.6 ppm (B8-3).

Of the 56 soil samples collected, eight samples (B4-3, B6-1, B7-1, B10-3, B11-3, B12, B-15, and B18-3) were analyzed for metals. Each soil sample contained at least one analyte that exceeded the guidance criteria (TAGM 4046 or background). Of the three metals which are COCs, arsenic was detected in exceedance of guidance criteria in five (B4-3, B6-1, B7-1, B11-3, and B12) of the eight samples. Arsenic concentrations ranged from 9.9 ppm (B4-3) to 22.2 ppm (B6-1). Chromium was detected at concentrations above the guidance criteria in six (B4-3, B6-1, B11-3, B12, B-15, and B18-3) of the eight samples collected for metals analysis.

Chromium ranged in concentration from 20.1 ppm (B18-3) to 24 ppm (B4-3). Copper was also detected above the guidance criteria in seven (B4-3, B6-1, B7-1, B11-3, B12, B-15, and B18-3) of the eight soil samples. Concentrations for copper ranged from 13.2 ppm (B4-3) to 19.2 (B-12).

Twenty eight samples were sent to the laboratory for dioxin analysis. Of the 28 samples, only one sample, MW-7 (2-4'), exhibited a 2,3,7,8-TCDD equivalence above the 1ppb screening level for dioxins with an equivalence of 1.0715 ppb. This is consistent with the elevated PCP concentrations also detected in MW-7.

A total of seven samples (B4-3, B7-1, B10-3, B11-3, B-12, B-15, and B18-3) were analyzed for pesticides. Only one sample, B7-1, exhibited concentrations (3,000 ppm) above the TAGM 4046 guidance value.

A complete summary of the soil boring/monitoring well analytical results is found on **Table 4** and presented on **Figure 9**. The resulting soil quality data indicates that the primary impacts were observed in subsurface soils to a depth of approximately eight feet below ground surface primarily around MW-4 and MW-7 which were installed near the former treatment building.

1.3.3.6 Groundwater Analytical Results

Groundwater samples from on-site monitoring wells and production wells were collected in December 2001, January 2002, and July 2003. Groundwater samples collected were analyzed for VOCs, fuel oil, PCBs , SVOCs, pesticides, metals and dioxins. A total of 31 groundwater samples have been collected from the 13 monitoring wells and 5 production wells on-site. Of the 31 groundwater samples collected, four samples (MW-2 through MW-5 (PI)) were analyzed for VOCs. Total xylene isomers were the only compounds that exceeded the TOGS guidance value (5 ppb) in MW-4.

In addition to VOCs, nine of the 31 groundwater samples (MW-2 through MW-11) collected during the 2002 sampling event) were analyzed for fuel oil components. Diesel fuel was detected in MW-4 at 24,000 ug/L. No fuel oil constituents were detected in any of the other nine samples analyzed.

Four of the 31 groundwater samples (MW-2 through MW-5 (PI)) collected were analyzed for PCBs. PCBs were not detected in any of the groundwater samples analyzed.

All 31 groundwater samples collected during the PI and RI were analyzed for SVOCs. PCP was detected above the TOGS groundwater guidance value in eight (MW-4 (PI), MW-4(2002), MW-6(2002), MW-7(2002), MW-4(2003), MW-6(2003), MW-7(2003), and MW-12(2003)) of the groundwater samples collected. PCP concentrations ranged from 11 ppb in MW-12 (2003) to 810 ppb in MW-7(2003).

A total of nine groundwater samples (including the ones exhibiting concentrations of PCP) had at least one analyte that exceeded the TOGS guidance values. Total SVOC concentrations ranged from 10.6 ppb (MW-10 (2003)) to 4,400 ppb (MW-7 (2002)). The highest SVOC concentrations (and the most analyte detections) were encountered in monitoring well MW-7. Acenaphthene, 4-chloro-3-methylphenol, 2-chlorophenol, 2,4-dinitrotoluene, 1,4-dichlorobenzene, 4-nitrophenol, N-nitroso-di-n-propylamine, phenol, pyrene, and 1,2,4-trichlorobenzene were all detected above TOGS 1.1.1 guidance values. Detections of bis (2-ethylhexyl) phthalate are believed to be laboratory artifacts.

The five production wells (PW-1 through PW-5) were sampled for pesticides. One pesticide (4-4' DDD) was detected in Well-3 (0.11 ppb); however, this concentration is below the NYSDEC TOGS 1.1.1 guidance value.

Fourteen groundwater samples (10 from on-site monitoring wells, and four from on-site production wells) have been collected during the PI and RI for metals analysis. No COC (i.e., arsenic, chromium, and copper) exceeded the TOGS guidance values. The most frequent metals detected were aluminum, iron, manganese and sodium. These metals are not considered to be associated with treatment operations and most likely represent background or naturally occurring levels.

A total of 17 groundwater samples have been collected during the PI and RI for analysis of dioxins. Of the 17 groundwater samples there have been six instances (MW-3 (2002), MW-4 (2002), MW-3(2003), MW-4(2003), MW-6(2003), and MW-7(2003)) when the 0.007 ppt screening level (for 2,3,7,8 TCDD equivalence) has been exceeded. TOGS 1.1.1 lists a groundwater guidance value for 2,3,7,8 TCDD as 7×10^{-7} ppb or 0.0007 ppt . This value has been adopted as the groundwater screening level, with the concentrations of other forms of dioxins and furans normalized to 2,3,7,8 TCDD using the toxicity equivalence factors (TEQs). Dioxin equivalence values range from 0.003679 ppt (MW-6(2003)) to 0.065403 ppt (MW-4 (2002)).

The analytical results from the groundwater sampling events are summarized on **Table 5** and presented on **Figure 10**. The results of this sampling program indicate that the primary dissolved impacts have been observed in areas which correspond with elevated soil impacts, primarily those areas around the former treatment area (e.g. MW-4 and MW-7) and to a lesser extent near the railroad spur.

1.3.3.7 Biota Analytical Results

A total of 30 stream trout samples were collected from various locations from Panther Creek. Trout samples were collected using electric shock sampling as described in the RI. The analytical results are summarized in **Table 6**.

Several dioxin and furan congeners were detected in the trout samples collected from Panther Creek. A total of 14 (2PC-1 through 2PC-9, 3PC-1, 3PC-5, 3PC-8, 3PC-12, and 3PC-15) of the 30 biota samples collected exhibited 2,3,7,8 TCDD equivalences greater than the 0.0003 ppt guidance value. 2,3,7,8 TCDD equivalences ranged from 0.00053 ppt (2PC-6) to 0.0916 ppt (3PC-13).

1.3.3.8 Summary

Site Specific Geology

Overburden across the Site consists of two to three feet of fill (most likely originating from the shale quarry located northeast of the on-site buildings) underlain by very dense glacial till. Depth to bedrock across the Site ranges between 0 and 95 feet below ground surface. Bedrock at the Site consists of blue and gray sandstone and blue shales as indicated by water supply well logs and local outcrops.

Site Specific Hydrogeology

Groundwater occurs within the till unit, primarily in the lenses of sand and gravel under unconfined conditions. Recharge of the water table is likely provided by precipitation infiltrating areas of the Site. Depth to groundwater observed in the on-site monitoring wells ranges between 4 and 20 feet bgs and generally flows in a northeasterly direction towards the on-site pond.

Nature and Extent of Impacts

Surface Soil Results

A total of 67 surface soil samples were collected during PI and RI investigative activities. Surface soil samples were collected from the former treatment building area, the treated lumber storage area south of former Building 50, the drum rinse area, and from the shooting range area. Surface soil samples collected were analyzed for SVOCs, metals and dioxins. Impacts to surface soil were mainly observed in the treated lumber storage area and in close proximity to the former treatment building. Surface soil sample, SS-32, located within the treated lumber storage area, exhibited the highest concentration for PCP. Surface soil analytical data indicates that impacts are not widespread and are limited to the above-mentioned areas.

Sediment Soil Results

A total of 37 sediment samples were collected from 27 sampling locations during the PI and RI. Sample locations include the outflow of the on-site pond, the outlet of the creek, the wetlands north of the pond, and the south side of the on-site pond. Sediment samples were analyzed for SVOCs, TOC, and dioxins. No significant impacts were observed in the samples collected from the selected sampling locations.

Shallow Test Pit Results

A total of 30 shallow test pit samples were collected south of Building 51 (treated lumber storage area) and analyzed for SVOCs, metals, and dioxins. Shallow tests were excavated to a depth of two to three feet bgs. STP-19, which is located north of Building 52, exhibited the highest concentration of PCP. Concentrations of the PCP and dioxins suggest that historic treatment processes have impacted the shallow subsurface.

Test Pit Soil Results

Forty-eight test pits were excavated across the Site to further investigate impacts to subsurface soil and to determine potential water bearing horizons that may act as migrational pathways for contaminants. A total of 53 soil samples were collected from the 48 test pits. Test pit soils were analyzed for VOCs, SVOCs, metals, and dioxins. Test pits were excavated in areas of the former treatment building area, treated lumber storage area, drum rinse area, and several satellite areas along the shooting range access road. Test pits were excavated to an average depth of 6 to 8 feet bgs, with the deepest test pit excavated to 15 feet bgs. Test pits in the area of the rail car slab exhibited the highest concentrations of site-related contaminants but impacts were also observed in the drum rinse area and the satellite areas along the shooting range access road.

Monitoring Well and Soil Boring Results

A total of 56 subsurface soil samples were collected from 41 soil boring locations across the Site and analyzed for VOCs, SVOCs, metals, dioxins, and pesticides. Thirteen of the 41 borings were completed as monitoring wells MW-2 through MW-14. Soil borings were completed in the areas of the former treatment building, treated lumber storage area, and drum rinse area. Impacts to subsurface soils were observed at depths greater than the groundwater table in wells/borings. Boring B8, located adjacent to the rail car slab, exhibited the highest concentration of site-related compounds.

Groundwater Analytical Results

Groundwater samples were collected during three separate sampling events (PI, 2002, and 2003). On-site monitoring wells were sampled for VOCs, SVOCs, fuel oil, PCBs, pesticides, metals and dioxins. Results from the three sampling events indicate that historic treatment processes completed at the Site have contributed to groundwater impacts. These impacts were observed in the former treatment building area and correspond with subsurface soil impacts (e.g., the impacted soils appear to be the source of impact) in the area of the former treatment building.

Biota Analytical Results

Dioxins detected in fish samples collected from the Panther Creek suggest that there may be site-related impacts to the aquatic life in close proximity to the Site.

1.4 Summary of Qualitative Human Health Exposure Assessment

The Qualitative Human Health Exposure Assessment (QEA) (Shaw, 2004) was used to determine the current and potential future exposure pathways associated with current or unremediated (baseline) site conditions (**Appendix A**). The QEA identified chemicals of potential concern (COPCs) and complete exposure pathways (mechanisms by which receptors may come into contact with site-related contaminants). The risk to receptors via complete pathways were then assessed based on comparison to screening levels in the context of current and reasonably foreseeable site exposures. The role of completed, ongoing and proposed remedial activities at the Site in mitigating exposures was addressed where appropriate. The QEA used data from the PI (NYSDEC, 1998 and 1999) and the RI (Shaw, 2004).

The QEA process was derived from the guidance set forth in the United States Environmental Protection Agency's Risk Assessment Guidance for Superfund (RAGS; 1989, 1991). The complete exposure assessment report is included as Appendix C. The following sections present a brief summary of the pertinent results from the report.

1.4.1 Exposure Setting

Camp Summit is a large complex of NYSDEC crew headquarters and an active NYSDCS incarceration facility, situated in the town of Fulton, Schoharie County, New York. Camp Summit is bordered on the southeast by New York State land, and the remainder of the facility is bordered by private property, some of which is used for residential purposes. A small pond is located on-site; its outlet feeds a tributary of Panther Creek. The outlet is a Class C (fish propagation) stream, and Panther Creek is a Class C (TS) (trout spawning) stream. A NYSDEC Regulated Wetland is located approximately 0.5 miles southeast of the Site. The surrounding area is rural, generally consisting of undeveloped forest and farmland.

Wood treatment operations were conducted at Camp Summit between 1962 and 1975. Based on previous investigations, several areas potentially impacted by releases at the Site have been identified, including:

- The NYSDEC office (Building 48).
- The former wood treatment plant (Building 49).
- The planer room in the old sawmill (Building 51).
- The former staging areas for treated lumber.
- The shale pit and several satellite areas previously used for waste disposal.
- The pond and associated drainage area on-site.

Each of these areas is indicated on **Figure 11**.

1.4.2 Chemicals of Potential Concern

The following media were addressed during the Camp Summit investigative activities: Surface soils, sediment, subsurface soils, and groundwater. Samples were collected from each medium during the investigative activities and laboratory analysis was performed to determine chemicals present. Detected chemicals were compared to NYSDEC TAGM and NYSDEC Ambient Groundwater Quality Standards to determine contaminants of potential concern (COPCs). The following substances were identified as COPCs:

- PCP,
- Dioxin,
- Fuel Oil,
- Copper,

- Arsenic, and
- Chromium.

1.4.3 *Identification of Exposure Pathways*

The exposure pathway is the route a chemical may take from its source to the receptor. An exposure pathway has five elements:

- contaminant source,
- contaminant release and transport mechanisms,
- point of exposure,
- route of exposure, and
- potential receptor.

Sources of Contamination

Contaminant sources exist at the Site and are associated with historical releases and surficial spills of wood treatment products (PCP, copper napthenate, and fuel oil) to soil.

Fate and Transport

Contaminant release and transport mechanisms carry contaminants from the source to points where individuals may be exposed. Chemical migration between media such as soil and groundwater is influenced by the chemical's characteristics such as water solubility or molecular size or shape, in addition to the chemical and physical characteristics particular to a site's media. Information about the fate and transport of the source chemicals is summarized below.

- **Pentachlorophenol**

  PCP has a low water solubility and a strong tendency to adsorb onto soil or sediment particles in the environment. Adsorption to soils and sediments is highly pH-dependent, and is more likely to occur under acidic conditions than under neutral or basic conditions. Therefore, leaching of PCP from soil to groundwater may be possible, particularly at lower pH. Disassociated forms of PCP may be rapidly photolyzed by sunlight; PCP may also undergo biodegradation by microorganisms, animals, and plants, although degradation is generally slow (Howard, 1991).

  PCP is lipid-soluble and therefore has a tendency to bioaccumulate in organisms. Bioaccumulation is largely pH-dependent, with considerable variation among species. Significant biomagnification of PCP in either terrestrial or aquatic food chains, however, has not been demonstrated (ATSDR, 2000).

PCP products often contain impurities such as chlorophenols, dioxins, and furans. Once released to the environment, these compounds generally adsorb to soil or sediment particles.

Due to their high adsorption rate, these compounds are not expected to leach from soil. Volatilization from either subsurface soil or water is not expected to be a major transport pathway, although may be significant for surficial impacts (ATSDR, 2000).

- **Fuel Oil**

  PCP is a preservative which uses oil as an emulsifier. At the Site, PCP was mixed with No. 2 fuel oil as the carrier fluid. Fuel oils are mixtures of numerous aliphatic and aromatic hydrocarbons. Individual components of fuel oil include n-alkanes, branched alkanes, benzene and alkylbenzenes, naphthalenes, and PAHs (ATSDR, 2000). Primary constituents identified in soil and/or groundwater at the Site are PAHs. Soil adsorption, volatilization to air, and leaching potential depend on a PAH's individual chemical characteristics; however, as a class of compounds, they are generally insoluble in water, with a strong tendency to bind to soil or sediment particles. Degradation may occur through photolysis, oxidation, biological action, and other mechanisms.

  As nonpolar, organic compounds, PAHs may be accumulated in organisms from water, soil, sediments, and food.

- **Copper Naphthenate**

  Copper naphthenate is a wood preservative/biocide comprised of copper compounds and naphthenic acid. The United States Environmental Protection Agency classifies copper naphthenate as a general-use (unrestricted) pesticide. Most preparations consist of 6-8% copper as copper naphthenate, which is typically diluted in solvents such as diesel fuel or mineral spirits (Merichem, 1999). Naphthenic acids are predominantly alicyclic (saturated, non-aromatic), and are naturally-occurring byproducts of petroleum.

  Horizontal and vertical migration of copper naphthenate from a release area is not anticipated to be significant, as the preservative has a strong tendency to bind to soil and/or organic particles. Adsorption of copper is particularly dependent on the soil's chemical and physical composition, such as pH, amount of organic matter, and cation exchange capacity, with the greatest potential for leaching occurring in acidic, sandy soils (ATSDR, 2000). In water, copper naphthenate will generally adsorb to or complex with mineral or organic constituents. At higher pHs, copper may precipitate out of solution (ATSDR, 2000). Volatilization and biodegradation of copper naphthenate may occur in soil and groundwater (Merichem, 1999).

  The bioconcentration factor (BCF) of copper may range considerably among species, from 10 in fish to 30,000 in mollusks; the potential for uptake may be influenced by feeding mechanisms, such as filter-feeding, as opposed to dermal or gill absorption (ATSDR, 2000). Copper is not known to biomagnify through the food chain (ATSDR, 2000). There is little information regarding the bioconcentration potential of napthenic acids.

Points of Exposure

The exposure point is a location where actual or potential human contact with a contaminated medium may occur. Analytical results for samples collected at Camp Summit indicate that soil, sediment and groundwater have been impacted by numerous contaminants, including the following:

- Pentachlorophenol (PCP) and other phenolic compounds.
- Polychlorinated dioxins (CDDs) and dibenzofurans (CDFs).
- Petroleum hydrocarbons.
- Polycyclic aromatic hydrocarbons (PAHs).
- Metals, including arsenic, chromium, and copper.

Exposure Routes and Potential Receptors

Camp Summit is currently maintained as a NYSDEC maintenance facility and as a NYSDCS correctional facility. Although the area is posted as off-limits and the treatment building is demolished/sealed off, inmates and NYSDEC/NYSDCS employees occasionally utilize Buildings 52 and 53 as part of their wood management operations. There are currently no deed restrictions on the property that would restrict future land use. Therefore, the following receptors have been identified for the Site under current and reasonable foreseeable future land use scenarios:

- Adult inmates and staff at Camp Summit.
- Construction workers performing excavation activities.
- Future NYSDEC maintenance and/or operation activities.

Based on the nature of the chemicals of potential concern, the types of media impacted at the Site, and land use scenarios, the following exposure routes were identified:

- Direct contact with exposed surficial soil. Exposure routes include incidental ingestion of, dermal contact with, and inhalation of, volatile or particulate-bound contaminants.
- Direct contact with subsurface soil and/or groundwater. Future construction activities involving excavation in the area of concern may allow exposure to impacted soil and shallow groundwater. Exposure routes include incidental ingestion of and dermal contact with soil and groundwater, and the inhalation of volatile or particulate-bound contaminants.
- Direct contact with groundwater used as a future drinking water source. Routes of exposure include ingestion and dermal contact. Currently, there are eight water supply wells located at the Site. Samples previously collected from these wells confirmed that

contaminants related to the wood processing activities were not present at detectable levels. Recent analysis of samples from five other water supply wells currently not in use have also shown that contaminants related to the wood processing activities are not present. However, there are no restrictions on the property that would limit the future placement of a water supply well in any area of the Site.

- Ingestion of fish or game species such as deer or wild turkey. As the Site and surrounding area provide ample habitat for game species and the opportunity for hunting, there is the potential for site-associated compounds (like dioxin) to accumulate in tissues of animals that forage at the Site. Hunters may later ingest these contaminated tissues. Analysis of fish tissue samples have shown the presence of dioxins and furans that may or may not be related to wood processing activities.

1.4.4 Conclusions

Complete exposure pathways have been identified for potential current and future human receptors based on exposure to contaminated soil, groundwater, fish tissue and sediment.

Under current conditions, prison inmates, NYSDEC and NYSDCS staff, and other receptors may visit impacted soil areas of Camp Summit. Additionally, Panther Creek and the tributary to Panther Creek are trout spawning and fish propagation streams, respectively, and fishing may occur in these areas. Therefore, fishermen may come into contact with sediment in the pond, and fish tissue through consumption of fish caught in the tributary or Panther Creek.

Surface and subsurface soils are impacted with dioxins and PCP in various areas around the Site, including in and around Buildings 48, 49, 50, 51, and 52. In addition, several suspected disposal locations have been shown to be impacted as well as the drum rinsing area. Recent groundwater data show impacts from the Site releases in wells close to Buildings 48 and 49.

There is considerable uncertainty about levels of exposure to consumers of game species. Terrestrial game likely to be hunted in this area would include species such as white-tailed deer and turkey. Both species consume vegetation; additionally, turkeys are opportunistic feeders that will also include invertebrates in their diet. Heavy metals and, to a lesser degree, dioxins and associated compounds are known to be persistent and bioaccumulative substances in plants. Dioxins, dibenzofurans, PCP and metals may accumulate in invertebrate tissue. There is the potential for bioaccumulation of these compounds in game species through dietary consumption, and therefore, people who ingest these species may likewise be exposed to these contaminants.

1.4.5 Step IIA Fish and Wildlife Impact Analysis

A Step IIA Fish and Wildlife Impact Analysis was prepared to determine if potential impacts to fish and wildlife resources exist at the Site from the former wood treatment operations. The FWIA consisted of a Step IIA Pathway Analysis. The complete FWIA report is included as **Appendix B**. The following sections present a brief summary of the pertinent results of the report.

1.4.5.1 Contaminant-Specific Impact Assessment

Site conditions indicate that: 1) various species of fish and wildlife are likely to be present at the site; 2) compounds that are mobile, persistent, or have the potential to bioaccumulate have been documented on the site; and 3) these compounds exist at or near the surface of soil, and have the potential to be taken up by plants and animals. Therefore, the following pathways of chemical movement and exposure to fish and wildlife were considered possible:

- Dermal contact with chemicals present in the surface soil, groundwater and sediments.
- Ingestion of chemicals in surface soil, groundwater, sediment and food sources.
- Direct uptake of chemicals in soil, sediment or groundwater by terrestrial and aquatic plants.

1.4.5.2 Conclusions

A Step IIA FWIA was prepared for the Camp Summit site. Chemical impacts have been identified in soil, groundwater and sediment. Various terrestrial and rivertine ecosystems are found at the Site and within the surrounding area. Potential biological receptors include the fish and wildlife species indigenous to the area.

Given the nature of the chemicals present at the Site (i.e., dioxins, phenols, PAHs and heavy metals) and the distribution of impact, complete exposure pathways were identified for terrestrial and aquatic receptors. Aquatic invertebrate tissue analysis was conducted and dioxins were not detected above the appropriate wildlife protection criteria beyond the on-site pond.

2.0 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES

The purpose of this FS is to evaluate and focus upon remedial response actions that may be applicable for the reduction of potential future risks to human health and the environment at the Site. Remedial Action Objectives (RAOs) are goals developed to protect human health and the environment. This section of the FS describes the development of RAOs for impacted media identified during recent site assessment activities (Shaw, 2001 and 2002), and how the RAOs will be used to evaluate potentially applicable remedial alternatives within this FS. The general requirements for this work are described in relevant guidance, including the NYSDEC TAGM 4030 (NYSDEC, 1990) and USEPA guidance for developing remedial actions (USEPA, 1988).

RAOs consist of medium-specific (i.e., soil, groundwater, etc.) goals for protecting human health and the environment (USEPA, 1988). The process of developing RAOs includes the identification of:

- COPCs at the Site;
- Exposure routes and receptors of potential concern; and
- Qualitative and quantitative goals for COPC cleanup in each medium that may require treatment.

The COPCs, exposure routes, and receptors of potential concern were discussed in **Sections 1.4.2** and **1.4.3** of this report.

2.1 Applicable or Relevant and Appropriate Requirements

Regulations and guidance for New York State's Inactive Hazardous Waste Disposal Site Remedial Program, 6 NYCRR Part 375 (NYSDEC, 1992) were promulgated to promote the orderly and efficient administration of Article 27, Title 13 of the Environmental Conservation Law (ECL). The scope, nature, and content of an inactive hazardous waste site remedial program performed in accordance with this statute are to be determined on a site-specific basis. Specifically, Part 375 pertains to the development and implementation of remedial programs under authority of ECL Article 27. Subpart 375-1.10(c)(1) states that “due consideration” must be given to "standards, criteria and guidelines" (SCGs) when evaluating remedial alternatives for Class 2 inactive hazardous waste disposal sites. The regulation states that such “consideration” should be given to guidance “determined, after the exercise of engineering judgment, to be applicable on a case-specific basis” (6 NYCRR 375.1-10(c)(1)(ii)).

SCGs include both New York State's criteria applicable to cleanup of contaminated media and federal ARARs that may be more stringent than the State's criteria. As part of this FS, SCGs were evaluated for site applicability to develop the medium-specific RAOs. SCGs may be chemical-specific, location-specific, or action-specific. Chemical-specific SCGs were evaluated to establish appropriate action levels for impacted site media (e.g., soil standards). Action-specific SCGs were evaluated to establish acceptable standards for the management of impacted media (e.g., minimum technology standards for treatment of specific wastes such as stormwater and erosion control during construction). Location-specific SCGs were evaluated to establish acceptable actions with respect to location and/or the presence of specific site conditions (e.g., protection of waters). A complete list of SCGs and ARARs identified for the surface soils, subsurface soils, and groundwater is presented in **Table 7**.

The New York State SCGs and federal ARARs that were considered during the development of this FS include:

- Federal Resource Conservation and Recovery Act (RCRA) requirements apply to soil, groundwater, or other material removed from the Site that is categorized as hazardous. These materials may be subject to all RCRA standards including the 40 CFR 268 land disposal regulations. All RCRA wastes would be disposed at RCRA-permitted facilities where land disposal restrictions (LDRs) would apply. RCRA is not applicable for determining remedial action levels.
- The Clean Air Act (CAA) regulates air emissions of certain hazardous air pollutants. The CAA would not be applicable during site remediation unless treatment technologies creating air emissions are used. Any future particulate or volatile emissions from the Site would be controlled by risk-based standards, which are more protective than CAA standards. As a result, CAA standards would be fully addressed by the more stringent risk-based standards.
- The Clean Water Act (CWA) regulates the discharge of pollutants into the waters of the United States. No discharges will be made directly to any body of water or to the ground surface at the Site.
- The Safe Drinking Water Act (SDWA) was created to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. Water will not be discharged directly to any potable water source or to the ground surface. Camp Summit is an active incarceration facility that uses an unimpacted bedrock aquifer as a public potable water supply.

- The New York State standards for groundwater quality promulgated under 6 NYCRR Part 703 and set forth in NYSDEC guidance (e.g. TOGS 1.1.1) were considered.
- The New York State Technical Administrative Guidance Memorandum – Technical Manual (NYSDEC, February 8, 1993) was required in regards to on-site consolidation of hazardous waste. This manual provides the NYSDEC definition of "Active Waste Management" as it pertains to hazardous waste land disposal.
- The primary guidance for soil cleanup values under Part 375 remedial actions is derived in the Technical and Administrative Guidance Memorandum on Determination of Soil Cleanup Objectives and Cleanup Levels HWR-94-4046, commonly referred to as TAGM 4046 (NYSDEC 1994). This guidance provides a basis for determining generic soil cleanup values that essentially ensures that all significant threats to human health and/or the environment posed by an inactive hazardous waste site are eliminated. For organic contaminants, the recommendation for an appropriate cleanup objective is based on the following criteria:
- Health-based levels that correspond to excess lifetime cancer risks of 1 in 1 million for Class A and B carcinogens, or 1 in 100,000 for Class C carcinogens.
- Human health-based levels for systemic toxicants, calculated from Reference Doses (RfDs).
- Environmental concentrations protective of groundwater/drinking water quality.

The generic guidance values listed in TAGM 4046 were used in screening the COPCs for each media and were used in the development of remedial actions, as required by the NYSDEC.

- New York State effluent standards for discharge to groundwater would apply to potential discharges. Potential discharges may arise from the dewatering process used to treat the excavated soil and the decontamination process.
- New York State solid waste regulations guide the disposal of newly generated solid waste (6 NYCRR Part 360). Each solid waste landfill will have specific acceptance criteria for individual chemical constituents.
- New York State air emission guidelines would not be applicable unless treatment technologies creating air emissions are used. Applicable guidance for short-term emissions during construction activities is contained in TAGM-4031.

The quantitative criteria retained from the review of SCGs for the COPCs identified in each medium at the Site are discussed in the following section.

2.2 Remedial Action Objectives

As described in **Section 1.4** of this FS, the QEA (Shaw, 2002) evaluated human health risks from potential on-site exposures to COPCs under current conditions and hypothetical future land-use scenarios. According to USEPA guidance, RAOs for protecting human receptors should express a remediation goal for COPCs in association with an exposure route (e.g. soil, groundwater, etc.), because protection may be achieved by reducing exposure (such as capping an area or limiting access,) as well as by reducing COPC levels (USEPA, 1988). The COPCs identified at the Site in the RI and QEA are discussed in **Section 1.4.2**. The concentrations and spatial distribution of COPCs across the Site were also evaluated in the context of potentially complete exposure pathways associated with current land-use during the QEA. The potentially complete exposure pathways and potential receptors for these land uses are discussed in **Section 1.4.3**.

This section summarizes the qualitative and quantitative RAOs developed for each specific medium at the Site. The criteria discussed in **Section 2.1** of this FS (SCGs and ARARs) are presented in this section relative to each impacted medium and relevant exposure pathway. According to USEPA guidance, RAOs are required to specify:

- The contaminants of concern;
- The media of concern;
- Exposure routes and receptors; and
- The acceptable contaminant levels for each exposure route.

These stipulations have been provided to address protection of human health that may be achieved through exposure reductions. Exposure reduction may be achieved through barriers to contact and/or institutional controls, or by removal actions and/or treatment. NYSDEC's regulations state that the goal of the remedial program for a specific site is “to restore that site to pre-disposal conditions, to the extent feasible and authorized by law” (6 NYCRR § 375.1-10(b)). At a minimum, the remedy must “eliminate or mitigate all significant threats” to human health or the environment through the “proper application of scientific and engineering principles.”

In accordance with USEPA guidance, RAOs were developed for each medium and potential exposure route (USEPA, 1998). Surface and subsurface soils were the areas identified as requiring remedial action in this FS. Qualitative and quantitative RAOs are summarized in **Tables 8** and are discussed in **Sections 2.2.1** and **2.2.2**. In the ensuing sections of this FS, each alternative will be evaluated relative to its effectiveness in achieving these goals by either limiting exposures to media containing COPCs exceeding these numeric criteria or by removal of and treatment or off-site disposal of the media.

2.2.1 Remedial Action Objectives for Soil

Analytical data gathered during the PI and RI identified COCs across the Site at varying concentrations. Therefore, the Site is considered an Area of Concern. Analytical results from within the Area of Concern have been identified contaminants in the soil above TAGM 4046 guidance values. A detailed discussion of the soil impacts is presented in **Sections 1.3.3.1** through **1.3.3.5**.

As described in **Sections 1.3.3.1** through **1.3.3.3**, surface soil impacts above guidance values were observed in the following vicinities:

- The area northeast of the former treatment building;
- In the treated lumber storage areas south of building; and
- In the former drum rinse area.

As described in **Sections 1.3.3.4** and **1.3.3.5**, subsurface soil impacts above guidance values were observed in the following vicinities:

- Beneath the slab of the former treatment building;
- In an area in close proximity to the former treatment building adjacent to the rail car slab;
- Southwest of the former Treatment Building;
- West of former Drying Shed #1;
- Within the drainage pathway from the SW corner of the former Treatment Building to the Seep; and
- In the drainage pathway from the SE corner of the former Treatment Building to the Footer Drain.

Accordingly, these areas (within the AOC) described above require remediation.

The quantitative RAOs for soils are given in **Table 8**. The qualitative remedial action objectives for soils at the Site are to eliminate or reduce to the extent practicable the following situations:

- Exposures of persons at or around the Site to PCP and dioxin in soils;
- Environmental exposures of flora or fauna to PCP and dioxin in soils;
- The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and
- The release of contaminants from soil into surface water, indoor air, and ambient air through storm water erosion, soil vapor, or wind borne dust.

2.2.2 Remedial Action Objectives for Groundwater

Analytical results from groundwater samples collected across the Site indicate that contaminants have been identified in groundwater at concentrations above TOGS 1.1.1 guidance values. These impacts have been observed primarily in the areas around monitoring wells MW-4 and MW-7, which are located within and near the former treatment areas. These impacts remain “near source” and do not appear to extend laterally from the source areas (except immediately downgradient from MW-4). The absence of a site wide groundwater plume is not unexpected because as mentioned previously, the overburden aquifer is essentially comprised of a series of water bearing units within the till which are poorly connected and not laterally continuous across the Site. Groundwater (and impacts) would move laterally through the infiltration of surface water moving vertically through the fill, filling the void spaces within the till. This low horizontal conductivity, combined with little to no lateral recharge of groundwater precludes the formation of a well defined contaminant “plume” and widespread migration of groundwater within the overburden sediments. However, dissolved impacts will remain, and likely become exasperated as long as groundwater remains in contact with the impacted soils. The dissolved impacts currently do not warrant “active” remediation (based upon the contaminant levels observed, but the “mass balance” will eventually result in contaminated groundwater moving away from the documented adsorbed sources if the adsorbed sources are not addressed (e.g. groundwater quality will “naturally” improve once the impacted soils and adsorbed sources are mitigated).

The efficiency of any soils remedy on groundwater quality would be confirmed by post-closure groundwater monitoring.

3.0 IDENTIFICATION AND SCREENING OF REMEDIAL ACTION TECHNOLOGIES

This section considers technologies that can be employed to meet the qualitative and quantitative RAOs as presented in **Section 2.2** for the Site cleanup. General Response Actions (GRAs) are listed in **Section 3.1**. Technology types and process options for each GRA are screened to select the most applicable technologies to meet the RAOs for each medium of concern in **Section 3.2**. Technology types that are deemed applicable and technically implementable are retained for detailed evaluation in **Section 3.3**. In **Section 4.0** site-specific remedial alternatives are assembled and evaluated relative to their effectiveness in addressing the identified areas of impacted media and the RAOs. A detailed analysis of each retained alternative is presented in **Section 5.0**. In **Section 6.0** the retained alternatives are contrasted with one another with regards to the satisfaction of CERCLA criteria, including overall protection of human health and the environment, cost, implementability, effectiveness, and reduction of toxicity, mobility, and volume. **Section 7.0** identifies the recommended remedial alternative and compares it to the CERCLA criteria.

3.1 Identification and Screening of General Response Actions

GRAs are media-specific actions that satisfy the RAOs. The process of developing GRAs to address impacted media is consistent with guidance for implementing the National Contingency Plan (NCP) under CERCLA (USEPA, 1988) and NYSDEC (NYSDEC, 1990). The process also ensures that a wide range of potential responses are considered during the development of remedial alternatives for the Site.

GRAs were developed to address the RAOs for surface and subsurface soil. GRAs that could be applied to impacted soil include:

- No Action;
- Institutional and/or Engineering Controls;
- Containment;
- Excavation;
- Disposal;
- In-situ Treatment; and
- Ex-situ Treatment.

Some GRAs are not applicable to the Site as a whole because of site-specific conditions. The application of specific GRAs is discussed in the following sections.

3.1.1 No Action

The "No Action" category serves as a baseline against which other response actions can be compared. The "No Action" category can include activities such as periodic soil sampling, groundwater monitoring, or air quality monitoring to identify changes in site conditions. Pursuant to the NCP and USEPA Guidance for conducting an RI/FS, the "No Action" response must be developed and examined as a baseline by which other remedial alternatives shall be compared.

3.1.2 Institutional and/or Engineering Controls

Under this response category, measures would be taken to restrict access and/or control specified activities at the Site. Physical and/or legal controls could be employed to restrict Site access. Physical controls include access restrictions such as fencing, postings, warning signs, and other barriers. Legal controls include zoning restrictions and restrictions attached to the title, as well as the classification of the Site within the New York State Registry of Inactive Hazardous Waste Disposal Sites (Registry) so that future property uses consider the Site's limitations specified by those documents.

3.1.3 Containment

The containment category refers to the use of natural or engineered barriers on-site to minimize potential direct contact with, or migration of, contaminated media. Technologies within the containment response category may include contact barriers, capping systems, and surface controls (i.e., drainage/grading), or combinations thereof.

3.1.4 Excavation

This GRA refers to the excavation of impacted soils at the Site. Removal operations at the Site could require the use of both common and specialized excavation equipment, depending upon the location of the impacted soil with respect to ground surface and groundwater. Excavated soils may be conditioned for subsequent transportation to an off-site disposal facility and/or treated on-site or off-site to meet Land Disposal Restriction (LDR) treatment standards, if applicable. Excavations below the water table would require dewatering.

3.1.5 Disposal

This GRA refers to disposal of impacted media after excavation and/or treatment. Both on-site and off-site disposal options will be evaluated as GRAs.

3.1.6 In-situ Treatment

In-situ treatment GRAs refer to appropriate technologies used to treat impacted soil without bringing it to the surface or physically removing the soils. Available technologies include enhanced biodegradation, stabilization, vitrification, and thermal desorption.

3.1.7 Ex-situ Treatment

Ex-situ treatment GRAs refer to appropriate technologies used to treat excavated soils on-site. Available technologies include bioremediation, stabilization, dechlorination, soil washing, and thermal desorption.

3.2 Identification and Preliminary Screening of Technology Types and Process Options

This section identifies and describes potentially applicable technology types for each GRA and presents the preliminary screening of each technology and process option. During this preliminary screening, process options and entire technology types may be eliminated from further consideration on the basis of technical effectiveness or implementability. Three factors, which are specified by the USEPA to evaluate and screen out technologies or process options are listed below:

- Nature of the contaminants;
- Specific media of concern at the Site; and
- Physical characteristics of the Site, including geology and hydrogeology.

3.2.1 No Action

Pursuant to the NCP and USEPA guidance for conducting RI/FS investigations, the “No Action” response must be developed and examined as a baseline by which other remedial alternatives will be compared. The “No Action” category can include activities such as periodic soil sampling, groundwater monitoring, or air quality monitoring to identify changes in site conditions. This response is easily implementable.

Further screening of this response/alternative is not required. It is retained as a general option for the later assembly of alternatives (**Section 4.0**) and for comparative purposes in the detailed analysis (**Section 5.0**) and comparative analysis (**Section 6.0**).

3.2.2 Institutional and/or Engineering Controls

Institutional and/or engineering controls are physical or legal measures taken to prevent direct exposure to impacted media. Institutional controls are not technologies; however, they can be used to enhance the long-term effectiveness and permanence of a remedial action. Potentially executable institutional controls include access restrictions, title restrictions, and zoning restrictions that prevent exposure to soil.

Implementation of any institutional controls would require negotiated agreement between the current property owner (New York State) and local and state government agencies. Institutional controls would enhance the effectiveness of other technologies and will be retained for further consideration.

Physical Mechanisms

Access restrictions could include fencing, alarm systems, security gates and patrols, and other physical barriers that restrict access to the Site. These measures are currently being utilized at Camp Summit (as a whole) as part of daily operations (e.g., it is an incarceration facility).

Other measures to control specific activities could be employed as dictated by future land use. For example, workers engaged in activities potentially exposing them to impacted media would require Occupational Safety and Health Administration (OSHA) training and certification (29 CFR 1910.120), medical fitness testing, and/or other appropriate documentation, including an approved Health and Safety Plan (HASP) and requirements. These plans would stipulate appropriate protective measures to prevent worker exposures during the completion of work on-site. In addition, a written summary of work performed or completed, documenting compliance with all established administrative controls, would be a customary requirement for work completed in “hazardous” environments. Future land-use activities may require control measures such as mandatory periodic training or signed compliance agreements prohibiting specified activities for on-site employees.

Legal Mechanisms

Restrictions placed in the title file may be used to impose specific legal restrictions for future land use or to require training programs or specific actions designed to prevent exposure to impacted media. The NYSDEC would place an official record in the title file prohibiting actions that may increase the risk of exposure to on-site contaminants. For example, prohibitions on excavation or construction in capped areas can be stated in the record, and maintenance of a cap or other remedial control structures can be required. Future remedial actions can also be specified in this record, such as requiring that subsurface soil exposed by future construction be handled in a specified manner or that a newly exposed area be capped. Access restriction controls can also be included in the title file.

Zoning restrictions are similar to title restrictions and could be used for the same purposes described above. Re-zoning would require working closely with the Town of Fulton to develop a special zoning district with specific building limitations or prohibitions, although this may not be practical given the use of the property. Approval would require a public hearing and/or a public participation process. This option would limit future exposure through property-use restrictions. The “layering” of this form of property use restriction in addition to title covenants would provide a more effective control mechanism than either of these actions completed individually.

Under New York State’s Inactive Hazardous Waste Disposal Sites Remedial Program, limitations are placed on physical alterations or substantial change in use of sites included in the Registry. These limitations would effectively limit significant changes in the exposure pathways present at portions of the Site included in the Registry, and require notification and NYSDEC approval prior to the implementation of these changes.

Institutional controls and/or engineering controls would enhance the effectiveness of other technologies and will be retained for further consideration.

3.2.3 Containment

Containment of impacted media would prevent potential receptors from directly contacting these media and impede potential migration of impacted media off-site. Technology types identified to achieve containment of the soil include surface controls and capping systems.

Surface Controls

Surface controls can be used to divert surface water away from impacted areas, minimize infiltration, or prevent erosion. Several measures, including diversion channels, grading, revegetation, or collection drains and basins can accomplish the control of surface water run-on/run-off. Surface controls reduce the amount of water that infiltrates and percolates into and out of impacted soils, thus decreasing the potential for exposure. Surface controls will be retained for further consideration.

Capping Systems

Containment of impacted material from the surrounding environment would reduce the risk of contaminant migration and potential exposures to COCs by preventing direct contact with impacted media. Containment can be achieved through the use of capping systems.

In accordance with USEPA Guidance (July 1989) and the TAGM Technical Manual, in-place capping or consolidation and capping within the same area of concern does not constitute placement of a hazardous waste, and therefore is not restricted under the LDRs. LDRs are discussed in greater detail under on-site disposal in **Section 3.3.5**.

The capping process options include permeable soil covers, low permeability cover systems (LPCS), asphalt/concrete caps, and multi-layered caps.

- Permeable Soil Covers: Permeable soil covers typically consist of 1 to 2 feet of locally available, inexpensive earthen materials and a 6-inch layer of topsoil for vegetative support. A permeable soil cover would reduce the risk of direct contact with impacted surface soils and prevent the potential erosion and transport of exposed impacted soils. However, a permeable soil cover would not prevent the infiltration of precipitation through the impacted soils, which may cause COPCs to migrate to the groundwater. For this reason, this technology will not be retained for further consideration.
- Low Permeability Cover System: An LPCS typically consists of 1 to 2 feet of compacted clay and a 6-inch layer of topsoil for vegetative support. The clay must have a maximum remolded coefficient of permeability of 1 x 10^{-7} cm/s throughout its thickness. An LPCS would reduce the potential for direct contact with impacted media and prevent the potential erosion of exposed surface soils. An LPCS would also reduce the infiltration of precipitation into the impacted media. This technology will be retained for further consideration.
- Asphalt/Concrete Caps: Both asphalt and concrete are considered to be good cap materials that effectively reduce surface erosion. By altering the asphalt mix (decreasing the aggregate grain size and adding extra asphalt), permeability of typically less than 10^{-7} cm/s, and sometimes as low as 10^{-11} cm/s, can be achieved. These mixtures are known as dense-grade or hydraulic-grade asphalts (Asphalt Institute, 1989) and have been approved for use in environmental caps and pond liners (Asphalt Magazine, Winter 1991/1992). They cannot withstand heavy design loads, but they are resistant to erosion and are more durable than highway asphalt. Asphalt/concrete cap systems should be engineered/constructed with suitable surface water drainage controls such that internal, downward drainage of precipitation does not occur. Although the treatment building is expected to be demolished prior to the commencement of remedial activities, if the building foundation is left in place it may not require modification in order to implement this process option. The integrity of this area would have to be evaluated

prior to designing an asphalt/concrete cap system. This technology will be retained for further consideration.

- Multi Layered Caps: A multi layered cap system is a more sophisticated technology than a soil cap and involves layers of compacted soil underlying and overlying a synthetic liner. These caps are most appropriately used in cases where a low-permeability cap must be constructed to prevent infiltrating water from leaching through the waste. A multi layered cap meeting the performance requirements of 6NYCCR Part 360 would be practicable and is a proven containment technology. This technology will be retained for further consideration.

3.2.4 Excavation

This process option involves the excavation of contaminated material and on-site treatment or transport to a permitted off-site facility for treatment and/or disposal. Due to the range of concentrations detected at the Site, pretreatment of the contaminated media may be required to meet LDRs. Treatment and disposal issues are further evaluated in the ensuing sections of this FS report.

The effectiveness of excavation would depend upon the location and depth of the impacted media to be excavated. Excavations greater than 4 feet deep may require bracing and/or sloping to stabilize the sidewalls of the excavation. Groundwater is first encountered on-site at depths ranging from 5 to 6 feet bgs. Depending on the depth to groundwater in the vicinity of the excavation and the area of the Site, water may or may not be encountered. If groundwater is encountered, water management technologies would be utilized. Excavation water will be treated and discharged on-site or containerized and shipped off-site for treatment and disposal. Excavation will be retained for further consideration.

3.2.5 Disposal

The GRA evaluation of disposal retained on-site and off-site disposal options. The requirements for disposal (on-site and off-site) are dependent upon the nature of the contamination and the concentrations of the COPCs. All disposal options considered below would effectively limit exposure to potential receptors; however, these options would not reduce, but rather transfer or contain, the volume and toxicity of the waste.

On-Site Disposal

On-site disposal includes the on-site consolidation of waste material into an area of consolidation. This area of consolidation would effectively limit long-term COPC exposure to potential receptors, however an increased short-term risk would occur while the excavated material was transported and placed within the area of consolidation.

Because the area of consolidation and the waste material that would be placed within the area of consolidation are both located within the same area of concern, LDRs under 40 CFR 268.49 are not applicable. Further discussion of LDRs is provided in **Section 3.3.5**. This option has been retained for further evaluation.

Off-Site Disposal

Depending on the nature of the contamination and its concentrations, the waste material may be disposed of off-site as hazardous or non-hazardous at an appropriate facility. This disposal process would be effective in removing COPCs from the Site and limiting long-term exposure to potential receptors; however, an increased short-term risk of exposure would be posed to workers during excavation and to potential receptors along the transportation route. This process would result in reductions in waste volume, toxicity, and mobility at the Site through the transfer of this waste to a secure, approved, off-site solid waste disposal or treatment facility. All disposal and waste management practices will comply with applicable LDRs which are discussed in detail in **Section 3.3.5**. Transfer to a disposal facility, however, would not result in an ultimate reduction in toxicity or volume. Waste mobility would be reduced by placement of the waste within a secured landfill off-site.

The staging, loading, and transportation processes of excavation materials would be considered practicable. Depending on the quantities and characteristics of material to be excavated and transported, the result of health risks may exceed those posed by leaving the material in place on-site. This process will be retained for further consideration.

3.2.6 In-situ Treatment

Enhanced Biodegradation

Enhanced biodegradation microbiological processes accelerate the degradation or transformation of contaminants into innocuous end products. Hydrogen Release Compound (HRC) can be used to stimulate rapid degradation of chlorinated contaminants in groundwater and saturated soil. The process by which HRC operates has both chemical and biological constituents. Upon coming into contact with subsurface moisture the HRC slowly releases lactic acid for a period of one to two years. As indigenous anaerobic microbes metabolize the lactic acid they produce consistent low concentrations of dissolved hydrogen. Other subsurface microbes use the hydrogen to strip the solvent molecules of their chlorine atoms and allow for further biological degradation. HRC has been shown to effectively stimulate the degradation of chlorinated compounds, such as PCP, as well as heavy metals, such as chromium and arsenic. Screening studies have demonstrated that 2,3,7,8-TCDD, the most toxic form of dioxin, is generally resistant to biodegradation (Spectrum, 2003). Regenesis, the primary vendor for

HRC, does not currently have data demonstrating the effectiveness of HRC in treating dioxins. Consequently, enhanced biodegradation using HRC will not be retained for further consideration.

Stabilization

The goal of the stabilization process is to limit the leaching of contaminants. Stabilization techniques limit the solubility or mobility of contaminants, even though the physical characteristics of the waste may not be changed or improved. To accomplish this, stabilizing agents, which chemically react with the contaminants and reduce their mobility, are added and blended with the soil. Types of stabilizing agents include Portland cement, bitumen, and fly ash.

Soil stabilization techniques are accomplished either in-situ or ex-situ. In-situ techniques involve the injection of a stabilizing agent into the soil. Auger/caisson systems and injector head systems are techniques used to apply the stabilizing agents to the soil. Auger/caisson systems involve using an auger equipped with a nozzle to inject the agents into the subsurface while simultaneously drilling into and mixing the soil. Injector head systems involve using high pressure to force stabilizing agents into the soil pore spaces through pipes.

Stabilization is a proven method for reducing the mobility of inorganic compounds. Pilot studies employing amendments such as granular activated carbon (GAC) to immobilize organic constituents have been performed ex-situ. GAC removes contaminants by sorption; it attracts and adsorbs organic molecules, as well as certain metal and inorganic molecules, until available active sites are occupied. Carbon is "activated" for this purpose by being thermally processed to create porous particles with a large internal surface area. However, there is a lack of overall demonstrated effectiveness of this technique, particularly in in-situ situations. Consequently, in-situ stabilization will not be retained for further consideration.

Vitrification

Vitrification of soils is a thermal treatment process that converts contaminated soil into a chemically inert, stable glass and crystalline product. In-situ vitrification is a relatively complex, high-energy technology requiring a high degree of skill and training. An array of electrodes is inserted into the ground to the desired treatment depth. An electrical current heats the soil to approximately 2,000 °C, well above the initial melting temperature (e.g., fusion) of soils. The pyrolyzed byproducts migrate to the surface of the vitrified zone, where they combust in the presence of oxygen. A vacuum hood placed over the treated area collects off gases, which are treated before release. The off-gas treatment system consists typically of a glycol cooling system, a wet scrubbing system and condenser, and carbon filters. In-situ vitrification is effective in the unsaturated zone, thus groundwater suppression pumps will need to be employed. In-situ vitrification is currently considered an innovative technology in the pilot stage of development. Implementation of this technology requires intensive site preparation, special equipment, and significant electrical supplies. These implementation issues and the high capital costs associated with vitrification cannot be justified in comparison to other process options. This technology will not be retained for further consideration.

Thermal Desorption

In-situ thermal desorption (ISTD) has successfully treated a broad range of volatile and semivolatile organic compounds, including PAHs, dioxins, and chlorinated solvents. Depending on the depth of the impacted zone, ISTD can be applied via thermal blankets or thermal wells. Thermal blankets are only effective up to depths of approximately 2 feet bgs, while thermal wells can be used to treat deeper impacts. Since the majority of soil impacts exist at depths greater than 2 feet bgs, thermal wells would be employed at the Site.

ISTD using thermal wells involves the installation of vertical boreholes, spaced 5 to 20 feet apart, at the required depth. ISTD can be applied to a variety of soil types, both above and below the water table. The dense soils at the Site will most likely cause the borehole spacing to be closer to five feet on center. Heaters are placed in the boreholes, causing contaminants in the soil to be vaporized. Heterogeneity does not generally limit heat flow through the soil formation. A significant feature of the ISTD process is the creation of a zone of very high temperature (>1000°F) near the heaters, which oxidizes most of the contaminants before they exit the soil (Terra Therm, 2003). A vacuum is then applied to draw the vaporized contaminants into an off-gas treatment system, which may consist of thermal oxidizers, activated carbon, etc. Metals that may be volatilized by the process and drawn into the vacuum will complicate off-gas treatment. After a cooling period, amendments may be introduced to the soil to rejuvenate its fertility and the Site would be returned to use.

Terra Therm is the sole vendor for this technology, which may bias information on ISTD and leads to non-competitive pricing. Further, the tight soils, which require decreased well spacing, and the separate areas of impact at the Site will likely be cost-prohibitive to the implementation of this technology. Consequently, ISTD will not be retained for further consideration.

3.2.7 Ex-situ Treatment

All ex-situ process options assume that soil has been excavated prior to implementation of these treatment technologies.

Bioremediation

As in in-situ bioremediation, ex-situ bioremediation uses a process in which indigenous or inoculated microorganisms (e.g., fungi, bacteria, and other microbes) degrade (i.e., metabolize) organic contaminants found in soil and/or groundwater. In the presence of sufficient oxygen (aerobic conditions), microorganisms will ultimately convert many organic contaminants to carbon dioxide, water, and microbial cell mass. In the absence of oxygen (anaerobic conditions), the contaminants will be ultimately metabolized to methane and carbon dioxide. Ex-situ bioremediation typically uses tilling or continuously mixed slurries to apply oxygen and nutrients, and is performed in a prepared bed (liners and aeration) or reactor. Ex-situ bioremediation requires a relatively large area of land for an extended period of time, rendering the land unavailable for other purposes. Hence, ex-situ bioremediation will not be retained for further evaluation.

Stabilization

The goal of the stabilization process is to limit the leaching of contaminants. Stabilization techniques limit the solubility or mobility of contaminants, even though the physical characteristics of the waste may not be changed or improved. To accomplish this, stabilizing agents, which chemically react with the contaminants and reduce their mobility, are added and blended with the soil. Types of stabilizing agents include Portland cement, bitumen, and fly ash.

Soil stabilization techniques are accomplished either in-situ or ex-situ. Ex-situ stabilization involves excavating the impacted materials, machine-mixing them with a stabilizing formula in a pug mill or rotating drum mixer, and depositing the treated soil in a designated area.

The stabilization of inorganic compounds is a mature remediation technology, while the stabilization of organic compounds is innovative. Pilot studies employing amendments such as granular activated carbon (GAC) to immobilize organic constituents have been performed ex-situ. GAC removes contaminants by sorption; it attracts and adsorbs organic molecules, as well as certain metal and inorganic molecules, until available active sites are occupied. Carbon is "activated" for this purpose by being thermally processed to create porous particles with a large internal surface area. However, there is a lack of overall demonstrated effectiveness of this technique.

Since ex-situ stabilization is not a proven method for reducing the mobility of organic compounds, the principal contaminants at the Site, it will not be retained for further consideration as a primary treatment technology. However, it is important to note that ex-situ stabilization may supplement another technology, as it is effective in reducing the mobility of inorganic compounds.

Dechlorination

Although not yet considered a fully proven technology by USEPA, dechlorination does have some track record of success for the treatment of the dioxin, furan, and PCP contaminants often found at wood-treatment sites. Dechlorination will not, however, be useful for treating PAHs, which do not contain chlorine. Dechlorination is one of very few techniques that are capable of destroying dioxins. The USEPA data show that wood-treatment site wastes containing dioxins and furans treated with alkali polyethylene glycolate (APEG) for 45 minutes at 160°F showed greater than 99% destruction of the dioxins and furans. However, there is some concern that incomplete dechlorination of the heavily chlorinated dioxins typically found at wood treating sites (containing up to 8 chlorine atoms) could result in the production of much more toxic forms of dioxins, including the most toxic, 2,3,7,8-TCDD. Dechlorination will not be retained because the process may form more toxic forms of dioxin.

Soil Washing

Soil washing is an ex-situ volume reduction process that separates fine soil particles from the larger grained soil. The concept of reducing soil contamination through the use of particle size separation is based on the finding that most organic and inorganic contaminants tend to bind, either chemically or physically, to clay, silt, and organic soil particles. The fines in turn are attached to the larger sands and gravel by physical processes such as compaction and adhesion. Washing the soil separates the fines from the sand and gravel and effectively separates and concentrates the contaminants into a smaller volume of fine material. Chemical additives may be added to the soil washing process to aid in the desorption and solubilization of contaminants that are present in the fines, thus further reducing the level contamination present in the fines. Although used for various organic compounds, it is not a proven technology for the treatment of wood treatment contaminants. The cost of this technology can be relatively high, depending on the volume of wash water and additive and percentage of fines that are generated. For these reasons, soil washing will not be retained for further consideration.

Thermal Desorption

Thermal desorption is a physical separation process that aims to volatilize contaminants. In this process, soil is heated and agitated in a chamber, causing water and organic contaminants to be vaporized. A gas or vacuum system transports the volatilized water and organic contaminants to a gas treatment system.

Three types of thermal desorption are available:

- Direct Fired: Fire is applied directly upon the surface of contaminated media. The main purpose of the fire is to desorb contaminants from the soil, though some contaminants may be thermally oxidized during the treatment process (Federal Remediation Technologies Roundtable (FRTR), 2002).
- Indirect Fired: A direct fired rotary dryer heats an air stream, which, by direct contact, desorbs water and organic contaminants from the soil (FRTR, 2002).

- Indirect Heated: An externally fired rotary dryer volatilizes the water and organics from the contaminated media into an inert carrier gas stream. The carrier gas is later treated to remove or recover the contaminants (FRTR, 2002).

Two common thermal desorption designs are the rotary dryer and thermal screw.

- Rotary Dryers: Horizontal cylinders, normally inclined and rotated, that can be indirect or direct fired.
- Thermal Screw: Screw conveyors or hollow augers are used to transport the medium through an enclosed trough while hot oil or steam circulates through the auger to indirectly heat the medium.

All thermal desorption systems require off-gas treatment. Condensers, activated carbon, wet scrubbers, and/or fabric filters may be employed to remove particulates and contaminants. The thermal desorption processes can be categorized into two groups based upon the operating temperature of the desorber:

- Low temperature thermal desorption (LTTD): Wastes are heated to 90 to 320 °C (200 to 600 °F). The target contaminant groups for LTTD systems are nonhalogenated VOCs and fuels; it can be used, but is less effective, in treating SVOCs.
- High temperature thermal desorption (HTTD): Wastes are heated to 320 to 560 °C (600 to 1,000 °F). The target contaminants for HTTD are SVOCs, PAHs, PCBs, and pesticides; VOCs and fuels also may be treated, but treatment may be less cost-effective.

HTTD would need to be implemented to treat the primary COPCs at the Site. One disadvantage of HTTD is that organic components in the soil could be damaged, causing treated soil to lose the ability to support future biological activity. Accordingly, amendments may be introduced to the soil after treatment to rejuvenate biological activity.

It is also important to note that metals in the feed will affect the thermal desorption process. Volatile metals will be managed as part of the off-gas stream; inorganics complicate off-gas treatment. The majority of metals will be retained in the treated residue and may require further treatment prior to disposal.

Thermal desorption will be retained for further consideration.

3.3 Evaluation of Retained Technologies

In **Section 3.2** technologies were presented and evaluated primarily with respect to applicability and technical implementability. In this Section remedial action technologies deemed applicable, implementable and retained for further consideration at the Site are evaluated in greater detail. The technologies are evaluated in terms of effectiveness, implementability (primarily constructability and administrative feasibility), and relative cost in accordance with USEPA guidance (USEPA, 1988).

Effectiveness

The retained technologies are further evaluated based upon their effectiveness relative to other processes within the same technology type. This evaluation focuses on:

- The potential effectiveness of the process option in handling the estimated areas or volumes of media and meeting the remedial action objectives.
- How proven and reliable the process is, with respect to Site contaminants and conditions, in meeting the RAOs from **Section 2.2**.

Implementability

Process options are evaluated for institutional implementability; technical implementability was evaluated during the preliminary evaluation. Institutional implementability includes the ability to obtain permits and approvals for on-site and off-site actions, the availability of disposal facilities (if required), and the availability of necessary equipment and skilled workers.

Cost

Process options are evaluated for relative cost. Options are eliminated if they are an order of magnitude or greater in cost and do not offer greater effectiveness, reliability, or environmental protection than other options. Costs are discussed only when the screening process is affected.

At this stage, in accordance with USEPA guidance (USEPA, 1988), the evaluation focuses on effectiveness factors, with less emphasis on implementability and cost evaluation. Additionally, a greater emphasis is placed on the institutional aspects of implementability rather than the construction aspects.

3.3.1 No Action

The "No Action" technology provides a baseline from which to evaluate the effectiveness of other alternatives in reducing the toxicity, mobility, or volume of COPCs, or potential exposure pathways to COPCs at the Site. The "No Action" technology would be readily implementable as previously discussed. Costs associated with the "No Action" technology include annual costs for maintenance and repair of paved surfaces, maintenance of fencing, site security operations, and costs associated with sample collection, laboratory analyses, and reporting of results.

Pursuant to the NCP and USEPA guidance for conducting RI/FS investigations, the "No Action" alternative must be developed and examined as a baseline of comparison for other remedial alternatives. This technology will be retained for further consideration.

3.3.2 Institutional and/or Engineering Controls

Institutional and/or engineering controls are physical or legal measures taken to deter Site access or direct exposure with impacted soil. Potentially implementable institutional controls include access restrictions, zoning restrictions, and site use limitations under the New York State Environmental Conservation Law (NYS ECL). Specific control measures are evaluated below.

Access Restrictions

Access restrictions effectively minimize the potential for direct contact with soil. Access restrictions include fencing and Site security operations.

Currently, access to Camp Summit is limited to adult inmates, facility personnel, and authorized visitors. Visitors must register at the gate and be accompanied by authorized personnel while at the facility. However, access to the Remedial Area is not restricted by any means. Chain-link fencing would be installed around the entire Remedial Area to limit access to impacted media. Postings regarding Site activities or access to the Site would also be feasible and appropriate.

Costs cannot be accurately assessed at this point in this FS report because measures to restrict Site access with respect to specific remedial alternatives are not defined; however, on an order-of-magnitude basis, the anticipated costs for access restrictions would be reasonable. Access restrictions will be retained for further consideration.

Restrictions Placed in the Title File

Restrictions placed in the title file can be used to effectively convey information regarding the remedial action. The NYSDEC would place an official record in the title file to regulate future site activities, thus controlling potential exposures to impacted media. These notifications could be placed on the title and all subsequent plot plans for the Site. This option could be implemented provided the appropriate legal actions are taken to prepare a negotiated agreement between the current property owner and local and state government agencies. Since the State of New York is the current property owner, this is a readily achievable action.

Costs cannot be accurately assessed at this time, but on an order-of-magnitude basis, the anticipated costs for a record to be placed in the title file would be reasonable. Restrictions placed in the title file are potentially applicable and will be retained for further consideration.

Zoning and Land Use Restrictions

Zoning restrictions could be used to regulate future site activity and thus control potential exposures to impacted media.

This option could be implemented at the local level; appropriate zoning actions would have to be adopted by local government agencies. Zoning restrictions may be more difficult to implement than title restrictions due to the local government approval process, which may require the creation of a special zoning district with specific building restrictions or prohibitions. Once created, this zoning district would require plan review and approval prior to any changes in site conditions that may impact potential exposures.

Costs cannot be accurately assessed at this time, but on an order-of-magnitude basis, the anticipated costs for implementing land use restrictions would be considered minimal relative to the overall estimated remedial costs. This process creates an additional level of inspection and enforcement to maintain the effectiveness of the implemented remedy. Therefore, zoning restrictions will be retained for further consideration.

3.3.3 Containment

As previously discussed, containment technologies determined to be technically implementable at the Site include surface water controls and capping systems.

Surface Controls

Surface controls are generally effective in minimizing erosion caused by surface water run-on and run-off. Surface controls would be used in conjunction with other remedial measures, depending on topography and other factors. The use of surface controls (vegetated areas, retention ponds, diversion channels, etc.) must be consistent with present site conditions and future land use scenarios. These options would employ standard construction practices, be effective when employed properly, and be relatively easy to implement.

The costs associated with surface controls vary depending upon the type and application of the controls. Surface controls will be integrated into any remedial alternative that involves regrading site topography. Specific controls will be identified in the remedial design.

Capping Systems

On-site consolidation at the Site may be accomplished through the use of a capping system. This system would reduce potential exposures to COCs by preventing direct contact with impacted media and contaminant infiltration into the groundwater. It would also provide a means of collecting off-gases generated during the degradation of PCP, if necessary.

In accordance with 40 CFR 268.48(d) and 6 NYCRR 370-376, on-site consolidation is not restricted under LDRs. LDRs are discussed in greater detail under on-site disposal in subsequent sections.

Capping process options retained for further consideration based upon their technical implementability include a low permeability cover system asphalt/concrete caps and multi layered caps.

- <u>Low Permeability Cover System:</u> The LPCS would consist of 1 to 2 feet of compacted clay (maximum remolded coefficient of permeability of 1 x 10^{-7} cm/s throughout its thickness) and a 6-inch layer of topsoil for vegetative support. An LPCS would effectively prevent direct contact with impacted soils and the migration of contaminants due to erosion. It would also prevent infiltration of precipitation into the impacted media. As with other containment options, the installation of an LPCS would be restrictive to some future land uses. Additionally, environmental stresses, settling, and erosion may lessen the effectiveness of a LPCS and render it susceptible to cracking. Thus, LPCSs require long-term maintenance and inspection. Institutional controls would be necessary to prevent damage to the cover. Construction of an LPCS is readily implementable; however; the availability of low permeability material required to achieve specifications may be prohibitive. Therefore, this process will not be retained.
- <u>Asphalt/Concrete Caps</u>: Asphalt/concrete caps would be effective in preventing the erosion of surface soils, exposure to impacted media.

  The Site's impacted areas could be covered with asphalt or concrete using conventional construction practices. Construction of an asphalt or concrete cap is readily implementable and available. The use of an asphalt/concrete cap would have to be carefully integrated with long-range development plans for the Site because caps may be restrictive for some future land uses. Institutional controls would be required to prevent damage to the cap. As with other capping options, asphalt/concrete caps require long-term maintenance. Asphalt/concrete caps would provide a degree of containment similar to an LPCS, but at a substantially increased cost. Thus, this process option will not be retained for further consideration.

- Multi Layered Caps: Multi layered cap systems are effective and are commonly used for capping hazardous waste landfills. A multi layered system meeting the substantive performance requirements of 6 NYCCR Part 360 would effectively prevent direct contact with impacted soil and the migration of contaminants due to erosion. One of the primary objectives of a multi layered cap is to prevent infiltration of rainwater through the subsurface soils.

  An impermeable multi layered cap system incorporating a synthetic liner, overlying a compacted soil layer, and overlain by a drainage soil layer and topsoil could be installed at the Site. Substantial design and construction engineering, Site preparation, quality control, and long-term maintenance would be inherent to the use of a multi layered cap.

  This solution would be similar to implement as an asphalt or concrete cap, but there are technical benefits of using an impermeable multi layered cap rather than an asphalt or concrete. Multi layered caps are less susceptible to cracking than asphalt/concrete caps as well as LPCSs and the multiple layers provide several opportunities to impede infiltration of precipitation. As with other capping options, a multi layered cap would have to be carefully integrated with the long-range development plans for the Site. Institutional controls would be required to prevent damage to a multi layered system.

  The cost of a multi layered system, considering material requirements, is similar to other capping options; however, multi layered caps provide a higher degree of containment. Multi layered caps will be retained for further consideration.

3.3.4 Excavation

The effectiveness of source removal would depend upon the location and depth of the impacted soil to be removed by excavation. Excavated materials could either be treated on-site or transported off-site for subsequent treatment/disposal. Treatment and disposal issues are further evaluated in disposal **Section 3.3.5**.

Excavations greater than 4 feet deep may require bracing and/or sloping to stabilize the sidewalls of the excavation. Groundwater is first encountered at the Site at depths ranging from 2 to 5 feet bgs. Depending on the depth to groundwater in the vicinity of the excavation, water may or may not be encountered.

Three zones were considered when evaluating the possibility of excavating materials at the Site: shallow excavations not requiring bracing, excavations above the water table requiring stabilization, and excavations below the water table requiring stablization and control of water.

- Shallow Excavation: Shallow excavations would be conducted in the top 3 feet of soil at the Site. They would not require bracing to complete and would be effective in removing impacted surface soils. Shallow excavations would not encounter water; therefore, no dewatering/water treatment-disposal-provisions were considered.

  Labor crews trained and certified in accordance with OSHA Standard 1910.120 would perform shallow excavations with standard construction equipment. In accordance with 29 CFR Part 1926 Subpart P, a Competent Person with the authority and knowledge to make decisions regarding health and safety issues must be designated on-site.

  Shallow excavation costs would depend upon the volume of material to be excavated from a given area and the presence/absence of underground utilities in the vicinity of the excavation. Shallow excavations would be the least costly of the excavation process options evaluated in this FS. Shallow excavations will be retained for further consideration.

- Excavations Above The Water Table Requiring Stabilization: Braced or sloped excavations above the water table can be completed with standard excavation and shoring equipment labor crews trained and certified in accordance with OSHA Standard 1910.120. In accordance with 29 CFR Part 1926 Subpart P of OSHA, a Competent Person with the authority and knowledge to make decisions regarding health and safety issues must be designated on-site. Excavation costs will be directly related to the depth of the excavation and the presence/absence of underground utilities and obstructions. Braced or sloped excavations above the water table will be retained for further consideration.

- Excavations Above the Water Table Requiring Stabilization: Braced and/or sloped excavations below the water table would be regarded as an effective method for removing impacted soil from the subsurface, however, several technical challenges associated with this category of excavations must be overcome to use this technology. These challenges are enumerated below and include:

  The risk of exposing construction workers, facility personnel, and authorized visitors to contaminants would be greater the deeper the excavation. The exposures are greater when compared to other remedial alternatives. Additionally, increased health and safety and engineering oversite will be required during these excavation processes.

  The act of dewatering for deep excavation may result in a large volume of water requiring treatment and disposal.

It is believed that the technical challenges associated with this option can be overcome, but with a decrease in effectiveness and an exponential increase in cost. Braced excavations below the water table will be retained for further consideration.

3.3.5 Disposal

Land disposal of waste material (on-site or off-site) is governed by its classification as hazardous or non-hazardous waste. In NYS, materials containing listed hazardous constituents are considered hazardous waste as well as wastes that are hazardous by virtue of their toxicity characteristics (as determined by pertinent testing standards). 6 NYCRR Part 371 defines the contaminated soils at the Site as F032 waste, which is described as “waste waters, process residue, preservative drippings, and spent formulations from wood preserving processes generated at plants currently or previously using PCP”. As such, all waste soils from the Site are considered listed waste and must be disposed of as a hazardous listed waste.

On-Site Disposal

On-site disposal includes on-site consolidation of waste material from the Site into an engineered consolidation area located within the remedial area. To dispose of a restricted waste on-site, LDRs must be addressed. 40 CFR 268.48 and 6 NYCRR 370-376 defines active waste management when placement of a hazardous or restricted material occurs. Under these regulatory requirements, placement occurs when a restricted waste is moved from an area of concern into or onto a land disposal unit. Placement does not occur when restricted waste is treated in-situ, capped in place, or consolidated within an area of concern. If placement occurs, LDRs are applicable and must be addressed.

Because the entire Site is considered an area of concern, placement would not occur under this option, therefore, LDRs are not applicable.

Although this option would not reduce the volume or toxicity of the material, it would provide containment and effectively limit exposure to potential receptors. On-site disposal costs would depend on the volume of waste that would require excavation and consolidation, and the design of the consolidation area. In general, on-site disposal in a consolidation area is less costly than off-site disposal.

Off-Site Disposal

Off-site disposal would include the transportation and disposal of the waste material in an appropriate facility. As described above, the waste material from the Site is a listed hazardous waste and therefore must be disposed of in an appropriate hazardous waste landfill. Prior to disposal, the soil may require treatment to meet LDR standards. The alternative LDR treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, 40 CFR 268.49(c) requires that soil impacted with regulated constituents must be treated to a level 10 times the Universal Treatment Standards (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on the data collected to date it is anticipated that the soil will require treatment.

This disposal process would be effective in removing the COPCs from the Site and would limit long-term exposure to potential receptors, however, an increased short-term risk of exposure may be posed to the workers during excavation as well as to potential receptors along the transportation route. Depending on the quantities of material to be transported, the result of health risks may exceed those posed by leaving the material in place or disposing of it on-site.

Disposal costs of hazardous wastes are significantly higher than off-site disposal as non-hazardous or on-site disposal. Costs for transportation, treatment to LDR standards (LDR standards define the level to which soils must be treated prior to land disposal), and disposal can range from approximately $350 to $600 per ton. Off-site disposal will be retained for further consideration.

Also of note, water generated during dewatering of the excavation will be transported off-site for subsequent treatment and disposal. Depending on the overall quantity of groundwater requiring treatment, it may be worthwhile to construct a temporary treatment system on-site.

3.3.6 Ex-Situ Treatment

Thermal Desorption

Thermal desorption is a physical separation process that volatilizes contaminants. In this process, soil is heated and agitated in a chamber, causing water and organic contaminants to be vaporized. A gas or vacuum system transports the volatilized water and organic contaminants to a gas treatment system.

Factors that may limit the applicability or effectiveness of thermal desorption include:

- Treated soil may no longer be able to support biological activity;
- High clay, humic material, or moisture content may increase reaction time as a result of binding of contaminants;
- Dust and organic matter in the soil increases the difficulty of treating off-gas;
- Dewatering may be necessary to achieve acceptable soil moisture content levels;
- High abrasive feed may damage the processor unit; and
- Debris greater than 60 mm in diameter typically must be removed prior to processing.

As indicated in **Section 3.2.7**, some metals in the feed will be carried over into the off-gas treatment system, while the majority of metals will be retained in the treated soil. With regard to metals in the off-gas, a material balance for metals should be conducted by bench scale testing to determine if the concentrations will exceed regulated stack emission values, as well as to facilitate successful design of the off-gas treatment and handling system. Wet scrubbers can be utilized to capture the volatilized metals so that they can be removed and disposed of properly in solid form.

With regard to metals in the treated soil, if the total or leachable concentrations in the treated soil exceed regulatory limits, backfilling or disposal at a landfill may not be an option unless further treatment is performed. TCLP testing would be performed to determine if further treatment of the soil is necessary, though, based on observed concentrations, failure is not anticipated. Further treatment typically involves using stabilization techniques to chemically immobilize the inorganics to prevent leaching.

The operation and maintenance duration depends on the processing rate of the thermal treatment unit and the volume of soil. The processing rate is dependent upon the contaminant type and soil characteristics. The throughput of a typical mobile unit ranges from 50 to 400 cubic yards per day (NFESC, 2002); the dense soils at the Site will likely cause the average daily throughput to be on the low end of this range. Additionally, the COPCs at the Site may require longer treatment times. Costs for a mobile thermal treatment unit typically range from $95 to $195 per cubic yard (NFESC, 2002).

While thermal desorption is capable of treating the principal contaminants, there are several limitations that render this technology unsuitable for this particular Site. The dense, clay soil found at the Site is not favorable to ex-situ thermal desorption, as it is more difficult to break apart and requires a longer retention time. Metals in the soil will complicate off-gas treatment. Further, it will be difficult to obtain a power source at the Site. The overall expense associated with this technology will be significantly greater than several of the other options, which will provide comparable protection of human health and the environment. Consequently, ex-situ thermal desorption will not be retained for further consideration.

3.4 Summary

In this section, a wide range of potentially applicable remedial technologies for each GRA were developed, screened, and evaluated for the Site based upon their effectiveness, implementability, and cost. These technologies include an assemblage of the most widely used processes for the COPCs and impacted media identified in the RAOs for the Site. Technologies that were retained from this evaluation for assemblage into site-wide remedial alternatives are summarized in **Table 9**.

4.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES

In this section, the technologies retained in **Section 3.3** are assembled into remedial alternatives designed to achieve the RAOs discussed in **Section 2.2**. The RAOs are goals developed to protect human health and the environment. The remedial alternatives presented here in are assembled primarily to address the soil at the Site. Since impacted soil at the Site is believed to be a continuing source of groundwater contamination, addressing the soil will also represent a long term benefit for the groundwater at the Site.

The range of alternatives for the Site has been developed within the framework of the regulatory guidelines outlined in the RI/FS Guidance Document (USEPA 1988).

A brief discussion of the alternatives developed, as well as the rationale behind their development, is presented in the following sections. The detailed evaluation of the retained alternatives is presented in **Section 5.0**. A comparative analysis of retained alternatives is presented in **Section 6.0**. The recommended remedial alternatives are presented in **Section 7.0**.

4.1 Alternative 1 – No Action

The No Action alternative has been included, under the NCP requirements, to provide a baseline by which to compare other alternatives. Under this alternative soil would not be actively treated and the Site conditions would remain the same. Property maintenance (security, fence repairs, etc.) currently exists and would continue to exist as part of the daily operations of Camp Summit as an incarceration facility. However, access restrictions and security operations do not currently exist at the Site to prevent contact with impacted media. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

4.2 Alternative 2 – Limited Action

Under this alternative institutional and engineering controls would be used to address soil impacts at the Site. An initial round of groundwater sampling of all wells would be completed to establish base line groundwater parameters. Property maintenance currently exists and would continue to exist as part of the daily operations of Camp Summit as an incarceration facility. A 6-foot high chain-link fence and gate would be placed around the perimeter of the impacted areas, specifically to restrict access to impacted media. Easements and official records would be placed in the title file that would limit future land use or prohibit activities that may increase risk of exposure to Site contaminants by the NYSDEC. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

Effectiveness

Currently, access to Camp Summit is limited to inmates, facility personnel, and authorized visitors. However, the impacted areas of the Site are not presently restricted by any means. Under this alternative a 6-foot high chain-link fence would be installed to impede persons and animals from directly contacting contaminated media. Although, this alternative prohibits contact with impacted surface soils, it is not protective of the groundwater system at the Site.

Implementability

This alternative is easily implemented. Institutional controls regarding Site access are readily implementable and, as Site ownership belongs to the State of New York, title restrictions and easements would be easily attained.

Cost

For the purposes of alternative screening, the net present worth of this alternative was estimated to be within the same order of magnitude as Alternative 1.

Conclusion

As this alternative does not actively address impacted Site soils, there will be a continued source of groundwater contamination at the Site. Therefore, this alternative will not be retained for further detailed evaluation.

4.3 Alternative 3 – Excavation and Off-Site Disposal

In this treatment alternative, the PCP and dioxin impacts in the soil would be addressed by excavation and off-site disposal at a permitted disposal facility. Specifically, the source areas delineated in **Figures 12** through **14** would be excavated using conventional methods and equipment. The former railroad slab and the Buildings 48, 49, and 50 slabs/foundations would be demolished as part of this remedial alternative.

The nature and extent of soil impacts was described in **Section 1.3.3** and the areas requiring remedial action were identified in **Section 2.2.1**. In some cases, the areas of surface and subsurface soil impacts overlap. Consequently, as illustrated in **Figures 12** through **14**, soils would be excavated as follows to remove the impacted soils above TAGM 4046 guidance values.

Area	Vicinity of Impact	Depth (feet bgs)	Approximate Volume (cubic yards)
A	Area GPR 1, TP-1	6	1,400
B	Area GPR 2, TP-3	10	75
C	Wood Storage Area	3	235
D	Wood Storage Area	3	45
E	Building 50	3	250
F	Building 49	6	1,500
G	Railroad Slab	8	3,000
H	Building 48	6	1,000
I	TP-2	4	400
J	TP03-9/10	6	840
K	STP 17/18/19	3	410
L	STP 21/22	3	400
M	TP03-7/TP12	6	800
N	SS 37/38	3	250

The total estimated removal volume of impacted soil is approximately 10,605 cubic yards, measured in place. A 20% bulking factor yields roughly 12,726 cubic yards of soil to be managed. Additionally, stabilization of saturated soils (i.e., soils removed from beneath the elevation of the groundwater table – approximately 1,800 cubic yards) would be necessary (estimated 30% by volume), which would require approximately 540 cubic yards of ash or similar product. The building slabs and foundations removed and crushed as part of this remedial alternative would produce roughly 140 cubic yards of waste that would require disposal. Consequently, the total volume that would require off-site disposal is approximately 13,406 cubic yards.

Dewatering operations may be required during excavation operations as the water table typically occurs between 5 to 6 feet below ground surface (bgs). Site geologic conditions indicate that groundwater exists within the overburden sediments across the Site. Water generated during excavation activities could be managed with a submersible pump and either 1) transferred to frac tanks for storage and subsequent off-site transportation for treatment and disposal or 2) treated on-site (using carbon or similar treatment methodology) and discharged, with the approval of the NYSDEC. Alternatively, groundwater recharge (and ultimately groundwater flow through the excavation area) could be reduced through the installation of a properly sized diversion channel around the upgradient portion of the excavation to redirect surface and groundwater flow around the areas requiring excavation.

The excavation would be performed in phases to minimize exposure and construction hazards. Construction workers would wear adequate personal protective equipment (PPE). No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas. Sloping or benching will be utilized to achieve stability of excavation sidewalls. Excavated materials would be transported to a permitted off-site treatment and disposal facility. The excavated areas would be backfilled with clean fill from an off-site source.

6 NYCRR Part 371 defines the contaminated soils as hazardous (F032) waste. As such, soils would have to be disposed of in an appropriate hazardous waste landfill and may require treatment prior to disposal. The alternative land disposal restriction (LDR) treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, according to 40 CFR 268.49 (c), soils impacted with regulated constituents must be treated to a level of 10 times the Universal Treatment Standard (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on existing data collected from the Site, concentrations of regulated constituents are below 10 times the UTS, with the exception of PCP and lead. One soil sample (TP-1) exceeded 150 ppm for lead (10 times the UTS for lead). Soil samples exceeded 74 ppm PCP (10 times the UTS for PCP) in several areas of the Site; the maximum concentration of PCP (820 ppm) was observed in soil boring B7. Accordingly, treatment (i.e., incineration) of soils prior to off-site land disposal is expected to be required.

Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years. Institutional controls would remain in effect to limit Site access and usage.

Effectiveness

This alternative is effective in providing a long-term remedy for PCP and dioxin impacted soils at the Site. Also, by removing the source of continued groundwater contamination, this remedial alternative would be effective in protecting the groundwater at the Site. Based on the Preliminary Investigation data and the Remedial Investigation data, PCP and dioxin source areas would be excavated as depicted on **Figures 12** through **14**. The excavation and off-site disposal of the impacted soils would remove the on-site volume, toxicity, and mobility of the COPCs.

Implementability

This alternative could be implemented using conventional construction equipment and construction practices. Limitations to this alternative could include:

- Geotechnically unstable soil – No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas; therefore, excavation sidewalls would be managed by either sloping or benching.
- Obstruction by subsurface boulders – It is anticipated that subsurface boulders will be encountered during excavation operations; however, this limitation is manageable.
- Building or foundation structures – The slabs and foundations under Buildings 48, 49, and former Building 50 will be removed and disposed as part of this remedial alternative. These structures are not expected to impede excavation and disposal operations.
- Groundwater management – Excavation dewatering in several of the proposed excavation areas will likely be necessary, as the groundwater table exists at 5 – 6 feet below the ground surface across the Site. Groundwater recharge to the Site is variable and seasonal. If a sand lens is encountered during excavation operations, it could yield significant amounts of groundwater that would require storage, treatment, and disposal. Management of substantial amounts of groundwater is achievable, but at decreased excavation efficiency. As an alternative to dewatering, a diversion trench could be placed upgradient of the excavation areas to redirect surface and ground water around the excavation areas.
- Hydrostatic failure of the excavation – Artesian pressure and other variables that could cause a hydrostatic failure are not likely to exist at the Site.
- Storage piles – Excavation may also be limited by the need to stage and characterize material prior to transport to various facilities based on contaminant concentration. If this limitation does exist, it is manageable.

Excavation and transport equipment, clean fill, and other items associated with this alternative are readily accessible. Since potential limitations are considered to be manageable, this remedial alternative is considered to be implementable.

Cost

For the purposes of alternative screening, the net present worth of this alternative was estimated to be two orders of magnitude greater than Alternatives 1 and 2 one order of magnitude greater than Alternative 5 and within the same order as Alternative 4.

Conclusion

The excavation and off-site disposal alternative is effective in removing impacted soils from the Site, thus, eliminating a continued source of groundwater contamination. This alternative is implementable and will be retained for further detailed evlaution.

4.4 Alternative 4 – Excavation and On-Site Consolidation with Limited Off-Site Disposal

Under this alternative, the PCP and dioxin impacts to soil would be addressed through excavation and a combination of on-site consolidation and off-site disposal. The majority of the excavated material would be placed within an on-site consolidation area and a limited amount of the material would be disposed off-site. Segregation of material for off-site disposal would be based upon visual impacts to the soil (i.e., staining, oily sheens, etc.).

The nature and extent of soil impacts was described in **Section 1.3.3** and the areas requiring remedial action were identified in **Section 2.2.1**. This alternative consists of excavating the areas identified in **Figures 12** through **14**, segregating materials for off-site disposal, and placing the remainder in the consolidation area identified in **Figure 15**. The former railroad slab, and the Buildings 48, 49, and 50 slabs/foundations would be demolished as part of this remedial alternative. The concrete rubble generated during the demolition of these building slabs and foundations would also be placed in the consolidation area.

As illustrated in **Figures 12** through **14**, soils would be excavated as follows.

Area	Vicinity of Impact	Depth (feet bgs)	Approximate Volume (cubic yards)
A	Area GPR 1, TP-1	6	1,400
B	Area GPR 2, TP-3	10	75
C	Wood Storage Area	3	235
D	Wood Storage Area	3	45
E	Building 50	3	250
F	Building 49	6	1,500
G	Railroad Slab	8	3,000
H	Building 48	6	1,000
I	TP-2	4	400
J	TP03-9/10	6	840
K	STP 17/18/19	3	410
L	STP 21/22	3	400
M	TP03-7/TP12	6	800
N	SS 37/38	3	250

The total estimated removal volume of impacted soil is approximately 10,605 cubic yards, measured in place. A 20% bulking factor yields roughly 12,726 cubic yards of soil to be managed. Additionally, stabilization of saturated soils (i.e., soils removed from beneath the elevation of the groundwater table – approximately 1,800 cubic yards) would be necessary (estimated 30% by volume), which would require approximately 540 cubic yards of ash or similar product. The building slabs and foundations removed and crushed as part of this remedial alternative would produce roughly 140 cubic yards of waste that would require disposal. Based upon review of the available Site data, it is estimated that approximately 2,800 cubic yards of impacted soil would be segregated and considered for disposal off-site in a NYSDEC permitted disposal facility. Consequently, the total volume of material that would be placed within the on-site consolidation area is approximately 9,926 cubic yards.

Dewatering operations may be required during excavation operations as the water table typically occurs between 5 to 6 feet bgs. Water generated during excavation activities could be managed with a submersible pump and either 1) transferred to frac tanks for storage and subsequent off-site transportation for treatment and disposal or 2) treated on-site (using carbon or similar treatment methodology) and discharged, with the approval of the NYSDEC. Alternatively, groundwater recharge (and ultimately groundwater flow through the excavation area) could be reduced through the installation of a properly sized diversion channel around the upgradient portion of the excavation to redirect surface and groundwater flow around the areas requiring excavation.

The excavation would be performed in phases to minimize exposure and construction hazards. Construction workers would wear adequate personal protective equipment (PPE). No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas. Sloping or benching will be utilized to achieve stability of excavation sidewalls. Excavated materials would be transported to a permitted off-site treatment and disposal facility. The excavated areas would be backfilled with clean fill from an off-site source.

The on-site consolidation area will be constructed on a prepared subgrade. A multi layer geomembrane cap would be installed over the consolidated material resulting in the configuration shown in Figure 15. This multi layer cap would eliminate the potential for direct contact with impacted media and prevent rainwater infiltration into the consolidation area. Multi layer geomembrane caps typically consist of the following components:

- Vegetative Layer – approximately 6 inches of topsoil that serves to reduce erosion and infiltration of precipitation;
- Drainage Layer – approximately 24 inches of porous material (sand) that enhances lateral drainage of any precipitation that infiltrates through the vegetative layer and minimizes liquid head build-up on the underlying geomembrane; the vegetative and drainage layers help protect the underlying barrier layers from the environmental stresses of wetting/drying and freezing/thawing;
- Synthetic Barrier – low permeability geomembrane (at least 40 mil thickness) that represents the final impedance to precipitation infiltration; and
- Low Permeability Layer – a geosynthetic clay liner consisting of sodium bentonite bound between two layers of needle-punched geotextile to prevent infiltration into the impacted media in the event that the synthetic barrier develops a leak or tear.

A preliminary design of the consolidation area is depicted in **Figure 15**. The maximum sideslopes are 4H:1V and the minimum slope is 2%. A minimum separation of 5 feet would be maintained between the base of the consolidation area and the expected elevation of the groundwater table. The design determined that, in order to contain 9,926 cubic yards of impacted material, the top of material elevation would be approximately 12 feet above the existing grade. The final grade of the consolidation area would not crest to a plateau, but would rise to a peak.

All future Site development would be required to consider the requirements of the consolidation area in their design. Institutional controls would be implemented to limit Site access and usage. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

The approximate 2,800 cubic yards that would be disposed off-site in a permitted disposal facility is regulated by 6 NYCRR Part 371, which defines the contaminated soils as hazardous (F032) waste. As such, these soils would have to be disposed of in an appropriate hazardous waste landfill and may require treatment prior to disposal. The alternative land disposal restriction (LDR) treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, according to 40 CFR 268.49 (c), soils impacted with regulated constituents must be treated to a level of 10 times the Universal Treatment Standard (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on the data collected from the Site to date, concentrations of regulated constituents are below 10 times the UTS, with the exception of PCP and lead. One soil sample (TP-1) exceeded 150 ppm for lead (10 times the UTS for lead). Soil samples exceeded 74 ppm PCP (10 times the UTS for PCP) in several areas of the Site; the maximum concentration of PCP (820 ppm) was observed in soil boring B7. Accordingly, treatment (i.e., incineration) of these soils prior to off-site land disposal is expected to be required.

Effectiveness

This alternative would provide an effective and long-term remedy for the PCP and dioxin impacted soil at the Site. PCP and dioxin source areas would be excavated and contained on-site within an area of consolidation as depicted on **Figure 15.** Under this alternative, the total volume of impacted soil is consolidated within a manageable unit that effectively prevents direct exposure to contaminants. It would also serve to impede the potential for transport of COPCs into groundwater by inhibiting the infiltration of precipitation and by preventing direct contact of the impacted soils with groundwater. The material transported off-site for disposal would effectively reduce the overall volume, toxicity, and mobility of the impacted material that is to remain on-site.

Implementability

This alternative is implementable using conventional construction equipment and construction practices. Special care would have to be given from a construction quality assurance/quality control standpoint to ensure that proper construction and testing procedures are implemented. The limitations discussed in **Section 4.3** regarding the implementation of excavation operations would also apply to this alternative. As an integral component of on-site consolidation and capping, the area of consolidation would have to be carefully integrated into the long-range development plans for the Site, as it would limit future land uses. Long-term maintenance and monitoring would be necessary to ensure the integrity and effectiveness of the consolidation area. Institutional controls would be implemented to limit land use activities that may compromise the condition of the area of consolidation. Transportation and off-site disposal of a portion of the total volume of impacted material is readily implementable.

Cost

For the purposes of alternative screening, the net present worth of this alternative was estimated to be one order of magnitude less than Alternative 3, approximately one order of magnitude greater than Alternatives 1 and 2, one order of magnitude greater than Alternative 5, and in the same order of magnitude as Alternative 3.

Conclusion

This alternative would be effective in reducing risks to human health and the environment by consolidating the impacted soils within a manageable unit that prevents direct exposures to contaminants and by transporting a portion of the total volume of impacted material to a permitted off-site disposal facility. It is readily implementable and will be retained for detailed evaluation.

5.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

In this section, the three alternatives for soil introduced and retained for further consideration in **Section 4.0** are evaluated using the seven criteria recommended by NYSDEC TAGM 4030 and the National Contingency Plan (USEPA, 1988). The three alternatives that will be evaluated in this section are:

- Alternative 1 – No Action
- Alternative 3 – Excavation and Off-Site Disposal
- Alternative 4 – Excavation and On-Site Consolidation with Limited Off-Site Disposal

This evaluation provides information to facilitate the comparison of the alternatives and the selection of a final remedy. The following criteria are used in the detailed analysis:

- Overall Protection of Human Health and the Environment – This criterion is concerned with the overall protection of human health and the environment, which would be achieved by eliminating, reducing, or controlling Site risks posed through the exposure pathways. This criterion includes direct contact risks, inhalation risks, and potential risks to ecosystems.
- Compliance with SCGs, ARARs and Other Regulations – This criterion evaluates the compliance of each alternative with SCGs, ARARs, and other regulations. The three regulatory categories that will be considered are chemical specific, location-specific, and action-specific SCGs and ARARs. These regulations are discussed in detail in **Section 2.1**.
- Short-term Effectiveness – The effectiveness of an alternative in protecting human health and the environment during construction and implementation of the remedial alternative is assessed under short-term effectiveness. This criterion encompasses concerns about short-term impacts, as well as the length of time required to implement the alternative. Factors such as cross-media impacts, the need to transport impacted material through populated areas, current Site operations, and the potential disruption of neighborhoods and ecosystems may be pertinent. Due to the affinity of COPCs to preferentially adsorb to soil organics, excavation remedies that release dust could create potential short-term risks through the inhalation pathway. The health and safety issues associated with the implementation of any remedial action involving excavation and transport of soil are included under this criterion.
- Long-term Effectiveness and Permanence – The long-term effectiveness of a remedial alternative is evaluated under this criterion with particular focus on the residual contamination remaining in a particular medium after completion of the selected alternative and the degree to which a remedial measure provides a

permanent remedy for the Site. The long-term integrity of containment options is also evaluated.

- Reduction in Mobility, Toxicity, and Volume – This criterion evaluates contaminant reductions with respect to concentration and/or mass based on a percentage or generalized estimate and the mass of contaminants or the volume of impacted media that will be destroyed or contained through treatment. This criterion also addresses potential decreased risks associated with changes in the mobility, toxicity, and volume. For this Site, the current potential risk levels are low for all impacted media. However, the alternatives have been designed to further reduce potential risk and to meet remedial objectives.
- Implementability – This criterion involves an evaluation of the alternative with respect to performance, reliability, and technical implementability. Performance and reliability focus on the ability of the alternative to meet specific goals or remedial levels. The technical implementability of an alternative addresses construction and operation with regard to site-specific conditions, including the operational impact of the existing on-site activities and the ability to safely implement the alternative. Administrative implementability focuses on the time and effort required in obtaining appropriate approvals and addressing other administrative issues.
- Cost – Estimated costs are included for each alternative. These costs may include design and construction costs, remedial action O&M costs, other capital and short term costs, and costs of field and project management associated with the implementation of the remedial alternatives. Estimates of permitting costs have also been included where appropriate. Costs are also calculated on a present worth basis, assuming a 5-year or 30-year period and a discount rate of 5%. Detailed cost estimates for each alternative evaluated are provided in **Appendix C**.

The analysis is three tiered. The first tier is comprised of threshold factors 1) overall protection of human health and the environment, and 2) compliance with SCGs, ARARs and other regulations. Any selected remedy must result in overall protection of human health and the environment. Similarly, the SCGs, ARARs, and other regulations must be complied with unless there is an overriding reason why compliance is not possible. The second tier is comprised of the remaining five criteria from the list above. The relative merits and problems associated with meeting these factors must be balanced in arriving at a remedy. The issues associated with each of these seven criteria are briefly described below. The third tier is comprised of modifying criteria; agency and community acceptance. Satisfaction of these criteria will be determined after submittal of this report; community acceptance will be addressed following the submittal of this report during the public comment period for the proposed plan. Thus, these criteria are not evaluated in this section.

5.1 Alternative 1 – No Action

The No Action alternative has been included, under the NCP requirements, to provide a baseline by which to compare other alternatives. Under this alternative soil would not be actively treated and the Site conditions would remain the same. Property maintenance (security, fence repairs, etc.) currently exists and would continue to exist as part of the daily operations of Camp Summit as an incarceration facility. However, access restrictions and security operations do not currently exist at the Site to prevent contact with impacted media. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

5.1.1 Overall Protection of Human Health and the Environment

This alternative would not reduce potential risks to human health or the environment for future use scenarios.

5.1.2 Compliance with ARARs

Under this alternative, soil with concentrations exceeding SCGs would remain available for direct contact and for potential contamination of groundwater. Site cleanup objectives would not be achieved for future use scenarios.

5.1.3 Short-term Effectiveness

Minimal disturbance to the Site would occur under this alternative. Disturbances would occur primarily during sampling activities, thus presenting a limited short-term risk to personnel collecting, transporting, and analyzing the samples. Since no construction activities would be performed, no short-term risks to inmates, facility personnel, authorized visitors, the community, or the environment would be presented as a result of such activities.

5.1.4 Long-term Effectiveness and Permanence

The long-term risk of direct contact with the impacted soil is not reduced under this alternative. Further, impacted soil would remain a potential source of groundwater contamination. Redevelopment of the Site and changes in its usage scenario could present an increased potential for risks to human health and the environment.

5.1.5 Reduction of Toxicity, Mobility, and Volume

The toxicity of impacted media would gradually decrease over an extended period of time through natural degradation and attenuation of PCP; however, dioxin would not be degraded. Although the rate of PCP degradation at the Site has not been modeled, based on the available data it is reasonable to expect that this process may take longer than 30 years, which is often used as the time frame of comparison for CERCLA remedies. This alternative would not provide reduction in the mobility of COPCs or the volume of impacted media.

5.1.6 Implementability

This alternative would be readily implementable at the Site. This technology would require minimal planned or implemented activities. Suppliers and materials to complete groundwater monitoring are widely available with no anticipated delays in implementation.

5.1.7 Cost

The estimated present worth of this remedial alternative is approximately $450,257. A breakdown of the cost estimate for this alternative is included in **Appendix C**.

5.1.8 Summary

Under this alternative, the Site would be left in its present condition. This alternative does not address the RAOs nor is it compatible with possible future development uses at the Site. Pursuant to the revised National Contingency Plan (NCP, 1990) and USEPA guidance (USEPA, 1988), the No Action alternative must be developed and assessed as a potential remedial action. The No Action alternative constitutes the baseline by which the other remedial alternatives are compared; therefore, this alternative will be retained, for comparative purposes, throughout the remainder of this FS report.

5.2 Alternative 3 – Excavation and Off-Site Disposal

Under this treatment alternative, the PCP and dioxin impacts in the soil would be addressed by excavation and off-site disposal at a permitted disposal facility. Specifically, the source areas delineated in **Figures 12** through **14** would be excavated using conventional methods and equipment. The former railroad slab and the Buildings 48, 49, and 50 slabs/foundations would be demolished as part of this remedial alternative.

The nature and extent of soil impacts was described in **Section 1.4.3** and the areas requiring remedial action were identified in **Section 2.2.1**. In some cases, the areas of surface and subsurface soil impacts overlap. Consequently, as illustrated in **Figures 12** through **14**, soils would be excavated as follows to remove the impacted soils above TAGM 4046 guidance values.

Area	Vicinity of Impact	Depth (feet bgs)	Approximate Volume (cubic yards)
A	Area GPR 1, TP-1	6	1,400
B	Area GPR 2, TP-3	10	75
C	Wood Storage Area	3	235
D	Wood Storage Area	3	45
E	Building 50	3	250
F	Building 49	6	1,500
G	Railroad Slab	8	3,000
H	Building 48	6	1,000
I	TP-2	4	400
J	TP03-9/10	6	840
K	STP 17/18/19	3	410
L	STP 21/22	3	400
M	TP03-7/TP12	6	800
N	SS 37/38	3	250

The total estimated removal volume of impacted soil is approximately 10,605 cubic yards, measured in place. A 20% bulking factor yields roughly 12,726 cubic yards of soil to be managed. Additionally, stabilization of saturated soils (i.e., soils removed from beneath the elevation of the groundwater table – approximately 1,800 cubic yards) would be necessary (estimated 30% by volume), which would require approximately 540 cubic yards of ash or similar product. The building slabs and foundations removed and crushed as part of this remedial alternative would produce roughly 140 cubic yards of waste that would require disposal. Consequently, the total volume that would require off-site disposal is approximately 13,406 cubic yards.

Dewatering operations may be required during excavation operations as the water table typically occurs between 5 to 6 feet below ground surface (bgs). Site geologic conditions indicate that groundwater exists within the overburden sediments across the Site. Water generated during excavation activities could be managed with a submersible pump and either 1) transferred to frac tanks for storage and subsequent off-site transportation for treatment and disposal or 2) treated on-site (using carbon or similar treatment methodology) and discharged, with the approval of the NYSDEC. Alternatively, groundwater recharge (and ultimately groundwater flow through the excavation area) could be reduced through the installation of a properly sized diversion channel around the upgradient portion of the excavation to redirect surface and groundwater flow around the areas requiring excavation.

The excavation would be performed in phases to minimize exposure and construction hazards. Construction workers would wear adequate personal protective equipment (PPE). No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas. Sloping or benching will be utilized to achieve stability of excavation sidewalls. Excavated materials would be transported to a permitted off-site treatment and disposal facility. The excavated areas would be backfilled with clean fill from an off-site source.

6 NYCRR Part 371 defines the contaminated soils as hazardous (F032) waste. As such, soils would have to be disposed of in an appropriate hazardous waste landfill and may require treatment prior to disposal. The alternative land disposal restriction (LDR) treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, according to 40 CFR 268.49 (c), soils impacted with regulated constituents must be treated to a level of 10 times the Universal Treatment Standard (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on existing data collected from the Site, concentrations of regulated constituents are below 10 times the UTS, with the exception of PCP and lead. One soil sample (TP-1) exceeded 150 ppm for lead (10 times the UTS for lead). Soil samples exceeded 74 ppm PCP (10 times the UTS for PCP) in several areas of the Site; the maximum concentration of PCP (820 ppm) was observed in soil boring B7. Accordingly, treatment (i.e., incineration) of soils prior to off-site land disposal is expected to be required.

Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years. Institutional controls would remain in effect to limit site access and usage.

5.2.1 Overall Protection of Human Health and the Environment

This alternative would provide overall protection of human health and the environment by mitigating the potential for exposures to surface and subsurface soil above the SCGs. Additionally, this alternative would remove a potential source of groundwater contamination.

5.2.2 Compliance with ARARs

This alternative would eliminate exposure to impacted soils exceeding the SCGs through the excavation and off-site disposal of soil exceeding the SCGs for PCP and dioxin. During construction activities, air pollution regulations would be complied with by controlling fugitive dust and emissions. Since the excavated soil would be transported off-site (i.e., outside the area of concern) for disposal, LDRs would be applicable to this alternative. In general, this alternative actively addresses the primary sources of soil and potential groundwater contamination, and hence, is consistent with SCGs that regulate soil and groundwater quality.

5.2.3 Short-Term Effectiveness

During the implementation of this remedial alternative, an increased risk of exposure would be posed to on-site construction workers and the community. Risks to workers performing remedial and monitoring activities under this alternative could be controlled and mitigated by the implementation of proper health and safety measures, including engineering controls (periodic water spray or the application of foam), air monitoring and use of PPE, in accordance with OSHA 1910.120. Even with proper engineering controls, short-term mobility of COPCs would be increased through vapor and dust inhalation pathways.

Truck traffic on the local roads would increase due to construction vehicles entering and leaving the Site. Traffic control measures (e.g., signage and construction entrances) would be implemented as needed to limit and manage the increased traffic. Minimal short-term risks to the communities surrounding the transportation routes exist during the excavation and transportation of waste and clean soil by trucks.

Risks to the environment resulting from implementation of this alternative include the potential for dust generation and sediment transport during excavation of the contaminated soil. Appropriate use of erosion and sediment control measures, such as silt fence/hay bale barriers, tarpaulins over material stockpiles, and dust suppression actions would mitigate these risks.

5.2.4 Long-Term Effectiveness

This remedial alternative would provide a permanent and effective solution to soil contamination exceeding the SCGs. Soil at the Site that exceeds the SCGs would be removed from the Site and transported to a secured, permitted waste disposal facility, thereby providing a permanent solution to the potential source of contamination to the groundwater. The excavation and off-site disposal of impacted soils above SCGs would reduce the on-site volume, toxicity, and mobility of the COPCs.

5.2.5 Reduction of Toxicity, Mobility, and Volume

There would not be any expected reduction in the volume, toxicity, or mobility of the COPCs excavated and disposed of off-site. Off-site disposal would reduce the on-site volume, toxicity, and mobility of the soil containing COPCs.

5.2.6 Implementability

This alternative could be implemented using conventional construction equipment and construction practices. Limitations to this alternative could include:

- Geotechnically unstable soil - No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas; however, the excavations would be benched as a precautionary measure.
- Obstruction by subsurface boulders – Subsurface boulders are possible. If this limitation does exist, it would be manageable.
- Building or foundation structures – The slab under the former treatment building would be removed and disposed as part of this remedial alternative. Similar structures are not expected to impede excavation and disposal operations.
- Groundwater management – Some type of dewatering of the excavation areas would likely be necessary, as the groundwater table exists at 5 – 6 feet bgs across the Site. Groundwater recharge to the Site is variable and seasonal. If a sand lens is encountered during excavation operations, it could yield significant amounts of groundwater that would require storage, treatment, and disposal. Management of substantial amounts of groundwater is achievable, but at decreased efficiency. As an alternative to dewatering, a diversion trench could be placed upgradient of the excavation areas to redirect surface and ground water around the excavation areas.
- Hydrostatic failure of the excavation – Artesian pressure and other variables that could cause a hydrostatic failure are not likely to exist at the Site.
- Storage piles – Excavation may also be limited by the need to stage and characterize material prior to transport to various facilities based on contaminant concentration. If this limitation does exist, it would be manageable.

Excavation and transport equipment, clean fill, and other items associated with this alternative are readily accessible. This alternative is implementable.

5.2.7 Cost

Costs associated with this alternative include equipment, labor, oversight, transport, and disposal fees. The estimated net present worth of this remedial alternative is approximately $17,249,695. A breakdown of the cost estimate for this alternative is provided in **Appendix C**.

5.2.8 Summary

This alternative would provide an effective, long-term remedy for PCP and dioxin impacts in the soil. Off-site disposal of the impacted soil exceeding SCGs would reduce on-site mobility, toxicity, and volume of PCP and dioxins. Disposal fees for F032 class wastes are significant, particularly when treatment prior to land disposal is necessary. Further, significant quantities of impacted water could be generated during excavation activities that would require storage, treatment, and disposal.

Excavation activities and off-site disposal of PCP and dioxin impacted soils may pose some technical challenges, while also posing some short-term risk to the construction workers and surrounding occupants of the facility. Short-term risks to workers could be mitigated through the utilization of engineering controls, air monitoring equipment, and PPE.

This remedial alternative will be retained for further consideration because it achieves all of the remedial action objectives and the short-term risks associated with its implementation would be manageable.

5.3 Alternative 4 – Excavation and On-Site Consolidation with Limited Off-Site Disposal

Under this alternative, the PCP and dioxin impacts to soil would be addressed through excavation and a combination of on-site consolidation and off-site disposal. The majority of the excavated material would be placed within an on-site consolidation area and a limited amount of the material would be disposed off-site. Segregation of material for off-site disposal would be based upon visual impacts to the soil (i.e., staining, oily sheens, etc.).

The nature and extent of soil impacts was described in **Section 1.3.3** and the areas requiring remedial action were identified in **Section 2.2.1**. This alternative consists of excavating the areas identified in **Figures 12** through **14**, segregating materials for off-site disposal, and placing the remainder in the area of consolidation identified in **Figure 15**. The former railroad slab, and the Buildings 48, 49, and 50 slabs/foundations would be demolished as part of this remedial alternative. The concrete rubble generated during the demolition of these building slabs and foundations would also be placed in the consolidation area.

As illustrated in **Figures 12** through **14**, soils would be excavated as follows.

Area	Vicinity of Impact	Depth (feet bgs)	Approximate Volume (cubic yards)
A	Area GPR 1, TP-1	6	1,400
B	Area GPR 2, TP-3	10	75
C	Wood Storage Area	3	235
D	Wood Storage Area	3	45
E	Building 50	3	250
F	Building 49	6	1,500
G	Railroad Slab	8	3,000
H	Building 48	6	1,000
I	TP-2	4	400
J	TP03-9/10	6	840
K	STP 17/18/19	3	410
L	STP 21/22	3	400
M	TP03-7/TP12	6	800
N	SS 37/38	3	250

The total estimated removal volume of impacted soil is approximately 10,605 cubic yards, measured in place. A 20% bulking factor yields roughly 12,726 cubic yards of soil to be managed. Additionally, stabilization of saturated soils (i.e., soils removed from beneath the elevation of the groundwater table – approximately 1,800 cubic yards) would be necessary (estimated 30% by volume), which would require approximately 540 cubic yards of ash or similar product. The building slabs and foundations removed and crushed as part of this remedial alternative would produce roughly 140 cubic yards of waste that would require disposal. Based upon review of the available Site data, it is estimated that approximately 2,800 cubic yards of impacted soil would be segregated and considered for disposal off-site in a NYSDEC permitted disposal facility. Consequently, the total volume of material that would be placed within the consolidation area is approximately 9,926 cubic yards.

Dewatering operations may be required during excavation operations as the water table typically occurs between 5 to 6 feet below ground surface (bgs). Water generated during excavation activities could be managed with a submersible pump and either 1) transferred to frac tanks for storage and subsequent off-site transportation for treatment and disposal or 2) treated on-site (using carbon or similar treatment methodology) and discharged, with the approval of the NYSDEC. Alternatively, groundwater recharge (and ultimately groundwater flow through the excavation area) could be reduced through the installation of a properly sized diversion channel around the upgradient portion of the excavation to redirect surface and groundwater flow around the areas requiring excavation.

The excavation would be performed in phases to minimize exposure and construction hazards. Construction workers would wear adequate personal protective equipment (PPE). No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas. Sloping or benching will be utilized to achieve stability of excavation sidewalls. Excavated materials would be transported to a permitted off-site treatment and disposal facility. The excavated areas would be backfilled with clean fill from an off-site source.

The on-site consolidation area will be constructed on a prepared subgrade. A multi layer geomembrane cap would be installed over the area of consolidation, resulting in the configuration shown in **Figure 15**. This multi layer cap would eliminate the potential for direct contact with impacted media and prevent rainwater infiltration into the consolidation area. Multi layer geomembrane caps typically consist of the following components:

- Vegetative Layer – approximately 6 inches of topsoil that serves to reduce erosion and infiltration of precipitation;
- Drainage Layer – approximately 24 inches of porous material (sand) that enhances lateral drainage of any precipitation that infiltrates through the vegetative layer and minimizes liquid head build-up on the underlying geomembrane; the vegetative and drainage layers help protect the underlying barrier layers from the environmental stresses of wetting/drying and freezing/thawing;

- Synthetic Barrier – low permeability geomembrane (at least 40 mil thickness) that represents the final impedance to precipitation infiltration; and
- Low Permeability Layer – a geosynthetic clay liner consisting of sodium bentonite bound between two layers of needle-punched geotextile to prevent infiltration into the impacted media in the event that the synthetic barrier develops a leak or tear.

A preliminary design of the consolidation area is depicted in **Figure 15**. The maximum sideslopes are 4H:1V and the minimum slope is 2%. A minimum separation of 5 feet would be maintained between the consolidated soil and the expected elevation of the groundwater table to prevent contaminant contact with the groundwater and subsequent contaminant transport. The design determined that, in order to contain 9,926 cubic yards of impacted material, the top of material elevation would be approximately 12 feet above the existing grade. The consolidation area would not crest to a plateau, but would rise to a peak.

All future Site development would be required to consider the requirements of the consolidation area in their design. Institutional controls would be implemented to limit Site access and usage. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

The approximate 2,800 cubic yards that would be disposed off-site in a permitted disposal facility is regulated by 6 NYCRR Part 371, which defines the contaminated soils as hazardous (F032) waste. As such, these soils would have to be disposed of in an appropriate hazardous waste landfill and may require treatment prior to disposal. The alternative land disposal restriction (LDR) treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, according to 40 CFR 268.49 (c), soils impacted with regulated constituents must be treated to a level of 10 times the Universal Treatment Standard (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on the data collected from the Site to date, concentrations of regulated constituents are below 10 times the UTS, with the exception of PCP and lead. One soil sample (TP-1) exceeded 150 ppm for lead (10 times the UTS for lead). Soil samples exceeded 74 ppm PCP (10 times the UTS for PCP) in several areas of the Site; the maximum concentration of PCP (820 ppm) was observed in soil boring B7. Accordingly, treatment (i.e., incineration) of these soils prior to off-site land disposal is expected to be required.

5.3.1 Overall Protection of Human Health and the Environment

This alternative would provide overall protection of human health and the environment by mitigating the potential for exposures to surface and subsurface soil above the SCGs. Excavation and off-site disposal of impacted soil exceeding SCGs would remove potential sources of groundwater contamination from the Site. Excavation and on-site consolidation would prevent direct contact with impacted soil. It would also serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which appears to be the primary transport mechanism at the Site.

5.3.2 Compliance with ARARs

This alternative would eliminate exposure to impacted soil through the excavation and consolidation/off-site disposal of soil exceeding the SCGs for PCP and dioxin. During construction activities, air pollution regulations would be complied with by controlling fugitive dust emissions through the use of periodic water spray or similar measures. LDRs would be applicable to excavated soil that would be transported off-site (i.e., outside the area of concern) for disposal. Alternatively, excavated soil that would be consolidated and capped on-site (i.e., within the area of concern) would not prompt LDRs because placement of a hazardous waste would not be constituted. In general, this alternative would actively address the primary sources of soil and potential groundwater contamination, and hence, is consistent with SCGs that regulate soil and groundwater quality.

5.3.3 Short-Term Effectiveness

During the implementation of this remedial alternative, an increased risk of exposure would be posed to on-site construction workers and the community. Risks to workers performing remedial and monitoring activities under this alternative could be controlled and mitigated by the implementation of proper health and safety measures, including engineering controls (periodic water spray or the application of foam), air monitoring and use of PPE, in accordance with OSHA 1910.120. Even with proper engineering controls, short-term mobility of COPCs would be increased through vapor and dust inhalation pathways.

Truck traffic on the local roads would increase due to construction vehicles entering and leaving the Site. Traffic control measures (e.g., signage and construction entrances) would be implemented as needed to limit and manage the increased traffic. Minimal short-term risks to the communities surrounding the transportation routes exist during the excavation and transportation of waste and clean soil by trucks.

Risks to the environment resulting from implementation of this alternative include the potential for dust generation and sediment transport during excavation of the contaminated soil. Appropriate use of erosion and sediment control measures, such as silt fence/hay bale barriers, tarpaulins over material stockpiles, and dust suppression actions would mitigate these risks.

5.3.4 Long-Term Effectiveness

This remedial alternative would provide an effective and long-term solution to soil impacts exceeding the SCGs. Soil at the Site that significantly exceeds the SCGs would be removed from the Site and transported to a secured, permitted waste disposal facility, thereby providing a permanent solution to the potential source of contamination to the groundwater. The excavation and off-site disposal of impacted soils above SCGs would reduce the on-site volume, toxicity, and mobility of the COPCs.

Excavation and on-site consolidation and capping would serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which appears to be the primary transport mechanism at the Site. The long-term effectiveness of the capped consolidation area would be ensured through routine inspection and maintenance of the area of consolidation and monitoring of groundwater. Institutional controls and restrictions on land usage would also be implemented.

5.3.5 Reduction of Toxicity, Mobility, and Volume

There is no expected reduction in the volume, toxicity, or mobility of the COPCs excavated and disposed of off-site. Off-site disposal would reduce the on-site volume, toxicity, and mobility of the soil containing COPCs.

Consolidation and capping of impacted soil would not lessen the toxicity or volume of hazardous wastes. It would, however, impede migration by preventing infiltration and transport of COPCs.

5.3.6 Implementability

This alternative could be implemented using conventional construction equipment and construction practices. Limitations to excavation could include:

- Geotechnically unstable soil - No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas; however, the excavations would be benched as a precautionary measure.
- Obstruction by subsurface boulders – Subsurface boulders are possible. If this limitation does exist, it would be manageable.
- Building or foundation structures – The slab under the former treatment building would be removed and disposed as part of this remedial alternative. Similar structures are not expected to impede excavation and disposal operations.
- Groundwater management – Some type of dewatering of the excavation areas would likely be necessary, as the groundwater table exists at 5 – 6 feet bgs across the Site. Groundwater recharge to the Site is variable and seasonal. If a sand lens is

encountered during excavation operations, it could yield significant amounts of groundwater that would require storage, treatment, and disposal. Management of substantial amounts of groundwater is achievable, but at decreased efficiency. As an alternative to dewatering, a diversion trench could be placed upgradient of the excavation areas to redirect surface and ground water around the excavation areas.

- Hydrostatic failure of the excavation – Artesian pressure and other variables that could cause a hydrostatic failure are not likely to exist at the Site.
- Storage piles – Excavation may also be limited by the need to stage and characterize material prior to transport to various facilities based on contaminant concentration. If this limitation does exist, it would be manageable.

Quality assurance/quality control parameters would have to be adhered to during construction of the consolidation area cap to ensure its effectiveness. The consolidation area would have to be carefully integrated into the long-range development plans for the Site, as it would limit future land uses. Institutional controls would be implemented to limit land use activities that may compromise the condition of the consolidation area. Vegetation that has tendency for deep root penetration must be eliminated from the vicinity of the area of consolidation. Long-term maintenance and monitoring would be necessary to ensure the integrity and effectiveness of the consolidation area.

Excavation and transport equipment, clean fill, synthetic materials, and other items associated with this alternative would be readily accessible. Suppliers and materials to complete groundwater monitoring would be widely available. This alternative is implementable.

5.3.7 Cost

In contrast to Alternative 3, transport and disposal fees for this alternative would be higher per ton of material due to the high contaminant concentrations in the soil that would be transported off-site for subsequent treatment and disposal. Less material would require off-site disposal, in comparison to Alternative 3, because this alternative includes the construction of an on-site consolidation area. Long-term inspection and maintenance of the consolidation area for at least 30 years would increase post-closure costs. The duration of inspection and maintenance would be dependent on deep-rooted vegetation, burrowing animals, settling of the consolidation area, and erosion.

Costs associated with this alternative include the equipment, labor, oversight, transport and disposal fees, and construction and maintenance of an area of consolidation. For the purposes of alternative screening, the net present worth of this alternative was estimated to be approximately 10,029,450. A breakdown of the cost estimate for this alternative is included in **Appendix C**.

5.3.8 Summary

This alternative would provide an effective, long-term remedy for PCP and dioxin impacts in the soil. The capped consolidation area would effectively prevent direct contact with impacted soil. It would also serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which has been shown to the primary recharge mechanism at the Site. Off-site disposal of a portion of the impacted soil exceeding SCGs would reduce on-site mobility, toxicity, and volume of PCP and dioxins. Disposal fees for F032 class wastes are significant, particularly when treatment prior to land disposal is necessary. Further, significant quantities of impacted water could be generated during excavation activities that would require storage, treatment, and disposal.

Construction of the consolidation area and cap, excavation activities, and off-site disposal of PCP and dioxin impacted soils may pose some technical challenges, while also posing some short-term risk to the construction workers and surrounding occupants of the facility. Short-term risks to workers could be mitigated through the utilization of engineering controls, air monitoring equipment, and PPE. Institutional controls would be implemented at the Site to ensure the integrity of the capped consolidation area.

This remedial alternative will be retained for further consideration because it achieves all of the remedial action objectives and the short-term risks associated with its implementation are manageable.

6.0 COMPARATIVE ANALYSIS

This section compares the relative performance of each of the remedial alternatives retained for further detailed analysis in **Section 5.0**, using the specific evaluation criteria identified therein.

Comparisons are presented in a qualitative manner in order to identify substantive differences between the alternatives. As with the detailed analysis, the following criteria were used for the comparative analysis:

- Overall Protection of Human Health and the Environment
- Compliance with SCGs, ARARs, and Other Regulations
- Short-Term Effectiveness
- Long-Term Effectiveness and Permanence
- Reduction in Mobility, Toxicity, and Volume
- Implementability
- Cost

The qualitative comparison is outlined in the following sections.

6.1 Comparative Analysis of Retained Remedial Alternatives

The retained remedial alternatives are:

- Alternative 1 – No Action
- Alternative 3 – Excavation and Off-Site Disposal
- Alternative 4 – Excavation and On-Site Consolidation with Limited Off-Site Disposal

6.1.1 Overall Protection of Human Health and the Environment

The comparative evaluation of overall protection of human health and the environment evaluates attainment of SCGs, as well as the analysis of other criteria evaluated for each alternative (specifically, short- and long-term effectiveness). The evaluation of this criteria focuses on such factors as the manner in which the remedial alternatives achieve protection over time, the degree to which site risks would be reduced, and the manner in which the source of COPCs would be eliminated, reduced, or controlled.

Alternative 1 (No Action) would not be protective of human health and the environment.

Alternatives 3 and 4 would involve the excavation and off-site disposal/on-site consolidation of surface and subsurface soil that exceed the SCGs. Excavation of the soil exceeding the SCGs would remove the potential source of groundwater contamination. Alternatives 3 and 4 involve the placement of excavated soil in a secured, permitted, off-site hazardous waste landfill, which would effectively mitigate the potential for exposure to soil exceeding the SCGs. On-site consolidation (Alternative 4) would effectively mitigate the potential for exposure to soil exceeding the SCGs. The consolidation area would serve to impede the potential for transport of contaminants into groundwater. Short-term impacts to both human health and the environment during the implementation of Alternatives 3 and 4 would be minimal and easily managed. Alternatives 3 and 4 are considered effective measures to protect against potential long-term human health risks and environmental impacts.

6.1.2 Compliance with SCGs and ARARs

The comparative evaluation of the compliance of each alternative focuses on the following criteria:

- Published NYSDEC Standards, Criteria, and Guidelines (SCGs)
- Other federal Applicable Relevant and Appropriate Requirements (ARARs)

Alternative 1 (No Action) would not comply with the SCGs and ARARs. The other alternatives under evaluation in the section would comply with SCGs and ARARs via the excavation and off-site disposal (Alternatives 3 and 4) or by on-site consolidation (Alternative 4) of surface and subsurface soil that exceed the SCGs. LDR guidelines would be applicable to Alternatives 3 and 4 because they involve the transport of impacted materials off-site (i.e., outside the area of concern) for disposal. The material to be consolidated on-site under Alternative 4 would not prompt these restrictions because on-site consolidation of materials (i.e., within the area of concern) would not constitute placement. All remedial actions would be completed in a manner compliant with action-specific standards and regulatory requirements.

6.1.3 Short-Term Effectiveness

The short-term effectiveness comparison includes the evaluation of the relative potential for impacts to the nearby communities, site worker exposures, environmental impacts, and the time frame for implementation of the alternatives.

The implementation of Alternative 1 (No Action) would result in the least short-term impact, because minimal action would be taken to disturb the impacted media at the Site. Alternatives 3 and 4 would all involve an increased short-term risk of exposures to on-site construction workers, the community, and the environment during construction activities. These risks could be managed through the appropriate utilization of erosion and sediment controls and health and safety measures, including engineering controls, air monitoring, and use of PPE, in accordance with OSHA 1910.120. Alternative 3 would pose the greatest short-term risks to human health and the environment because it would involve the largest volume of impacted material to be transported off-site.

6.1.4 Long-Term Effectiveness

The comparative evaluation of long-term effectiveness focuses on the reduction of residual risk and the adequacy and reliability of controls provided by each alternative.

Alternative 1 (No Action) would not reduce the risk of direct contact with impacted media. Therefore, it would not be a permanent or effective remedy.

Alternatives 3 and 4 would provide an effective and long-term solution to soil impacts exceeding the SCGs. They would effectively mitigate the potential for exposure to soil exceeding the SCGs. Excavation of the soil exceeding the SCGs would remove the potential source of groundwater contamination. Alternatives 3 and 4 involve the placement of excavated soil in a secured, permitted, off-site hazardous waste landfill, which would reduce the on-site volume, toxicity, and mobility of the COPCs. On-site consolidation (Alternative 4) would impede the potential for transport of contaminants into groundwater. The long-term effectiveness of the consolidation area would be ensured through routine inspection and maintenance of the area of consolidation as well as institutional controls and restrictions on land usage.

Groundwater monitoring would be performed under all alternatives. Alternatives 3 and 4 are considered effective measures to protect against potential long-term human health risks and environmental impacts.

6.1.5 Reduction of Toxicity, Mobility, and Volume

The comparative evaluation of the reduction of mobility, toxicity, and volume focuses on the ability of the alternative to address the impacted material on-site, the mass of material destroyed or treated, the irreversibility of the process employed, and the nature of the impacted materials after the implementation of the alternative.

Under Alternative 1 (No Action) the volume and toxicity of soil impacted with PCP would gradually decrease over time through natural degradation; dioxin concentrations would remain unaffected. Impacted soil would remain a potential source of contamination to the groundwater, as the infiltration of precipitation, which appears to be the primary mechanism of COPC transport at the Site, would not be impeded.

Alternatives 3 and 4 would reduce the on-site volume, toxicity, and mobility of COPCs through the excavation and off-site disposal of impacted soil exceeding the SCGs; however, there would not be any expected reduction in the volume, toxicity, or mobility of the COPCs disposed of off-site. On-site consolidation (Alternative 4) of impacted soil would not lessen the toxicity or volume of hazardous materials on-site. It would, however, consolidate the material into a manageable unit that would impede migration by preventing the infiltration and transport of COPCs.

6.1.6 Implementability

The comparative evaluation of implementability focuses on the feasibility of construction and operation of each alternative, the administrative feasibility, the availability or required disposal facilities, technical and service personnel, and contractors.

Alternative 1 (No Action) would require minimal planned or implemented activities.

Alternative 4 would include the construction of a capped consolidation area. Quality assurance/quality control parameters would have to be adhered to during construction of the capped consolidation area to ensure its effectiveness. The capped consolidation area would have to be carefully integrated into the long-range development plans for the Site. The long-term effectiveness of the consolidation area would be ensured through routine inspection and maintenance of the area as well as institutional controls and restrictions on land usage.

Alternatives 3 and 4 could be implemented using standard construction equipment and practices. Each of these alternatives would involve excavation, and are thus equally likely to encounter limitations associated with excavation activities. Excavation and transport equipment, clean fill, synthetic liner materials, materials to complete groundwater monitoring, and other items associated with these alternatives are readily available.

6.1.7 Cost

The comparative evaluation of the cost of remediation is based on the net present worth of each alternative. The total capital, annual O&M and present value costs for all Alternatives are presented in **Appendix C**. The approximate cost associated with each Alternative is as follows:

- Alternative 1 – No Action: **$450,257**
- Alternative 3 – Excavation and Off-Site Disposal: **$17,249,695**
- Alternative 4 – Excavation and On-Site Consolidation with Limited Off-Site Disposal: **$10,029,450**

7.0 RECOMMENDED ALTERNATIVE

Alternative 4 (Excavation and On-Site Consolidation with Limited Off-Site Disposal) is the recommended remedial alternative for addressing impacted soils at the Site. Based upon the comparative analysis presented in **Section 6**, Excavation and On-Site Consolidation with Limited Off-Site Disposal is recommended because, in comparison to the other alternatives presented in **Sections 4 and 5**, it was equally protective of human health and the environment, had a greater short-term effectiveness, and was cost effective.

Under this alternative, the PCP and dioxin impacts to soil would be addressed through excavation and a combination of on-site consolidation and off-site disposal. The majority of the excavated material would be placed within an on-site consolidation area and a limited amount of the material would be disposed off-site. Segregation of material for off-site disposal would be based upon visual impacts to the soil (i.e., staining, oily sheens, etc.).

The nature and extent of soil impacts was described in **Section 1.4.3** and the areas requiring remedial action were identified in **Section 2.2.1**. This alternative consists of excavating the areas identified in **Figures 12** through **14**, segregating materials for off-site disposal, and placing the remainder in the area of consolidation identified in **Figure 15**. The former railroad slab, and the Buildings 48, 49, and 50 slabs/foundations would be demolished as part of this remedial alternative. The concrete rubble generated during the demolition of these building slabs and foundations would also be placed in the consolidation area.

As illustrated in **Figures 12** through **14**, soils would be excavated as follows.

Area	Vicinity of Impact	Depth (feet bgs)	Approximate Volume (cubic yards)
A	Area GPR 1, TP-1	6	1,400
B	Area GPR 2, TP-3	10	75
C	Wood Storage Area	3	235
D	Wood Storage Area	3	45
E	Building 50	3	250
F	Building 49	6	1,500
G	Railroad Slab	8	3,000
H	Building 48	6	1,000
I	TP-2	4	400
J	TP03-9/10	6	840
K	STP 17/18/19	3	410
L	STP 21/22	3	400
M	TP03-7/TP12	6	800
N	SS 37/38	3	250

The total estimated removal volume of impacted soil is approximately 10,605 cubic yards, measured in place. A 20% bulking factor yields roughly 12,726 cubic yards of soil to be managed. Additionally, stabilization of saturated soils (i.e., soils removed from beneath the elevation of the groundwater table – approximately 1,800 cubic yards) would be necessary (estimated 30% by volume), which would require approximately 540 cubic yards of ash or similar product. The building slabs and foundations removed and crushed as part of this remedial alternative would produce roughly 140 cubic yards of waste that would require disposal. Based upon review of the available Site data, it is estimated that approximately 2,800 cubic yards of impacted soil would be segregated and considered for disposal off-site in a NYSDEC permitted disposal facility. Consequently, the total volume of material that would be placed within the consolidation area is approximately 9,926 cubic yards.

Dewatering operations may be required during excavation operations as the water table typically occurs between 5 to 6 feet below ground surface (bgs). Water generated during excavation activities could be managed with a submersible pump and either 1) transferred to frac tanks for storage and subsequent off-site transportation for treatment and disposal or 2) treated on-site (using carbon or similar treatment methodology) and discharged, with the approval of the NYSDEC. Alternatively, groundwater recharge (and ultimately groundwater flow through the excavation area) could be reduced through the installation of a properly sized diversion channel around the upgradient portion of the excavation to redirect surface and groundwater flow around the areas requiring excavation.

The excavation would be performed in phases to minimize exposure and construction hazards. Construction workers would wear adequate personal protective equipment (PPE). No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas. Sloping or benching will be utilized to achieve stability of excavation sidewalls. Excavated materials would be transported to a permitted off-site treatment and disposal facility. The excavated areas would be backfilled with clean fill from an off-site source.

The on-site consolidation area will be constructed on a prepared subgrade. A multi layer geomembrane cap would be installed over the area of consolidation, resulting in the configuration shown in **Figure 15**. This multi layer cap would eliminate the potential for direct contact with impacted media and prevent rainwater infiltration into the consolidation area. Multi layer geomembrane caps typically consist of the following components:

- Vegetative Layer – approximately 6 inches of topsoil that serves to reduce erosion and infiltration of precipitation;
- Drainage Layer – approximately 24 inches of porous material (sand) that enhances lateral drainage of any precipitation that infiltrates through the vegetative layer and minimizes liquid head build-up on the underlying geomembrane; the vegetative and drainage layers help protect the underlying barrier layers from the environmental stresses of wetting/drying and freezing/thawing;
- Synthetic Barrier – low permeability geomembrane (at least 40 mil thickness) that represents the final impedance to precipitation infiltration; and
- Low Permeability Layer – a geosynthetic clay liner consisting of sodium bentonite bound between two layers of needle-punched geotextile to prevent infiltration into the impacted media in the event that the synthetic barrier develops a leak or tear.

A preliminary design of the consolidation area is depicted in **Figure 15**. The maximum sideslopes are 4H:1V and the minimum slope is 2%. A minimum separation of 5 feet would be maintained between the consolidated soil and the expected elevation of the groundwater table to prevent contaminant contact with the groundwater and subsequent contaminant transport. The design determined that, in order to contain 9,926 cubic yards of impacted material, the top of material elevation would be approximately 12 feet above the existing grade. The consolidation area would not crest to a plateau, but would rise to a peak.

All future Site development would be required to consider the requirements of the consolidation area in their design. Institutional controls would be implemented to limit Site access and usage. Groundwater monitoring would occur annually for five years. Based on the results, further groundwater monitoring would continue either annually or biannually for an additional 25 years.

The approximate 2,800 cubic yards that would be disposed off-site in a permitted disposal facility is regulated by 6 NYCRR Part 371, which defines the contaminated soils as hazardous (F032) waste. As such, these soils would have to be disposed of in an appropriate hazardous waste landfill and may require treatment prior to disposal. The alternative land disposal restriction (LDR) treatment standards for contaminated soil are addressed in 40 CFR 268.49. In general, according to 40 CFR 268.49 (c), soils impacted with regulated constituents must be treated to a level of 10 times the Universal Treatment Standard (UTS) or until 90% reduction is achieved, whichever is met first, prior to land disposal. The UTS for regulated constituents is given in 40 CFR 268.48. Based on the data collected from the Site to date, concentrations of regulated constituents are below 10 times the UTS, with the exception of PCP and lead. One soil sample (TP-1) exceeded 150 ppm for lead (10 times the UTS for lead). Soil samples exceeded 74 ppm PCP (10 times the UTS for PCP) in several areas of the Site; the maximum concentration of PCP (820 ppm) was observed in soil boring B7. Accordingly, treatment (i.e., incineration) of these soils prior to off-site land disposal is expected to be required.

7.1 Overall Protection of Human Health and the Environment

This alternative would provide overall protection of human health and the environment by mitigating the potential for exposures to surface and subsurface soil above the SCGs. Excavation and off-site disposal of impacted soil exceeding SCGs would remove potential sources of groundwater contamination from the Site. Excavation and on-site consolidation would prevent direct contact with impacted soil. It would also serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which appears to be the primary transport mechanism at the Site.

7.2 Compliance with ARARs

This alternative would eliminate exposure to impacted soil through the excavation and consolidation/off-site disposal of soil exceeding the SCGs for PCP and dioxin. During construction activities, air pollution regulations would be complied with by controlling fugitive dust emissions through the use of periodic water spray or similar measures. LDRs would be applicable to excavated soil that would be transported off-site (i.e., outside the area of concern) for disposal. Alternatively, excavated soil that would be consolidated and capped on-site (i.e., within the area of concern) would not prompt LDRs because placement of a hazardous waste would not be constituted. In general, this alternative would actively address the primary sources of soil and potential groundwater contamination, and hence, is consistent with SCGs that regulate soil and groundwater quality.

7.3 Short-Term Effectiveness

During the implementation of this remedial alternative, an increased risk of exposure would be posed to on-site construction workers and the community. Risks to workers performing remedial and monitoring activities under this alternative could be controlled and mitigated by the implementation of proper health and safety measures, including engineering controls (periodic water spray or the application of foam), air monitoring and use of PPE, in accordance with OSHA 1910.120. Even with proper engineering controls, short-term mobility of COPCs would be increased through vapor and dust inhalation pathways.

Truck traffic on the local roads would increase due to construction vehicles entering and leaving the Site. Traffic control measures (e.g., signage and construction entrances) would be implemented as needed to limit and manage the increased traffic. Minimal short-term risks to the communities surrounding the transportation routes exist during the excavation and transportation of waste and clean soil by trucks.

Risks to the environment resulting from implementation of this alternative include the potential for dust generation and sediment transport during excavation of the contaminated soil. Appropriate use of erosion and sediment control measures, such as silt fence/hay bale barriers, tarpaulins over material stockpiles, and dust suppression actions would mitigate these risks.

7.4 Long-Term Effectiveness

This remedial alternative would provide an effective and long-term solution to soil impacts exceeding the SCGs. Soil at the Site that significantly exceeds the SCGs would be removed from the Site and transported to a secured, permitted waste disposal facility, thereby providing a permanent solution to the potential source of contamination to the groundwater. The excavation and off-site disposal of impacted soils above SCGs would reduce the on-site volume, toxicity, and mobility of the COPCs.

Excavation and on-site consolidation and capping would serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which appears to be the primary transport mechanism at the Site. The long-term effectiveness of the capped consolidation area would be ensured through routine inspection and maintenance of the area of consolidation and monitoring of groundwater. Institutional controls and restrictions on land usage would also be implemented.

7.5 Reduction of Toxicity, Mobility, and Volume

There is no expected reduction in the volume, toxicity, or mobility of the COPCs excavated and disposed of off-site. Off-site disposal would reduce the on-site volume, toxicity, and mobility of the soil containing COPCs.

Consolidation and capping of impacted soil would not lessen the toxicity or volume of hazardous wastes. It would, however, impede migration by preventing infiltration and transport of COPCs.

7.6 Implementability

This alternative could be implemented using conventional construction equipment and construction practices. Limitations to excavation could include:

- Geotechnically unstable soil - No sheeting, shoring, or bracing is expected to be required due to the dense soils at the Site and the manageable size of the excavation areas; however, the excavations would be benched as a precautionary measure.

- Obstruction by subsurface boulders – Subsurface boulders are possible. If this limitation does exist, it would be manageable.
- Building or foundation structures – The slab under the former treatment building would be removed and disposed as part of this remedial alternative. Similar structures are not expected to impede excavation and disposal operations.
- Groundwater management – Some type of dewatering of the excavation areas would likely be necessary, as the groundwater table exists at 5 – 6 feet bgs across the Site. Groundwater recharge to the Site is variable and seasonal. If a sand lens is encountered during excavation operations, it could yield significant amounts of groundwater that would require storage, treatment, and disposal. Management of substantial amounts of groundwater is achievable, but at decreased efficiency. As an alternative to dewatering, a diversion trench could be placed upgradient of the excavation areas to redirect surface and ground water around the excavation areas.
- Hydrostatic failure of the excavation – Artesian pressure and other variables that could cause a hydrostatic failure are not likely to exist at the Site.
- Storage piles – Excavation may also be limited by the need to stage and characterize material prior to transport to various facilities based on contaminant concentration. If this limitation does exist, it would be manageable.

Quality assurance/quality control parameters would have to be adhered to during construction of the consolidation area cap to ensure its effectiveness. The consolidation area would have to be carefully integrated into the long-range development plans for the Site, as it would limit future land uses. Institutional controls would be implemented to limit land use activities that may compromise the condition of the consolidation area. Vegetation that has tendency for deep root penetration must be eliminated from the vicinity of the area of consolidation. Long-term maintenance and monitoring would be necessary to ensure the integrity and effectiveness of the consolidation area.

Excavation and transport equipment, clean fill, synthetic materials, and other items associated with this alternative would be readily accessible. Suppliers and materials to complete groundwater monitoring would be widely available. This alternative is implementable.

7.7 Cost

In contrast to Alternative 3, transport and disposal fees for this alternative would be higher per ton of material due to the high contaminant concentrations in the soil that would be transported off-site for subsequent treatment and disposal. Less material would require off-site disposal, in comparison to Alternative 3, because this alternative includes the construction of an on-site consolidation area. Long-term inspection and maintenance of the consolidation area for at least

30 years would increase post-closure costs. The duration of inspection and maintenance would be dependent on deep-rooted vegetation, burrowing animals, settling of the consolidation area, and erosion.

Costs associated with this alternative include the equipment, labor, oversight, transport and disposal fees, and construction and maintenance of an area of consolidation. For the purposes of alternative screening, the net present worth of this alternative was estimated to be approximately 10,606,586. A breakdown of the cost estimate for this alternative is included in **Appendix C**.

7.8 Summary

This alternative would provide an effective, long-term remedy for PCP and dioxin impacts in the soil. The capped consolidation area would effectively prevent direct contact with impacted soil. It would also serve to impede the potential for transport of COPCs into groundwater because migration would not be encouraged by infiltration of precipitation, which has been shown to the primary recharge mechanism at the Site. Off-site disposal of a portion of the impacted soil exceeding SCGs would reduce on-site mobility, toxicity, and volume of PCP and dioxins. Disposal fees for F032 class wastes are significant, particularly when treatment prior to land disposal is necessary. Further, significant quantities of impacted water could be generated during excavation activities that would require storage, treatment, and disposal.

Construction of the consolidation area and cap, excavation activities, and off-site disposal of PCP and dioxin impacted soils may pose some technical challenges, while also posing some short-term risk to the construction workers and surrounding occupants of the facility. Short-term risks to workers could be mitigated through the utilization of engineering controls, air monitoring equipment, and PPE. Institutional controls would be implemented at the Site to ensure the integrity of the capped consolidation area.

This remedial alternative will be retained for further consideration because it achieves all of the remedial action objectives and the short-term risks associated with its implementation are manageable.

8.0 REFERENCES

Asphalt Institute, 1989.

Asphalt Magazine, 1991/1992.

In-Situ Thermal Desorption – ISTD. TerraTherm. Accessed November 2002. http://www.terratherm.com/default.htm.

Newell, A. J., 1987 Fish Flesh Criteria for Piscivorous Wildlife. New York State Department of Environmental Conservation (NYSDEC), Division of Fish and Wildlife, Bureau of Environmental Protection, Technical Report 87-3.

NYSDEC, 1998. Preliminary Investigation Report, Camp Summit, September 1998.

NYSDEC, 1989. Division Technical and Administrative Guidance Memorandum (TAGM) Guidelines for Remedial Investigations/Feasibility Studies HWR-89-4025, March 1989.

NYSDEC, 1989. TAGM 4031, Fugitive Dust Suppression and Particulate Monitoring Program and Inactive Hazardous Waste Sites, October 27, 1989.

NYSDEC, 1990. TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, May 15, 1990.

NYSDEC, 1992. Inactive Waste Disposal Site Remedial Program. 6 NYCRR part 375.

NYSDEC, 1994. TAGM 4046. Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994.

NYSDEC, 1998. Division of Water Technical and Operation Guidance Series (TOGS) (1.1.1). Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998.

NYSDEC, 1999. Preliminary Investigation Report Addendum No. 1, Camp Summit, June 1999.

Regenesis. Accessed March 2003. http://www.regenesis.com.

Remediation Technologies. Naval Facilities Engineering Service Center. Accessed November 2002. <http://erb.nfesc.navy.mil/restoration/technologies/remed/main.htm>.

Remediation Technologies Screening Matrix and Reference Guide, Version 4.0. Federal Remediation Technologies Roundtable. Accessed November 2002. <http://www.frtr.gov/matrix2/section1/toc.html>.

Spectrum Chemical Fact Sheet. Spectrum Laboratories. Accessed August 2002. http://www.speclab.com/compound/c1746016.htm.

USEPA, 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, October 1988.

USEPA, 1993. Remedial Technologies Screening Matrix and Reference Guide, July 1993.

Shaw, 2004. Draft Remedial Investigation Report, Camp Summit Site, Fulton, New York, January 2004.

TABLES

Table 1
Surface Soil Analytical Results
Camp Summit

		Preliminary Investigation											
Analyte (units) **SVOC/PAH *(mg/kg)***	**TAGM**	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**SS-5**	**SS-6**	**SS-7**	**SS-8**	**SS-9**	**SS-10**	**SS-11**	**SS-12**
Acenaphthene	50	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{a}anthracene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	2.7	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	NP	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-Ethylhexyl) Phthalate	50	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.2	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl Phthalate	8.1	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalte	120	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	50	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	50	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	13	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1*	**0.73**	**0.88**	**0.13**	**1.09**	**0.87**	**0.4**	**0.47**	**1.4**	**3.28**	**0.37**	**0.3**	ND
Phenanthrene	50	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	50	--	--	--	--	--	--	--	--	--	--	--	--
Total SVOC	500	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

SVOC Data Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 1
Surface Soil Analytical Results
Camp Summit

		Preliminary Investigation											
Analyte (units) **SVOC/PAH *(mg/kg)***	**TAGM**	**SS-13**	**SS-14**	**SS-15**	**SS-16**	**SS-17**	**SS-18**	**SS-19**	**SS-20**	**SS-21**	**SS-22**	**SS-23**	**SS-24**
Acenaphthene	50	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{a}anthracene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	2.7	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	NP	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-Ethylhexyl) Phthalate	50	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.2	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl Phthalate	8.1	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalte	120	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	50	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	50	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	13	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1*	**0.32**	**0.31**	**0.55**	ND	**0.24**	**0.34**	**1.86**	**1.59**	ND	**0.56**	**0.5**	**0.6**
Phenanthrene	50	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	50	--	--	--	--	--	--	--	--	--	--	--	--
Total SVOC	500	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

< = Below MDL

-- = Not Sampled

SVOC Data Qualifiers:

All results in mg/kg or parts per million

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detection limit

Table 1
Surface Soil Analytical Results
Camp Summit

		Preliminary Investigation													
Analyte (units)	**TAGM**														
SVOC/PAH *(mg/kg)*		**SS-25**	**SS-26**	**SS-27**	**SS-28**	**SS-29**	**SS-30**	**SS-31**	**SS-32**	**SS-33**	**SS-34**	**SS-35**	**SS-36**	**SS-37**	**SS-38**
Acenaphthene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{a}anthracene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzoic Acid	2.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-Ethylhexyl) Phthalate	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	6.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl Phthalate	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalte	120	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1*	**4.79**	**1.14**	**0.14**	**0.74**	**1.7**	**0.7**	**0.98**	**253**	**0.18**	ND	**0.36**	**0.12**	**80**	**1.55**
Phenanthrene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total SVOC	500	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

<u>SVOC Data Qualifiers:</u>
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 1
Surface Soil Analytical Results
Camp Summit

Analyte (units)	**TAGM**	**Remedial Investigation**															
SVOC/PAH (mg/kg)		**SS-1**	**SS-2**	**SS-3**	**SS-4**	**SS-5**	**SS-6**	**SS-7**	**SS-8**	**SS-9**	**SS-10**	**SS-11**	**SS-12**	**SS-13**	**SS-14**	**SS-15**	**SS-16**
Acenaphthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Anthracene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.035 J**	<0.330	<0.330	<0.330	**0.089 J**	**0.024 J**	<0.330	<0.330
Benzo{b}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	**0.024 J**	<0.330	<0.330	<0.330	**0.035 J**	<0.330	<0.330	<0.330	**0.068 J**	**0.039 J**	<0.330	<0.330
Benzo{k}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.034 J**	<0.330	<0.330	<0.330	**0.082 J**	<0.330	<0.330	<0.330
Benzo(ghi) perylene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo (a) Pyrene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.024 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzoic Acid	2.7	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Carbazole	NP	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Chrysene	0.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.040 J**	<0.330	<0.330	<0.330	**0.078 J**	**0.030 J**	<0.330	<0.330
Bis (2-Ethylhexyl) Phthalate	50	<0.330	<0.330	<0.330	<0.330	**0.023 J**	<0.330	<0.330	<0.330	**0.023 J**	<0.330	<0.330	**0.031 J**	<0.330	<0.330	<0.330	<0.330
Dibenzofuran	6.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	**0.039 J**	**0.040 J**	<0.330	<0.330	**0.042 J**	<0.330	<0.330	**0.071 J**	<0.330	<0.330	<0.330	<0.330	<0.330
Diethylphthalate	7.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.025 J**	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	<0.330	**0.027 J**	<0.330	<0.330	<0.330	**0.041 J**	<0.330	<0.330	<0.330	**0.054 J**	**0.046 J**	**0.021 J**	<0.330
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Indeno (1,2,3-cd) pyrene	3.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
2-Methylnaphthalene	36.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.220 J**
Naphthalene	13	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Pentachlorophenol	1*	**0.038 J**	<1.6	**0.062 J**	<1.6	<1.6	**1.6**	**2**	<1.6	<1.6	<1.6	<1.6	**1**	<1.6	<1.6	<1.6	**6.3**
Phenanthrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.110 J**
Pyrene	50	<0.330	<0.330	<0.330	<0.330	**0.025 J**	<0.330	<0.330	<0.330	**0.039 J**	<0.330	<0.330	<0.330	**0.055 J**	**0.044 J**	**0.020 J**	**0.071 J**
Total SVOC	500	**0.038 J**	BDL	**0.062 J**	**0.039 J**	**0.139 J**	**1.6**	**2**	**0.042 J**	**0.271 J**	BDL	**71 J**	**1.03**	**0.426 J**	**0.208 J**	**0.041 J**	**6.701 J**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

SVOC Data Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 1
Surface Soil Analytical Results
Camp Summit

Analyte (units)	TAGM	Remedial Investigation																				
SVOC/PAH *(mg/kg)*		**SS-17**	**SS-18**	**SS-19**	**SS-20**	**SS-21**	**SS-22**	**SS-23**	**SS-24**	**SS-25**	**SS-26**	**SS-27**	**SS-28**	**SS-29**	**BGM-1**	**BGM-2**	**BGM-3**	**BGM03-1**	**BGM03-2**	**BGM03-3**	**BGM03-4**	**BGM03-5**
Acenaphthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Anthracene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzo{a}anthracene	0.33	<0.330	<0.330	**0.110 J**	**0.072 J**	<0.330	**0.040 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzo{b}fluoranthene	1.1	<0.330	<0.330	**0.110 J**	**0.047 J**	<0.330	**0.044 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzo{k}fluoranthene	1.1	<0.330	<0.330	**0.130 J**	**0.052 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzo(ghi) perylene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzo (a) Pyrene	0.33	<0.330	<0.330	<0.330	**0.046 J**	<0.330	**0.025 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Benzoic Acid	2.7	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	**0.550 J**	<1.6	-	-	-	<1.0	<1.0	<1.1	<2.2	<0.420
Carbazole	NP	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Chrysene	0.4	<0.330	<0.330	**0.210 J**	**0.079 J**	<0.330	**0.047 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<0.410	<0.440	<0.900	<0.420
Bis (2-Ethylhexyl) Phthalate	50	<0.330	**0.032 J**	<0.330	**0.030 J**	<0.330	<0.330	<0.330	<0.330	**0.098 J**	<0.330	<0.330	<0.330	<0.330	-	-	-	**0.024J**	**0.031J**	<0.440	**0.048J**	**0.360J**
Dibenzofuran	6.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Diethylphthalate	7.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.049 J**	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Fluoranthene	50	<0.330	<0.330	**0.290 J**	**0.160 J**	<0.330	**0.061 J**	<0.330	**0.021 J**	**0.028 J**	**0.050 J**	**0.037 J**	<0.330	<0.330	-	-	-	<0.400	**0.026J**	<0.440	<0.900	<0.420
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Indeno (1,2,3-cd) pyrene	3.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
2-Methylnaphthalene	36.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Naphthalene	13	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Pentachlorophenol	1*	**0.400 J**	**0.460 J**	**1.6**	**0.045 J**	<1.6	**1.6 J**	**0.110 J**	**0.660 J**	**0.470 J**	<1.6	<1.6	<1.6	<1.6	-	-	-	<1.000	<1,000	<1.1	<2.2	<0.420
Phenanthrene	50	<0.330	<0.330	<0.330	**0.046 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Pyrene	50	<0.330	<0.330	**0.35**	**0.140 J**	<0.330	**0.110 J**	<0.330	**0.022 J**	**0.028 J**	**0.051 J**	**0.034 J**	<0.330	<0.330	-	-	-	<0.400	<410	<0.440	<0.900	<0.420
Total SVOC	500	**0.400 J**	**0.492 J**	**2.8 J**	**0.717 J**	BDL	**1.927 J**	**0.110 J**	**0.703 J**	**0.624 J**	**0.101 J**	**0.071 J**	**0.599 J**	BDL	-	-	-	**0.024J**	**0.057J**	ND	**0.048J**	**0.360J**

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

SVOC Data Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 1
Surface Soil Analytical Results
Camp Summit

			Preliminary Investigation											
Metals *(mg/kg)*	**TAGM**	**BGM Average**	**SS-4**	**SS-6**	**SS-8**	**SS-9**	**SS-19**	**SS-20**	**SS-25**	**SS-26**	**SS-29**	**SS-32**	**SS-36**	**SS-38**
Aluminum	NV	**18866.6**	--	**13000**	--	--	--	--	--	--	--	--	**16700**	--
Antimony	NV	**0.283**	--	ND	--	--	--	--	--	--	--	--	ND	--
Arsenic	7.5	**9.1**	--	**6.7**	--	--	--	--	--	--	--	--	**15**	--
Barium	**300**	54.6	--	**116**	--	--	--	--	--	--	--	--	**59.3**	--
Berillium	0.16	**0.54**	--	**1.1**	--	--	--	--	--	--	--	--	**0.78 B**	--
Cadmium	**1**	0.15	--	**0.6 B**	--	--	--	--	--	--	--	--	ND	--
Calcium	NV	**110.6**	--	**2090**	--	--	--	--	--	--	--	--	**2370**	--
Chromium	10	**19.06**	--	**10.8**	--	--	--	--	--	--	--	--	**25.1**	--
Cobalt	**30**	9.33	--	**9**	--	--	--	--	--	--	--	--	**21.8**	--
Copper	0.25	**10.76**	--	**5.9**	--	--	--	--	--	--	--	--	**25.7**	--
Iron	2000	**30633.3**	--	**15200**	--	--	--	--	--	--	--	--	**36700**	--
Lead	NV	**17.86**	--	**17.3**	--	--	--	--	--	--	--	--	**36.5**	--
Magnesium	NV	**2300**	--	**1380**	--	--	--	--	--	--	--	--	**5410**	--
Manganese	NV	**929**	--	**1970**	--	--	--	--	--	--	--	--	**1770**	--
Nickel	13	**14.9**	--	**18.6**	--	--	--	--	--	--	--	--	**39.8**	--
Potassium	NV	**561**	--	**401 B**	--	--	--	--	--	--	--	--	**1470**	--
Selenium	**2**	1.5	--	**0.84 B**	--	--	--	--	--	--	--	--	ND	--
Silver	NV	**0.0**	--	ND	--	--	--	--	--	--	--	--	ND	--
Mercury	**0.1**	0.045	--	ND	--	--	--	--	--	--	--	--	**0.06**	--
Sodium	NV	NP	--	**368 B**	--	--	--	--	--	--	--	--	**68.7**	--
Thallium	NV	**6.3**	--	ND	--	--	--	--	--	--	--	--	ND	--
Vanadium	**150**	27.16	--	**10.1**	--	--	--	--	--	--	--	--	**16.6**	--
Zinc	20	**67.36**	--	**67.2**	--	--	--	--	--	--	--	--	**141**	--
Total Metals			--	**15279.1**	--	--	--	--	--	--	--	--	**42291.88**	--

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled
Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 1
Surface Soil Analytical Results
Camp Summit

			Remedial Investigation											
Metals ***(mg/kg)***	**TAGM**	**BGM Average**	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**SS-5**	**SS-6**	**SS-7**	**SS-8**	**SS-9**	**SS-10**	**SS-11**	**SS-12**
Aluminum	NV	**18866.6**	-	**13700**	**15300**	-	**12800**	-	-	**13800**	-	**14800**	**12400**	**14100**
Antimony	NV	**0.283**	-	**0.91 B**	**0.80 B**	-	**0.66 B**	-	-	**0.70 B**	-	<0.65	**0.65 B**	<0.60
Arsenic	7.5	**9.1**	-	**17.9**	**6.8**	-	**6.5**	-	-	**9.5**	-	**9.3**	**9.2**	**9**
Barium	**300**	54.6	-	**36.7**	**21.6 B**	-	**43.1**	-	-	**24.1**	-	**39**	**23**	**45.9**
Berillium	0.16	**0.54**	-	**0.66**	**0.79**	-	**0.62**	-	-	**0.69**	-	**0.76**	**0.55 B**	**0.66**
Cadmium	**1**	0.15	-	**0.30 B**	**0.33 B**	-	**0.33 B**	-	-	**0.30 B**	-	**0.38 B**	**0.23 B**	**0.38 B**
Calcium	NV	**110.6**	-	**703**	**469 B**	-	**2300**	-	-	**1770**	-	**7830**	**379**	**2360**
Chromium	10	**19.06**	-	**22.5**	**21.7**	-	**19.1**	-	-	**20.6**	-	**22**	**18.1**	**19.8**
Cobalt	**30**	9.33	-	**20.1**	**17.3**	-	**13.3**	-	-	**15.4**	-	**15.1**	**21.9**	**15.2**
Copper	0.25	**10.76**	-	**18.5**	**21.7**	-	**15.5**	-	-	**20**	-	**19.3**	**10.9**	**25.9**
Iron	2000	**30633.3**	-	**32200**	**35800**	-	**29300**	-	-	**33000**	-	**37300**	**29300**	**30700**
Lead	NV	**17.86**	-	**42.1**	**24.1**	-	**21.6**	-	-	**24**	-	**24.9**	**18.1**	**22.8**
Magnesium	NV	**2300**	-	**4060**	**4900**	-	**4080**	-	-	**4870**	-	**5300**	**3960**	**4190**
Manganese	NV	**929**	-	**784**	**428**	-	**939**	-	-	**603**	-	**826**	**726**	**955**
Nickel	13	**14.9**	-	**31.6**	**32.7**	-	**29.3**	-	-	**33.6**	-	**34**	**29.4**	**30.4**
Potassium	NV	**561**	-	**783**	**826**	-	**904**	-	-	**903**	-	**1070**	**729**	**804**
Selenium	**2**	1.5	-	**1.7**	**1.1**	-	**1.2**	-	-	**1.2**	-	**1.8**	**1.1**	**1.2**
Silver	NV	**0.0**	-	<0.09	<0.10	-	<0.10	-	-	<0.10	-	<0.12 U	<0.011	<0.11
Mercury	**0.1**	0.045	-	<0.011	<0.011	-	**0.029 B**	-	-	<0.013	-	**0.014 B**	<0.10	<0.012
Sodium	NV	NP	-	**29.4 B**	**46.6 B**	-	**44.4 B**	-	-	**53.3 B**	-	**85.8**	**30.5**	**43.8 B**
Thallium	NV	**6.3**	-	**4.3**	**5.6**	-	**4.5**	-	-	**5**	-	**5**	**4.6**	**5**
Vanadium	**150**	27.16	-	**18.2**	**13.3**	-	**15.3**	-	-	**16.3**	-	**17.8**	**14.5**	**17.5**
Zinc	20	**67.36**	-	**62.9**	**120**	-	**71.7**	-	-	**70**	-	**124**	**52.5**	**80.9**
Total Metals			-	**52,537.77**	**58,057.42**	-	**50,610.14**	-	-	**52,240.69**	-	**67,525.15**	**47.729.43**	**53,427.44**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Metal Data Qualifiers:

All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 1
Surface Soil Analytical Results
Camp Summit

			Remedial Investigation													
Metals *(mg/kg)*	**TAGM**	**BGM Average**	**SS-13**	**SS-14**	**SS-15**	**SS-16**	**SS-17**	**SS-18**	**SS-19**	**SS-20**	**SS-21**	**SS-22**	**SS-23**	**SS-24**	**SS-25**	**SS-26**
Aluminum	NV	**18866.6**	-	**16700 E**	-	-	**17700 E**	-	**13000 E**	-	**13100 E**	**17900 E**	**13800 E**	**15000 E**	**13500 E**	**19900 E**
Antimony	NV	**0.283**	-	**1.8 B**	-	-	**1.0 B**	-	**0.77 B**	-	**0.70 B**	**1.1 B**	**0.98 B**	**1.3 B**	**0.88 B**	**1.3 B**
Arsenic	7.5	**9.1**	-	**11.6**	-	-	**13.4**	-	**11.6**	-	**10.8**	**12.9**	**9.9**	**13.7**	**9.7**	**13.8**
Barium	**300**	54.6	-	**47.2 E**	-	-	**52.5 E**	-	**42.0 E**	-	**39.7 E**	**75.4 E**	**47.1 E**	**44.4 E**	**42.9 E**	**103 E**
Berillium	0.16	**0.54**	-	**0.97**	-	-	**0.79**	-	**0.65**	-	**0.6**	**0.68 B**	**0.59 B**	**0.7**	**0.63 B**	**1.4**
Cadmium	**1**	0.15	-	**0.39 B**	-	-	**0.19 B**	-	**0.83**	-	**0.20 B**	**0.29 B**	**0.20 B**	**0.19 B**	**0.11 B**	**0.62 B**
Calcium	NV	**110.6**	-	**2900 E**	-	-	**2410 E**	-	**4450 E**	-	**47900 E**	**3060 E**	**2750 E**	**2270 E**	**3450 E**	**3790 E**
Chromium	10	**19.06**	-	**23.6 E**	-	-	**24.0 E**	-	**18.0 E**	-	**17.8 E**	**19.7 E**	**17.2 E**	**19.0 E**	**18.8 E**	**16.8 E**
Cobalt	**30**	9.33	-	**18.1 E**	-	-	**16.69 E**	-	**15.4 E**	-	**12.1 E**	**12.1 E**	**12.1 E**	**17.3 E**	**13.9 E**	**46.2 E**
Copper	0.25	**10.76**	-	**16.5 E**	-	-	**23.5 E**	-	**26.5 E**	-	**15.8 E**	**15.1 E**	**16.6 E**	**25.6 E**	**17.7 E**	**18.8 E**
Iron	2000	**30633.3**	-	**40300 E**	-	-	**39100 E**	-	**29900 E**	-	**31300 E**	**31800 E**	**26700 E**	**31400 E**	**29500 E**	**26700 E**
Lead	NV	**17.86**	-	**26.7 E**	-	-	**27.1 E**	-	**25.9 E**	-	**25.3 E**	**45.9 E**	**25.4 E**	**32.9 E**	**26.7 E**	**104 E**
Magnesium	NV	**2300**	-	**5060 E**	-	-	**4890 E**	-	**5400 E**	-	**5570 E**	**2970 E**	**3120 E**	**3690 E**	**4170 E**	**190 E**
Manganese	NV	**929**	-	**1180 E**	-	-	**1130 E**	-	**821 E**	-	**646 E**	**1240 E**	**1150 E**	**1950 E**	**828 E**	**4510 E**
Nickel	13	**14.9**	-	**35.3 E**	-	-	**36.4 E**	-	**29.0 E**	-	**29.5 E**	**21.4 E**	**23.0 E**	**30.0 E**	**29.1 E**	**17.6 E**
Potassium	NV	**561**	-	**1410**	-	-	**1150**	-	**988**	-	**941**	**970**	**959**	**950**	**1120**	**889 B**
Selenium	**2**	1.5	-	**2.2**	-	-	**1.7**	-	**1.4**	-	**1.3**	**2**	**1.7**	**1.6**	**1.4**	**2.7**
Silver	NV	**0.0**	-	**0.28 B**	-	-	<0.12	-	<0.10	-	<0.09	<0.13	<0.12	<0.11	<0.12	**0.21 B**
Mercury	**0.1**	0.045	-	**0.044 B**	-	-	**0.037 B**	-	**0.034 B**	-	<0.010	**0.048 B**	<0.014	<0.012	<0.015	**0.256**
Sodium	NV	NP	-	**56.7 B**	-	-	**61.5 B**	-	**56.5 B**	-	**95.7 B**	**139 B**	**161 B**	**73.4 B**	**91.2 B**	<59.9
Thallium	NV	**6.3**	-	**3.5**	-	-	**3**	-	**1.7**	-	<0.53	**2.7**	**2.2**	**2**	**1.6**	**3.3**
Vanadium	**150**	27.16	-	**19.5 E**	-	-	**21.7 E**	-	**15.5 E**	-	**15.3 E**	**25.3 E**	**18.5 E**	**19.1 E**	**16.7 E**	**26.5 E**
Zinc	20	**67.36**	-	**122 E**	-	-	**131 E**	-	**255 E**	-	**79.4 E**	**106 E**	**101 E**	**86.5 E**	**129 E**	**96.5 E**
Total Metals			-	**67,936.38**	-	-	**66,749.51**	-	**55,059.78**	-	**99,801.20**	**58,419.62**	**48,916.47**	**55,627.69**	**52,968.32**	**56,431.99**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 1
Surface Soil Analytical Results
Camp Summit

			Remedial Investigation										
Metals *(mg/kg)*	**TAGM**	**BGM Average**	**SS-27**	**SS-28**	**SS-29**	**BGM-1**	**BGM-2**	**BGM-3**	**BGM03-1**	**BGM03-2**	**BGM03-3**	**BGM03-4**	**BGM03-5**
Aluminum	NV	**18866.6**	**14800 E**	**16200 E**	**14200 E**	**21800 E***	**17800 E***	**17000 E***	-	-	-	-	-
Antimony	NV	**0.283**	**1.3 B**	**0.75 B**	<0.71	**0.85 BN**	<6.9 N	<8.0 N	-	-	-	-	-
Arsenic	7.5	**9.1**	**10.8**	**9.8**	**5.8**	**8.6**	**8.2**	**10.5**	-	-	-	-	-
Barium	**300**	54.6	**91.0 E**	**51.7 E**	**52.1 E**	**50.3 E***	**54.4 E***	**59.3 E***	-	-	-	-	-
Berillium	0.16	**0.54**	**0.85**	**0.72**	**0.62 B**	**0.57 B**	**0.46 B**	**0.60 B**	-	-	-	-	-
Cadmium	**1**	0.15	**0.47 B**	**0.09 B**	**0.18 B**	**0.16 B**	**0.17 B**	**0.12 B**	-	-	-	-	-
Calcium	NV	**110.6**	**2710 E**	**475 BE**	**845 E**	**128 B**	**81.0 B**	**123 B**	-	-	-	-	-
Chromium	10	**19.06**	**15.2 E**	**17.4 E**	**15.7 E**	**21.0 E***	**18.2 E***	**18.0 E***	-	-	-	-	-
Cobalt	**30**	9.33	**28.4 E**	**23.1 E**	**14.2 E**	**7.1 E**	**10.5 E**	**10.4 E**	-	-	-	-	-
Copper	0.25	**10.76**	**11.6 E**	**9.4 E**	**6.7 E**	**9.2 E**	**8.2 E**	**14.9 E**	-	-	-	-	-
Iron	2000	**30633.3**	**23900 E**	**23300 E**	**20000 E**	**32700E***	**27700 E***	**31500 E***	-	-	-	-	-
Lead	NV	**17.86**	**51.2 E**	**37.2 E**	**30.3 E**	**15.7**	**22.1**	**15.8**	-	-	-	-	-
Magnesium	NV	**2300**	**1980 E**	**2630 E**	**2510 E**	**2260 E**	**2090 E**	**2550 E**	-	-	-	-	-
Manganese	NV	**929**	**1410 E**	**393 E**	**411 E**	**330 E***	**1500 E***	**957 E***	-	-	-	-	-
Nickel	13	**14.9**	**16.8 E**	**17.3 E**	**15.9 E**	**14.2 E**	**13.0 E**	**17.6 E**	-	-	-	-	-
Potassium	NV	**561**	**751 B**	**798**	**773**	**565 B**	**574 B**	**544 B**	-	-	-	-	-
Selenium	**2**	1.5	**1.9**	**1.8**	**1.3**	**1.5***	**1.5 ***	**1.5 ***	-	-	-	-	-
Silver	NV	**0.0**	**0.2 B**	<0.12	<0.12	<1.2	<1.2	<1.3	-	-	-	-	-
Mercury	**0.1**	0.045	**0.13**	**0.046**	**0.018 B**	**0.044 B**	**0.072**	**0.018 B**	-	-	-	-	-
Sodium	NV	NP	**61.1 B**	**37.1 B**	**41.8 B**	<606	<577	<671	-	-	-	-	-
Thallium	NV	**6.3**	**1.9**	**1.3 B**	**2.5**	**6.4***	**6.5***	**6.1***	-	-	-	-	-
Vanadium	**150**	27.16	**23.8 E**	**23.7 E**	**21.6 E**	**31.6 E***	**26.7 E***	**23.2 E***	-	-	-	-	-
Zinc	20	**67.36**	**112 E**	**107 E**	**93.3 E**	**70.2 E***	**63.3 E***	**68.6 E***	-	-	-	-	-
Total Metals			**45,979.65**	**44,134.41**	**39,041.02**	**58,020.72**	**49,978.30**	**52,920.64**	-	-	-	-	-

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Metal Data Qualifiers:

All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 1
Surface Soil Analytical Results
Camp Summit

		Preliminary Investigation											
Dioxins ***(ng/g)***	**TEFs**	**SS-4**	**SS-6**	**SS-8**	**SS-9**	**SS-19**	**SS-20**	**SS-25**	**SS-26**	**SS-29**	**SS-32**	**SS-36**	**SS-38**
Total TCDF	NP	**0.0173**	--	**0.057**	**0.0542**	**0.0718**	**0.0379**	**0.118**	**0.028**	**0.0544**	**0.0643**	--	**0.0857**
Total PeCDF	NP	**0.0976**	--	**0.179**	**0.189**	**0.312**	**0.174**	**0.601**	**0.143**	**0.235**	**0.24**	--	**0.59**
TotalHxCDF	NP	**0.758**	--	**1.38**	**1.78**	**3**	**1.58**	**8.03**	**1.61**	**2.08**	**2.29**	--	**7.99**
Total HpCDF	NP	**6.46**	--	**11.6**	**14.1**	**18.9**	**18.1**	**57.2**		**12.8**	**17.5**	--	**61.8**
Total TCDD	NP	**0.0173**	--	**0.0432**	**0.0432**	**0.0773**	**0.035**	**0.141**	**0.0363**	**0.0323**	**0.0507**	--	**0.212**
Total PeCDD	NP	**0.0709**	--	**0.23**	**0.23**	**0.442**	**0.211**	**0.949**	**0.219**	**0.112**	**0.189**	--	**1.01**
Total HxCDD	NP	**0.82**	--	**1.84**	**2.3**	**3.92**	**1.85**	**3.93**	**1.97**	**2.07**	**2.66**	--	**6.8**
Total HpCDD	NP	**2.79**	--	**5.89**	**4.73**	**6.54**	**4.98**	**37.8**	**2.11**	**4.71**	**7.27**	--	**50**
2,3,7,8-TCDD	1	**0.00401**	--	**0.0082**	**0.00683**	**0.0138**	**0.00748**	**0.0225**	**0.00507**	**0.00835**	**0.0124**	--	**0.0144**
1,2,3,7,8-PeCDD	0.5	**0.0201**	--	**0.0433**	**0.0425**	**0.0889**	**0.0441**	**0.185**	**0.0446**	**0.0621**	**0.0576**	--	**0.141**
1,2,3,4,7,8-HxCDD	0.1	**0.0433**	--	**0.0943**	**0.107**	**0.203**	**0.105**	**0.452**	**0.123**	**0.137**	**0.0957**	--	**0.265**
1,2,3,6,7,8-HxCDD	0.1	**0.132**	--	**0.268**	**0.399**	**0.635**	**0.665**	**2.08**	**0.37**	**0.477**	**0.616**	--	**2.42**
1,2,3,7,8,9-HxCDD	0.1	**0.0748**	--	**0.192**	**0.208**	**0.399**	**0.212**	**1.03**	**0.225**	**0.29**	**0.227**	--	**0.707**
1,2,3,4,6,7,8-HpCDD	0.01	**3.84**	--	**7.01**	**8.93**	**12.1**	**11.3**	**37.7**		**8.26**	**11.5**	--	**41**
OCDD	0.0001	**24.1**	--	**29**	**53.7**	**61.4**	**75.4**	**159**		**64.3**	**96.8**	--	**426**
2,3,7,8-TCDF	0.1	**0.0012**	--	**0.0032**	**0.00314**	**0.00424**	**0.00199**	**0.00758**	**0.00159**	**0.00211**	**0.0041**	--	**0.0233**
1,2,3,7,8-PeCDF	0.05	**0.0033**	--	**0.0102**	**0.0103**	**0.0145**	**0.00677**	**0.0251**	**0.00477**	**0.00575**	**0.0124**	--	**0.0788**
2,3,4,7,8-PeCDF	0.5	**0.00301**	--	**0.00671**	**0.00829**	**0.0123**	**0.00478**	**0.0235**	**0.00435**	**0.00512**	**0.009**	--	**0.0753**
1,2,3,4,7,8-HxCDF	0.1	**0.0191**	--	**0.0456**	**0.0518**	**0.0862**	**0.0421**	**0.193**	**0.0408**	**0.0434**	**0.062**	--	**0.491**
1,2,3,6,7,8-HxCDF	0.1	**0.0169**	--	**0.0383**	**0.0377**	**0.077**	**0.0351**	**0.159**	**0.0329**	**0.0394**	**0.0466**	--	**0.313**
2,3,4,6,7,8-HxCDF	0.1	**0.00571**	--	**0.00202**	<1.90	<2.84	<3.55	<22.9	<4.25	**0.00194**	<3.3	--	<14.6
1,2,3,7,8,9-HxCDF	0.1	**0.0144**	--	**0.0294**	**0.0264**	**0.0568**	**0.0283**	**0.148**	**0.028**	**0.0317**	**0.0375**	--	**0.195**
1,2,3,4,6,7,8-HpCDF	0.01	**0.746**	--	**1.78**	**2**	**3.49**	**1.79**	**9.07**	**2**	**2.34**	**2.98**	--	**12.7**
1,2,3,4,7,8,9-HpCDF	0.01	**0.0415**	--	**0.0815**	**0.0997**	**0.193**	**0.0995**	**0.505**	**0.0856**	**0.125**	**0.165**	--	**0.508**
OCDF	0.0001	**3.1**	--	**3.95**	**9.42**	**8.77**	**7.09**	**29.3**		**7.42**	**9.31**	--	**58.4**
2,3,7,8-TCDD Equivalence	1	**0.12**	--	**0.102**	**0.289**	**0.439**	**0.323**	**1.196**	**0.317**	**0.323**	**0.408**	--	**1.594**

Notes:

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

< = Below MDL

-- = Not Sampled

Dioxin Data Qualifiers:

All results in ng/kg or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 1
Surface Soil Analytical Results
Camp Summit

		Preliminary Investigation											
Dioxins *(ng/g)*	**TEFs**	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**SS-5**	**SS-6**	**SS-7**	**SS-8**	**SS-9**	**SS-10**	**SS-11**	**SS-12**
Total TCDF	NP	<0.084	**0.012**	<0.00044	-	**0.0067**	-	-	**0.0091**	-	**0.018**	**0.013**	**0.13**
Total PeCDF	NP	<0.18	**0.068**	**0.0084**	-	**0.13**	-	-	**0.14**	-	**0.12**	**0.14**	**2.3**
TotalHxCDF	NP	<0.61	**0.53**	**0.2**	-	**1.5**	-	-	**1.3**	-	**1.1**	**1.6**	**24**
Total HpCDF	NP	**3.3**	**1.6**	**1.5**	-	**6.7**	-	-	**4.3**	-	**4.8**	**6.3**	**110**
Total TCDD	NP	<0.042	**0.0039**	<0.00044	-	**0.017**	-	-	**0.011**	-	**0.04**	**0.0074**	**0.15**
Total PeCDD	NP	<0.21	**0.057**	**0.003**	-	**0.099**	-	-	**0.1**	-	**0.23**	**0.091**	**0.93**
Total HxCDD	NP	<0.39	**0.46**	**0.19**	-	**1.2**	-	-	**1.2**	-	**1.5**	**1.4**	**17**
Total HpCDD	NP	**13**	**4.3**	**3.4**	-	**12**	-	-	**10**	-	**12**	**14**	**280**
2,3,7,8-TCDD	1	<0.042	**0.0014**	<0.00029	-	**0.0047**	-	-	**0.0044**	-	**0.008**	**0.0031**	**0.042**
1,2,3,7,8-PeCDD	0.5	<0.21	**0.012**	**0.003 J**	-	**0.03**	-	-	**0.038**	-	**0.047**	**0.037**	**0.28**
1,2,3,4,7,8-HxCDD	0.1	<0.57	**0.021**	**0.0089**	-	**0.064**	-	-	**0.075**	-	**0.08**	**0.093**	**0.78 D**
1,2,3,6,7,8-HxCDD	0.1	<0.56	**0.099**	**0.055**	-	**0.32**	-	-	**0.27**	-	**0.29**	**0.37**	**4.7 D**
1,2,3,7,8,9-HxCDD	0.1	<0.55	**0.054**	**0.022**	-	**0.16**	-	-	**0.17**	-	**0.2**	**0.23**	**2.1 D**
1,2,3,4,6,7,8-HpCDD	0.01	**7.9**	**2.7 E**	**2.2 E**	-	**7.6 D**	-	-	**6.5 E**	-	**7.2 E**	**8.9 D**	**180 DE**
OCDD	0.0001	**54**	**15 E**	**20.0 E**	-	**55.0 D**	-	-	**38 E**	-	**51 E**	**44.0 D**	**930 DE**
2,3,7,8-TCDF	0.1	<0.084	**0.0096 JCON**	<0.00018	-	**0.0014 CON**	-	-	**0.0011 JCON**	-	**0.0014**	**0.0012 CON**	**0.028 CON**
1,2,3,7,8-PeCDF	0.05	<0.18	**0.0039 J**	<0.00044	-	**0.012**	-	-	**0.01**	-	**0.0082**	**0.0085**	**0.19**
2,3,4,7,8-PeCDF	0.5	<0.18	**0.0035 J**	<0.00023	-	**0.0078**	-	-	**0.0061**	-	**0.0079**	**0.0059**	**0.12**
1,2,3,4,7,8-HxCDF	0.1	<0.059	**0.018**	**0.0041 J**	-	**0.041**	-	-	**0.034**	-	**0.037**	**0.042**	**0.74**
1,2,3,6,7,8-HxCDF	0.1	<0.059	**0.013**	**0.003 J**	-	**0.028**	-	-	**0.03**	-	**0.022**	**0.037**	**0.33**
2,3,4,6,7,8-HxCDF	0.1	<0.068	**0.012**	<0.0025	-	**0.022**	-	-	**0.025**	-	**0.018**	**0.023**	**0.25**
1,2,3,7,8,9-HxCDF	0.1	<0.068	<0.00079	<0.00085	-	<0.0025	-	-	<0.0017	-	<0.002	<0.0021	**0.045**
1,2,3,4,6,7,8-HpCDF	0.01	**0.87 J**	**0.46**	**0.32**	-	**1.5**	-	-	**1.2**	-	**1.1**	**1.5**	**24 D**
1,2,3,4,7,8,9-HpCDF	0.01	<0.14	**0.025**	**0.017**	-	**0.081**	-	-	**0.061**	-	**0.072**	**0.085**	**1.6 D**
OCDF	0.0001	**2.6 J**	**1.5**	**1.8**	-	**5.8**	-	-	**4**	-	**5**	**5.0 D**	**95 D**
2,3,7,8-TCDD Equivalence	1	**0.09336 J**	**0.06551 EJ**	**0.03835 J**	-	**0.18573**	-	-	**0.16927 E**	-	**0.19002 E**	**0.214345 D**	**3.3073 DE**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 1
Surface Soil Analytical Results
Camp Summit

		Remedial Investigation													
Dioxins *(ng/g)*	**TEFs**	**SS-13**	**SS-14**	**SS-15**	**SS-16**	**SS-17**	**SS-18**	**SS-19**	**SS-20**	**SS-21**	**SS-22**	**SS-23**	**SS-24**	**SS-25**	**SS-26**
Total TCDF	NP	-	**0.03**	-	-	**0.093**	-	**0.25**	-	**0.0089**	**0.033**	**0.12**	**0.041**	**0.039**	**0.034**
Total PeCDF	NP	-	**0.28**	-	-	**1.4**	-	**3**	-	**0.086**	**0.29**	**1.4**	**0.53**	**0.55**	**0.019**
TotalHxCDF	NP	-	**2.5**	-	-	**17**	-	**38**	-	**0.82**	**4.5**	**24**	**4.4**	**4.1**	**0.049**
Total HpCDF	NP	-	**10**	-	-	**89**	-	**140**	-	**2.9**	**25**	**120**	**14**	**12**	**0.11**
Total TCDD	NP	-	**0.021**	-	-	**0.11**	-	**0.071**	-	**0.023**	**0.026**	**0.11**	**0.057**	**0.077**	**0.0048**
Total PeCDD	NP	-	**0.17**	-	-	**0.84**	-	**0.69**	-	**0.11**	**0.25**	**0.96**	**0.44**	**0.45**	**0.0057**
Total HxCDD	NP	-	**2**	-	-	**14**	-	**15**	-	**0.85**	**4.6**	**20**	**3.6**	**3.8**	**0.05**
Total HpCDD	NP	-	**19**	-	-	**210**	-	**200**	-	**7**	**72**	**320**	**36**	**34**	**0.26**
2,3,7,8-TCDD	1	-	**0.005**	-	-	**0.021**	-	**0.016**	-	**0.0071**	**0.0049**	**0.022**	**0.014**	**0.017**	<0.00045
1,2,3,7,8-PeCDD	0.5	-	**0.049**	-	-	**0.31**	-	**0.24**	-	**0.03**	**0.088**	**0.32**	**0.1**	**0.095**	<0.0017
1,2,3,4,7,8-HxCDD	0.1	-	**0.1**	-	-	**0.92**	-	**0.56**	-	**0.042**	**0.24**	**0.81**	**0.16**	**0.19**	<0.0026
1,2,3,6,7,8-HxCDD	0.1	-	**0.51**	-	-	**3.7 E**	-	**5.6 E**	-	**0.16**	**1.4**	**6.5 E**	**0.88**	**0.91**	**0.0081**
1,2,3,7,8,9-HxCDD	0.1	-	**0.26**	-	-	**2.2**	-	**1.4**	-	**0.1**	**0.62**	**2.2**	**0.44**	**0.48**	**0.0065 J**
1,2,3,4,6,7,8-HpCDD	0.01	-	**12 D**	-	-	**140 DE**	-	**130 DE**	-	**4.1 E**	**47 D**	**210 DE**	**23 D**	**21 D**	**0.16**
OCDD	0.0001	-	**89 D**	-	-	**690 DE**	-	**770 DE**	-	**30 E**	**200 D**	**1200 DE**	**130 DE**	**170 DE**	**0.94**
2,3,7,8-TCDF	0.1	-	**0.0021 CON**	-	-	**0.011 CON**	-	**0.014 CON**	-	**0.00089 JCON**	**0.0029 CON**	**0.013 CON**	**0.005 CON**	**0.0052 CON**	**0.0027 CON**
1,2,3,7,8-PeCDF	0.05	-	**0.017**	-	-	**0.067**	-	**0.15**	-	**0.0065**	**0.017**	**0.085**	**0.036**	**0.032**	<0.003
2,3,4,7,8-PeCDF	0.5	-	**0.011**	-	-	**0.045**	-	**0.13**	-	**0.0041 J**	**0.014**	**0.062**	**0.024**	**0.022**	<0.0031
1,2,3,4,7,8-HxCDF	0.1	-	**0.069**	-	-	**0.39**	-	**1.7**	-	**0.021**	**0.1**	**0.52**	**0.13**	**0.12**	**0.0053 J**
1,2,3,6,7,8-HxCDF	0.1	-	**0.051**	-	-	**0.24**	-	**0.78**	-	**0.015**	**0.08**	**0.36**	**0.088**	**0.096**	<0.0034
2,3,4,6,7,8-HxCDF	0.1	-	**0.033**	-	-	**0.2**	-	**0.51**	-	**0.0096**	**0.058**	**0.24**	**0.052**	**0.053**	**0.0038 J**
1,2,3,7,8,9-HxCDF	0.1	-	<0.0031	-	-	**0.017**	-	**0.075**	-	<0.0023	**0.0048 J**	**0.026**	**0.0085**	**0.0082**	<0.00042
1,2,3,4,6,7,8-HpCDF	0.01	-	**2.5**	-	-	**21 D**	-	**38 D**	-	**0.63**	**5.7 D**	**24 D**	**3.3 D**	**3.9 E**	**0.043**
1,2,3,4,7,8,9-HpCDF	0.01	-	**0.13**	-	-	**1.1 D**	-	**2.9 D**	-	**0.042**	**0.29 D**	**1.1 D**	**0.18 D**	**0.23**	<0.0029
OCDF	0.0001	-	**9.2 D**	-	-	**84 D**	-	**88 D**	-	**2.9**	**25 D**	**130 D**	**13 D**	**18 D**	**0.12**
2,3,7,8-TCDD Equivalence	1	-	**0.29448 D**	-	-	**2.66805 DE**	-	**3.0672 DE**	-	**0.110334 JE**	**0.85972 JD**	**3.76815 DE**	**0.53325 DE**	**0.53344 DE**	**0.00478 J**

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Dioxin Data Qualifiers:

All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 1
Surface Soil Analytical Results
Camp Summit

		Remedial Investigation										
Dioxins ***(ng/g)***	**TEFs**	**SS-27**	**SS-28**	**SS-29**	**BGM-1**	**BGM-2**	**BGM-3**	**BGM03-1**	**BGM03-2**	**BGM03-3**	**BGM03-4**	**BGM03-5**
Total TCDF	NP	-	-	-	-	-	-	<0.03	<0.02	<0.03	<0.02	<0.02
Total PeCDF	NP	-	-	-	-	-	-	<0.06	<0.05	<0.05	<0.05	<0.03
TotalHxCDF	NP	-	-	-	-	-	-	<0.05	<0.07	<0.07	**0.12**	<0.02
Total HpCDF	NP	-	-	-	-	-	-	<0.07	<0.09	<0.12	**1.1**	**0.29**
Total TCDD	NP	-	-	-	-	-	-	<0.03	<0.03	<0.03	<0.03	<0.03
Total PeCDD	NP	-	-	-	-	-	-	<0.04	<0.03	<0.04	<0.04	<0.05
Total HxCDD	NP	-	-	-	-	-	-	<0.06	<0.10	<0.10	<0.10	<0.05
Total HpCDD	NP	-	-	-	-	-	-	<0.12	**0.42**	**0.22**	**2.5**	**0.7J**
2,3,7,8-TCDD	1	-	-	-	-	-	-	<0.03	<0.03	<0.03	<0.03	<0.03
1,2,3,7,8-PeCDD	0.5	-	-	-	-	-	-	<0.04	<0.03	<0.04	<0.04	<0.05
1,2,3,4,7,8-HxCDD	0.1	-	-	-	-	-	-	<0.06	<0.10	<0.10	<0.10	<0.05
1,2,3,6,7,8-HxCDD	0.1	-	-	-	-	-	-	<0.05	<0.08	<0.08	<0.09	<0.04
1,2,3,7,8,9-HxCDD	0.1	-	-	-	-	-	-	<0.05	<0.08	<0.08	<0.09	<0.04
1,2,3,4,6,7,8-HpCDD	0.01	-	-	-	-	-	-	<0.12	**0.28**	**0.15**	**1.7**	**0.46J**
OCDD	0.0001	-	-	-	-	-	-	**0.36J**	**1.8**	**1.1**	**8.1**	**3.4**
2,3,7,8-TCDF	0.1	-	-	-	-	-	-	<0.03	<0.02	<0.03	<0.02	<0.02
1,2,3,7,8-PeCDF	0.05	-	-	-	-	-	-	<0.06	<0.05	<0.05	<0.05	<0.03
2,3,4,7,8-PeCDF	0.5	-	-	-	-	-	-	<0.06	<0.05	<0.05	<0.05	<0.03
1,2,3,4,7,8-HxCDF	0.1	-	-	-	-	-	-	<0.05	<0.06	<0.07	<0.04	<0.02
1,2,3,6,7,8-HxCDF	0.1	-	-	-	-	-	-	<0.04	<0.05	<0.06	<0.04	<0.02
2,3,4,6,7,8-HxCDF	0.1	-	-	-	-	-	-	<0.05	<0.06	<0.07	<0.04	<0.02
1,2,3,7,8,9-HxCDF	0.1	-	-	-	-	-	-	<0.05	<0.07	<0.07	<0.04	<0.02
1,2,3,4,6,7,8-HpCDF	0.01	-	-	-	-	-	-	<0.06	<0.08	<0.10	**0.28**	**0.07J**
1,2,3,4,7,8,9-HpCDF	0.01	-	-	-	-	-	-	<0.07	<0.09	<0.12	<0.07	<0.03
OCDF	0.0001	-	-	-	-	-	-	<0.05	**0.15**	**0.06**	**1.2**	**0.4J**
2,3,7,8-TCDD Equivalence	1	-	-	-	-	-	-	**0.000036**	**0.002995**	**0.001616**	**0.02073**	**0.00568**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 1
Surface Soil Analytical Results
Camp Summit

		Remedial Investigation				
Dioxins *(ng/g)*	**TEFs**	**BGM03-6**	**BGM03-7**	**BGM03-8**	**BGM03-9**	**BGM03-10**
Total TCDF	NP	<0.03	<0.03	<0.38	<0.04	<0.06
Total PeCDF	NP	<0.04	<0.06 JS	<0.51	<0.07	<0.13
TotalHxCDF	NP	<0.03	2.3 S	<0.33	<0.06	<0.07
Total HpCDF	NP	**0.68 JS**	**16**	<1.5	**0.73 JS**	**1.4 JS**
Total TCDD	NP	<0.06	<0.04	<0.40	<0.05	<0.07
Total PeCDD	NP	<0.05	<0.14	<0.63	<0.06	<0.10
Total HxCDD	NP	<0.04	**1.8 JS**	<1.0	<0.26	<0.11
Total HpCDD	NP	**2.1**	**42 E/ 41**	**4.5**	**2.7**	**4.1**
2,3,7,8-TCDD	1	<0.06	<0.04	<0.40	<0.05	<0.07
1,2,3,7,8-PeCDD	0.5	<0.05	<0.14	<0.63	<0.06	<0.10
1,2,3,4,7,8-HxCDD	0.1	<0.04	**0.1 JS**	<1.0	<0.26	<0.11
1,2,3,6,7,8-HxCDD	0.1	<0.03	**0.47 JS**	<0.75	<0.19	<0.08
1,2,3,7,8,9-HxCDD	0.1	<0.03	**0.21 JS**	<0.82	<0.21	<0.09
1,2,3,4,6,7,8-HpCDD	0.01	**1.3**	**28 E/ 27**	<4.5	**1.7**	**2.6**
OCDD	0.0001	**6.2 B**	**162 EB/160 B**	**6.5 B**	**9.0 B**	**14 B**
2,3,7,8-TCDF	0.1	<0.03	<0.03	<0.38	<0.04	<0.06
1,2,3,7,8-PeCDF	0.05	<0.04	<0.06	<0.51	<0.07	<0.13
2,3,4,7,8-PeCDF	0.5	<0.04	<0.06	<0.50	<0.07	<0.13
1,2,3,4,7,8-HxCDF	0.1	<0.03	**0.04 JS**	<0.28	<0.05	<0.06
1,2,3,6,7,8-HxCDF	0.1	<0.03	<0.03	<0.24	<0.04	<0.05
2,3,4,6,7,8-HxCDF	0.1	<0.03	**0.02 JS**	<0.30	<0.05	<0.07
1,2,3,7,8,9-HxCDF	0.1	<0.03	<0.04	<0.33	<0.06	<0.07
1,2,3,4,6,7,8-HpCDF	0.01	**0.18 JS**	**3.2**	<1.0	**0.20 JS**	**0.32 JS**
1,2,3,4,7,8,9-HpCDF	0.01	<0.09	<0.05	<01.5	<0.07	<0.16
OCDF	0.0001	**0.63 JB**	**0.15**	**0.51 JB**	**0.66 JB**	**1.1 JB**
2,3,7,8-TCDD Equivalence	1	**0.015483**	**0.402015**	**0.000701**	**0.019966**	**0.03071**

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
< = Below MDL
-- = Not Sampled

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 2
Sediment Analytical Data
Camp Summit

Analyte	NYSDEC Guidance Criteria	**Preliminary Investigation**										
SVOCs (mg/kg or ppm)		**SED-1**	**SED-2**	**SED-3**	**SED-4**	**SED-5**	**SED-6A**	**SED-6B**	**SED-6C**	**SED-7A**	**SED-7B**	**SED-8**
Phenanthrene	84.41	ND	ND	**1.2**	ND	ND	--	--	--	--	--	--
Anthracene	84.41	ND	ND	**0.29 J**	ND	ND	--	--	--	--	--	--
Carbazole	NA	--	--	--	--	--	--	--	--	--	--	--
Fluoranthrene	463.87	ND	**0.29 J**	**2.1**	ND	ND	--	--	--	--	--	--
Pyrene	625.7	ND	**0.29 J**	**2**	ND	ND	--	--	--	--	--	--
Benzo(a) anthracene	1220.1	ND	ND	**0.92 J**	ND	ND	--	--	--	--	--	--
Chrysene	0.4**	ND	**0.2 J**	**1.1**	ND	ND	--	--	--	--	--	--
Benzo (I) fluoranthene	1.1**	ND	ND	**0.82 J**	ND	ND	--	--	--	--	--	--
Benzo (k) fluoranthene	1.1**	--	--	--	--	--	--	--	--	--	--	--
Benzo (b) fluoranthene	1.1**	ND	ND	**0.88 J**	ND	ND	--	--	--	--	--	--
Benzo (a) pyrene	3179.8	ND	ND	**0.78 J**	**0.53 J**	ND	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3.2**	ND	ND	**0.34 J**	ND	ND	--	--	--	--	--	--
Benzo(ghi) perylene	800.0**	ND	ND	**0.34 J**	ND	ND	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	597.6	ND	ND	**0.41 J**	ND	ND	--	--	--	--	--	--
Pentachlorophenol	299.5	**1.9 U**	**1.0 J**	**3.7 J**	**2.2 U**	**28.0 U**	**0.12**	**0.1**	**<0.1**	**0.4**	**0.4**	**0.1**
Di-n-octyl phthalate	120**	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	8.1	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	217	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7.02	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	122.0**	--	--	--	--	--	--	--	--	--	--	--
Total SVOCs	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Criteria used PIR and if no sediment criteria available used TAGM 4046 criteria for protection of groundwater
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
** = TAGM 4046 Value; Soil clean-up objective for the protection of groundwater

SVOC Data Qualifiers:
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 2
Sediment Analytical Data
Camp Summit

		Preliminary Investigation		Remedial Investigation								
Dioxins (ng/g or ppb)	**TEF**	**SED-3**	**SED-10A**	**DSED-1**	**DSED-2**	**DSED-3**	**SED-1**	**SED-2**	**SED-3**	**SED-4**	**SED-5**	**SED-6**
Total TCDF	-	**0.77**	**1.07**	<0.12	<0.12	<0.14	<0.14	<0.096	<0.14	<0.13	<0.097	<0.18
Total PeCDF	-	**2.41**	**3.43**	<0.097	<0.34	<0.17	<0.080	<0.010	<0.039	<0.22	<0.071	<0.18
TotalHxCDF	-	**15.2**	**20.2**	<0.064	<0.35	<0.17	<0.072	<0.0077	<0.11	<0.12	<0.051	<0.38
Total HpCDF	-	**101**	**86.7**	<0.22	<0.64	<0.49	<0.078	<0.011	<0.33	<0.061	<0.033	<0.31
Total TCDD	-	**0.421**	**0.81**	<0.043	<0.15	<0.065	<0.041	<0.016	<0.026	<0.067	<0.051	<0.059
Total PeCDD	-	**1.19**	**1.83**	<0.14	<0.38	<0.16	<0.082	<0.027	<0.11	<0.19	<0.19	<0.54
Total HxCDD	-	**10.5**	**22.5**	<0.093	<0.45	<0.21	<0.19	<0.017	<0.10	<0.32	<0.12	<0.23
Total HpCDD	-	**65.6**	**55.8**	<0.051	<0.59	<1.1	<0.20	<0.023	<0.58	<0.11	<0.040	<0.39
2,3,7,8-TCDD	1	**0.0306**	**0.0492**	<0.043	<0.015	<0.065	<0.041	<0.016	<0.026	<0.067	<0.051	<0.059
1,2,3,7,8-PeCDD	0.14	**0.243**	**0.331**	<0.14	<0.38	<0.16	<0.082	<0.027	<0.11	<0.19	<0.19	<0.54
1,2,3,4,7,8-HxCDD	0.0048	**0.584**	**0.815**	<0.097	<0.46	<0.22	<0.19	<0.018	<0.11	<0.33	<0.12	<0.24
1,2,3,6,7,8-HxCDD	0.0016	**3.34**	**3.31**	<0.096	<0.46	<0.22	<0.19	<0.018	<0.11	<0.33	<0.12	<0.23
1,2,3,7,8,9-HxCDD	0.0016	**1.49**	**2.09**	<0.093	<0.45	<0.21	<0.19	<0.017	<0.10	<0.32	<0.12	<0.23
1,2,3,4,6,7,8-HpCDD	0.000032	**65.6**	**53.2**	<0.51	<0.59	<1.1	<0.20	<0.023	<0.58	<0.11	<0.040	<0.39
OCDD	0.000000025	**459**	**43.2**	<1.6	**3.1 J**	**8.4**	<0.61	<0.061	**4.7 J**	<0.73	<0.090	<1.7
2,3,7,8-TCDF	0.25	**0.0241**	**0.0396**	<0.12	<0.12	<0.14	<0.14	<0.096	<0.14	<0.13	<0.097	<0.18
1,2,3,7,8-PeCDF	0.010	**0.0802**	**0.0998**	<0.098	<0.34	<0.17	<0.081	<0.010	<0.040	<0.23	<0.072	<0.19
2,3,4,7,8-PeCDF	0.80	**0.0592**	**0.0691**	<0.097	<0.34	<0.17	<0.080	<0.010	<0.039	<0.22	<0.071	<0.18
1,2,3,4,7,8-HxCDF	0.0025	**0.451**	**0.532**	<0.064	<0.35	<0.17	<0.072	<0.0077	<0.0066	<0.12	<0.051	<0.095
1,2,3,6,7,8-HxCDF	0.0063	**0.332**	**0.518**	<0.064	<0.35	<0.17	<0.072	<0.0077	<0.0066	<0.12	<0.051	<0.095
2,3,4,6,7,8-HxCDF	0.022	<26.4	<25	<0.075	<0.41	<0.20	<0.083	<0.0090	<0.0076	<0.14	<0.060	<0.11
1,2,3,7,8,9-HxCDF	0.019	**0.252**	**0.363**	<0.075	<0.41	<0.20	<0.083	<0.0090	<0.0076	<0.14	<0.060	<0.11
1,2,3,4,6,7,8-HpCDF	0.000010	**16.1**	**16.6**	<0.22	<0.64	<0.24	<0.078	<0.011	<0.097	<0.061	<0.033	<0.31
1,2,3,4,7,8,9-HpCDF	0.00040	**0.677**	**0.894**	<0.28	<0.81	<0.52	<0.099	<0.014	<0.0031	<0.077	<0.041	<0.40
OCDF	0.000000032	**62.9**	**48.4**	<0.30	<1.2	<1.0	<0.084	<0.058	<0.20	<0.087	<0.093	<0.54
2,3,7,8-TCDD Equivalence	-	2.68	1.82	BDL	**0.000000077**	**0.00000021**	BDL	BDL	**0.00000012**	BDL	BDL	BDL
Total Organic Carbon %	-	32.7	34.9	50.4	40.6	3.83	78.5	30.3	15.8	61	48.6	---
Site-specific Benchmark	-	0.00654	0.00698	0.01008	0.00812	0.000766	0.0157	0.00606	0.00316	0.0122	0.00972	---

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 2
Sediment Analytical Data
Camp Summit

Analyte		**Preliminary Investigation**	**Remedial Investigation**									
Metals (mg/kg)		**SED-10A**	**DSED-1**	**DSED-2**	**DSED-3**	**SED-1**	**SED-2**	**SED-3**	**SED-4**	**SED-5**	**SED-6**	**SED-7**
Aluminum	33000"	28900	---	---	---	---	---	---	---	---	---	---
Antimony	N/A"	ND	---	---	---	---	---	---	---	---	---	---
Arsenic	6.0	**10.1**	---	---	---	---	---	---	---	---	---	---
Barium	15-600"	150	---	---	---	---	---	---	---	---	---	---
Berillium	0.0-1.75"	1.5 B	---	---	---	---	---	---	---	---	---	---
Cadmium	0.60	**3.1**	---	---	---	---	---	---	---	---	---	---
Calcium	130-35000"	2220 B	---	---	---	---	---	---	---	---	---	---
Chromium	26.0	**33.8**	---	---	---	---	---	---	---	---	---	---
Cobalt	2.5-60"	20.3 B	---	---	---	---	---	---	---	---	---	---
Copper	16.0	11.5 B	---	---	---	---	---	---	---	---	---	---
Iron	200,000	**38900**	---	---	---	---	---	---	---	---	---	---
Lead	31.0	**54.9**	---	---	---	---	---	---	---	---	---	---
Magnesium	100-5000"	**5170**	---	---	---	---	---	---	---	---	---	---
Manganese	460.0	**1250**	---	---	---	---	---	---	---	---	---	---
Nickel	16.0	**42.2**	---	---	---	---	---	---	---	---	---	---
Potassium	8500-43000"	1330 B	---	---	---	---	---	---	---	---	---	---
Selenium	0.1-3.9"	ND	---	---	---	---	---	---	---	---	---	---
Silver	N/A"	ND	---	---	---	---	---	---	---	---	---	---
Mercury	0.20	ND	---	---	---	---	---	---	---	---	---	---
Sodium	6000-8000"	236	---	---	---	---	---	---	---	---	---	---
Thallium	N/A"	ND	---	---	---	---	---	---	---	---	---	---
Vanadium	N/A"	33	---	---	---	---	---	---	---	---	---	---
Zinc	120.0	**160**	---	---	---	---	---	---	---	---	---	---
Total Metals												

Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison

" = Eastern USA background limits

Table 2
Sediment Analytical Data
Camp Summit

Analyte	NYSDEC Guidance Criteria	**Preliminary Investigation**											
SVOCs (mg/kg or ppm)		**SED-9A**	**SED-9B**	**SED-9C**	**SED-10A**	**SED-10B**	**SED-10C**	**SED-11A**	**SED-11B**	**SED-11C**	**SED-12A**	**SED-12B**	**SED-13**
Phenanthrene	84.41	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	84.41	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	NA	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthrene	463.87	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	625.7	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a) anthracene	1220.1	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4**	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (I) fluoranthene	1.1**	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (k) fluoranthene	1.1**	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (b) fluoranthene	1.1**	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) pyrene	3179.8	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	3.2**	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	800.0**	--	--	--	--	--	--	--	--	--	--	--	--
Bis(2-ethylhexyl) phthalate	597.6	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	299.5	**0.06**	**0.06**	**0.05**	**0.5**	**<0.1**	**<0.1**	**0.1**	**0.2**	**<0.1**	**0.1**	**<0.1**	**0.1**
Di-n-octyl phthalate	120**	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl phthalate	8.1	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	217	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	7.02	--	--	--	--	--	--	--	--	--	--	--	--
Butylbenzylphthalate	122.0**	--	--	--	--	--	--	--	--	--	--	--	--
Total SVOCs	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Criteria used PIR and if no sediment criteria available used T
Only analytes detected at or above laboratory method detecti
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
** = TAGM 4046 Value; Soil clean-up objective for the protecti
<u>SVOC Data Qualifiers:</u>
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detect

Table 2
Sediment Analytical Data
Camp Summit

		Remedial Investigation				
Dioxins (ng/g or ppb)	**TEF**	**SED-7**	**SED03-01**	**SED03-02**	**SED03-03**	**SED03-04**
Total TCDF	-	<0.15	<0.09	<0.25	<0.13	<0.05
Total PeCDF	-	<0.31	<0.17	<0.83	<0.12	<0.14
TotalHxCDF	-	<1.6	<0.10	<0.61	<0.80	<0.08
Total HpCDF	-	<0.10	<0.16	<2.3	<0.26	**0.06JS**
Total TCDD	-	<0.073	<0.10	<0.37	<0.22	<0.06
Total PeCDD	-	<0.46	<0.14	<4.5	<1.4	<0.08
Total HxCDD	-	<3.1	<0.14	<0.62	<0.45	<0.12
Total HpCDD	-	<0.20	**0.73 J**	<0.45	**2.1**	<0.86
2,3,7,8-TCDD	1	<0.073	<0.10	<0.37	<0.22	<0.06
1,2,3,7,8-PeCDD	0.14	<0.46	<0.14	<4.5	<1.4	<0.08
1,2,3,4,7,8-HxCDD	0.0048	<0.41	<0.14	<0.62	<0.45	<0.12
1,2,3,6,7,8-HxCDD	0.0016	<0.41	<0.11	<0.48	<0.35	<0.09
1,2,3,7,8,9-HxCDD	0.0016	<0.40	<0.12	<0.51	<0.37	<0.10
1,2,3,4,6,7,8-HpCDD	0.000032	<0.20	**0.45 J**	<0.45	**1.3**	<0.86
OCDD	0.000000025	<0.74	**2.5**	**1.8**	**11**	**2.3**
2,3,7,8-TCDF	0.25	<0.15	<0.09	<0.25	<0.13	<0.05
1,2,3,7,8-PeCDF	0.010	<0.31	<0.17	<0.83	<0.12	<0.14
2,3,4,7,8-PeCDF	0.80	<0.31	<0.17	<0.80	<0.11	<0.14
1,2,3,4,7,8-HxCDF	0.0025	<0.19	<0.09	<0.56	<0.72	<0.07
1,2,3,6,7,8-HxCDF	0.0063	<0.19	<0.07	<0.47	<0.60	<0.06
2,3,4,6,7,8-HxCDF	0.022	<0.22	<0.09	<0.57	<0.74	<0.07
1,2,3,7,8,9-HxCDF	0.019	<0.22	<0.10	<0.61	<0.80	<0.08
1,2,3,4,6,7,8-HpCDF	0.000010	<0.10	<0.12	<1.7	<0.19	**0.06**
1,2,3,4,7,8,9-HpCDF	0.00040	<0.13	<0.16	<2.3	<0.26	<0.11
OCDF	0.000000032	<0.24	<0.14	<1.2	<1.1	**0.3 J**
2,3,7,8-TCDD Equivalence	-	BDL	1.42593E-05	4.5214E-08	4.12885E-05	6.67283E-07
Total Organic Carbon %	-	---	---	---	---	---
Site-specific Benchmark	-	---	---	---	---	---

Notes:

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Dioxin Data Qualifiers:

All results in ng/kg or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 2
Sediment Analytical Data
Camp Summit

Analyte		Remedial Investigation			
Metals (mg/kg)		**SED03-01**	**SED03-02**	**SED03-03**	**SED03-04**
Aluminum	33000"	**5,570**	**8,550**	**9,030**	**17,500**
Antimony	N/A"	<0.42	<0.34	<0.36	<0.51
Arsenic	6.0	**6.4**	**12.1**	**8.1**	**7.3**
Barium	15-600"	**41.6**	**87.2**	**33.7**	**66.9**
Berillium	0.0-1.75"	**0.46**	**0.51**	**0.6**	**0.86**
Cadmium	0.60	**0.31**	**3.3**	**0.31**	**0.09**
Calcium	130-35000"	**181,000**	**70,400**	**150,000**	**1,460**
Chromium	26.0	**12.6**	**18.9**	**12.3**	**22.2**
Cobalt	2.5-60"	**3.9**	**6.9**	**8.5**	**11.0**
Copper	16.0	**14.9**	**27.7**	**12.1**	**7.1**
Iron	200,000	**9,700**	**16,800**	**20,300**	**26,500**
Lead	31.0	**26.7**	**22.8**	**21**	**18.9**
Magnesium	100-5000"	**34,600**	**5,800**	**5,060**	**3,990**
Manganese	460.0	**455**	**765**	**688**	**490**
Nickel	16.0	**14.9**	**19.0**	**20.9**	**26.4**
Potassium	8500-43000"	**1,190**	**1,150**	**1,150**	**1,910**
Selenium	0.1-3.9"	<0.42	<0.34	<0.36	<0.51
Silver	N/A"	<0.12	<0.09	<0.10	<0.14
Mercury	0.20	**0.02**	**0.06**	**0.04**	**0.03**
Sodium	6000-8000"	**406**	**801**	**333**	**238**
Thallium	N/A"	<0.80	<0.64	<0.68	<0.96
Vanadium	N/A"	**36.4**	**20.9**	**12.4**	**22.1**
Zinc	120.0	**103**	**140**	**72.1**	**83.2**
Total Metals		**233,182**	**104,625**	**186,763**	**52,354**

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is site background

Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

" = Eastern USA background limits

Table 2
Sediment Analytical Data
Camp Summit

Analyte	NYSDEC Guidance Criteria	Remedial Investigation													
SVOCs (mg/kg or ppm)		**DSED-1**	**DSED-2**	**DSED-3**	**SED-1**	**SED-2**	**SED-3**	**SED-4**	**SED-5**	**SED-6**	**SED-7**	**SED03-01**	**SED03-02**	**SED03-03**	**SED03-04**
Phenanthrene	84.41	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	**0.17J**	<0.00062
Anthracene	84.41	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Carbazole	NA	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Fluoranthrene	463.87	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	**0.26J**	<0.00062
Pyrene	625.7	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	**0.27J**	<0.00062
Benzo(a) anthracene	1220.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	**0.15J**	<0.00062
Benzo (I) fluoranthene	1.1**	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (k) fluoranthene	1.1**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	**0.27J**	**0.15J**	<0.00062
Benzo (b) fluoranthene	1.1**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Benzo (a) pyrene	3179.8	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	**0.69**	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Indeno (1,2,3-cd) pyrene	3.2**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Benzo(ghi) perylene	800.0**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Bis(2-ethylhexyl) phthalate	597.6	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	**0.66J**	<5.4	<2.4	<0.00062
Pentachlorophenol	299.5	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<28.0	<13.0	<6.0	<0.0015
Di-n-octyl phthalate	120**	**0.44**	**2.1**	**1.1**	<0.44	<0.33	<1.1	**0.19 J**	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Di-n-butyl phthalate	8.1	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
2-Methylnaphthalene	217	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Naphthalene	7.02	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	<2.4	<0.00062
Butylbenzylphthalate	122.0**	<0.41	<0.55	<0.41	<0.44	<0.33	<1.1	<0.33	<0.33	<0.33	<0.33	<11.0	<5.4	**0.36J**	<0.00062
Total SVOCs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Criteria used PIR and if no sediment criteria available used TA
Only analytes detected at or above laboratory method detectio
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
** = TAGM 4046 Value; Soil clean-up objective for the protecti

SVOC Data Qualifiers:
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detect

Table 3
Test Pit Soil Analytical Results
Preliminary Investigation
Camp Summit

Analyte ***(units)***	**TAGM (4046) or SiteBackground Average**		**TP-1**	**TP-7**
Metals ***(mg/kg)***				
Aluminum	NV	**18866.6**	11100	11100
Antimony	NV	**0.283**	0.47 B	0.47 B
Arsenic	7.5	**9.1**	6	6.7
Barium	**300**	54.6	59.3	45.1
Berillium	0.16	**0.54**	**0.63 B**	**0.64**
Cadmium	1 or 0.15		0.51 B	0.3 B
Calcium	NV	**110.6**	912	1070
Chromium	10	**19.06**	**13.4**	**17.1**
Cobalt	**30**	9.33	13.2	13.7
Copper	0.25	**10.76**	9.8	17.7
Iron	2000	**30633.3**	**24500**	**27400**
Lead	NV	**17.86**	31.6	17.7
Magnesium	NV	**2300**	1660	3560
Manganese	NV	**929**	542	801
Mercury	13	**14.9**	**0.12 B**	ND
Nickel	NV	**561**	14.2	28.5
Potassium	**2**	1.5	427 B	587
Selenium	NV	0.0	0.73 B	0.37 B
Silver	0.1	**0.045**	0.26 B	0.14 B
Sodium	NP	**0.047**	56.8 B	43.9
Thallium	NV	**6.3**	1.4	ND
Vanadium	**150**	27.16	17.8	10.5
Zinc	20	**67.36**	**54.2**	**61.1**

Pentachlorophenol Immunoassay Test Results (ug/kg)

TP2-1	**TP2-2**	**TP-3**	**TP-4**	**TP-5**	**TP-6**
140	**2070**	ND	ND	690	**>10000**

Pentachlorophenol Immunoassay Test Results (ug/kg)

TP-13	**TP-14**	**TP-15**	**TP-16**	**TP-17**	**TP-18**
ND	ND	ND	**1000**	**6430**	ND

Pentachlorophenol Immunoassay Test Results (ug/kg)

TP-7	**TP-8**	**TP-9**	**TP-10**	**TP-11**	**TP-12**
7580	ND	**13500**	580	**128000(78000)**	**1700**

Pentachlorophenol Immunoassay Test Results (ug/kg)

TP-19	**TP-20**	**TP-21**	**TP-22**	**TP-23**	**TP-24**
ND	ND	ND	140	ND	100

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte ***(units)***		**STP-1**	**STP-2**	**STP-3**	**STP-4**	**STP-5**	**STP-6**	**STP-7**	**STP-8**	**STP-9**	**STP-10**	**STP-11**	**STP-12**
VOC ***(mg/kg)***	**TAGM**												
Acetone	0.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	5.5	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	1.5	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1.2	--	--	--	--	--	--	--	--	--	--	--	--
Total VOCs		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Pesticides ***(mg/kg)***	**TAGM**	**STP-1**	**STP-2**	**STP-3**	**STP-4**	**STP-5**	**STP-6**	**STP-7**	**STP-8**	**STP-9**	**STP-10**	**STP-11**	**STP-12**
4,4-DDD	**2.9**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
4,4-DDT	**2.1**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

SVOC/PAH ***(mg/kg)***	**TAGM**	**STP-1**	**STP-2**	**STP-3**	**STP-4**	**STP-5**	**STP-6**	**STP-7**	**STP-8**	**STP-9**	**STP-10**	**STP-11**	**STP-12**
Acenaphthene	50	<0.330	<0.330	**0.031 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Anthracene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Bis (2-Ethylhexyl) Phthalate	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.037 J**	<0.330
Dibenzofuran	6.2	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	**0.110 J**	**0.072 J**	**0.079 J**	**0.044 J**	<0.330	<0.330	**0.056 J**	<0.330	<0.330
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Indeno(1,2,3-cd)pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	13	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1	<1.6	<1.6	**0.420 J**	<1.6	<1.6	**0.190 J**	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6
Phenanthrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Pyrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	**0.034 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Total SVOC		BDL	BDL	**0.451 J**	**0.110 J**	**0.072 J**	**0.303 J**	**0.044 J**	BDL	BDL	**0.056 J**	**0.037 J**	BDL

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:
All results in mg/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte *(units)*		**STP-13**	**STP-14**	**STP-15**	**STP-16**	**STP-17**	**STP-18**	**STP-19**	**STP-20**	**STP-21**	**STP-22**	**STP-23**	**STP-24**
VOC *(mg/kg)*	**TAGM**												
Acetone	0.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Butanone	0.3	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	5.5	--	--	--	--	--	--	--	--	--	--	--	--
Methylene Chloride	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	1.5	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1.2	--	--	--	--	--	--	--	--	--	--	--	--
Total VOCs		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Pesticides *(mg/kg)*	**TAGM**	**STP-13**	**STP-14**	**STP-15**	**STP-16**	**STP-17**	**STP-18**	**STP-19**	**STP-20**	**STP-21**	**STP-22**	**STP-23**	**STP-24**
4,4-DDD	**2.9**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**
4,4-DDT	**2.1**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

SVOC/PAH *(mg/kg)*	**TAGM**	**STP-13**	**STP-14**	**STP-15**	**STP-16**	**STP-17**	**STP-18**	**STP-19**	**STP-20**	**STP-21**	**STP-22**	**STP-23**	**STP-24**
Acenaphthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Anthracene	50	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	**0.030 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	<0.330	<0.330	<0.330	<0.330	<0.330	**0.056 J**	**0.027 J**	<0.330	<0.330	<0.330	<0.330	<0.330
Bis (2-Ethylhexyl) Phthalate	50	<0.330	<0.330	<0.330	<0.330	<0.330	**0.047 J**	**0.038 J**	<0.330	<0.330	**0.052 J**	<0.330	<0.330
Dibenzofuran	6.2	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	**0.089 J**	**0.037 J**	**0.150 J**	<0.330	<0.330	<0.330	<0.330	**0.047 J**	**0.042 J**
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	**0.037 J**	<0.330	<0.330	<0.330	**0.045 J**	<0.330	<0.330
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.031 J**	<0.330	<0.330	<0.330	<0.330	<0.330
Indeno(1,2,3-cd)pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	13	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1	<1.6	<1.6	**0.460 J**	<1.6	**0.460 J**	**1.6**	**26.0 D**	<1.6	**4.7**	**12.0 D**	<1.6	<1.6
Phenanthrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	**0.190 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Pyrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	**0.37**	**0.290 J**	<0.330	<0.330	**0.160 J**	<0.330	<0.330
Total SVOC		BDL	BDL	**0.460 J**	**0.089 J**	**0.497 J**	**2.450 J**	**26.125 JD**	BDL	**4.7**	**12.257 JD**	**0.047 J**	**0.042 J**

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:

All results in mg/kg or parts per billion

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte ***(units)***		**STP-25**	**STP-26**	**STP-27**	**STP-28**	**STP-29**	**STP-30**	**TP-1**	**TP-2**	**TP-3**	**TP-4**	**TP-5**	**TP-6**
VOC ***(mg/kg)***	**TAGM**												
Acetone	0.2	--	--	--	--	--	--	**3200**	-	-	-	-	-
2-Butanone	0.3	--	--	--	--	--	--	**410**	-	-	-	-	-
Ethylbenzene	5.5	--	--	--	--	--	--	**12000 D**	-	-	-	-	-
Methylene Chloride	0.1	--	--	--	--	--	--	**7**	-	-	-	-	-
Toluene	1.5	--	--	--	--	--	--	**100**	-	-	-	-	-
Total Xylenes	1.2	--	--	--	--	--	--	**43000 D**	-	-	-	-	-
Total VOCs		**--**	**--**	**--**	**--**	**--**	**--**	**58717 D**					

Pesticides ***(mg/kg)***	**TAGM**	**STP-25**	**STP-26**	**STP-27**	**STP-28**	**STP-29**	**STP-30**	**TP-1**	**TP-2**	**TP-3**	**TP-4**	**TP-5**	**TP-6**
4,4-DDD	**2.9**	**--**	**--**	**--**	**--**	**--**	**--**	<22	-	-	-	-	-
4,4-DDT	**2.1**	**--**	**--**	**--**	**--**	**--**	**--**	<22	-	-	-	-	-

SVOC/PAH ***(mg/kg)***	**TAGM**	**STP-25**	**STP-26**	**STP-27**	**STP-28**	**STP-29**	**STP-30**	**TP-1**	**TP-2**	**TP-3**	**TP-4**	**TP-5**	**TP-6**
Acenaphthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	<0.330	-	<0.330	<0.330
Anthracene	50	--	--	--	--	--	--	<0.330	-	<0.330	-	<0.330	<0.330
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.062 J**	-	<0.330	<0.330
Benzo{b}fluoranthene	1.1	--	--	--	--	--	--	<0.330	-	**0.110 J**	-	<0.330	<0.330
Benzo{k}fluoranthene	1.1	--	--	--	--	--	--	<0.330	-	**0.097 J**	-	<0.330	<0.330
Benzo (a) Pyrene	0.33	--	--	--	--	--	--	<0.330	-	**0.041 J**	-	<0.330	<0.330
Chrysene	0.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.130 J**	-	<0.330	<0.330
Bis (2-Ethylhexyl) Phthalate	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.170 J**	-	<0.330	<0.330
Dibenzofuran	6.2	--	--	--	--	--	--	<0.330	-	<0.330	-	<0.330	<0.330
Diethylphthalate	7.1	--	--	--	--	--	--					<0.330	<0.330
Di-n-butyl Phthalate	8.1	<0.330	**0.130 J**	**0.039 J**	**0.083 J**	<0.330	<0.330	<0.330	-	**0.090 BJ**	-	<0.330	<0.330
Di-n-octyl phthalte	120	<0.330	**0.050 J**	**0.026 J**	**0.032 J**	<0.330	<0.330	<0.330	-	<0.330	-	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.34**	-	<0.330	<0.330
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	<0.330	-	<0.330	<0.330
Indeno(1,2,3-cd)pyrene	3.2	--	--	--	--	--	--	<0.330	-	**0.022 J**	-	<0.330	<0.330
2-Methylnaphthalene	36.4	--	--	--	--	--	--	<0.330	-	<0.330	-	<0.330	<0.330
Naphthalene	13	--	--	--	--	--	--	<0.330	-	<0.330	-	<0.330	<0.330
Pentachlorophenol	1	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	**130 D**	-	**0.570 J**	-	**0.230 J**	<1.6
Phenanthrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.170 J**	-	<0.330	<0.330
Pyrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	-	**0.200 J**	-	<0.330	<0.330
Total SVOC		BDL	**0.180 J**	**0.065 J**	**0.115 J**	BDL	BDL	**130 D**	-	**2.002 BJ**	-	**0.230 J**	BDL

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:
All results in mg/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte *(units)*		TP-7	TP-8	TP-9	TP-10	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16	TP-17	TP-18
VOC *(mg/kg)*	**TAGM**												
Acetone	0.2	-	-	-	-	-	-	-	-	-	<25	-	-
2-Butanone	0.3	-	-	-	-	-	-	-	-	-	<25	-	-
Ethylbenzene	5.5	-	-	-	-	-	-	-	-	-	**33**	-	-
Methylene Chloride	0.1	-	-	-	-	-	-	-	-	-	**5**	-	-
Toluene	1.5	-	-	-	-	-	-	-	-	-	<5	-	-
Total Xylenes	1.2	-	-	-	-	-	-	-	-	-	**280 B**	-	-
Total VOCs											**318 B**		

Pesticides *(mg/kg)*	**TAGM**	TP-7	TP-8	TP-9	TP-10	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16	TP-17	TP-18
4,4-DDD	**2.9**	-	-	-	-	-	-	-	-	-	-	-	-
4,4-DDT	**2.1**	-	-	-	-	-	-	-	-	-	-	-	-

SVOC/PAH *(mg/kg)*	**TAGM**	TP-7	TP-8	TP-9	TP-10	TP-11	TP-12	TP-13	TP-14	TP-15	TP-16	TP-17	TP-18
Acenaphthene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Anthracene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.42**
Benzo{b}fluoranthene	1.1	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.39**
Benzo{k}fluoranthene	1.1	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.280 J**
Benzo (a) Pyrene	0.33	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.39**
Chrysene	0.4	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	**0.44**
Bis (2-Ethylhexyl) Phthalate	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Dibenzofuran	6.2	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**0.55**	<0.330	<0.330
Diethylphthalate	7.1	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	-	<0.330	**0.091 BJ**	<0.330	<0.330	<0.330	<0.330	**0.048 J**	<0.330
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**0.040 J**	<0.330	**0.6**
Fluorene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**0.69**	<0.330	<0.330
Indeno(1,2,3-cd)pyrene	3.2	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
2-Methylnaphthalene	36.4	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**14 D**	<0.330	<0.330
Naphthalene	13	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**1.6**	<0.330	<0.330
Pentachlorophenol	1	<1.6	<1.6	<1.6	-	**0.890 J**	**1.2 J**	**0.160 J**	<1.6	**0.150 J**	**0.220 J**	<1.6	<1.6
Phenanthrene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**1**	<0.330	**0.120 J**
Pyrene	50	<0.330	<0.330	<0.330	-	<0.330	<0.330	<0.330	<0.330	<0.330	**0.072 J**	<0.330	**0.68**
Total SVOC		BDL	BDL	BDL	-	**0.890 J**	**1.291 BJ**	**0.160 J**	BDL	**0.150 J**	**18.972 DJ**	**0.048 J**	**3.320 J**

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
SVOC, VOC, Pesticide Data Qualifiers:
All results in mg/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte ***(units)***		**TP-19**	**TP-20**	**TP-21**	**TP-22**	**TP-23**	**TP-24**	**TP-25**	**TP-26**	**TP-27**	**TP-28**	**TP-29**	**TP-30**
VOC ***(mg/kg)***	**TAGM**												
Acetone	0.2	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	5.5	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	1.5	-	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	1.2	-	-	-	-	-	-	-	-	-	-	-	-
Total VOCs													

Pesticides ***(mg/kg)***	**TAGM**	**TP-19**	**TP-20**	**TP-21**	**TP-22**	**TP-23**	**TP-24**	**TP-25**	**TP-26**	**TP-27**	**TP-28**	**TP-29**	**TP-30**
4,4-DDD	**2.9**	-	-	-	-	-	-	-	-	-	-	-	-
4,4-DDT	**2.1**	-	-	-	-	-	-	-	-	-	-	-	-

SVOC/PAH ***(mg/kg)***	**TAGM**	**TP-19**	**TP-20**	**TP-21**	**TP-22**	**TP-23**	**TP-24**	**TP-25**	**TP-26**	**TP-27**	**TP-28**	**TP-29**	**TP-30**
Acenaphthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Anthracene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{a}anthracene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{b}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo{k}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Benzo (a) Pyrene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Chrysene	0.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Bis (2-Ethylhexyl) Phthalate	50	<0.330	**0.260 J**	<0.330	<0.330	<0.330	<0.330	<0.330	**0.021 J**	<0.330	<0.330	<0.330	<0.330
Dibenzofuran	6.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Diethylphthalate	7.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Di-n-octyl phthalte	120	**0.051 J**	**0.050 J**	**0.058 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluoranthene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Fluorene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Indeno(1,2,3-cd)pyrene	3.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
2-Methylnaphthalene	36.4	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Naphthalene	13	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Pentachlorophenol	1	<1.6	<1.6	<1.6	<1.6	<1.6	<1.6	**0.065 J**	**0.420 J**	<1.6	<1.6	<1.6	<1.6
Phenanthrene	50	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Pyrene	50	**0.33**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330
Total SVOC		**0.381 J**	**0.310 J**	**0.058 J**	BDL	BDL	BDL	**0.065 J**	**0.441 J**	BDL	BDL	BDL	BDL

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:
All results in mg/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte *(units)*		TP-31	TP-32	TP-33	TP-34	TP-35	TP-36	TP-37	TP03-1	TP03-2	TP03-3	TP03-4	TP03-5W
VOC *(mg/kg)*	**TAGM**								-	-	-	-	-
Acetone	0.2	-	**110**	<25	-	-	-	-	-	-	-	-	-
2-Butanone	0.3	-	**18 J**	**6 J**	-	-	-	-	-	-	-	-	-
Ethylbenzene	5.5	-	**64**	**230**	-	-	-	-	-	-	-	-	-
Methylene Chloride	0.1	-	**9**	**8**	-	-	-	-	-	-	-	-	-
Toluene	1.5	-	<5	**78**	-	-	-	-	-	-	-	-	-
Total Xylenes	1.2	-	**510 B**	**7200 D**	-	-	-	-	-	-	-	-	-
Total VOCs			**711 JB**	**7522 JD**					-	-	-	-	-

Pesticides *(mg/kg)*	**TAGM**	TP-31	TP-32	TP-33	TP-34	TP-35	TP-36	TP-37	TP03-1	TP03-2	TP03-3	TP03-4	TP03-5W
4,4-DDD	**2.9**	-	-	**37**	-	-	-	-	-	-	-	-	-
4,4-DDT	**2.1**	-	-	**20**	-	-	-	-	-	-	-	-	-

SVOC/PAH *(mg/kg)*	**TAGM**	TP-31	TP-32	TP-33	TP-34	TP-35	TP-36	TP-37	TP03-1	TP03-2	TP03-3	TP03-4	TP03-5W
Acenaphthene	50	<0.330	**3.5**	**0.940**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Anthracene	50	<0.330	<0.330	**0.130 J**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Benzo{a}anthracene	0.33	<0.330	**0.052 J**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Benzo{b}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Benzo{k}fluoranthene	1.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Benzo (a) Pyrene	0.33	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Chrysene	0.4	<0.330	**0.079 J**	**0.020 J**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Bis (2-Ethylhexyl) Phthalate	50	<0.330	**0.031 J**	<0.330	<0.330	**0.019 J**	**0.025 J**	<0.330	**0.130JB**	**0.082JB**	**0.100JB**	<0.370	**0.100JB**
Dibenzofuran	6.2	<0.330	**6.0**	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Diethylphthalate	7.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Di-n-butyl Phthalate	8.1	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Di-n-octyl phthalte	120	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Fluoranthene	50	<0.330	**0.110 J**	**0.025 J**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Fluorene	50	<0.330	**3.6**	**1.4**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Indeno(1,2,3-cd)pyrene	3.2	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
2-Methylnaphthalene	36.4	<0.330	**73 D**	**17 D**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Naphthalene	13	<0.330	**6.4**	**2.4**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Pentachlorophenol	1	<1.6	**5.3**	**23 D**	<1.6	<1.6	**0.130 J**	**0.690 J**	<1.1	<0.95	<1.00	<0.93	<0.94
Phenanthrene	50	<0.330	**16.0**	**3.0**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Pyrene	50	<0.330	**1.0**	**0.280 J**	<0.330	<0.330	<0.330	<0.330	<0.450	<0.380	<0.400	<0.370	<0.380
Total SVOC		BDL	**115.072 DJ**	**48.195 DJ**	BDL	**0.019 J**	**0.155 J**	**0.690 J**	**0.130JB**	**0.082JB**	**0.100JB**	ND	**0.100JB**

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:
All results in mg/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Analyte ***(units)***		**TP03-5E**	**TP03-6NE**	**TP03-6SW**	**TP03-7W**	**TP03-8**	**TP03-9N**	**TP03-9S**	**TP03-10W**	**TP03-10E**	**TP03-11W**	**TP03-11E**
VOC ***(mg/kg)***	**TAGM**	-	-	-	-	-	-	-	-	-	-	-
Acetone	0.2	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	0.3	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	5.5	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	0.1	-	-	-	-	-	-	-	-	-	-	-
Toluene	1.5	-	-	-	-	-	-	-	-	-	-	-
Total Xylenes	1.2	-	-	-	-	-	-	-	-	-	-	-
Total VOCs		-	-	-	-	-	-	-	-	-	-	-

Pesticides ***(mg/kg)***	**TAGM**	**TP03-5E**	**TP03-6NE**	**TP03-6SW**	**TP03-7W**	**TP03-8**	**TP03-9N**	**TP03-9S**	**TP03-10W**	**TP03-10E**	**TP03-11W**	**TP03-11E**
4,4-DDD	**2.9**	-	-	-	-	-	-	-	-	-	-	-
4,4-DDT	**2.1**	-	-	-	-	-	-	-	-	-	-	-

SVOC/PAH ***(mg/kg)***	**TAGM**	**TP03-5E**	**TP03-6NE**	**TP03-6SW**	**TP03-7W**	**TP03-8**	**TP03-9N**	**TP03-9S**	**TP03-10W**	**TP03-10E**	**TP03-11W**	**TP03-11E**
Acenaphthene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	**0.110J**	<0.400	<0.440
Anthracene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.076J**	**0.033J**	**0.091J**	<0.400	<0.440
Benzo{a}anthracene	0.33	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.039J**	<0.420	**0.029J**	<0.400	<0.440
Benzo{b}fluoranthene	1.1	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Benzo{k}fluoranthene	1.1	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Benzo (a) Pyrene	0.33	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Chrysene	0.4	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.058J**	<0.420	**0.049J**	<0.400	<0.440
Bis (2-Ethylhexyl) Phthalate	50	**0.090JB**	**0.280JB**	**0.100JB**	**0.120JB**	**0.160JB**	<0.370	**0.040J**	**0.170JB**	**0.160JB**	**0.080JB**	**0.140JB**
Dibenzofuran	6.2	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Diethylphthalate	7.1	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	**0.620J**	<0.400	<0.440
Di-n-butyl Phthalate	8.1	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Di-n-octyl phthalte	120	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	<0.380	<0.400	<0.440
Fluoranthene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.079J**	**0.021J**	**0.071J**	<0.400	<0.440
Fluorene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.190J**	**0.120J**	**0.250J**	<0.400	<0.440
Indeno(1,2,3-cd)pyrene	3.2	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.370	<0.420	<0.380	<0.400	<0.440
2-Methylnaphthalene	36.4	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	<0.390	<0.420	**2.6**	<0.400	<0.440
Naphthalene	13	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.068J**	<0.420	**0.190J**	<0.400	<0.440
Pentachlorophenol	1	<1.00	<0.94	<1.00	**1.3**	**0.700J**	**6.1J**	**0.610J**	**0.410J**	**2.6**	<0.990	**0.370J**
Phenanthrene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**1.1**	**0.6**	**1.2**	<0.400	<0.440
Pyrene	50	<0.420	<0.380	<0.400	<0.510	<0.410	<0.370	**0.420J**	**0.800J**	**0.340J**	<0.400	<0.440
Total SVOC		**0.090JB**	**0.280JB**	**100JB**	**1.420JB**	**0.860JB**	**6.1J**	**2.507J**	**2.091J**	**8.031JB**	**0.080JB**	**0.510JB**

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

SVOC, VOC, Pesticide Data Qualifiers:

All results in mg/kg or parts per billion

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detecti

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals *(mg/kg)*	TAGM (4046) or SiteBackground Average		STP-1	STP-2	STP-3	STP-4	STP-5	STP-6	STP-7	STP-8	STP-9	STP-10	STP-11	STP-12
Aluminum	NV	**18866.6**	**16,300 E**	-	**16,900**	-	**14,900 E**	-	**22,000 E**	-	**21,200 E**	**18,000**	**12,400 E**	-
Antimony	NV	**0.283**	<0.64	-	**0.88 BN**	-	<0.67	-	**0.81 B**	-	<0.62	**1.5 BN**	<0.55	-
Arsenic	7.5	**9.1**	**5.9**	-	**9.4**	-	**8.3**	-	**6.6**	-	**7.2**	**7.9**	**11.3**	-
Barium	**300**	54.6	**44.7**	-	**57.1**	-	**37**	-	**106**	-	**54**	**33.3**	**21.7**	-
Berillium	0.16	**0.54**	**0.77**	-	**0.63 B**	-	**0.54 B**	-	**1.1**	-	**0.7**	**0.88**	**0.48 B**	-
Cadmium	**1**		**0.34 B**	-	**0.06 B**	-	**0.09 B**	-	**0.34 B**	-	**0.09 B**	<0.04	<0.03	-
Calcium	NV	**110.6**	**1600 E**	-	**1450**	-	**359 BE**	-	**1020 E**	-	**280 BE**	**1130**	**260 BE**	-
Chromium	10	**19.06**	**20**	-	**17.7**	-	**19.3**	-	**22.5**	-	**23**	**24.3**	**16.5**	-
Cobalt	**30**	9.33	**15.6**	-	**12.5**	-	**12.1**	-	**14**	-	**17.5**	**16.2**	**10.4**	-
Copper	0.25	**10.76**	**12.4**	-	**9.8**	-	**8.9**	-	**16.7**	-	**13.6**	**23.8**	**8.7**	-
Iron	2000	**30633.3**	**27,800 E**	-	**26,000**	-	**26,400 E**	-	**27,400 E**	-	**27,900 E**	**40,100**	**26,900 E**	-
Lead	NV	**17.86**	**23.5 E**	-	**21.7 ***	-	**16.5 E**	-	**27.3 E**	-	**20.4 E**	**37.8 ***	**15.8 E**	-
Magnesium	NV	**2300**	**3,780 E**	-	**2,360**	-	**3,410 E**	-	**3,310 E**	-	**3160 E**	**5250**	**3410 E**	-
Manganese	NV	**929**	**453 E**	-	**527**	-	**761 E**	-	**2,640 E**	-	**660 E**	**396**	**340 E**	-
Nickel	13	**14.9**	**26.2 E**	-	**17**	-	**23.9 E**	-	**31.3 E**	-	**24.3 E**	**34.8**	**23.3 E**	-
Potassium	NV	**561**	**911**	-	**770 E**	-	**824**	-	**1,060**	-	**903**	**1,210 E**	**659**	-
Selenium	**2**	1.5	**1.6**	-	**1.8**	-	**1.3**	-	**1.5**	-	**1.8**	**2.2**	**1.1**	-
Silver	NV	0.0	**0.27 B**	-	<0.12	-	<0.12	-	<0.13	-	<0.11	<0.11	**0.058**	-
Mercury	**0.1**	0.045	**0.038 B**	-	**0.035 B***	-	**0.068**	-	**0.020 B**	-	<0.048	**0.042 B***	<0.10	-
Sodium	NP	**0.047**	**122 B**	-	**141 B**	-	**241 B**	-	**90.6 B**	-	**114 B**	**88.1 B**	**70.7 B**	-
Thallium	NV	**6.3**	**5.3**	-	**0.91 B**	-	**5.6**	-	**5**	-	**4.2**	<0.61	**5**	-
Vanadium	**150**	27.16	**20.3**	-	**24**	-	**20**	-	**23.3**	-	**25.1**	**20.3**	**15.7**	-
Zinc	20	**67.36**	**86.3 E**	-	**72.9**	-	**68.1 E**	-	**128 E**	-	**92.0 E**	**105**	**52.9 E**	-
Total Metals			**51229.2**	**-**	**48,394.73**	**-**	**47,116.70**	**-**	**56,845.07**	**-**	**54,500.89**	**66,482.122**	**44,222.64**	**-**

Notes:

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is site background

Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals *(mg/kg)*	**TAGM (4046) or SiteBackground Average**		**STP-13**	**STP-14**	**STP-15**	**STP-16**	**STP-17**	**STP-18**	**STP-19**	**STP-20**	**STP-21**	**STP-22**	**STP-23**	**STP-24**
Aluminum	NV	**18866.6**	**15,300 E**	-	**18,600 E**	-	**14,800 E**	-	**15,800 E**	**19200 E**	-	-	**19,200**	-
Antimony	NV	**0.283**	**0.95 B**	-	**0.76 B**	-	<0.70	-	**0.83 B**	<0.75	-	-	**0.95 BN**	-
Arsenic	7.5	**9.1**	**12.6**	-	**12.7**	-	**8.1**	-	**6.3**	**6.9**	-	-	**8.2**	-
Barium	**300**	54.6	**39.5**	-	**65.9**	-	**59.5**	-	**32.2**	**63.8**	-	-	**43.3**	-
Berillium	0.16	**0.54**	**0.7**	-	**0.68**	-	**0.63 B**	-	**0.69**	**0.74**	-	-	**0.66**	-
Cadmium	**1**		**0.03 B**	-	**0.12 B**	-	**0.17 B**	-	**0.08 B**	**0.16 B**	-	-	<0.04	-
Calcium	NV	**110.6**	**1,430 E**	-	**505 BE**	-	**977 E**	-	**1,100 E**	**929 E**	-	-	**284 B**	-
Chromium	10	**19.06**	**21.4**	-	**20.5**	-	**16.5**	-	**21**	**21.8**	-	-	**21.1**	-
Cobalt	**30**	9.33	**15.6**	-	**16.1**	-	**13**	-	**12.8**	**17**	-	-	**12.9**	-
Copper	0.25	**10.76**	**20.5**	-	**12.3**	-	**12.3**	-	**16.4**	**13.4**	-	-	**10.2**	-
Iron	2000	**30633.3**	**32,500 E**	-	**29,200 E**	-	**28,200 E**	-	**33,400 E**	**30,900 E**	-	-	**31,500**	-
Lead	NV	**17.86**	**23.9 E**	-	**25.5 E**	-	**25.2 E**	-	**26.0 E**	**26.5 E**	-	-	**15.8 ***	-
Magnesium	NV	**2300**	**4,550 E**	-	**3,000 E**	-	**2,390 E**	-	**4,450 E**	**3,570 E**	-	-	**3190**	-
Manganese	NV	**929**	**710 E**	-	**1,010 E**	-	**603 E**	-	**566 E**	**582 E**	-	-	**561**	-
Nickel	13	**14.9**	**33.9 E**	-	**22.6 E**	-	**18.7 E**	-	**29.6 E**	**25.5 E**	-	-	**25**	-
Potassium	NV	**561**	**990**	-	**881**	-	**919**	-	**842**	**881**	-	-	**825 E**	-
Selenium	**2**	1.5	**1.1**	-	**1.6**	-	**1.5**	-	**1.4**	**1.9**	-	-	**1.8**	-
Silver	NV	0.0	**0.030 B**	-	<0.12	-	<0.12	-	<0.10	<0.13	-	-	<0.12	-
Mercury	**0.1**	0.045	<0.10	-	**0.062 B**	-	**0.020 B**	-	<0.11	**0.043 B**	-	-	<0.034 B*	-
Sodium	NP	**0.047**	**61.3 B**	-	**93.5 B**	-	**271**	-	**65.6 B**	**223 B**	-	-	**44.5 B**	-
Thallium	NV	**6.3**	**4.3**	-	**6**	-	**5.7**	-	**5.6**	**5**	-	-	**1.8**	-
Vanadium	**150**	27.16	**18.6**	-	**25.2**	-	**22.6**	-	**18.2**	**25.2**	-	-	**22.6**	-
Zinc	20	**67.36**	**79.2 E**	-	**80.3 E**	-	**92.7 E**	-	**243 E**	**154 E**	-	-	**86.6**	-
Total Metals			**55,813.61**	**-**	**53,580.38**	**-**	**48,436.62**	**-**	**56,637.70**	**56,646.94**	**-**	**-**	**55,855.41**	**-**

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument de
than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is si

Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals ***(mg/kg)***	**TAGM (4046) or SiteBackground Average**		**STP-25**	**STP-26**	**STP-27**	**STP-28**	**STP-29**	**STP-30**	**TP-1**	**TP-2**	**TP-3**	**TP-4**	**TP-5**	**TP-6**
Aluminum	NV	**18866.6**	**16,800**	**16,600**	**17,500**	-	-	-	**25,800 E**	-	-	-	-	-
Antimony	NV	**0.283**	**1.3 BN**	**1.3 BN**	**0.94 BN**	-	-	-	**3.7 B**	-	-	-	-	-
Arsenic	7.5	**9.1**	**13.9**	**10**	**9.7**	-	-	-	**28.6**	-	-	-	-	-
Barium	**300**	54.6	**53.9**	**56.8**	**74.6**	-	-	-	**67.6 E**	-	-	-	-	-
Berillium	0.16	**0.54**	**0.75**	**0.71**	**0.59 B**	-	-	-	**1.1**	-	-	-	-	-
Cadmium	**1**		**0.07 B**	**0.12 B**	**0.04 B**	-	-	-	-	-	-	-	-	-
Calcium	NV	**110.6**	**2,930**	**4,900**	**489**	-	-	-	**228 B**	-	-	-	-	-
Chromium	10	**19.06**	**21.4**	**20.3**	**18**	-	-	-	**37.2 E**	-	-	-	-	-
Cobalt	**30**	9.33	**15.8**	**14.6**	**11.3**	-	-	-	**107 E**	-	-	-	-	-
Copper	0.25	**10.76**	**17.9**	**19.7**	**9.1**	-	-	-	**29.2 E**	-	-	-	-	-
Iron	2000	**30633.3**	**34,100**	**34,600**	**29,900**	-	-	-	**124,000**	-	-	-	-	-
Lead	NV	**17.86**	**28.2 ***	**26.4 ***	**21.8 ***	-	-	-	**173 E**	-	-	-	-	-
Magnesium	NV	**2300**	**4,180**	**3,980**	**2,190**	-	-	-	**1,100 E**	-	-	-	-	-
Manganese	NV	**929**	**1,160**	**1,160**	**812**	-	-	-	**20,000E**	-	-	-	-	-
Nickel	13	**14.9**	**39.7**	**27.7**	**15**	-	-	-	**8.7**	-	-	-	-	-
Potassium	NV	**561**	**973 E**	**1,180 E**	**786 E**	-	-	-	**708 B**	-	-	-	-	-
Selenium	**2**	1.5	**1.6**	**2.2**	**1.7**	-	-	-	**8.4**	-	-	-	-	-
Silver	NV	0.0	<0.12	<0.12	<0.12	-	-	-	**0.398**	-	-	-	-	-
Mercury	**0.1**	0.045	**0.040 B***	**0.037 B***	**0.034 B***	-	-	-	<0.16	-	-	-	-	-
Sodium	NP	**0.047**	**371 B**	**386 B**	**326 B**	-	-	-	**50.7 B**	-	-	-	-	-
Thallium	NV	**6.3**	<0.69	<0.67	**2.9**	-	-	-	**0.94**	-	-	-	-	-
Vanadium	**150**	27.16	**20.9**	**22.8**	**26.9**	-	-	-	**97.9 E**	-	-	-	-	-
Zinc	20	**67.36**	**97.1**	**89.3**	**73**	-	-	-	**116 E**	-	-	-	-	-
Total Metals			**60,826.56**	**63,098.3**	**52,268.604**	**-**	**-**	**-**	**171,858.44**	-	-	-	-	-

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument de
than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is si

Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals ***(mg/kg)***	**TAGM (4046) or SiteBackground Average**		**TP-7**	**TP-8**	**TP-9**	**TP-10**	**TP-11**	**TP-12**	**TP-13**	**TP-14**	**TP-15**	**TP-16**	**TP-17**	**TP-18**
Aluminum	NV	**18866.6**	-	-	-	-	-	-	-	-	-	**14,800 E**	-	-
Antimony	NV	**0.283**	-	-	-	-	-	-	-	-	-	**1.7 BN**	-	-
Arsenic	7.5	**9.1**	-	-	-	-	-	-	-	-	-	**14.3**	-	-
Barium	**300**	54.6	-	-	-	-	-	-	-	-	-	**31.7**	-	-
Berillium	0.16	**0.54**	-	-	-	-	-	-	-	-	-	**0.64**	-	-
Cadmium	**1**		-	-	-	-	-	-	-	-	-	-	-	-
Calcium	NV	**110.6**	-	-	-	-	-	-	-	-	-	**340 B**	-	-
Chromium	10	**19.06**	-	-	-	-	-	-	-	-	-	**20.8 E**	-	-
Cobalt	**30**	9.33	-	-	-	-	-	-	-	-	-	**12.6 E**	-	-
Copper	0.25	**10.76**	-	-	-	-	-	-	-	-	-	**125 E***	-	-
Iron	2000	**30633.3**	-	-	-	-	-	-	-	-	-	**31,600 E**	-	-
Lead	NV	**17.86**	-	-	-	-	-	-	-	-	-	**19.2 E**	-	-
Magnesium	NV	**2300**	-	-	-	-	-	-	-	-	-	**4,390 E**	-	-
Manganese	NV	**929**	-	-	-	-	-	-	-	-	-	**505 E**	-	-
Nickel	13	**14.9**	-	-	-	-	-	-	-	-	-	**30.8 E**	-	-
Potassium	NV	**561**	-	-	-	-	-	-	-	-	-	**883**	-	-
Selenium	**2**	1.5	-	-	-	-	-	-	-	-	-	**1.5 ***	-	-
Silver	NV	0.0	-	-	-	-	-	-	-	-	-	<0.11	-	-
Mercury	**0.1**	0.045	-	-	-	-	-	-	-	-	-	**0.017 B**	-	-
Sodium	NP	**0.047**	-	-	-	-	-	-	-	-	-	**34.3 B**	-	-
Thallium	NV	**6.3**	-	-	-	-	-	-	-	-	-	<0.61	-	-
Vanadium	**150**	27.16	-	-	-	-	-	-	-	-	-	**18.2 E**	-	-
Zinc	20	**67.36**	-	-	-	-	-	-	-	-	-	**64.8 E**	-	-
Total Metals			-	-	-	-	-	-	-	-	-	**52,893.55**	-	-

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument de
than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is si

Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals *(mg/kg)*	TAGM (4046) or SiteBackground Average		TP-19	TP-20	TP-21	TP-22	TP-23	TP-24	TP-25	TP-26	TP-27	TP-28	TP-29	TP-30
Aluminum	NV	**18866.6**	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	NV	**0.283**	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	7.5	**9.1**	-	-	-	-	-	-	-	-	-	-	-	-
Barium	**300**	54.6	-	-	-	-	-	-	-	-	-	-	-	-
Berillium	0.16	**0.54**	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium	**1**		-	-	-	-	-	-	-	-	-	-	-	-
Calcium	NV	**110.6**	-	-	-	-	-	-	-	-	-	-	-	-
Chromium	10	**19.06**	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	**30**	9.33	-	-	-	-	-	-	-	-	-	-	-	-
Copper	0.25	**10.76**	-	-	-	-	-	-	-	-	-	-	-	-
Iron	2000	**30633.3**	-	-	-	-	-	-	-	-	-	-	-	-
Lead	NV	**17.86**	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	NV	**2300**	-	-	-	-	-	-	-	-	-	-	-	-
Manganese	NV	**929**	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	13	**14.9**	-	-	-	-	-	-	-	-	-	-	-	-
Potassium	NV	**561**	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	**2**	1.5	-	-	-	-	-	-	-	-	-	-	-	-
Silver	NV	0.0	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	**0.1**	0.045	-	-	-	-	-	-	-	-	-	-	-	-
Sodium	NP	**0.047**	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	NV	**6.3**	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	**150**	27.16	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	20	**67.36**	-	-	-	-	-	-	-	-	-	-	-	-
Total Metals			-	-	-	-	-	-	-	-	-	-	-	-

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument de
than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is si
Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals ***(mg/kg)***	**TAGM (4046) or SiteBackground Average**		**TP-31**	**TP-32**	**TP-33**	**TP-34**	**TP-35**	**TP-36**	**TP-37**	**TP03-1**	**TP03-2**	**TP03-3**	**TP03-4**	**TP03-5W**
Aluminum	NV	**18866.6**	-	-	-	-	-	-	-	**19,900**	**16,900**	**18,400**	**16,400**	**16,700N**
Antimony	NV	**0.283**	-	-	-	-	-	-	-	<0.33	<0.32	**0.45**	<0.31N	<0.27N
Arsenic	7.5	**9.1**	-	-	-	-	-	-	-	**8.2**	**10.5**	**19.6**	**10.7***	**10.6***
Barium	**300**	54.6	-	-	-	-	-	-	-	**68.6**	**47.0**	**48.9**	**36.2***	**33.8**
Berillium	0.16	**0.54**	-	-	-	-	-	-	-	**0.86**	**0.86**	**1.2**	**0.72**	**0.58**
Cadmium	**1**		-	-	-	-	-	-	-	**0.13**	<0.04	**0.13**	**0.17***	**0.34***
Calcium	NV	**110.6**	-	-	-	-	-	-	-	**860**	**471**	**650**	**469***	**202**
Chromium	10	**19.06**	-	-	-	-	-	-	-	**21.8**	**23.2**	**23.6**	**22.4**	**22.4**
Cobalt	**30**	9.33	-	-	-	-	-	-	-	**14.4**	**15.1**	**17.8**	**14.1**	**11.2**
Copper	0.25	**10.76**	-	-	-	-	-	-	-	**40.4**	**18.2**	**26.6**	**17.7**	**16.1**
Iron	2000	**30633.3**	-	-	-	-	-	-	-	**28,200**	**33,500**	**48,400**	**32500N**	**33100N**
Lead	NV	**17.86**	-	-	-	-	-	-	-	**22.9**	**20.2**	**88.2**	**19.4**	**14.1**
Magnesium	NV	**2300**	-	-	-	-	-	-	-	**3,060**	**4,810**	**4,300**	**4,900**	**4,660**
Manganese	NV	**929**	-	-	-	-	-	-	-	**792**	**819**	**1,330**	**554N**	**389N***
Nickel	13	**14.9**	-	-	-	-	-	-	-	**22.1**	**37.0**	**38.2**	**33.9**	**29.4**
Potassium	NV	**561**	-	-	-	-	-	-	-	**13,200**	**1,330**	**1,310**	**1,110**	**1150E**
Selenium	**2**	1.5	-	-	-	-	-	-	-	**0.36**	<0.32	<0.33	<0.31	**0.33***
Silver	NV	0.0	-	-	-	-	-	-	-	<0.09	<0.09	<0.09	<0.08	<0.08
Mercury	**0.1**	0.045	-	-	-	-	-	-	-	**0.08**	**0.04**	**0.06**	**0.04**	**0.07**
Sodium	NP	**0.047**	-	-	-	-	-	-	-	**57.8**	**59.2**	**54.9**	**54.7**	**47.4**
Thallium	NV	**6.3**	-	-	-	-	-	-	-	<0.63	<0.61	<0.62	<0.58	**0.54**
Vanadium	**150**	27.16	-	-	-	-	-	-	-	**27.9**	**19.3**	**22.0**	**18.7**	**21.7**
Zinc	20	**67.36**	-	-	-	-	-	-	-	**87.2**	**76.9**	**271**	**73.7**	**64.4**
Total Metals			-	-	-	-	-	-	-	**66,385**	**58,158**	**75,003**	**56,235N***	**39774N*E**

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument de
than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is si

Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Metals *(mg/kg)*	**TAGM (4046) or SiteBackground Average**		**TP03-5E**	**TP03-6NE**	**TP03-6SW**	**TP03-7W**	**TP03-8**	**TP03-9N**	**TP03-9S**	**TP03-10W**	**TP03-10E**	**TP03-11W**	**TP03-11E**
Aluminum	NV	**18866.6**	**17200N**	**15500N**	**17,500N**	**22,300N**	**15,700**	**14900N**	**11300N**	**17400N**	**15400N**	**17700N**	**16300N**
Antimony	NV	**0.283**	<0.34N	<0.32N	<0.34N	<0.39N	<0.21N	<0.32N	<0.24N	<0.32N	<0.32N	<0.34N	<0.36N
Arsenic	7.5	**9.1**	**11.3***	**14.2***	**10.3***	**11.6***	**9.9***	**11.3***	**8.5***	**10.9***	**12.7***	**10.4***	**12***
Barium	**300**	54.6	**42.6**	**37.4**	**41.0**	**58.6**	**37.9**	**49.2***	**31***	**49.7**	**33.1**	**55.9**	**48.4**
Berillium	0.16	**0.54**	**0.54**	**0.58**	**0.55**	**0.88**	**0.58**	**0.76**	**0.55**	**0.74**	**0.55**	**0.63**	**0.52**
Cadmium		**1**	**0.39***	**0.36***	**0.33***	**0.34***	**0.25***	**0.11***	**0.09***	**0.35***	**0.39***	**0.38***	**0.36***
Calcium	NV	**110.6**	**204**	**234**	**138**	**409**	**355**	**1570***	**1230***	**712**	**347**	**412**	**484**
Chromium	10	**19.06**	**20.3**	**20.7**	**20.3**	**26.1**	**22.2**	**21.3**	**16.6**	**22.4**	**21.3**	**21.3**	**19.6**
Cobalt	**30**	9.33	**13**	**13.8**	**10.9**	**16.6**	**13.4**	**13.1**	**10.7**	**15.9**	**13.5**	**12.9**	**12.6**
Copper	0.25	**10.76**	**13.2**	**18.9**	**11.8**	**14.0**	**14.8**	**20.7**	**15.1**	**20.5**	**17.9**	**14.6**	**61.3**
Iron	2000	**30633.3**	**30500N**	**32000N**	**28900N**	**34200N**	**28600N**	**31900N**	**24300N**	**32500N**	**31600N**	**29800N**	**27900N**
Lead	NV	**17.86**	**18.2**	**18.4**	**14.2**	**22.1**	**14.8**	**21.3**	**12.0**	**24.2**	**18.6**	**18.6**	**20.7**
Magnesium	NV	**2300**	**3,660**	**4,160**	**3,650**	**4360N**	**4,570**	**4,510**	**3,570**	**4,480**	**4,390**	**3,930**	**3,360**
Manganese	NV	**929**	**649N***	**700N***	**463N***	**2550N***	**580N***	**847N**	**748N**	**855N***	**875N***	**950N***	**964N***
Nickel	13	**14.9**	**23.7**	**28.3**	**24.9**	**31.4**	**31.8**	**35.6**	**28.5**	**33.8**	**29.2**	**25.8**	**21.8**
Potassium	NV	**561**	**1150E**	**1,220E**	**1160E**	**1410E**	**1010E**	**1,230**	**892**	**1320E**	**1110E**	**1430E**	**1130E**
Selenium	**2**	1.5	**0.53***	**0.55***	**0.53***	**0.65**	**0.5***	<0.32	<0.24	**0.38***	<0.32	**0.49***	**0.79***
Silver	NV	0.0	**0.14**	<0.09	<0.09	**0.11**	<0.06	<0.09	<0.07	<0.09	<0.09	**0.15**	**0.11**
Mercury	**0.1**	0.045	**0.09**	**0.07**	**0.1**	**0.18**	**0.07**	**0.03**	**0.05**	**0.08**	**0.04**	**0.09**	**0.1**
Sodium	NP	**0.047**	**87.9**	**42.3**	**42.7**	**54.6**	**41.9**	**57**	**50.4**	**80.0**	**220**	**50.2**	**42.9**
Thallium	NV	**6.3**	<0.64	<0.61	**0.65**	<0.74	**0.66**	<0.60	<0.46	**0.62**	<0.60	<0.65	<0.68
Vanadium	**150**	27.16	**23.6**	**20.4**	**22.1**	**27.7**	**19.7**	**18.9**	**14.5**	**22.9**	**20.5**	**23.1**	**22.1**
Zinc	20	**67.36**	**67.3**	**66.7**	**72.8**	**105**	**64.5**	**79.6**	**58.5**	**81.4**	**68.2**	**70.3**	**64.3**
Total Metals			**53,686N*E**	**52,877N*E**	**34,584N*E**	**43,299N*E**	**51,088N*E**	**55,286N***	**42,286N***	**57,631N*E**	**54,178N*E**	**54,527N*E**	**50,466N*E**

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Metal Data Qualifiers:

All results in mg/kg or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument de
than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is si

Metals SCGs used for comparison were either TAGM 4046 or
average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are
clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins ***(ng/g)***	**TEFs**	**STP-1**	**STP-2**	**STP-3**	**STP-4**	**STP-5**	**STP-6**	**STP-7**	**STP-8**	**STP-9**	**STP-10**	**STP-11**	**STP-12**
Total TCDF	NP	<0.065	<0.068	<0.072	-	<0.065	-	<0.084	-	<0.080	<0.072	<0.068	-
Total PeCDF	NP	<0.073	<0.061	<0.12	-	<0.089	-	<0.061	-	<0.082	<0.094	<0.056	-
TotalHxCDF	NP	<0.093	<0.016	<0.066	-	<0.021	-	<0.20	-	<0.027	<0.11	<0.037	-
Total HpCDF	NP	<0.33	<0.029	<0.21	-	<0.034	-	**1.5**	-	<0.031	<0.13	<0.14	-
Total TCDD	NP	<0.035	<0.044	<0.32	-	<0.048	-	<0.024	-	<0.058	<0.027	<0.040	-
Total PeCDD	NP	<0.17	<0.14	<0.18	-	<0.13	-	<0.097	-	<0.16	<0.14	<0.11	-
Total HxCDD	NP	<0.083	<0.031	<0.13	-	<0.033	-	<0.14	-	<0.051	<0.27	<0.031	-
Total HpCDD	NP	<0.49	<0.042	<0.48	-	<0.053	-	**2.8**	-	<0.027	<0.12	<0.11	-
2,3,7,8-TCDD	1	<0.035	<0.044	<0.032	-	<0.048	-	<0.024	-	<0.058	<0.027	<0.040	-
1,2,3,7,8-PeCDD	0.5	<0.17	<0.14	<0.18	-	<0.13	-	<0.097	-	<0.16	<0.14	<0.11	-
1,2,3,4,7,8-HxCDD	0.1	<0.088	<0.033	<0.14	-	<0.035	-	<0.15	-	<0.054	<0.28	<0.033	-
1,2,3,6,7,8-HxCDD	0.1	<0.094	<0.035	<0.15	-	<0.037	-	<0.16	-	<0.057	<0.30	<0.035	-
1,2,3,7,8,9-HxCDD	0.1	<0.083	<0.031	<0.13	-	<0.033	-	<0.14	-	<0.051	<0.27	<0.031	-
1,2,3,4,6,7,8-HpCDD	0.01	<0.49	<0.042	<0.48	-	<0.053	-	**0.91 J**	-	<0.027	<0.12	<0.11	-
OCDD	0.0001	**3.6 J**	<0.37	**3.6**	-	<0.25	-	**12**	-	<0.054	**1**	<0.56	-
2,3,7,8-TCDF	0.1	<0.065	<0.068	<0.072	-	<0.065	-	<0.084	-	<0.080	<0.072	<0.068	-
1,2,3,7,8-PeCDF	0.05	<0.077	<0.065	<0.13	-	<0.095	-	<0.065	-	<0.087	<0.10	<0.059	-
2,3,4,7,8-PeCDF	0.5	<0.073	<0.061	<0.12	-	<0.089	-	<0.061	-	<0.082	<0.094	<0.056	-
1,2,3,4,7,8-HxCDF	0.1	<0.093	<0.016	<0.066	-	<0.021	-	<0.073	-	<0.027	<0.11	<0.037	-
1,2,3,6,7,8-HxCDF	0.1	<0.095	<0.017	<0.067	-	<0.021	-	<0.074	-	<0.027	<0.12	<0.037	-
2,3,4,6,7,8-HxCDF	0.1	<0.10	<0.018	<0.071	-	<0.023	-	<0.078	-	<0.029	<0.12	<0.040	-
1,2,3,7,8,9-HxCDF	0.1	<0.10	<0.018	<0.072	-	<0.023	-	<0.079	-	<0.029	<0.12	<0.040	-
1,2,3,4,6,7,8-HpCDF	0.01	<0.091	<0.029	<0.19	-	<0.034	-	<0.34	-	<0.031	<0.13	<0.14	-
1,2,3,4,7,8,9-HpCDF	0.01	<0.031	<0.033	<0.21	-	<0.038	-	<0.043	-	<0.035	<0.15	<0.16	-
OCDF	0.0001	<0.36	<0.036	<0.28	-	<0.042	-	**2.4 J**	-	<0.040	<0.24	<0.19	-
2,3,7,8-TCDD Equivalence	1	**0.00036 J**	BDL	**0.00036**	-	BDL	-	**0.01054 J**	-	BDL	**0.0001 J**	BDL	-

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins ***(ng/g)***	**TEFs**	**STP-13**	**STP-14**	**STP-15**	**STP-16**	**STP-17**	**STP-18**	**STP-19**	**STP-20**	**STP-21**	**STP-22**	**STP-23**	**STP-24**
Total TCDF	NP	<0.048	-	<0.079	-	<0.067	-	<0.086	<0.089	-	-	<0.065	-
Total PeCDF	NP	<0.078	-	<0.087	-	<0.20	-	<1.4	<0.14	-	-	<0.094	-
TotalHxCDF	NP	<0.22	-	**1.7**	-	**5.3**	-	**23**	<0.45	-	-	<0.37	-
Total HpCDF	NP	<0.19	-	**13**	-	**34**	-	**100**	**3.3**	-	-	<0.040	-
Total TCDD	NP	<0.030	-	<0.045	-	<0.035	-	<0.035	<0.050	-	-	<0.037	-
Total PeCDD	NP	<0.19	-	<0.15	-	<0.41	-	<0.26	<0.19	-	-	<0.20	-
Total HxCDD	NP	<0.19	-	<0.40	-	**8.4**	-	**10**	<0.24	-	-	<0.63	-
Total HpCDD	NP	<0.21	-	**17**	-	**140**	-	**160**	**5.9**	-	-	<0.054	-
2,3,7,8-TCDD	1	<0.030	-	<0.045	-	<0.035	-	<0.035	<0.050	-	-	<0.037	-
1,2,3,7,8-PeCDD	0.5	<0.19	-	<0.15	-	<0.41	-	<0.26	<0.19	-	-	<0.20	-
1,2,3,4,7,8-HxCDD	0.1	<0.12	-	<0.10	-	<0.50	-	<0.29	<0.15	-	-	<0.092	-
1,2,3,6,7,8-HxCDD	0.1	<0.12	-	<0.40	-	**2.4**	-	**3.9**	<0.21	-	-	<0.098	-
1,2,3,7,8,9-HxCDD	0.1	<0.11	-	<0.098	-	**0.97 J**	-	**0.71 J**	<0.12	-	-	<0.087	-
1,2,3,4,6,7,8-HpCDD	0.01	<0.21	-	**12**	-	**91 E**	-	**110 E**	**3.9**	-	-	<0.054	-
OCDD	0.0001	**1.4 J**	-	**80 E**	-	**630 E**	-	**480 E**	**21**	-	-	<0.29	-
2,3,7,8-TCDF	0.1	<0.048	-	<0.079	-	<0.067	-	<0.086	<0.089	-	-	<0.065	-
1,2,3,7,8-PeCDF	0.05	<0.083	-	<0.092	-	<0.21	-	<0.21	<0.15	-	-	<0.10	-
2,3,4,7,8-PeCDF	0.5	<0.078	-	<0.087	-	<0.20	-	<0.12	<0.14	-	-	<0.094	-
1,2,3,4,7,8-HxCDF	0.1	<0.061	-	<0.097	-	<0.13	-	**0.70 J**	<0.13	-	-	<0.096	-
1,2,3,6,7,8-HxCDF	0.1	<0.062	-	<0.098	-	<0.20	-	<0.33	<0.13	-	-	<0.098	-
2,3,4,6,7,8-HxCDF	0.1	<0.065	-	<0.10	-	<0.21	-	<0.24	<0.14	-	-	<0.10	-
1,2,3,7,8,9-HxCDF	0.1	<0.066	-	<0.11	-	<0.21	-	<0.16	<0.14	-	-	<0.10	-
1,2,3,4,6,7,8-HpCDF	0.01	<0.060	-	**2.4**	-	**7.2**	-	**20**	**0.88 J**	-	-	<0.040	-
1,2,3,4,7,8,9-HpCDF	0.01	<0.030	-	<0.21	-	<0.53	-	**0.83 J**	<0.12	-	-	<0.046	-
OCDF	0.0001	<0.17	-	**16**	-	**41**	-	**96**	**3.0 J**	-	-	<0.097	-
2,3,7,8-TCDD Equivalence	1	**0.00014 J**	-	**0.1536 E**	-	**1.3861 JE**	-	**1.8969 JE**	**0.0502 J**	-	-	BDL	-

Notes:

Only analytes detected at or above laboratory method detectic
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detectio

Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

<u>Dioxin Data Qualifiers:</u>

All results in ng/kg or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins *(ng/g)*	TEFs	STP-25	STP-26	STP-27	STP-28	STP-29	STP-30	TP-1	TP-2	TP-3	TP-4	TP-5	TP-6
Total TCDF	NP	<0.069	<0.068	<0.088	-	-	-	**0.03**	-	**0.018**	-	-	-
Total PeCDF	NP	<0.16	<0.095	<0.16	-	-	-	**0.32**	-	**0.26**	-	-	-
TotalHxCDF	NP	<0.44	<0.28	<0.10	-	-	-	**27**	-	**5.1**	-	-	-
Total HpCDF	NP	<0.60	<0.23	<0.086	-	-	-	**290**	-	**30**	-	-	-
Total TCDD	NP	<0.031	<0.0049	<0.45	-	-	-	**0.2**	-	**0.039**	-	-	-
Total PeCDD	NP	<0.38	<0.32	<0.32	-	-	-	**0.27**	-	**0.5**	-	-	-
Total HxCDD	NP	<0.59	<0.31	<0.31	-	-	-	**22**	-	**9.3**	-	-	-
Total HpCDD	NP	**2.3**	<0.16	<0.19	-	-	-	**790**	-	**110**	-	-	-
2,3,7,8-TCDD	1	<0.031	<0.0049	<0.045	-	-	-	**0.2 J**	-	**0.0091**	-	-	-
1,2,3,7,8-PeCDD	0.5	<0.15	<0.027	<0.32	-	-	-	**0.17**	-	**0.19**	-	-	-
1,2,3,4,7,8-HxCDD	0.1	<0.29	<0.099	<0.32	-	-	-	**0.42**	-	**0.56**	-	-	-
1,2,3,6,7,8-HxCDD	0.1	<0.31	<0.11	<0.34	-	-	-	**9**	-	**2.3**	-	-	-
1,2,3,7,8,9-HxCDD	0.1	<0.27	<0.094	<0.31	-	-	-	**1.2**	-	**1.7**	-	-	-
1,2,3,4,6,7,8-HpCDD	0.01	**1.4 J**	<0.16	<0.19	-	-	-	**480 D**	-	**64 E**	-	-	-
OCDD	0.0001	**9.1**	<1.0	<0.53	-	-	-	**5400 D**	-	**430 E**	-	-	-
2,3,7,8-TCDF	0.1	<0.069	<0.068	<0.088	-	-	-	<0.01	-	<0.0025	-	-	-
1,2,3,7,8-PeCDF	0.05	<0.17	<0.10	<0.17	-	-	-	<0.014	-	<.00073	-	-	-
2,3,4,7,8-PeCDF	0.5	<0.16	<0.095	<0.16	-	-	-	<0.014	-	<0.0093	-	-	-
1,2,3,4,7,8-HxCDF	0.1	<0.25	<0.11	<0.16	-	-	-	**0.5**	-	**0.12**	-	-	-
1,2,3,6,7,8-HxCDF	0.1	<0.25	<0.11	<0.10	-	-	-	**0.18**	-	**0.096**	-	-	-
2,3,4,6,7,8-HxCDF	0.1	<0.27	<0.12	<0.11	-	-	-	**0.13 J**	-	**0.1**	-	-	-
1,2,3,7,8,9-HxCDF	0.1	<0.30	<0.12	<0.11	-	-	-	<0.029	-	<0.011	-	-	-
1,2,3,4,6,7,8-HpCDF	0.01	<0.059	<0.23	<0.086	-	-	-	**57**	-	**7.5**	-	-	-
1,2,3,4,7,8,9-HpCDF	0.01	<0.60	<0.26	<0.098	-	-	-	**2.7**	-	**0.39**	-	-	-
OCDF	0.0001	<0.81	<0.15	<0.16	-	-	-	**450 D**	-	**28 E**	-	-	-
2,3,7,8-TCDD Equivalence	1	**0.01491 J**	BDL	BDL	-	-	-	**7.41 DJ**	-	**1.3564 JE**	-	-	-

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins ***(ng/g)***	**TEFs**	**TP-7**	**TP-8**	**TP-9**	**TP-10**	**TP-11**	**TP-12**	**TP-13**	**TP-14**	**TP-15**	**TP-16**	**TP-17**	**TP-18**
Total TCDF	NP	<0.0004	**0.044**	<0.000058	-	-	-	-	**0.0095**	-	<0.00042	-	<0.094
Total PeCDF	NP	<0.0013	**0.7**	<0.00036	-	-	-	-	**0.035**	-	**0.0093**	-	<0.25
TotalHxCDF	NP	**0.042**	**5.6**	**0.0051**	-	-	-	-	**0.39**	-	**0.13**	-	<0.54
Total HpCDF	NP	<0.00045	**22**	**0.049**	-	-	-	-	**1.9**	-	**0.64**	-	**1.7**
Total TCDD	NP	**0.014**	**0.0021**	<0.000057	-	-	-	-	**0.0036**	-	**0.00095**	-	<0.067
Total PeCDD	NP	**0.3**	**0.08**	<0.00026	-	-	-	-	**0.027**	-	<0.0025	-	<0.33
Total HxCDD	NP	**0.12**	**2**	**0.0024**	-	-	-	-	**0.32**	-	**0.1**	-	<0.4
Total HpCDD	NP	<0.0002	**19**	**0.085**	-	-	-	-	**3.4**	-	**1.5**	-	**4.2**
2,3,7,8-TCDD	1	<0.0002	<0.0009	<0.000057	-	-	-	-	**0.0017**	-	<0.00019	-	<0.067
1,2,3,7,8-PeCDD	0.5	<0.00045	**0.032**	<0.00013	-	-	-	-	**0.015**	-	<0.0025	-	<0.33
1,2,3,4,7,8-HxCDD	0.1	<0.0013	**0.087**	<0.00025	-	-	-	-	**0.021**	-	**0.0046 J**	-	<0.42
1,2,3,6,7,8-HxCDD	0.1	**0.0071**	**0.66**	<0.002	-	-	-	-	**0.09**	-	**0.031**	-	<0.45
1,2,3,7,8,9-HxCDD	0.1	<0.0025	**0.25**	<0.0011	-	-	-	-	**0.046**	-	**0.013**	-	<0.4
1,2,3,4,6,7,8-HpCDD	0.01	**0.2 D**	**14 E**	**0.057**	-	-	-	-	**2.1**	-	**0.86**	-	**2.8**
OCDD	0.0001	**1.0 D**	**72 E**	**0.33**	-	-	-	-	**12 E**	-	**7.5**	-	**15**
2,3,7,8-TCDF	0.1	<0.0004	**0.011 CON**	<0.000054	-	-	-	-	**0.00095 JCON**	-	<0.00026	-	<0.094
1,2,3,7,8-PeCDF	0.05	<0.00088	**0.057**	<0.000087	-	-	-	-	<0.0023	-	<0.0013	-	<0.27
2,3,4,7,8-PeCDF	0.5	<0.00031	**0.039**	<0.000087	-	-	-	-	<0.0019	-	<0.0008	-	<0.25
1,2,3,4,7,8-HxCDF	0.1	<0.0017	**0.19**	<0.00031	-	-	-	-	**0.016**	-	**0.0061**	-	<0.13
1,2,3,6,7,8-HxCDF	0.1	<0.00061	**0.1**	<0.00022	-	-	-	-	**0.012**	-	**0.0038 J**	-	<0.13
2,3,4,6,7,8-HxCDF	0.1	<0.001	**0.075**	<0.00027	-	-	-	-	**0.008**	-	<0.0024	-	<0.14
1,2,3,7,8,9-HxCDF	0.1	<0.00046	**0.015**	<0.00028	-	-	-	-	<0.0011	-	<0.00062	-	<0.14
1,2,3,4,6,7,8-HpCDF	0.01	**0.032**	**3.7**	**0.1**	-	-	-	-	**0.6**	-	**0.15**	-	<0.58
1,2,3,4,7,8,9-HpCDF	0.01	<0.0026	**0.4**	<0.00088	-	-	-	-	**0.03**	-	**0.0089**	-	<0.1
OCDF	0.0001	**0.15 D**	**12 E**	**0.047**	-	-	-	-	**2.4**	-	**0.77**	-	<0.14
2,3,7,8-TCDD Equivalence	1	**.003145 D**	**0.36655 E**	**0.001608**	-	-	-	-	**0.057335 EJ**	-	**0.016866 DJ**	-	**0.0295 J**

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins *(ng/g)*	**TEFs**	**TP-19**	**TP-20**	**TP-21**	**TP-22**	**TP-23**	**TP-24**	**TP-25**	**TP-26**	**TP-27**	**TP-28**	**TP-29**	**TP-30**
Total TCDF	NP	<0.077	-	**0.089**	-	-	<0.10	-	<0.083	<0.078	<0.064	-	-
Total PeCDF	NP	<0.12	-	<0.22	-	-	<0.15	-	**0.14**	<0.10	<0.10	-	-
TotalHxCDF	NP	<0.066	-	<0.62	-	-	<0.074	-	**1.1**	<0.044	<0.034	-	-
Total HpCDF	NP	<0.033	-	**2.2**	-	-	<0.10	-	**9.8**	<0.036	<0.043	-	-
Total TCDD	NP	<0.036	-	<0.051	-	-	<0.071	-	<0.057	<0.049	<0.036	-	-
Total PeCDD	NP	<0.17	-	<0.38	-	-	<0.75	-	<0.25	<0.074	<0.15	-	-
Total HxCDD	NP	<0.19	-	<0.41	-	-	<0.19	-	<0.61	<0.080	<0.060	-	-
Total HpCDD	NP	<0.097	-	**6.4**	-	-	<0.37	-	**16**	<0.074	<0.11	-	-
2,3,7,8-TCDD	1	<0.036	-	<0.051	-	-	<0.071	-	<0.057	<0.049	<0.036	-	-
1,2,3,7,8-PeCDD	0.5	<0.17	-	<0.38	-	-	<0.75	-	<0.25	<0.13	<0.15	-	-
1,2,3,4,7,8-HxCDD	0.1	<0.21	-	<0.43	-	-	<0.2	-	<0.071	<0.085	<0.063	-	-
1,2,3,6,7,8-HxCDD	0.1	<0.22	-	<0.46	-	-	<0.22	-	<0.40	<0.090	<0.068	-	-
1,2,3,7,8,9-HxCDD	0.1	<0.19	-	<0.41	-	-	<0.19	-	<0.11	<0.080	<0.060	-	-
1,2,3,4,6,7,8-HpCDD	0.01	<0.097	-	**4**	-	-	<0.37	-	**11**	<0.074	<0.11	-	-
OCDD	0.0001	<0.43	-	**31**	-	-	**1.3 J**	-	**59**	<0.24	<0.55	-	-
2,3,7,8-TCDF	0.1	<0.077	-	<0.089	-	-	<0.10	-	<0.083	<0.078	<0.064	-	-
1,2,3,7,8-PeCDF	0.05	<0.12	-	<0.23	-	-	<0.16	-	<0.15	<0.11	<0.11	-	-
2,3,4,7,8-PeCDF	0.5	<0.12	-	<0.22	-	-	<0.15	-	<0.14	<0.10	<0.10	-	-
1,2,3,4,7,8-HxCDF	0.1	<0.066	-	<0.096	-	-	<0.074	-	<0.073	<0.044	<0.034	-	-
1,2,3,6,7,8-HxCDF	0.1	<0.067	-	<0.098	-	-	<0.075	-	<0.075	<0.044	<0.034	-	-
2,3,4,6,7,8-HxCDF	0.1	<0.071	-	<0.10	-	-	<0.080	-	<0.079	<0.047	<0.036	-	-
1,2,3,7,8,9-HxCDF	0.1	<0.072	-	<0.10	-	-	<0.081	-	<0.080	<0.048	<0.036	-	-
1,2,3,4,6,7,8-HpCDF	0.01	<0.033	-	<0.10	-	-	<0.10	-	**1.6 J**	<0.036	<0.043	-	-
1,2,3,4,7,8,9-HpCDF	0.01	<0.038	-	<0.80	-	-	<0.12	-	<0.15	<0.042	<0.049	-	-
OCDF	0.0001	<0.072	-	**2.5 J**	-	-	<0.37	-	**10**	<0.10	<0.087	-	-
2,3,7,8-TCDD Equivalence	1	BDL	-	**0.04335 J**	-	-	**0.00013 J**	-	**0.1329 J**	BDL	BDL	-	-

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectiv
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins *(ng/g)*	**TEFs**	**TP-31**	**TP-32**	**TP-33**	**TP-34**	**TP-35**	**TP-36**	**TP-37**	**TP03-1**	**TP03-2**	**TP03-3**	**TP03-4**	**TP03-5W**
Total TCDF	NP	-	<0.021	<0.072	-	-	-	-	<0.03	<0.02	<0.01	<0.02	<0.02
Total PeCDF	NP	-	<0.076	<0.11	-	-	-	-	<0.04	<0.05	<0.02	<0.03	<0.03
TotalHxCDF	NP	-	**1.4**	**5.1**	-	-	-	-	<0.05	<0.03	**0.16J**	<0.05	<0.03
Total HpCDF	NP	-	**14**	**48**	-	-	-	-	<0.10	**1.1**	**1.2**	**0.23J**	<0.03
Total TCDD	NP	-	<0.029	<0.041	-	-	-	-	<0.04	<0.03	<0.02	<0.03	<0.03
Total PeCDD	NP	-	<0.12	<0.12	-	-	-	-	<0.05	<0.04	<0.03	<0.04	<0.04
Total HxCDD	NP	-	<0.48	**3.1**	-	-	-	-	<0.04	<0.17	<0.02	<0.06	<0.03
Total HpCDD	NP	-	**26**	**87**	-	-	-	-	<0.04	**3.5**	**3.0**	**0.68J**	<0.03
2,3,7,8-TCDD	1	-	<0.029	<0.041	-	-	-	-	<0.04	<0.03	<0.02	<0.03	<0.03
1,2,3,7,8-PeCDD	0.5	-	<0.12	<0.12	-	-	-	-	<0.05	<0.04	<0.03	<0.04	<0.04
1,2,3,4,7,8-HxCDD	0.1	-	<0.090	<0.036	-	-	-	-	<0.04	<0.17	<0.02	<0.06	<0.03
1,2,3,6,7,8-HxCDD	0.1	-	<0.48	**1.7**	-	-	-	-	<0.03	<0.14	<0.02	<0.05	<0.02
1,2,3,7,8,9-HxCDD	0.1	-	<0.041	<0.098	-	-	-	-	<0.03	<0.14	<0.02	<0.05	<0.02
1,2,3,4,6,7,8-HpCDD	0.01	-	**17**	**29**	-	-	-	-	<0.04	**2.2**	**1.9**	**0.46J**	<0.03
OCDD	0.0001	-	**5.5**	**430 E**	-	-	-	-	**0.35J**	**15**	**9.9**	**2.8**	**0.07J**
2,3,7,8-TCDF	0.1	-	<0.021	<0.072	-	-	-	-	<0.03	<0.02	<0.01	<0.02	<0.02
1,2,3,7,8-PeCDF	0.05	-	<0.081	<0.11	-	-	-	-	<0.04	<0.05	<0.02	<0.03	<0.03
2,3,4,7,8-PeCDF	0.5	-	<0.076	<0.11	-	-	-	-	<0.04	<0.04	<0.02	<0.03	<0.03
1,2,3,4,7,8-HxCDF	0.1	-	<0.061	<1.0	-	-	-	-	<0.05	<0.02	<0.02	<0.04	<0.02
1,2,3,6,7,8-HxCDF	0.1	-	<0.062	<1.1	-	-	-	-	<0.04	<0.02	<0.02	<0.04	<0.02
2,3,4,6,7,8-HxCDF	0.1	-	<0.065	<1.1	-	-	-	-	<0.05	<0.02	<0.02	<0.04	<0.02
1,2,3,7,8,9-HxCDF	0.1	-	<0.066	<1.1	-	-	-	-	<0.05	<0.03	<0.02	<0.05	<0.03
1,2,3,4,6,7,8-HpCDF	0.01	-	**2.3**	**8**	-	-	-	-	<0.08	**0.21J**	**0.18J**	**0.06JS**	<0.03
1,2,3,4,7,8,9-HpCDF	0.01	-	<0.074	<0.34	-	-	-	-	<0.10	**0.91**	**1.0**	<0.04	<0.03
OCDF	0.0001	-	**17**	**57**	-	-	-	-	**0.15**	**1.3**	**0.88**	**0.24J**	<0.02
2,3,7,8-TCDD Equivalence	1	-	**0.19525 D**	**0.5887 DJ**	-	-	-	-	**0.00005**	**0.02573**	**0.031878**	**0.005504**	**0.000007**

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 3
Test Pit Soil Analytical Results
Remedial Investigation
Camp Summit

Dioxins *(ng/g)*	**TEFs**	**TP03-5E**	**TP03-6NE**	**TP03-6SW**	**TP03-7W**	**TP03-8**	**TP03-9N**	**TP03-9S**	**TP03-10W**	**TP03-10E**	**TP03-11W**	**TP03-11E**
Total TCDF	NP	<0.04	<0.02	<0.03	<0.04	<0.020	<0.02	**0.6J**	<0.01	<0.01	<0.02	**0.07J**
Total PeCDF	NP	<0.07	<0.03	<0.07	<0.07	<0.04	<0.04	**1.2J**	**0.44J**	**0.44J**	<0.03	<0.08
TotalHxCDF	NP	<0.04	<0.02	<0.02	<0.03	**1.6**	<0.02	**32**	**6.8**	**11**	<0.02	**3.4**
Total HpCDF	NP	<0.04	<0.03	<0.03	<0.05	**6.0**	**0.47J**	**96**	**23**	**36**	<0.03	**33**
Total TCDD	NP	<0.04	<0.02	<0.03	<0.04	<0.03	<0.03	<0.02	<0.02	<0.02	<0.03	<0.03
Total PeCDD	NP	<0.06	<0.03	<0.05	<0.05	<0.04	<0.04	<0.03	<0.03	<0.02	<0.04	<0.05
Total HxCDD	NP	<0.08	<0.06	<0.03	<0.04	**0.79J**	<0.05	**5.6**	**1.7J**	**1.7**	<0.05	**3.1**
Total HpCDD	NP	<0.06	<0.09	<0.03	<0.05	**11**	**0.72J**	**115**	**30**	**40**	<0.08	**90**
2,3,7,8-TCDD	1	<0.04	<0.02	<0.03	<0.04	<0.03	<0.03	<0.02	<0.02	<0.02	<0.03	<0.03
1,2,3,7,8-PeCDD	0.5	<0.06	<0.03	<0.05	<0.05	<0.04	<0.04	<0.03	<0.03	<0.02	<0.04	<0.05
1,2,3,4,7,8-HxCDD	0.1	<0.08	<0.06	<0.03	<0.04	<0.04	<0.05	<0.07	<0.07	<0.04	<0.05	**0.26J**
1,2,3,6,7,8-HxCDD	0.1	<0.06	<0.05	<0.03	<0.03	**0.21J**	<0.04	**2.2**	**0.61J**	**0.67**	<0.04	**0.75**
1,2,3,7,8,9-HxCDD	0.1	<0.06	<0.05	<0.03	<0.03	**0.12J**	<0.04	**0.36J**	**0.14J**	**0.1J**	<0.04	**0.41J**
1,2,3,4,6,7,8-HpCDD	0.01	<0.06	<0.09	<0.03	<0.05	**7.2**	**0.48J**	**80**	**20**	**27**	<0.08	**53**
OCDD	0.0001	**0.14J**	**0.19J**	**0.10J**	**0.34J**	**29**	**3.1**	**457**	**118**	**140**	**0.3J**	**650**
2,3,7,8-TCDF	0.1	<0.04	<0.02	<0.03	<0.04	<0.02	<0.02	**0.6J**	<0.01	<0.01	<0.02	<0.03
1,2,3,7,8-PeCDF	0.05	<0.07	<0.03	<0.07	<0.07	<0.04	<0.04	**0.25J**	**0.06J**	**0.07J**	<0.03	<0.08
2,3,4,7,8-PeCDF	0.5	<0.07	<0.03	<0.06	<0.07	<0.04	<0.04	**0.12J**	**0.04J**	**0.06J**	<0.02	<0.08
1,2,3,4,7,8-HxCDF	0.1	<0.04	<0.02	<0.02	<0.03	**0.05J**	<0.02	**1.2**	**0.22J**	**0.4J**	<0.02	**0.09J**
1,2,3,6,7,8-HxCDF	0.1	<0.03	<0.01	<0.02	<0.03	<0.02	<0.02	**0.32J**	**0.06J**	<0.03	<0.02	<0.03
2,3,4,6,7,8-HxCDF	0.1	<0.04	<0.02	<0.02	<0.03	<0.03	<0.02	**0.82**	**0.13J**	**0.3J**	<0.02	<0.03
1,2,3,7,8,9-HxCDF	0.1	<0.04	<0.02	<0.02	<0.03	<0.03	<0.02	**1.2**	**0.13J**	**0.32J**	<0.02	<0.03
1,2,3,4,6,7,8-HpCDF	0.01	<0.03	<0.02	<0.03	<0.04	**1.5**	**0.08J**	**14**	**4.2**	**4.5**	<0.02	**6.7**
1,2,3,4,7,8,9-HpCDF	0.01	<0.04	<0.03	<0.03	<0.05	**0.04J**	<0.03	**1.5**	**0.22J**	**0.48J**	<0.03	**0.19J**
OCDF	0.0001	<0.03	<0.08	<0.05	<0.02	**5.4**	**45J**	**51**	**19**	**18**	<0.2	**41**
2,3,7,8-TCDD Equivalence	1	**0.000014**	**0.000019**	**0.00001**	**0.000034**	**0.12884**	**0.00741**	1.7483	**0.4099**	**0.5481**	**0.00003**	**0.819**

Notes:
Only analytes detected at or above laboratory method detectic
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detectio
Shaded Text=Exceedence of TAGM 4046 soil cleanup objecti
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated

Dioxin Data Qualifiers:
All results in ng/kg or parts per trillion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		Preliminary Investigation													
VOCs (mg/kg)	**TAGM**	**B1-1**	**B1-5**	**B2-3**	**B3-1**	**B4-2**	**B4-3**	**B5-2**	**B5-3**	**B6-1**	**B6-4**	**B7-1**	**B7-3**	**B7-4**	**B8-3**
Acetone	0.2	-	-	-	-	-	**0.084**	-	-	ND	-	**0.054 J**	-	-	-
2-Butanone	0.3	-	-	-	-	-	**0.023**	-	-	ND	-	ND	-	-	-
Chloroform	0.3	-	-	-	-	-	ND	-	-	ND	-	ND	-	-	-
Toluene	1.5	-	-	-	-	-	**0.003 J**	-	-	ND	-	ND	-	-	-
Ethylbenzene	5.5	-	-	-	-	-	**0.004 J**	-	-	ND	-	ND	-	-	-
Xylenes (total)	1.2	-	-	-	-	-	**0.011 J**	-	-	ND	-	ND	-	-	-
Total VOCs		-	-	-	-	-	**0.125**	-	-	ND	-	**0.054**	-	-	-

Pesticides and PCBs Analysis Results (ug/kg)	**TAGM**	**B1-1**	**B1-5**	**B2-3**	**B3-1**	**B4-2**	**B4-3**	**B5-2**	**B5-3**	**B6-1**	**B6-4**	**B7-1**	**B7-3**	**B7-4**	**B8-3**
4,4'-DDD	2900	-	-	-	-	-	ND	-	-	**23**	-	**410**	-	-	-
4,4'-DDT	2100	-	-	-	-	-	ND	-	-	**39**	-	**3000**	-	-	-
Total Pest. & PCB		-	-	-	-	-	ND	-	-	**62**	-	**3410**	-	-	-

SVOC/PAH (mg/kg)	**TAGM**	**B1-1**	**B1-5**	**B2-3**	**B3-1**	**B4-2**	**B4-3**	**B5-2**	**B5-3**	**B6-1**	**B6-4**	**B7-1**	**B7-3**	**B7-4**	**B8-3**
Acenaphthene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a) anthracene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (k) fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (b) fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-Ethylhexyl) Phthalate	50	**0.062 JB**	**0.076 JB**	**0.2 JB**	**0.072 JB**	**0.58 B**	**0.19 JB**	**29**	ND	**4.3 JB**	**16**	ND	ND	**12.0 JB**	**24.0 B**
Carbazole	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.9 J**	ND
Di-n-butyl Phthalate	8.1	ND	ND	ND	**0.046 J**	**0.048 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	6.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**4.6 J**
Di-n-octyl phthalte	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**8000 J**
Indeno (1,2,3-cd) pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	ND	ND	ND	ND	ND	**0.55**	**11.0 J**	**3.7 J**	**2.1 J**	**11.0 J**	**18.0 JD**	**15.0 J**	**4.7 J**	**63**
Naphthalene	13	ND	ND	ND	ND	ND	**0.33 J**	**1.9 J**	ND	ND	ND	ND	ND	ND	**18**
Pentachlorophenol	1 or MDL	**0.3 J**	**1.0 U**	**1.1 U**	**0.079 J**	**1.1 U**	**1.2 U**	**35.0 U**	**4.5 J**	**87**	**6.6 J**	**400 D**	**820**	**150 D**	**420 D**
Phenanthrene	50	ND	ND	ND	ND	ND	ND	**2.6 J**	ND	**11.0 J**	**4.3 J**	**11.0 JD**	ND	**2.1J**	**13**
Pyrene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenol	0.03 or MDL	**0.33 J**	ND	**0.19 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total SVOCs		**0.692**	**1.076**	**1.49**	**0.197**	**1.728**	**2.27**	**79.5**	**8.2**	**104.4**	**37.9**	**429**	**835**	**170.7**	**8542.6**

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NA = compound not analyzed for.
NP = Not Promulgated
-- = Not sampled

SVOC & VOC Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Pesticide & PCB Data Qualifiers
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		Preliminary Investigation													
VOCs (mg/kg)	**TAGM**	**B9-2**	**B10-3**	**B11-1**	**B11-3**	**B12**	**B13**	**B14**	**B15**	**B16-2**	**B16-3**	**B17-2**	**B17-3**	**B18-3**	**B19-2**
Acetone	0.2	-	**0.037**	-	**0.010 J**	ND	-	-	ND	-	-	-	-	**0.046 J**	-
2-Butanone	0.3	-	**0.012 J**	-	ND	ND	-	-	ND	-	-	-	-	ND	-
Chloroform	0.3	-	ND	-	ND	ND	-	-	**0.002 J**	-	-	-	-	ND	-
Toluene	1.5	-	ND	-	ND	ND	-	-	ND	-	-	-	-	ND	-
Ethylbenzene	5.5	-	ND	-	ND	ND	-	-	ND	-	-	-	-	ND	-
Xylenes (total)	1.2	-	**0.002 J**	-	ND	ND	-	-	ND	-	-	-	-	**0.009 J**	-
Total VOCs		-	**0.051**	-	**0.1**	ND	-	-	**0.002**	-	-	-	-	**0.055**	-

Pesticides and PCBs Analysis Results (ug/kg)	**TAGM**	**B9-2**	**B10-3**	**B11-1**	**B11-3**	**B12**	**B13**	**B14**	**B15**	**B16-2**	**B16-3**	**B17-2**	**B17-3**	**B18-3**	**B19-2**
4,4'-DDD	2900	-	ND	-	ND	ND	-	-	ND	-	-	-	-	ND	-
4,4'-DDT	2100	-	ND	-	ND	ND	-	-	ND	-	-	-	-	ND	-
Total Pest. & PCB		-	ND	-	ND	ND	-	-	ND	-	-	-	-	ND	-

SVOC/PAH (mg/kg)	**TAGM**	**B9-2**	**B10-3**	**B11-1**	**B11-3**	**B12**	**B13**	**B14**	**B15**	**B16-2**	**B16-3**	**B17-2**	**B17-3**	**B18-3**	**B19-2**
Acenaphthene	50	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	**1.2 J**	ND
Anthracene	8.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a) anthracene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (k) fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (b) fluoranthene	1.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) pyrene	0.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(ghi) perylene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bis (2-Ethylhexyl) Phthalate	50	**38.0 B**	**16.0 B**	**--**	**0.042 B**	**0.089 JB**	ND	ND	**0.047 JB**	ND	**0.083 J**	**0.089 J**	ND	**1.2 J**	ND
Carbazole	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	0.4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	7.1	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-butyl Phthalate	8.1	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzofuran	6.2	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-octyl phthalte	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	50	ND	ND	--	ND	ND	ND	ND	ND	**0.11 J**	ND	ND	ND	ND	ND
Fluorene	50	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno (1,2,3-cd) pyrene	3.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	36.4	ND	**7.7 J**	--	**0.32 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	13	ND	ND	--	**0.051 J**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pentachlorophenol	1 or MDL	**37**	**32.0 U**	--	**0.15 J**	ND	**1.5 U**	**1.7 U**	**0.13 J**	**1.5 U**	**1.5 U**	**10**	**2.5**	**83**	**13**
Phenanthrene	50	ND	**1.5 J**	--	ND	ND	ND	ND	ND	**0.099 J**	ND	ND	ND	**3.9 J**	ND
Pyrene	50	ND	ND	--	ND	ND	ND	ND	ND	**0.079 J**	ND	ND	ND	ND	ND
Phenol	0.03 or MDL	ND	ND	--	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total SVOCs		**75**	**57.2**	**--**	**0.563**	**0.089**	**1.5**	**1.7**	**0.177**	**1.788**	**1.583**	**10.089**	**2.5**	**88.1**	**13**

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NA = compound not analyzed for.
NP = Not Promulgated
-- = Not sampled

SVOC & VOC Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Pesticide & PCB Data Qualifiers
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		**Preliminary Investigation**	**Remedial Investigation**												
VOCs (mg/kg)	**TAGM**	**B19-3**	**SB-1 (6-8')**	**SB-2 (8-10')**	**SB-3 (6-8')**	**SB-4 (8 10')**	**SB-5 (2-4')**	**SB-6 (4 6')**	**SB-7 (3-5')**	**MW-6 (6-8')**	**MW-7 (2 4')**	**MW-8 (4-6')**	**MW-9 (8-10')**	**MW-10 (10-12')**	**MW-11 (2-4')**
Acetone	0.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.3	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.3	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	1.5	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5.5	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	1.2	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs		-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Pesticides and PCBs Analysis Results (ug/kg)	**TAGM**	**B19-3**	**SB-1 (6-8')**	**SB-2 (8-10')**	**SB-3 (6-8')**	**SB-4 (8 10')**	**SB-5 (2-4')**	**SB-6 (4 6')**	**SB-7 (3-5')**	**MW-6 (6-8')**	**MW-7 (2 4')**	**MW-8 (4-6')**	**MW-9 (8-10')**	**MW-10 (10-12')**	**MW-11 (2-4')**
4,4'-DDD	2900	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Pest. & PCB		-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

SVOC/PAH (mg/kg)	**TAGM**	**B19-3**	**SB-1 (6-8')**	**SB-2 (8-10')**	**SB-3 (6-8')**	**SB-4 (8 10')**	**SB-5 (2-4')**	**SB-6 (4 6')**	**SB-7 (3-5')**	**MW-6 (6-8')**	**MW-7 (2 4')**	**MW-8 (4-6')**	**MW-9 (8-10')**	**MW-10 (10-12')**	**MW-11 (2-4')**
Acenaphthene	50	ND	<0.33	<0.33	<0.33	<0.33	<0.33	**0.25 J**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
Anthracene	8.1	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Benzo(a) anthracene	0.33	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Benzo (k) fluoranthene	1.1	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Benzo (b) fluoranthene	1.1	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Benzo (a) pyrene	0.33	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Benzo(ghi) perylene	50	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Bis (2-Ethylhexyl) Phthalate	50	**2700**	<0.33	<0.33	**0.027J**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	**0.13 J**
Carbazole	NP	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Chrysene	0.4	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Diethylphthalate	7.1	ND	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
Di-n-butyl Phthalate	8.1	ND	<0.33	**0.084 BJ**	**0.12 BJ**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	**0.1 J**
Dibenzofuran	6.2	ND	<0.33	**0.058 J**	**0.16 J**	<0.33	<0.33	**0.19 J**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
Di-n-octyl phthalte	50	--	<0.33	**0.2 J**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
Fluoranthene	50	ND	<0.33	<0.33	**0.021 J**	<0.33	<0.33	**0.024 J**	<0.33	<0.33	**0.048 J**	<0.33	<0.33	<0.33	<0.33
Fluorene	50	ND	<0.33	**0.061 J**	**0.35**	<0.33	<0.33	**0.41**	<0.33	**0.061 J**	<0.33	<0.33	<0.33	<0.33	<0.33
Indeno (1,2,3-cd) pyrene	3.2	--	<0.33	<0.8	<0.8	<0.33	<0.33	<0.33	<0.33	<0.33	<0.8	<0.33	<0.33	<0.33	<0.33
2-Methylnaphthalene	36.4	ND	<0.33	**0.39**	**1.9**	<0.33	<0.33	**2.1**	<0.33	**0.19 J**	**0.16 J**	<0.33	<0.33	<0.33	<0.33
Naphthalene	13	ND	<0.33	**0.03J**	**0.27**	<0.33	<0.33	**0.25 J**	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
Pentachlorophenol	1 or MDL	**7.5**	**0.16 J**	**9.8 D**	**9.6 D**	<1.6	**1.8**	<1.6	<1.6	**0.024 J**	**29.0 D**	<1.6	<1.6	<1.6	<1.6
Phenanthrene	50	ND	<0.33	**0.34**	**0.88**	<0.33	<0.33	**1.1**	<0.33	**0.15 J**	**0.41**	<0.33	<0.33	<0.33	<0.33
Pyrene	50	ND	<0.33	**0.043 J**	**0.055 J**	<0.33	<0.33	<0.33	<0.33	<0.33	**0.094 J**	<0.33	<0.33	<0.33	<0.33
Phenol	0.03 or MDL	ND	-	-	-	-	-	-	-	-	-	-	-	-	-
Total SVOCs		**2707.5**	**0.16 J**	**11.006 BJD**	**13.383 BJ**	BDL	**1.8 J**	**4.14 J**	BDL	**0.425 J**	**27.712 JD**	BDL	BDL	BDL	**0.23 J**

Notes:

Only analytes detected at or above laboratory method detection limits incl
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NA = compound not analyzed for.

NP = Not Promulgated

-- = Not sampled

SVOC & VOC Qualifiers:

All results in mg/kg or parts per million

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detection limit

Pesticide & PCB Data Qualifiers

All results in ug/kg or parts per billion

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detection limit

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		Remedial Investigation														
VOCs (mg/kg)	**TAGM**	**MW-12 (8-10')**	**MW-12 (12-14')**	**MW-13 (4-6')**	**MW-13 (8-10')**	**MW-14 (10-12')**	**MW-14 (18-20')**	**SSB03-03 (6-7')**	**SSB03-03 (12-13')**	**SSB03-01 (6-8')**	**SSB03-02 (7-9')**	**SSB03-05 (2-4')**	**SSB03-05 (8-10')**	**SSB03-04 (3-5')**	**SSB03-04 (11-13')**	**SSB03-15 (4-6')**
Acetone	0.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	1.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total VOCs		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Pesticides and PCBs Analysis Results (ug/kg)	**TAGM**	**MW-12 (8-10')**	**MW-12 (12-14')**	**MW-13 (4-6')**	**MW-13 (8-10')**	**MW-14 (10-12')**	**MW-14 (18-20')**	**SSB03-03 (6-7')**	**SSB03-03 (12-13')**	**SSB03-01 (6-8')**	**SSB03-02 (7-9')**	**SSB03-05 (2-4')**	**SSB03-05 (8-10')**	**SSB03-04 (3-5')**	**SSB03-04 (11-13')**	**SSB03-15 (4-6')**
4,4'-DDD	2900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Pest. & PCB		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

SVOC/PAH (mg/kg)	**TAGM**	**MW-12 (8-10')**	**MW-12 (12-14')**	**MW-13 (4-6')**	**MW-13 (8-10')**	**MW-14 (10-12')**	**MW-14 (18-20')**	**SSB03-03 (6-7')**	**SSB03-03 (12-13')**	**SSB03-01 (6-8')**	**SSB03-02 (7-9')**	**SSB03-05 (2-4')**	**SSB03-05 (8-10')**	**SSB03-04 (3-5')**	**SSB03-04 (11-13')**	**SSB03-15 (4-6')**
Acenaphthene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.25J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Anthracene	8.1	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.12J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Benzo(a) anthracene	0.33	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Benzo (k) fluoranthene	1.1	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Benzo (b) fluoranthene	1.1	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Benzo (a) pyrene	0.33	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Benzo(ghi) perylene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Bis (2-Ethylhexyl) Phthalate	50	**0.13J**	**0.06J**	**0.091J**	**0.023J**	**0.016JB**	**0.49B**	**0.047J**	**0.024J**	**0.072J**	**0.053J**	**0.038J**	**0.031J**	**0.033J**	**0.050J**	<0.360
Carbazole	NP	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Chrysene	0.4	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Diethylphthalate	7.1	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	**0.022J**	<0.380	**0.024J**	**0.032J**	<0.360
Di-n-butyl Phthalate	8.1	<0.380	<0.380	<0.410	<0.370	<0.370	**0.019J**	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Dibenzofuran	6.2	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.37J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Di-n-octyl phthalte	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Fluoranthene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.11J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Fluorene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.66J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Indeno (1,2,3-cd) pyrene	3.2	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	<0.120	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
2-Methylnaphthalene	36.4	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**7**	<0.460	<0.420	<0.380	**0.054J**	<0.380	<0.360
Naphthalene	13	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.86J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Pentachlorophenol	1 or MDL	<0.940	<0.940	<1.0	<0.920	<0.930	<0.940	<1.1	<1.0	**0.36**	<1.1	<1.0	<0.950	**2.9**	<0.960	<0.900
Phenanthrene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**2**	<0.460	<0.420	<0.380	**0.083J**	<0.380	<0.360
Pyrene	50	<0.380	<0.380	<0.410	<0.370	<0.370	<0.380	<0.440	<0.420	**0.22J**	<0.460	<0.420	<0.380	<0.440	<0.380	<0.360
Phenol	0.03 or MDL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total SVOCs		**0.13J**	**0.06J**	**0.091J**	**0.023J**	**0.16JB**	**0.509JB**	**0.047J**	**0.024J**	**11.522J**	**0.053J**	**0.06J**	**0.031J**	**3.094J**	**0.082J**	BDL

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NA = compound not analyzed for.
NP = Not Promulgated
-- = Not sampled

SVOC & VOC Qualifiers:
All results in mg/kg or parts per million
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Pesticide & PCB Data Qualifiers
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		Preliminary Investigation													
Dioxins (ug/kg)	**TEF**	**B1-1**	**B1-5**	**B2-3**	**B3-1**	**B4-2**	**B4-3**	**B5-2**	**B5-3**	**B6-1**	**B6-4**	**B7-1**	**B7-3**	**B7-4**	**B8-3**
Total TCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TotalHxCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDD	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDF	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD Equivalence	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled
Dioxin Data Qualifiers:
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		Preliminary Investigation													
Dioxins (ug/kg)	**TEF**	**B9-2**	**B10-3**	**B11-1**	**B11-3**	**B12**	**B13**	**B14**	**B15**	**B16-2**	**B16-3**	**B17-2**	**B17-3**	**B18-3**	**B19-2**
Total TCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PeCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TotalHxCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HpCDF	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total TCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PeCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HxCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total HpCDD	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDD	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDD	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDD	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDD	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8-PeCDF	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,7,8-PeCDF	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,6,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6,7,8-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,7,8,9-HxCDF	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,6,7,8-HpCDF	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,3,4,7,8,9-HpCDF	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OCDF	0.0001	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,7,8-TCDD Equivalence	1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled

Dioxin Data Qualifiers:
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		**Preliminary Investigation**	**Remedial Investigation**												
Dioxins (ug/kg)	**TEF**	**B19-3**	**SB-1 (6-8')**	**SB-2 (8-10')**	**SB-3 (6-8')**	**SB-4 (8 10')**	**SB-5 (2-4')**	**SB-6 (4 6')**	**SB-7 (3-5')**	**MW-6 (6-8')**	**MW-7 (2 4')**	**MW-8 (4-6')**	**MW-9 (8-10')**	**MW-10 (10-12')**	**MW-11 (2-4')**
Total TCDF	NP	--	<0.001	<0.0033	**0.046**	<0.000087	<0.000085	<0.00013	<0.000032	**0.0016**	**0.013**	<0.00013	<0.00031	<0.036	<0.22
Total PeCDF	NP	--	<0.0021	**0.072**	**5.2**	<0.00029	<0.00086	<0.000095	<0.000067	**0.0048**	**0.081**	<0.00013	**0.011**	<0.13	<0.073
TotalHxCDF	NP	--	0.016	**3.4**	**46**	**0.011**	**0.052**	<0.00077	<0.00073	**1**	**6.2**	<0.0002	**1.1**	<0.046	<0.11
Total HpCDF	NP	--	**0.23**	**25**	<0.0068	**0.074**	**0.39**	**0.0049**	**0.0048**	**9.1**	**57**	<0.0006	**8.2**	<0.21	<0.077
Total TCDD	NP	--	<0.0015	<0.0047	<0.0053	<0.000084	<0.00033	<0.000087	<0.000074	**0.0016**	**0.01**	<0.000099	**0.00061**	<0.046	<0.030
Total PeCDD	NP	--	<0.003	<0.0097	<0.022	<0.00028	<0.00073	<0.00026	<0.00032	**0.0081**	**0.13**	<0.00021	**0.0052**	<0.18	<0.13
Total HxCDD	NP	--	<0.0097	**1.8**	**3.3**	**0.0066**	**0.029**	<0.0012	<0.00049	**0.66**	**6.1**	<0.00013	**0.72**	<0.051	<0.043
Total HpCDD	NP	--	**0.46**	**52**	**98**	**0.16**	**0.6**	**0.044**	**0.013**	**14**	**150**	<0.00078	**17**	<0.31	<0.10
2,3,7,8-TCDD	1	--	<0.0015	<0.0047	<0.0053	<0.000066	<0.000083	0.000087	<0.000056	<0.00013	**0.0023**	<0.000099	**0.00061 J**	<0.046	<0.030
1,2,3,7,8-PeCDD	0.5	--	<0.003	<0.0097	<0.012	<0.00022	<0.00019	<0.00026	<0.000057	<0.0004	**0.041**	<0.00021	**0.0052 J**	<0.18	<0.13
1,2,3,4,7,8-HxCDD	0.1	--	<0.0023	<0.012	<0.021	<0.00056	<0.00027	<0.000053	<0.00006	<0.0025	**0.12**	<0.00012	**0.013**	<0.054	<0.045
1,2,3,6,7,8-HxCDD	0.1	--	<0.0097	**0.85**	**1.4**	**0.0031 J**	**0.013**	<0.00075	<0.00034	**0.28**	**2.3**	<0.00013	**0.28**	<0.058	<0.048
1,2,3,7,8,9-HxCDD	0.1	--	<0.0023	**0.055**	**0.098**	<0.0011	<0.0013	<0.00032	<0.00016	**0.016**	**0.41**	<0.00012	**0.04**	<0.051	<0.043
1,2,3,4,6,7,8-HpCDD	0.01	--	**0.29**	**34 D**	**64 D**	**0.096**	**0.39**	**0.025**	**0.0099**	**8.9 D**	**96 ED**	<0.00078	**11 D**	<0.31	<0.10
OCDD	0.0001	--	**3.1**	**310 D**	**540 D**	**0.82**	**2.7**	**0.24**	**0.08**	**63 D**	**650 ED**	<0.0046	**96 DE**	**0.81 J**	**0.6**
2,3,7,8-TCDF	0.1	--	<0.001	<0.0033	<0.0055	<0.000087	<0.000085	<0.00013	<0.000026	<0.00037	<0.00075	<0.00013	<0.00031	<0.036	<0.22
1,2,3,7,8-PeCDF	0.05	--	<0.0016	<0.019	<0.028	<0.00012	<0.00048	<0.000064	<0.000032	<0.0016	<0.004	<0.00013	<0.0014	<0.14	<0.077
2,3,4,7,8-PeCDF	0.5	--	<0.0016	<0.011	<0.013	<0.00011	<0.0004	<0.000063	<0.000032	<0.0011	<0.0032	<0.00013	<0.001	<0.13	<0.073
1,2,3,4,7,8-HxCDF	0.1	--	<0.0017	**0.098**	**0.12**	<0.00038	<0.0017	<0.000072	<0.00011	**0.013**	**0.11**	<0.00013	**0.02**	<0.046	<0.11
1,2,3,6,7,8-HxCDF	0.1	--	<0.0016	<0.027	<0.033	<0.00029	<0.00058	<0.000063	<0.000021	**0.0034 J**	**0.035**	<0.00011	**0.006**	<0.047	<0.11
2,3,4,6,7,8-HxCDF	0.1	--	<0.0017	<0.025	<0.022	<0.00035	<0.00037	<0.000078	<0.000036	<0.0024	**0.032**	<0.00014	**0.0035 J**	<0.050	<0.12
1,2,3,7,8,9-HxCDF	0.1	--	<0.0019	<0.0084	<0.012	<0.00011	<0.00017	<0.000083	<0.000028	<0.0011	<0.0043	<0.00015	<0.0012	<0.050	<0.12
1,2,3,4,6,7,8-HpCDF	0.01	--	**0.038**	**4.4**	**8**	**0.014**	**0.063**	<0.0022	<0.0014	**1.3**	**11 D**	<0.00028	**1.6**	<0.21	<0.077
1,2,3,4,7,8,9-HpCDF	0.01	--	<0.0033	**0.22**	**0.4**	<0.00095	<0.0024	<0.00018	<0.00018	**0.062**	**0.64 D**	<0.00015	**0.064**	<0.24	<0.088
OCDF	0.0001	--	**0.23**	**32 D**	**63 D**	**0.1**	**0.41**	**0.0094 J**	**0.0073 J**	**11 D**	**66 D**	<0.00073	**11 D**	<0.36	<0.12
2,3,7,8-TCDD Equivalence	1.0	--	**0.003613**	**0.5207 D**	**0.9461 D**	**0.001502 J**	**0.006141**	**0.000275 J**	**0.000108 J**	**0.14126 DJ**	**1.0715 ED**	BDL	**0.1768 JED**	**0.000081 J**	**0.00006**

Notes:

Only analytes detected at or above laboratory method detection limits incl
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

-- = Not sampled

Dioxin Data Qualifiers:

All results in ug/kg or parts per billion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)		**Remedial Investigation**														
Dioxins (ug/kg)	**TEF**	**MW-12 (8-10')**	**MW-12 (12-14')**	**MW-13 (4-6')**	**MW-13 (8-10')**	**MW-14 (10-12')**	**MW-14 (18-20')**	**SSB03-03 (6-7')**	**SSB03-03 (12-13')**	**SSB03-01 (6-8')**	**SSB03-02 (7-9')**	**SSB03-05 (2-4')**	**SSB03-05 (8-10')**	**SSB03-04 (3-5')**	**SSB03-04 (11-13')**	**SSB03-15 (4-6')**
Total TCDF	NP	<0.08	<0.02	<0.03	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02	<0.02	<0.04	<0.02	<0.02	<0.04	<0.02
Total PeCDF	NP	<0.14	<0.08	<0.06	<0.05	<0.08	<0.05	<0.11	<0.04	<0.05	<0.04	<0.10	<0.05	<0.03	<0.08	<0.03
TotalHxCDF	NP	<0.21	<0.05	<0.05	<0.05	<0.04	<0.02	<0.04	<0.07	**3.0**	<0.03	<0.04	<0.09	**3.8**	<0.04	<0.07
Total HpCDF	NP	<0.45	<0.10	<0.06	<0.08	<0.03	<0.02	<0.05	<0.15	**24**	<0.05	<0.07	<0.21	**34**	<0.07	<0.07
Total TCDD	NP	<0.08	<0.03	<0.04	<0.03	<0.03	<0.04	<0.04	<0.04	<0.02	<0.03	<0.05	<0.03	<0.03	<0.04	<0.02
Total PeCDD	NP	<0.01	<0.04	<0.05	<0.04	<0.04	<0.07	<0.07	<0.05	<0.03	<0.05	<0.10	<0.04	<0.04	<0.05	<0.03
Total HxCDD	NP	<0.22	<0.05	<0.05	<0.07	<0.02	<0.02	<0.05	<0.11	**1.6**	<0.05	<0.06	<0.13	**1.4JS**	<0.05	<0.07
Total HpCDD	NP	<0.34	<0.05	<0.06	<0.06	<0.02	<0.02	<0.04	<0.08	**58**	<0.04	<0.09	<0.08	**47**	**0.08JS**	<0.06
2,3,7,8-TCDD	1	<0.08	<0.03	<0.04	<0.03	<0.03	<0.04	<0.04	<0.04	<0.02	<0.03	<0.05	<0.03	<0.03	<0.04	<0.02
1,2,3,7,8-PeCDD	0.5	<0.01	<0.04	<0.05	<0.04	<0.04	<0.07	<0.07	<0.05	<0.03	<0.05	<0.10	<0.04	<0.04	<0.05	<0.03
1,2,3,4,7,8-HxCDD	0.1	<0.22	<0.05	<0.05	<0.07	<0.02	<0.02	<0.05	<0.11	<0.06	<0.05	<0.06	<0.13	<0.06	<0.05	<0.07
1,2,3,6,7,8-HxCDD	0.1	<0.17	<0.04	<0.04	<0.05	<0.02	<0.02	<0.04	<0.09	**0.66**	<0.04	<0.04	<0.11	**0.57JS**	<0.04	<0.06
1,2,3,7,8,9-HxCDD	0.1	<0.18	<0.04	<0.04	<0.06	<0.02	<0.02	<0.04	<0.10	<0.05	<0.04	<0.05	<0.11	**0.04JS**	<0.04	<0.06
1,2,3,4,6,7,8-HpCDD	0.01	<0.34	<0.05	<0.06	<0.06	<0.02	<0.02	<0.04	<0.08	**38**	<0.04	<0.09	<0.08	**32**	**0.08JS**	<0.06
OCDD	0.0001	**3.4**	**0.08J**	**0.23J**	<0.02	**0.03J**	**0.08J**	**0.1JB**	**0.15JB**	**214B**	**0.32JB**	**0.79JB**	**0.3JB**	**135B**	**0.69JB**	<0.14
2,3,7,8-TCDF	0.1	<0.08	<0.02	<0.03	<0.02	<0.03	<0.03	<0.03	<0.03	<0.02	<0.02	<0.04	<0.02	<0.02	<0.04	<0.02
1,2,3,7,8-PeCDF	0.05	<0.14	<0.08	<0.06	<0.05	<0.08	<0.05	<0.11	<0.04	<0.05	<0.04	<0.10	<0.05	<0.03	<0.08	<0.03
2,3,4,7,8-PeCDF	0.5	<0.13	<0.08	<0.06	<0.05	<0.07	<0.05	<0.11	<0.04	<0.05	<0.04	<0.10	<0.05	<0.03	<0.07	<0.02
1,2,3,4,7,8-HxCDF	0.1	<0.19	<0.05	<0.05	<0.05	<0.03	<0.01	<0.03	<0.07	<0.06	<0.03	<0.04	<0.09	<0.06	<0.03	<0.06
1,2,3,6,7,8-HxCDF	0.1	<0.16	<0.04	<0.04	<0.04	<0.03	<0.01	<0.03	<0.06	<0.05	<0.03	<0.04	<0.07	**3.2**	<0.03	<0.05
2,3,4,6,7,8-HxCDF	0.1	<0.19	<0.05	<0.05	<0.05	<0.03	<0.01	<0.03	<0.07	<0.06	<0.03	<0.04	<0.09	<0.06	<0.04	<0.06
1,2,3,7,8,9-HxCDF	0.1	<0.21	<0.05	<0.05	<0.05	<0.04	<0.02	<0.04	<0.07	<0.07	<0.03	<0.04	<0.09	<0.07	<0.04	<0.07
1,2,3,4,6,7,8-HpCDF	0.01	<0.33	<0.07	<0.04	<0.06	<0.02	<0.01	<0.04	<0.12	**3.7**	<0.04	<0.06	<0.17	**4.1**	<0.05	<0.06
1,2,3,4,7,8,9-HpCDF	0.01	<0.45	<0.10	<0.06	<0.08	<0.03	<0.02	<0.05	<0.15	**0.16J**	<0.05	<0.07	<0.21	<0.10	<0.07	<0.07
OCDF	0.0001	<1.1	<0.02	<0.03	<0.02	<0.01	<0.01	<0.04	<0.03	**28**	<0.03	<0.06	<0.03	**27**	<0.04	<0.02
2,3,7,8-TCDD Equivalence	1.0	**0.00034**	**0.000008**	**0.000023**	BDL	**0.000003**	**0.000008**	**0.00001**	**0.000015**	**0.5088**	**0.000032**	**0.000079**	**0.00003**	**0.7582**	**0.000869**	**BDL**

Notes:

Only analytes detected at or above laboratory method detection limits incl
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

-- = Not sampled

Dioxin Data Qualifiers:

All results in ug/kg or parts per billion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)			**Preliminary Investigation**													
Metals (mg/kg)	**TAGM (4046) or Site Background Average**		**B1-1**	**B1-5**	**B2-3**	**B3-1**	**B4-2**	**B4-3**	**B5-2**	**B5-3**	**B6-1**	**B6-4**	**B7-1**	**B7-3**	**B7-4**	**B8-3**
Aluminum	NV	**18866.6**	-	-	-	-	-	**20500**	-	-	**16800**	-	**15800**	-	-	-
Arsenic	7.5	**9.1**	-	-	-	-	-	**9.9**	-	-	**22.2**	-	**12.3**	-	-	-
Barium	**300**	54.6	-	-	-	-	-	**99.4**	-	-	**84.5**	-	**62.9**	-	-	-
Beryllium	0.16	**0.54**	-	-	-	-	-	**0.76 B**	-	-	**0.65 B**	-	**0.72 B**	-	-	-
Cadmium	**1**	0.15	-	-	-	-	-	**0.12 B**	-	-	**0.10 B**	-	ND	-	-	-
Calcium	NV	**110.6**	-	-	-	-	-	**899 B**	-	-	**1510**	-	**1810**	-	-	-
Chromium	10	**19.06**	-	-	-	-	-	**24**	-	-	**21.2**	-	**19.7**	-	-	-
Cobalt	**30**	9.33	-	-	-	-	-	**15.5**	-	-	**16.8**	-	**14.3**	-	-	-
Copper	0.25	**10.76**	-	-	-	-	-	**13.2**	-	-	**13.8**	-	**14.1**	-	-	-
Iron	2000	**30633.3**	-	-	-	-	-	**31100**	-	-	**31000**	-	**27200**	-	-	-
Lead	NV	**17.86**	-	-	-	-	-	**21.7**	-	-	**25.3**	-	**19.8**	-	-	-
Magnesium	NV	**2300**	-	-	-	-	-	**3360**	-	-	**3230**	-	**3530**	-	-	-
Manganese	NV	**929**	-	-	-	-	-	**2660**	-	-	**2620**	-	**861**	-	-	-
Mercury	**0.1**	0.045	-	-	-	-	-	**0.11**	-	-	**0.13**	-	**0.05 B**	-	-	-
Nickel	13	**14.9**	-	-	-	-	-	**27.4**	-	-	**27**	-	**27.7**	-	-	-
Potassium	NV	**561**	-	-	-	-	-	**555 B**	-	-	**898 B**	-	**915 B**	-	-	-
Selenium	**2**	1.5	-	-	-	-	-	**0.6 B**	-	-	**1.1 B**	-	**0.34 B**	-	-	-
Silver	NV	**0.0**	-	-	-	-	-	ND	-	-	ND	-	ND	-	-	-
Sodium	NV	NP	-	-	-	-	-	**87.1 B**	-	-	**76.2 B**	-	**74.6 B**	-	-	-
Vandium	**150**	27.16	-	-	-	-	-	**22.6**	-	-	**18.9**	-	**16.7**	-	-	-
Zinc	20	**67.36**	-	-	-	-	-	**104**	-	-	**85.6**	-	**77.6**	-	-	-
Total Metals			-	-	-	-	-	**59,500.39**	-	-	**56,451.48**	-	**50,456.81**	-	-	-

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)			**Preliminary Investigation**													
Metals (mg/kg)	**TAGM (4046) or Site Background Average**		**B9-2**	**B10-3**	**B11-1**	**B11-3**	**B12**	**B13**	**B14**	**B15**	**B16-2**	**B16-3**	**B17-2**	**B17-3**	**B18-3**	**B19-2**
Aluminum	NV	**18866.6**	-	**12900**	-	**17500**	**17700**	-	-	**17200**	-	-	-	-	**14300**	-
Arsenic	7.5	**9.1**	-	**8.5**	-	**13.7**	**14.9**	-	-	ND	-	-	-	-	ND	-
Barium	**300**	54.6	-	**68.4**	-	**61.2**	**52.3**	-	-	**17**	-	-	-	-	**14.8**	-
Beryllium	0.16	**0.54**	-	**0.55 B**	-	**0.78 B**	**0.82 B**	-	-	**30.7 B**	-	-	-	-	**28.7 B**	-
Cadmium	**1**	0.15	-	**0.12 B**	-	ND	ND	-	-	**0.72 B**	-	-	-	-	**0.62 B**	-
Calcium	NV	**110.6**	-	**1440**	-	**1400**	**4630**	-	-	**276 B**	-	-	-	-	**254 B**	-
Chromium	10	**19.06**	-	**15.5**	-	**23.2**	**23.2**	-	-	**22.9**	-	-	-	-	**20.1**	-
Cobalt	**30**	9.33	-	**12.4**	-	**17.9**	**18.8**	-	-	**17.3**	-	-	-	-	**20.3**	-
Copper	0.25	**10.76**	-	**10.6**	-	**17.5**	**19.2**	-	-	**17.6**	-	-	-	-	**16.6**	-
Iron	2000	**30633.3**	-	**25400**	-	**30100**	**36800**	-	-	**32700**	-	-	-	-	**29100**	-
Lead	NV	**17.86**	-	**20.3**	-	**20.9**	**26.1**	-	-	**21.6**	-	-	-	-	**19.8**	-
Magnesium	NV	**2300**	-	**2550**	-	**4380**	**4550**	-	-	**4240**	-	-	-	-	**4820**	-
Manganese	NV	**929**	-	**2890**	-	**979**	**1020**	-	-	**537**	-	-	-	-	**789**	-
Mercury	**0.1**	0.045	-	**0.07 B**	-	ND	**0.09 B**	-	-	**0.06 B**	-	-	-	-	ND	-
Nickel	13	**14.9**	-	**21.4**	-	**34.4**	**31.5**	-	-	**32.1**	-	-	-	-	**33.3**	-
Potassium	NV	**561**	-	**828 B**	-	**1040**	**851 B**	-	-	**542 B**	-	-	-	-	**899 B**	-
Selenium	**2**	1.5	-	**0.35 B**	-	**0.45**	**0.31 B**	-	-	**0.4 B**	-	-	-	-	ND	-
Silver	NV	**0.0**	-	ND	-	**1.4**	ND	-	-	ND	-	-	-	-	ND	-
Sodium	NV	NP	-	**84.6 B**	-	**78.8**	**45.8**	-	-	**1070**	-	-	-	-	**113 B**	-
Vandium	**150**	27.16	-	**15**	-	**18.7**	**18**	-	-	**16.6**	-	-	-	-	**13.1**	-
Zinc	20	**67.36**	-	**80**	-	**87**	**116**	-	-	**116**	-	-	-	-	**69.7**	-
Total Metals			-	**46,345.79**	-	**55,774.93**	**65,918.02**	-	-	**56,857.98**	-	-	-	-	**50,512.02**	-

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit
than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site backgrou
Metals SCGs used for comparison were either TAGM 4046 or Site Backgr
average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally a
clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)			Preliminary Investigation	Remedial Investigation												
Metals (mg/kg)	**TAGM (4046) or Site Background Average**		**B19-3**	**SB-1 (6-8')**	**SB-2 (8-10')**	**SB-3 (6-8')**	**SB-4 (8-10')**	**SB-5 (2-4')**	**SB-6 (4-6')**	**SB-7 (3-5')**	**MW-6 (6-8')**	**MW-7 (2-4')**	**MW-8 (4-6')**	**MW-9 (8-10')**	**MW-10 (10-12')**	**MW-11 (2-4')**
Aluminum	NV	**18866.6**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	7.5	**9.1**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	**300**	54.6	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.16	**0.54**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**1**	0.15	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	**110.6**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	10	**19.06**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	**30**	9.33	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.25	**10.76**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	2000	**30633.3**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	NV	**17.86**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	**2300**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	**929**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	**0.1**	0.045	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	13	**14.9**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	**561**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	**2**	1.5	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	NV	**0.0**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	NP	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Vandium	**150**	27.16	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	20	**67.36**	-	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals			-	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit
than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site backgrou
Metals SCGs used for comparison were either TAGM 4046 or Site Backgr
average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally a
clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 4
Soil Boring and Monitoring Well Soil Analytical Results
Camp Summit

Analyte (units)			Remedial Investigation														
Metals (mg/kg)	**TAGM (4046) or Site Background Average**		**MW-12 (8-10')**	**MW-12 (12-14')**	**MW-13 (4-6')**	**MW-13 (8-10')**	**MW-14 (10-12')**	**MW-14 (18-20')**	**SSB03-03 (6-7')**	**SSB03-03 (12-13')**	**SSB03-01 (6-8')**	**SSB03-02 (7-9')**	**SSB03-05 (2-4')**	**SSB03-05 (8-10')**	**SSB03-04 (3-5')**	**SSB03-04 (11-13')**	**SSB03-15 (4-6')**
Aluminum	NV	**18866.6**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	7.5	**9.1**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	**300**	54.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.16	**0.54**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	**1**	0.15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NV	**110.6**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	10	**19.06**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	**30**	9.33	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.25	**10.76**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	2000	**30633.3**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	NV	**17.86**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	NV	**2300**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	NV	**929**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	**0.1**	0.045	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	13	**14.9**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NV	**561**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	**2**	1.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	NV	**0.0**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	NV	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vandium	**150**	27.16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	20	**67.36**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Only analytes detected at or above laboratory method detection limits incl
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BDL= Below Laboratory Method Detection Limit
ND= Non-Detect
NP = Not Promulgated
-- = Not sampled

Metal Data Qualifiers:
All results in mg/kg or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit
than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site backgrou
Metals SCGs used for comparison were either TAGM 4046 or Site Backgr
average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally a
clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 5
Groundwater Analytical Results
Camp Summit

Analyte	**TOGS**														
		Preliminary Investigation				**Remedial Investigation 2002**									
VOCs (ug/L or ppb)		**SMW-2**	**SMW-3**	**SMW-4**	**SMW-5**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**
Acetone	50	ND	ND	**15**	ND	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	5	ND	ND	**2 J**	ND	--	--	--	--	--	--	--	--	--	--
Xylenes (Total)	5	ND	ND	**18**	ND	--	--	--	--	--	--	--	--	--	--
Fuel Oil	NP	--	--	--	--	<5000	<5000	**24000**	<5000	<5000	<5000	<5000	<5000	<5000	<5000
		Preliminary Investigation				**Remedial Investigation 2002**									
SVOCs (ug/L or ppb)		**SMW-2**	**SMW-3**	**SMW-4**	**SMW-5**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**
Acenaphthene	20	--	--	--	--	<10	<10	<10	<10	<10	**440 B**	<10	<10	<10	<10
Bis (2-ethylhexyl) phthalate	5	--	--	--	--	<10	**1 J**	<10	<10	**1 BJ**	<10	**2 BJ**	**4 BJ**	**3 BJ**	**0.5 BJ**
4-Chloro-3-methylphenol	1*	--	--	--	--	<10	<10	<10	<10	<10	**450 B**	<10	<10	<10	<10
2-Chlorophenol	1*	--	--	--	--	<10	<10	<10	<10	<10	**380 B**	<10	<10	<10	<10
Dibenzofuran	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diethylphthalate	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-butylphthalate	50	--	--	--	--	<10	<10	<10	**1 J**	**1 J**	<10	**0.9 J**	<10	<10	<10
2,4-Dichlorophenol	5	--	--	--	--	<10	<10	**8 J**	<10	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene	5	--	--	--	--	<10	<10	<10	<10	<10	**460 B**	<10	<10	<10	<10
Di-n-octyl phthalate	50	--	--	--	--	<10	<10	<10	<10	**0.6 J**	<10	**0.7 J**	<10	**1 J**	**0.5 J**
1,4-Dichlorobenzene	3	--	--	--	--	<10	<10	<10	<10	<10	**290**	<10	<10	<10	<10
Fluorene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	NP	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylphenol	1*	--	--	--	--	<10	<10	**0.7 J**	<10	<10	<10	<10	<10	<10	<10
4-Methylphenol	1*	ND	ND	**17**	ND	<10	<10	**8 J**	<10	<10	<10	<10	<10	<10	<10
Naphthalene	10	ND	ND	**120**	ND	<10	<10	**110**	<10	<10	<10	<10	<10	<10	<10
4-Nitrophenol	1*	--	--	--	--	<50	<50	<50	<50	<50	**360**	<50	<50	<50	<50
N-Nitroso-Di-n-propylamine	50	--	--	--	--	<10	<10	<10	<10	<10	**420 B**	<10	<10	<10	<10
Pentachlorophenol	1*	ND	ND	**300**	ND	<50	<50	**190 BD**	<50	**28 BJ**	**490 B**	**0.8 BJ**	<50	<50	<50
Phenol	1*	--	--	--	--	<10	<10	**1 BJ**	<10	<10	**290**	<10	<10	<10	<10
Phenanthrene	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	50	--	--	--	--	<10	<10	<10	<10	<10	**510 B**	<10	<10	<10	<10
1,2,4-Trichlorobenzene	5	--	--	--	--	<10	<10	<10	<10	<10	**310 B**	<10	<10	<10	<10
2,4,5-Trichlorophenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	1*	--	--	--	--	<10	<10	**2 J**	<10	<10	<10	<10	<10	<10	<10
Total SVOCs		**BDL**	**BDL**	**437**	**BDL**	**BDL**	**1J**	**319.7 JB**	**1J**	**2.6J**	**4400 B**	**4.4 BJ**	**4BJ**	**4BJ**	**1 BJ**

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BRL= Below Laboratory Reporting Limit
ND= Non-Detect
NP = Not Promulgated
PW = Production Well
NA = Not Analyzed

VOC, SVOC Data Qualifiers:
All results in ug/L or parts per billion
J=Estimated result, result is less than the reporting limit
B=Analyte was found in method blank as well as the sample
< = Analyte was not detected above laboratory method detection limit

Table 5
Groundwater Analytical Results
Camp Summit

Analyte	TOGS													
		Remedial Investigation 2003												
VOCs (ug/L or ppb)		**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**	**MW-12**	**MW-13**	**MW-14**
Acetone	50	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylenes (Total)	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Fuel Oil	NP	--	--	--	--	--	--	--	--	--	--	--	--	--
		Remedial Investigation 2003												
SVOCs (ug/L or ppb)		**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**	**MW-12**	**MW-13**	**MW-14**
Acenaphthene	20	<10	<10	<52	<10	**0.9J**	<100	<10	<10	<10	<30	<10	<10	<10
Bis (2-ethylhexyl) phthalate	5	**5J**	**2J**	**9J**	**17**	**45**	**9J**	**27**	**3JB**	**6J**	**140**	**8JB**	**23B**	**13B**
4-Chloro-3-methylphenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Chlorophenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	NP	<10	<10	**3J**	<10	**1J**	<100	<10	<10	<10	<30	<10	<10	<10
Diethylphthalate	50	<10	<10	<52	<10	**1J**	<100	<10	**1J**	<10	<30	**0.9J**	<10	**0.9J**
Di-n-butylphthalate	50	**1J**	**1J**	<52	<10	**2J**	<100	<10	**1JB**	**0.6J**	<30	**1J**	**0.8J**	**0.8J**
2,4-Dichlorophenol	5	<10	<10	<52	<10	**0.7J**	<100	<10	<10	<10	<30	<10	<10	<10
2,4-Dinitrotoluene	5	--	--	--	--	--	--	--	--	--	--	--	--	--
Di-n-octyl phthalate	50	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	3	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	50	<10	<10	**5J**	<10	**3J**	<100	<10	<10	<10	<30	<10	<10	<10
2-Methylnaphthalene	NP	<10	<10	**57**	<10	**6J**	<100	<10	<10	<10	<30	<10	<10	<10
2-Methylphenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Methylphenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	10	<10	<10	**42J**	<10	**6J**	<100	<10	<10	<10	<30	<10	<10	<10
4-Nitrophenol	1*	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Nitroso-Di-n-propylamine	50	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	1*	<25	<26	**250**	<26	**24J**	**810**	<26	**0.8J**	<25	<76	**11J**	<26	<26
Phenol	1*	<10	**0.8J**	<52	**1J**	**1J**	<100	**0.6J**	**0.9J**	**4J**	<30	**0.7J**	<10	**1J**
Phenanthrene	50	<10	<10	**4J**	<10	**3J**	<100	<10	<10	<10	<30	<10	<10	<10
Pyrene	50	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	5	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,5-Trichlorophenol	1*	<25	<26	<130	<26	**3J**	<250	<26	<26	<25	<76	<26	<26	<26
2,4,6-Trichlorophenol	1*	<10	<10	<52	<10	**0.7J**	<100	<10	<10	<10	<30	<10	<10	<10
Total SVOCs		**6J**	**3.8 J**	**314 J**	**18 J**	**97.3 J**	**819 J**	**27.6 J**	**6.7 JB**	**10.6 J**	**140**	**21.6 J**	**23.8**	**15.7 J**

Notes:

Only analytes detected at or above laboratory method detection limits incluc
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BRL= Below Laboratory Reporting Limit

ND= Non-Detect

NP = Not Promulgated

PW = Production Well

NA = Not Analyzed

VOC, SVOC Data Qualifiers:

All results in ug/L or parts per billion

J=Estimated result, result is less than the reporting limit

B=Analyte was found in method blank as well as the sample

< = Analyte was not detected above laboratory method detection limit

Table 5
Groundwater Analytical Results
Camp Summit

		Preliminary Investigation				Remedial Investigation 2002									
Metals (mg/L or ppm)	**TOGS**	**SMW-2**	**SMW-3**	**SMW-4**	**SMW-5**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**
Aluminum	0.1	**0.456**	**0.509**	**0.698**	**2.31**	-	-	-	-	**1.150 N**	**0.229 N**	**0.98 N**	**1.87 N**	**2.180 N**	**0.602 N**
Antimony	0.003	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Arsenic	0.025	ND	ND	**0.0173**	**0.0247**	-	-	-	-	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034	<0.0034
Barium	1	**0.495**	**0.0381**	**0.0747**	**0.0274**	-	-	-	-	**0.0472 B**	**0.0773 B**	**0.0491 B**	**0.085 B**	**0.113 B**	**0.052 B**
Beryllium	0.003	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Cadmium	0.005	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Calcium	NP	**58.5**	**64.3**	**36.5**	**36.5**	-	-	-	-	**51.3**	**79.5**	**109**	**83.2**	**45.7**	**38.8**
Chromium	0.05	ND	ND	ND	ND	-	-	-	-	**0.0019 B**	<0.00008	**0.00098 B**	**0.0022 B**	**0.0025 B**	**0.0011 B**
Cobalt	0.005	ND	ND	ND	ND	-	-	-	-	**0.0072 B**	<0.0007	**0.0017 B**	**0.0022 B**	**0.0013 B**	**0.00092 B**
Copper	0.2	ND	ND	ND	ND	-	-	-	-	**0.0027 B**	**0.0010 B**	**0.0015 B**	**0.0023 B**	**0.0021 B**	**0.0016 B**
Iron	0.3	**0.972**	**1.88**	**32.7**	**6.8**	-	-	-	-	**7.93**	**0.307**	**1.53**	**2.8**	**1.66**	**0.737**
Lead	0.025	ND	ND	ND	ND	-	-	-	-	**0.0019 B**	<0.0018	<0.0018	**0.0019 B**	<0.0018	<0.0018
Magnesium	35	**9.55**	**18.4**	**8.22**	**13.9**	-	-	-	-	**12.1**	22.6	**25.3**	**23.1**	**16**	**13.1**
Manganese	0.3	**5.13**	**14.1**	**14.8**	**0.26**	-	-	-	-	**13.3**	**0.562**	**1.07**	**0.552**	**0.325**	**0.274**
Mercury	0.0007	ND	ND	ND	ND	-	-	-	-						
Nickel	0.1	ND	ND	ND	ND	-	-	-	-	**0.0073 B**	**0.0021 B**	**0.0032 B**	**0.0044 B**	**0.002 B**	**0.0017 B**
Potassium	NP	**3.21**	**2.35**	**2.26**	**6.08**	-	-	-	-	**2.63 B**	**4.56 B**	**2.77 B**	**5.37**	**4.26 B**	**2.79 B**
Selenium	0.01	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Silver	0.05	ND	ND	ND	ND	-	-	-	-	-	-	-	-	-	-
Sodium	20	**48.7**	**19.7**	**49.4**	**9.3**	-	-	-	-	**40**	**34.8**	**22.6**	**49.7**	**8**	**10.5**
Thallium	0.0005	ND	ND	ND	**0.0118**	-	-	-	-	-	-	-	-	-	-
Vanadium	NP	ND	ND	ND	ND	-	-	-	-	**0.0016 B**	**0.00099 B**	**0.0015 B**	**0.0025 B**	**0.0037 B**	**0.0011 B**
Zinc	2	**0.0206**	**0.0154**	**0.0168**	**0.0198**	-	-	-	-	**0.0163 B**	**0.0049 B**	**0.0136 B**	**0.0097 B**	**0.0042 B**	**0.0055 B**
Total Metals		**124.7956**	**121.2925**	**144.6868**	**75.2337**	-	-	-	-	**128.4798**	**120.0442**	**163.3216**	**166.7022**	**78.2538**	**66.8669**

Notes:
Only analytes detected at or above laboratory method detection limits included on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BRL= Below Laboratory Reporting Limit
ND= Non-Detect
NP = Not Promulgated
PW = Production Well
NA = Not Analyzed

Metal Data Qualifiers:
All results in mg/L or parts per million
D=Result obtained from dilution
B=Indicates a value greater than or equal to the instrument detection limit but less than the quantitation limit
NV=Indicates TAGM recommened soil clean-up objective is site background
Metals SCGs used for comparison were either TAGM 4046 or Site Background average, which ever is higher
Bold Text=SCG used for Regulatory Comparison
The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally accepted clean-up levels
The SCG for Lead (400 ppm) was adopted from the EPA

Table 5
Groundwater Analytical Results
Camp Summit

		Remedial Investigation 2003												
Metals (mg/L or ppm)	**TOGS**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**	**MW-12**	**MW-13**	**MW-14**
Aluminum	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	0.025	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	1	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	0.003	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Calcium	NP	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	0.2	--	--	--	--	--	--	--	--	--	--	--	--	--
Iron	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	0.025	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnesium	35	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese	0.3	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury	0.0007	--	--	--	--	--	--	--	--	--	--	--	--	--
Nickel	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--
Potassium	NP	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--
Sodium	20	--	--	--	--	--	--	--	--	--	--	--	--	--
Thallium	0.0005	--	--	--	--	--	--	--	--	--	--	--	--	--
Vanadium	NP	--	--	--	--	--	--	--	--	--	--	--	--	--
Zinc	2	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Metals		--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Only analytes detected at or above laboratory method detection limits incluc on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BRL= Below Laboratory Reporting Limit

ND= Non-Detect

NP = Not Promulgated

PW = Production Well

NA = Not Analyzed

Metal Data Qualifiers:

All results in mg/L or parts per million

D=Result obtained from dilution

B=Indicates a value greater than or equal to the instrument detection limit bı than the quantitation limit

NV=Indicates TAGM recommened soil clean-up objective is site backgrounc

Metals SCGs used for comparison were either TAGM 4046 or Site Backgroı average, which ever is higher

Bold Text=SCG used for Regulatory Comparison

The SCG for Cadmium (10 ppm) and Chromium (50 ppm) are generally acc clean-up levels

The SCG for Lead (400 ppm) was adopted from the EPA

Table 5
Groundwater Analytical Results
Camp Summit

		Preliminary Investigation				Remedial Investigation 2002									
Dioxins (ng/L)	**TEFs**	**SMW-2**	**SMW-3**	**SMW-4**	**SMW-5**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**	**MW-11**
Total TCDF	-	--	--	--	--	<0.0019	<0.0021	<0.0017	<0.0018	-	-	-	-	-	-
Total PeCDF	-	--	--	--	--	<0.0040	<0.0053	<0.0039	<0.0036	-	-	-	-	-	-
Total HxCDF	-	--	--	--	--	<0.0040	**0.04**	**0.31**	<0.0034	-	-	-	-	-	-
Total HpCDF	-	--	--	--	--	<0.0021	**0.32**	**3.2**	<0.0068	-	-	-	-	-	-
Total TCDD	-	--	--	--	--	<0.0024	<0.0029	<0.0024	<0.0029	-	-	-	-	-	-
Total PeCDD	-	--	--	--	--	<0.0048	<0.0058	<0.0050	<0.0061	-	-	-	-	-	-
Total HxCDD	-	--	--	--	--	<0.0040	<0.024	**0.25**	<0.0048	-	-	-	-	-	-
Total HpCDD	-	--	--	--	--	**0.37**	**0.73**	**6.6**	<0.014	-	-	-	-	-	-
2,3,7,8-TCDD	1	--	--	--	--	<0.0024	<0.0029	<0.0024	<0.0029	-	-	-	-	-	-
1,2,3,7,8-PeCDD	0.5	--	--	--	--	<0.0048	<0.0058	<0.0050	<0.0061	-	-	-	-	-	-
1,2,3,4,7,8-HxCDD	0.1	--	--	--	--	<0.0036	<0.0040	<0.0040	<0.0044	-	-	-	-	-	-
1,2,3,6,7,8-HxCDD	0.1	--	--	--	--	<0.0040	<0.015	**0.12**	<0.0048	-	-	-	-	-	-
1,2,3,7,8,9-HxCDD	0.1	--	--	--	--	<0.0036	<0.0084	<0.011	<0.0044	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDD	0.01	--	--	--	--	**0.037 J**	**0.46**	**4.4**	<0.014	-	-	-	-	-	-
OCDD	0.0001	--	--	--	--	**0.26**	**3**	**35**	**0.16**	-	-	-	-	-	-
2,3,7,8-TCDF	0.1	--	--	--	--	<0.0019	<0.0021	<0.0017	<0.0018	-	-	-	-	-	-
1,2,3,7,8-PeCDF	0.05	--	--	--	--	<0.0030	<0.0033	<0.0033	<0.0036	-	-	-	-	-	-
2,3,4,7,8-PeCDF	0.5	--	--	--	--	<0.0030	<0.0032	<0.0032	<0.0035	-	-	-	-	-	-
1,2,3,4,7,8-HxCDF	0.1	--	--	--	--	<0.0036	<0.0034	<0.0072	<0.0031	-	-	-	-	-	-
1,2,3,6,7,8-HxCDF	0.1	--	--	--	--	<0.0034	<0.0033	<0.0031	<0.0029	-	-	-	-	-	-
2,3,4,6,7,8-HxCDF	0.1	--	--	--	--	<0.0037	<0.0036	<0.0034	<0.0032	-	-	-	-	-	-
1,2,3,7,8,9-HxCDF	0.1	--	--	--	--	<0.0040	<0.0039	<0.0037	<0.0034	-	-	-	-	-	-
1,2,3,4,6,7,8-HpCDF	0.01	--	--	--	--	<0.0067	**0.093**	**0.59**	<0.0037	-	-	-	-	-	-
1,2,3,4,7,8,9-HpCDF	0.01	--	--	--	--	<0.0053	<0.0044	<0.027	<0.0044	-	-	-	-	-	-
OCDF	0.0001	--	--	--	--	<0.027	**0.032**	**4**	<0.0098	-	-	-	-	-	-
2,3,7,8-TCDD Equivilance (ng/g or ppb)	0.0007	--	--	--	--	**0.000396**	**0.005833**	**0.065403**	**0.000016**	-	-	-	-	-	-

Notes:
Only analytes detected at or above laboratory method detection limits included
on tables
*PCP results from PIR Immunoassay Results
Bold Text=Analyte detected above laboratory method detection limit
Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives
BRL= Below Laboratory Reporting Limit
ND= Non-Detect
NP = Not Promulgated
PW = Production Well
NA = Not Analyzed

<u>Dioxin Data Qualifiers:</u>
All results in ug/kg or parts per billion
J=Estimated result, result is less than the reporting limit
E=Estimated result, result exceeds calibration range
CON=Confirmation analysis

Table 5
Groundwater Analytical Results
Camp Summit

		Remedial Investigation 2003						
Dioxins (ng/L)	**TEFs**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**
Total TCDF	-	NA	NA	NA	NA	NA	NA	NA
Total PeCDF	-	NA	NA	NA	NA	NA	NA	NA
Total HxCDF	-	NA	NA	NA	NA	NA	NA	NA
Total HpCDF	-	NA	NA	NA	NA	NA	NA	NA
Total TCDD	-	NA	NA	NA	NA	NA	NA	NA
Total PeCDD	-	NA	NA	NA	NA	NA	NA	NA
Total HxCDD	-	NA	NA	NA	NA	NA	NA	NA
Total HpCDD	-	NA	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	1	<0.00124	<0.0012	<0.00108	<0.00192	<0.0016	<0.00208	<0.00188
1,2,3,7,8-PeCDD	0.5	<0.0026	**0.00496 J**	<0.00280	<0.00216	<0.0024	<0.00236	<0.0024
1,2,3,4,7,8-HxCDD	0.1	<0.00208	**0.0113 J**	<0.00396	<0.00164	<0.0044	<0.00104	<0.0016
1,2,3,6,7,8-HxCDD	0.1	<0.0044	**0.0249 J**	**0.394**	<0.00196	<0.0111	**0.0157 J**	<0.0008
1,2,3,7,8,9-HxCDD	0.1	<0.00268	**0.0113 J**	<0.00944	<0.0008	<0.0028	<0.0016	<0.00296
1,2,3,4,6,7,8-HpCDD	0.01	**0.0131 J**	**0.826**	**1.63**	**0.0111 J**	**0.295**	**0.91**	**0.0102 J**
OCDD	0.0001	**0.0529**	**4.95**	**11.4**	**0.0886**	**1.72**	**13.3**	**0.0536**
2,3,7,8-TCDF	0.1	<0.00232	<0.002	<0.00160	<0.0016	<0.0012	<0.0016	<0.00132
1,2,3,7,8-PeCDF	0.05	<0.0016	<0.00144	<0.002	<0.00192	<0.0016	<0.00128	<0.0016
2,3,4,7,8-PeCDF	0.5	<0.00128	<0.0016	<0.0024	<0.00064	<0.00084	<0.00052	<0.0016
1,2,3,4,7,8-HxCDF	0.1	<0.00068	**0.0114 J**	<0.00808	<0.00116	<0.00264	<0.00424	<0.0008
1,2,3,6,7,8-HxCDF	0.1	<0.0028	**0.0374**	**0.0245 J**	<0.00068	<0.00672	<0.0157	<0.00132
2,3,4,6,7,8-HxCDF	0.1	<0.00116	<0.0048	<0.0052	<0.00068	<0.0028	<0.0024	<0.0008
1,2,3,7,8,9-HxCDF	0.1	<0.002	<0.002	<0.0056	<0.0012	<0.0032	<0.001	<0.0008
1,2,3,4,6,7,8-HpCDF	0.01	**0.00324 J**	**0.12**	**0.187**	<0.00248	**0.0537**	**0.0938**	<0.00444
1,2,3,4,7,8,9-HpCDF	0.01	<0.0036	**0.0115 J**	**0.0208 J**	<0.0048	<0.00472	<0.0072	<0.0052
OCDF	0.0001	**0.00708 J**	**0.481**	**1.34**	**0.00948 J**	**0.195**	**1.12**	<0.003
2,3,7,8-TCDD Equivilance (ng/g or ppb)	0.0007	**0.000169**	**0.01285**	**0.061502**	**0.000121**	**0.003679**	**0.01305**	**0.000107**

Notes:

Only analytes detected at or above laboratory method detection limits incluc
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BRL= Below Laboratory Reporting Limit

ND= Non-Detect

NP = Not Promulgated

PW = Production Well

NA = Not Analyzed

Dioxin Data Qualifiers:

All results in ug/kg or parts per billion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 5
Groundwater Analytical Results
Camp Summit

Dioxins (ng/L)	TEFs	MW-9	MW-10	MW-11	MW-12	MW-13	MW-14
Total TCDF	-	NA	NA	NA	NA	NA	NA
Total PeCDF	-	NA	NA	NA	NA	NA	NA
Total HxCDF	-	NA	NA	NA	NA	NA	NA
Total HpCDF	-	NA	NA	NA	NA	NA	NA
Total TCDD	-	NA	NA	NA	NA	NA	NA
Total PeCDD	-	NA	NA	NA	NA	NA	NA
Total HxCDD	-	NA	NA	NA	NA	NA	NA
Total HpCDD	-	NA	NA	NA	NA	NA	NA
2,3,7,8-TCDD	1	<0.002	<0.00236	<0.0016	<0.002	<0.00184	<0.0036
1,2,3,7,8-PeCDD	0.5	<0.00248	<0.00196	<0.0036	<0.0032	<0.0032	<0.00416
1,2,3,4,7,8-HxCDD	0.1	<0.0016	<0.00204	<0.00052	<0.0036	**0.00944 J**	<0.00468
1,2,3,6,7,8-HxCDD	0.1	<0.0134	<0.00072	<0.00228	<0.00528	**0.0492**	<0.00328
1,2,3,7,8,9-HxCDD	0.1	<0.0056	<0.00156	<0.0012	<0.00472	**0.0231 J**	<0.00384
1,2,3,4,6,7,8-HpCDD	0.01	**0.285**	<0.0133	**0.0157 J**	**0.0436**	**2.45**	**0.0353**
OCDD	0.0001	**2.51**	**0.386**	**0.313**	**0.537**	**23.9**	**0.412**
2,3,7,8-TCDF	0.1	<0.00052	<0.00024	<0.0012	<0.002	<0.00208	<0.0016
1,2,3,7,8-PeCDF	0.05	<0.002	<0.0012	<0.0012	<0.00096	<0.0012	<0.00152
2,3,4,7,8-PeCDF	0.5	<0.002	<0.0012	<0.0016	<0.0016	<0.0016	<0.00112
1,2,3,4,7,8-HxCDF	0.1	<0.00172	<0.0008	<0.00108	<0.0016	<0.00888	<0.00108
1,2,3,6,7,8-HxCDF	0.1	<0.00164	<0.00056	<0.00152	<0.00344	**0.0369**	<0.00140
2,3,4,6,7,8-HxCDF	0.1	<0.0024	<0.00064	<0.00104	<0.00168	<0.0032	<0.002
1,2,3,7,8,9-HxCDF	0.1	<0.00172	<0.0014	<0.00104	<0.0016	<0.0036	<0.0024
1,2,3,4,6,7,8-HpCDF	0.01	**0.0312**	<0.00264	<0.00476	<0.0121	**0.241**	<0.00532
1,2,3,4,7,8,9-HpCDF	0.01	<0.00504	<0.001	<0.0036	<0.004	**0.0199 J**	<0.0052
OCDF	0.0001	**0.218**	**0.012 J**	<0.00988	**0.0213 J**	**1.86**	<0.0151
2,3,7,8-TCDD Equivilance (ng/g or ppb)	0.0007	**0.003435**	**0.000040**	**0.000188**	**0.000492**	**0.041549**	**0.000394**

Notes:

Only analytes detected at or above laboratory method detection limits incluc
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text=Exceedence of TAGM 4046 soil cleanup objectives

BRL= Below Laboratory Reporting Limit

ND= Non-Detect

NP = Not Promulgated

PW = Production Well

NA = Not Analyzed

Dioxin Data Qualifiers:

All results in ug/kg or parts per billion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 6
Biota Analytical Results
Camp Summit

Sample Location		**2PC-1**	**2PC-2**	**2PC-3**	**2PC-4**	**2PC-5**	**2PC-6**	**2PC-7**	**2PC-8**	**2PC-9**	**2PC-10**	**2PC-11**
Sample Species		Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout
Individual Fish/Composite		Individual	Individual	Composite	Composite	Composite	Composite	Composite	Composite	Compostie	Composite	Composite
Number of Fish in Composite		NA	NA	2	2	4	4	4	4	4	4	3
Sample Length (mm)		199	179	324	302	530	561	520	541	514	482	278
Sample Weight (g)		54	46	60	48	66	74	60	68	59	49	17
Analyte												
Dioxins (pg/g or ppt)	**TEFs**	**2PC-1**	**2PC-2**	**2PC-3**	**2PC-4**	**2PC-5**	**2PC-6**	**2PC-7**	**2PC-8**	**2PC-9**	**2PC-10**	**2PC-11**
Total TCDF	-	<1.9	<0.99	<0.72	<0.88	<0.29	<1.0	**1.2**	<1.2	<0.23	<0.26	<0.52
Total PeCDF	-	<1.4	<1.3	<1.2	<1.2	<0.17	<1.2	<1.2	<0.30	<0.18	<0.10	<0.26
Total HxCDF	-	<1.6	<1.4	<1.3	<1.4	<0.21	<1.5	<1.0	<0.27	<0.44	<0.13	<0.32
Total HpCDF	-	<0.73	<0.59	<0.62	<0.71	<0.26	<0.94	<0.68	<0.20	<0.17	<0.10	<0.11
Total TCDD	-	<0.66	<0.67	<0.89	<0.64	<0.17	<0.58	<0.70	<0.12	<0.084	<0.10	<0.08
Total PeCDD	-	<2.4	<1.7	<2.2	<2	<0.36	<2.2	<2.2	<0.20	<0.15	<0.25	<0.13
Total HxCDD	-	<1.5	<1.6	<1.5	<1.4	<0.29	<1.5	<1.4	<0.25	<0.22	<0.26	<0.38
Total HpCDD	-	<1.5	<1.7	<1.1	<0.98	<0.85	<1.0	<1.6	**13**	<0.52	<0.61	<0.84
2,3,7,8-TCDD	1	<0.66	<0.67	<0.89	<0.64	<0.17	<0.58	<0.70	<0.12	<0.084	<0.10	<0.08
1,2,3,7,8-PeCDD	0.5	<2.4	<1.7	<2.2	<2.0	<0.36	<2.2	<2.2	<0.20	<0.15	<0.17	<0.13
1,2,3,4,7,8-HxCDD	0.1	<1.4	<1.5	<1.3	<1.3	<0.091	<1.4	<1.2	<0.081	<0.07	<0.072	<0.071
1,2,3,6,7,8-HxCDD	0.1	<1.5	<1.6	<1.5	<1.4	<0.29	<1.5	<1.4	<0.25	<0.22	<0.26	<0.38
1,2,3,7,8,9-HxCDD	0.1	<1.3	<1.5	<1.3	<1.2	<0.10	<1.4	<1.2	<0.082	<0.11	<0.070	<0.10
1,2,3,4,6,7,8-HpCDD	0.01	<1.5	<1.7	<1.1	<0.98	<0.85	<1.0	<1.6	**8.4**	<0.52	<0.61	<0.84
OCDD	0.0001	**9 J**	<4.1	**6.3 J**	**8.2 J**	**7.3 J**	**5.3 J**	**9.4 J**	**47**	**5.9 J**	<3.8	<4.2
2,3,7,8-TCDF	0.1	<0.74	**0.58 J**	<0.72	<0.88	<0.29	<0.85	<0.91	<0.31	<0.23	<0.26	<0.35
1,2,3,7,8-PeCDF	0.05	<1.4	<1.3	<1.2	<1.2	<0.17	<1.2	<1.2	<0.14	<0.093	<0.079	<0.10
2,3,4,7,8-PeCDF	0.5	<1.3	<1.3	<1.1	<1.2	<0.17	<1.2	<1.2	<0.14	<0.093	<0.10	<0.10
1,2,3,4,7,8-HxCDF	0.1	<1.4	<1.3	<1.2	<1.2	<0.0084	<1.3	<0.89	<0.071	<0.075	<0.13	<0.08
1,2,3,6,7,8-HxCDF	0.1	<1.3	<1.2	<1.1	<1.2	<0.079	<1.2	<0.84	<0.054	<0.083	<0.068	<0.082
1,2,3,7,8,9-HXxCDF	0.1	<1.4	<1.3	<1.2	<1.3	<0.089	<1.4	<0.92	<0.060	<0.073	<0.076	<0.055
2,3,4,6,7,8-HxCDF	0.1	<1.6	<1.4	<1.3	<1.4	<0.10	<1.5	<1.0	<0.065	<0.078	<0.054	<0.059
1,2,3,4,6,7,8-HpCDF	0.01	<0.61	<0.49	<0.52	<0.59	<0.22	<0.79	<0.57	<0.17	<0.14	<0.086	<0.094
1,2,3,4,7,8,9-HpCDF	0.01	<0.73	<0.59	<0.62	<0.71	<0.26	<0.94	<0.68	<2.0	<0.17	<0.10	<0.072
OCDF	0.0001	<2.0	<1.9	<1.8	<1.6	<0.14	<2.0	<1.6	<0.067	<0.16	<0.15	<0.14
2,3,7,8- TCDD Equivalence	3.0	**0.0009**	**0.058**	**0.00063**	**0.00082**	**0.00073**	**0.00053**	**0.00094**	**0.0887**	**0.00059**	BDL	BDL

Notes:

Only analytes detected at or above laboratory method detection limits included on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection limit

Shaded Text= Exceedance of 2,3,7,8 TCDD equivalence guidance value.

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Dioxin Data Qualifiers:

All results in pg/g or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 6
Biota Analytical Results
Camp Summit

Sample Location		**3PC-1**	**3PC-2**	**3PC-3**	**3PC-4**	**3PC-5**	**3PC-6**	**3PC-7**	**3PC-8**	**3PC-9**	**3PC-10**	**3PC-11**
Sample Species		Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Stream Trout	Steam Trout	Steam Trout	Steam Trout
Individual Fish/Composite		Individual	Individual	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite
Number of Fish in Composite		NA	NA	3	2	3	3	3	4	3	4	5
Sample Length (mm)		162	176	434	333	405	460	408	499	390	510	599
Sample Weight (g)		52	54	61	60	56	59	54	59	51	62	61
Analyte												
Dioxins (pg/g or ppt)	**TEFs**	**3PC-1**	**3PC-2**	**3PC-3**	**3PC-4**	**3PC-5**	**3PC-6**	**3PC-7**	**3PC-8**	**3PC-9**	**3PC-10**	**3PC-11**
Total TCDF	-	<1.1	<0.12	<0.17	<0.71	<0.12	<0.63	<1.8	<0.088	<0.38	<0.66	<0.90
Total PeCDF	-	<0.23	<0.10	<0.085	<0.28	<0.090	<0.14	<0.80	<0.085	<0.86	<1.7	<1.2
Total HxCDF	-	<0.22	<0.087	<0.11	<0.12	<0.055	<0.28	<0.77	<0.15	<1.0	<2.0	<1.6
Total HpCDF	-	<0.070	<0.071	<0.059	<0.087	<0.069	<0.078	<0.23	<0.44	<0.63	<1.0	<0.64
Total TCDD	-	<0.10	<0.13	<0.11	<0.095	<0.10	<0.080	<0.069	<0.081	<0.36	<1.0	<0.46
Total PeCDD	-	<0.20	<0.24	<0.15	<0.14	<0.17	<0.16	<0.13	<0.27	<1.5	<0.53	<2.7
Total HxCDD	-	<0.086	<0.087	<0.079	<0.085	<0.079	<0.86	<0.10	<0.10	<1.2	<2.9	<1.8
Total HpCDD	-	<1.3	<0.10	<0.32	<0.12	<0.49	<0.19	<0.53	<0.72	<0.75	<2.1	<1.2
2,3,7,8-TCDD	1	<0.10	<0.13	<0.11	<0.095	<0.10	<0.080	<0.069	<0.080	<0.36	<0.47	<0.46
1,2,3,7,8-PeCDD	0.5	<0.14	<0.14	<0.14	<0.14	<0.13	<0.11	<0.13	<0.13	<1.5	<2.9	<2.7
1,2,3,4,7,8-HxCDD	0.1	<0.08	<0.081	<0.072	<0.070	<0.073	<0.080	<0.10	<0.090	<1.0	<1.9	<1.6
1,2,3,6,7,8-HxCDD	0.1	<0.086	<0.087	<0.078	<0.085	<0.079	<0.086	<0.10	<0.10	<1.2	<2.1	<1.8
1,2,3,7,8,9-HxCDD	0.1	<0.078	<0.079	<0.071	<0.069	<0.072	<0.078	<0.10	<0.076	<1.0	<1.8	<1.6
1,2,3,4,6,7,8-HpCDD	0.01	<1.3	<0.093	<0.32	<0.075	<0.49	<0.15	<0.53	<0.72	<0.75	<1.6	<1.2
OCDD	0.0001	**8.6 J**	<0.67	<2.8	<1.3	**5.4 J**	<1.7	<3.5	**6.8 J**	<3.4	<3.1	<1.8
2,3,7,8-TCDF	0.1	<0.14	<0.10	<0.10	<0.088	<0.077	<0.074	<0.10	<0.073	<0.38	<0.52	<0.90
1,2,3,7,8-PeCDF	0.05	<0.11	<0.10	<0.085	<0.10	<0.090	<0.088	<0.10	<0.085	<0.86	<1.5	<1.2
2,3,4,7,8-PeCDF	0.5	<0.11	<0.10	<0.085	<0.10	<0.090	<0.088	<0.10	<0.085	<0.84	<1.5	<1.2
1,2,3,4,7,8-HxCDF	0.1	<0.046	<0.055	<0.068	<0.039	<0.048	<0.049	<0.048	<0.089	<0.89	<1.8	<1.4
1,2,3,6,7,8-HxCDF	0.1	<0.040	<0.048	<0.046	<0.034	<0.042	<0.043	<0.18	<0.040	<0.85	<1.7	<1.3
1,2,3,7,8,9-HXxCDF	0.1	<0.049	<0.059	<0.056	<0.042	<0.052	<0.053	<0.051	<0.050	<0.93	<1.8	<1.4
2,3,4,6,7,8-HxCDF	0.1	<0.053	<0.063	<0.060	<0.044	<0.055	<0.056	<0.055	<0.053	<1.0	<2.0	<1.6
1,2,3,4,6,7,8-HpCDF	0.01	<0.059	<0.059	<0.049	<0.073	<0.058	<0.065	<0.064	<0.19	<0.53	<0.86	<0.54
1,2,3,4,7,8,9-HpCDF	0.01	<0.070	<0.071	<0.059	<0.087	<0.069	<0.078	<0.077	<0.084	<0.63	<1.0	<0.64
OCDF	0.0001	<0.14	<0.16	<0.16	<0.15	<0.14	<0.14	<0.14	<0.54	<1.2	<3.2	<2.8
2,3,7,8- TCDD Equivalence	3.0	**0.00086**	BDL	BDL	BDL	**0.00054**	BDL	BDL	**0.00068**	BDL	BDL	BDL

Notes:

Only analytes detected at or above laboratory method detection lim
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection lim

Shaded Text= Exceedance of 2,3,7,8 TCDD equivalence guidance

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Dioxin Data Qualifiers:

All results in pg/g or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 6
Biota Analytical Results
Camp Summit

Sample Location		**3PC-12**	**3PC-13**	**3PC-14**	**3PC-14**	**3PC-15**	**3PC-16**	**3PC-17**	**3PC-18**	**3PC-19**			
Sample Species		Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout	Steam Trout			
Individual Fish/Composite		Composite	Composite	Composite		Composite	Composite	Composite	Composite	Composite			
Number of Fish in Composite		17	15	15		5	6	5	5	5			
Sample Length (mm)		1139	1060	1033		605	717	586	585	561			
Sample Weight (g)		46	47	44		69	76	60	62	52			
Analyte													
Dioxins (pg/g or ppt)	**TEFs**	**3PC-12**	**3PC-13**	**3PC-14**	**3PC-14**	**3PC-15**	**3PC-16**	**3PC-17**	**3PC-18**	**3PC-19**	**TURTLE-1**	**FISH-1**	**FISH-2**
Total TCDF	-	<0.63	**1.8**	<0.68	**1.7**	<2.6	<0.68	**1.8**	<2.2	<0.87	**48.6**	**2.24**	**4.19**
Total PeCDF	-	<1.2	<1.1	<0.097	<1.3	<0.68	<1.1	<1.4	<1.2	<1.3	**206**	**6.95**	**15.6**
Total HxCDF	-	<1.5	<1.4	<1.3	<1.4	<1.1	<1.3	<1.8	<1.2	<1.6	**864**	**39.8**	**81.8**
Total HpCDF	-	<0.78	<0.82	<0.62	<0.86	<1.3	<0.67	<0.96	<0.67	<0.71	**515**	**98.5**	**356**
Total TCDD	-	<0.32	<0.42	<0.79	<0.41	<0.67	<0.80	<0.47	<0.67	<0.43	**0.35**	**0.24**	**0.96**
Total PeCDD	-	<2.2	<2.1	<1.8	<2.2	<0.080	<1.7	<204	<1.8	<2.0	**39.4**	**4.95**	**8.68**
Total HxCDD	-	<1.6	**12**	<1.3	<1.6	<1.7	<1.5	<1.7	<1.3	<1.6	**56.2**	**17.5**	**50.1**
Total HpCDD	-	<1.3	<1.6	<1.2	<1.3	<1.5	<1.2	<1.7	<1.2	<1.4	**37.4**	**22.8**	**93.3**
2,3,7,8-TCDD	1	<0.32	<0.42	<0.79	<0.41	<1.2	<0.8	<0.47	<0.67	<0.43	**48.6**	**2.07**	**3.36**
1,2,3,7,8-PeCDD	0.5	<2.2	<2.1	<1.8	<2.2	<0.80	<1.7	<2.4	<1.8	<2.0	**206**	**6.95**	**11**
1,2,3,4,7,8-HxCDD	0.1	<1.5	<1.4	<1.2	<1.4	<1.7	<1.4	<1.5	<1.2	<1.5	**124**	**4.3**	**7.07**
1,2,3,6,7,8-HxCDD	0.1	<1.6	<1.6	<1.3	<1.6	<1.4	<1.5	<1.7	<1.3	<1.6	**683**	**20.5**	**.5.9**
1,2,3,7,8,9-HxCDD	0.1	<1.4	<1.4	<1.2	<1.4	<1.5	<1.3	<1.5	<1.2	<1.5	**43.4**	**3.65**	**7.77**
1,2,3,4,6,7,8-HpCDD	0.01	<1.3	**8.8**	<1.2	<1.3	<1.3	<1.2	<1.7	<1.2	<1.4	**290**	**59.9**	**208**
OCDD	0.0001	**5.8 J**	**36**	**6.9 J**	<3.3	<1.2	**6.1 J**	<4.9	**5 J**	<2.9	**261**	**221**	**1180**
2,3,7,8-TCDF	0.1	<0.63	<0.85	<0.68	<0.68	**6.1 J**	<0.68	<0.93	<0.69	<0.87	**0.35**	**0.11**	<0.14
1,2,3,7,8-PeCDF	0.05	<1.2	<1.1	<0.97	<1.3	<0.68	<0.97	<1.4	<1.2	<1.3	**1.15**	**0.62**	**0.86**
2,3,4,7,8-PeCDF	0.5	<1.2	<1.0	<0.95	<1.2	<0.97	<0.95	<1.3	<1.1	<1.3	**36.4**	**1.28**	**2.25**
1,2,3,4,7,8-HxCDF	0.1	<1.4	<1.2	<1.2	<1.2	<0.95	<1.2	<1.6	<1.1	<1.4	**4.89**	**1.07**	**2.79**
1,2,3,6,7,8-HxCDF	0.1	<1.3	<1.2	<1.1	<1.2	<1.2	<1.1	<1.5	<1.0	<1.3	**25.7**	**1.27**	**2.95**
1,2,3,7,8,9-HXxCDF	0.1	<1.4	<1.3	<1.2	<1.3	<1.1	<1.2	<1.6	<1.1	<1.5	<0.30	<0.37	<0.55
2,3,4,6,7,8-HxCDF	0.1	<1.5	<1.4	<1.3	<1.4	<1.2	<1.3	<1.8	<1.2	<1.6	**15.2**	**2.69**	**4.93**
1,2,3,4,6,7,8-HpCDF	0.01	<0.66	<0.69	<0.52	<0.72	<1.3	<0.57	<0.81	<0.56	<0.60	**18.5**	**9.18**	**32.7**
1,2,3,4,7,8,9-HpCDF	0.01	<0.78	<0.82	<0.62	<0.86	<0.57	<0.67	<0.96	<0.67	<0.71	**0.74**	<0.58	**2.11**
OCDF	0.0001	2.9	<2.3	<2.4	<1.9	<2.6	<2.6	<3.5	<2.5	<3.0	**10.2**	**19.4**	**92.3**
2,3,7,8- TCDD Equivalence	3.0	**0.00058**	**0.0916**	**0.00069**	BDL	**0.61**	**0.00061**	BDL	**0.0005**	BDL	**263**	**10.5**	**19.8**

Notes:

Only analytes detected at or above laboratory method detection lim
on tables

*PCP results from PIR Immunoassay Results

Bold Text=Analyte detected above laboratory method detection lim

Shaded Text= Exceedance of 2,3,7,8 TCDD equivalence guidance

BDL= Below Laboratory Method Detection Limit

ND= Non-Detect

NP = Not Promulgated

Dioxin Data Qualifiers:

All results in pg/g or parts per trillion

J=Estimated result, result is less than the reporting limit

E=Estimated result, result exceeds calibration range

CON=Confirmation analysis

Table 7 - Standards, Criteria and Guidelines Evaluation				
Camp Summit, Fulton, New York				
Requirements/Criteria	**Citation**	**Description**	**Evaluation**	**Evaluation Comment**
FEDERAL				
Resource Conservation and Recovery Act (RCRA)	**40 U.S.C. 6901-6987**			
Identification and Listing of Hazardous Wastes	40 CFR Part 261-265	Outlines criteria determining whether solid waste is a hazardous waste after generation and is subject to regulation under 40 CFR Parts 260-266. Does not address cleanup action levels.	Applicable to removed media only.	These regulations would only apply to media removed from the site as part of a remedial action.
Land Disposal Restrictions	40 CFR Part 268	Established constituent-specific standards to which hazardous wastes must be treated prior to land disposal. Only applies to newly generated solid wastes.	Applicable to removed media only.	These requirements would be applicable to media removed from the site which are determined to be hazardous wastes that are land disposed off site as part of a remedial action.
Clean Air Act (CAA)	**42 U.S.C. 7401-7642**			
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes ambient air quality standards for protection of public health.	Applicable.	NAAQS may be applicable in evaluating whether there are air impacts at a site prior to remediation, or during long-term remediation programs. Due to the site conditions, air emissions would not be a significant issue.
Clean Water Act (CWA)	**33 U.S.C. 251-1376**			
Ambient Ground Water Quality Criteria Guidelines	40 CFR Part 141	Establishes maximum contaminant levels (MCLs) for treatment of groundwater for public potable water supplies.	Not Applicable.	Camp Summit is an active incarceration facility that uses an unimpacted bedrock aquifer as a public potable water supply.

Table 7 - Standards, Criteria and Guidelines Evaluation
Camp Summit, Fulton, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
Safe Drinking Water Act (SDWA)	**40 U.S.C.300**			
National Primary Drinking Water Standards	40 CFR Part 141	Establishes maximum contaminant levels or MCLs, which are health-based standards for public water systems.	Not Applicable.	Water will not be discharged directly to any potable water source. Camp Summit is an active incarceration facility that uses an unimpacted bedrock aquifer as a public potable water supply.
National Secondary Drinking Water Standards	40 CFR Part 132	Non-enforceable health goals for public water systems that relate to aesthetic quality.	Not Applicable.	Water will not be discharged directly to any potable water source. Camp Summit is an active incarceration facility that uses an unimpacted bedrock aquifer as a public potable water supply.
STATE				
New York State Environmental Conservation Law	**Chapter 10 Articles 15, 17**			
New York State Pollution Discharge Elimination System	15 NYCRR 750-758	Defines permitting requirements for discharges.	Relevant and Appropriate.	The regulations would be applicable only for alternatives that include discharge to surface water.
Ambient Water Quality Standards and Guidance Values	6 NYCRR 700-705	Establishes quality standards for groundwater and incorporates federal MCLs and standards from other state regulations.	Applicable.	The regulations would be applicable only for alternatives that include discharge to surface water and groundwater.
Ambient Water Quality Standards and Guidance Values	TOGS 1.1.1	Establishes quality standards for groundwater in New York State and incorporates federal MCLs.	Applicable.	The regulations would be applicable only for alternatives that include discharge to surface water and groundwater.
Technical Guidance for Screening Contaminated Sediments		Describes the methodology used by the Division of Fish and Wildlife and the Division of Marine Resources for establishing criteria for the purpose of identifying contaminated sediments.	Not Applicable.	Relevant for sedimentation control.

Table 7 - Standards, Criteria and Guidelines Evaluation
Camp Summit, Fulton, New York

Requirements/Criteria	Citation	Description	Evaluation	Evaluation Comment
Groundwater Effluent Standards	6 NYCRR 700-705	Establishes effluent standards and/or limitations for discharges to groundwater.	Applicable.	The regulations would be applicable only for alternatives that include discharge to surface water and groundwater.
New York State Environmental Conservation Law	**Article 27**			
Determination of Soil Clean-Up Objectives and Clean-Up Levels	TAGM HWR-94-4046	Establishes general clean-up goals for environmental media.	Applicable.	Widely used as a guidance document for calculating soil cleanup levels.
Identification and Listing of Hazardous Wastes	6 NYCRR 371	Outlines criteria determining whether solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 370-376.	Applicable.	Applies to material generated from the site for off-site disposal and determined to be hazardous waste.
Solid Waste Management	6 NYCRR 360	Includes solid waste disposal requirements.	Applicable.	These regulations would only be applicable to the off site disposal of non-hazardous waste.
New York State Environmental Conservation Law	**Article 19**			
New York State Air Guide 1	6 NYCRR 750-758	Provides guidance for permitting emissions from new or existing sources.	Applicable but not relevant.	No air emissions are being considered.
Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites	TAGM HWR 89-4031	Provides guidance for fugitive dust suppression and particulate monitoring at inactive hazardous waste sites.	Relevant and appropriate.	This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

Table 8 - Remedial Action Objectives for Soil

Camp Summit, Fulton, New York

Chemical of Potential Concern	SCGs/ARARs		Qualitative Remedial Action Objectives
	TAGM 4046 [1] Generic Soil Cleanup Values	TAGM 4046 Soil Cleanup Values for Groundwater Protection	
Pentachlorophenol	1 ppm [2] or MDL [3]	1 ppm	Eliminate or reduce to the extent practicable: 1. Exposures of persons at or around the Site to PCP and dioxin in soils; 2. Environmental exposures of flora or fauna to PCP and dioxin in soils; 3. The release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards; and 4. The release of contaminants from soil into surface water, indoor air, ambient air, through storm water erosion, soil vapor, or wind borne dust.
2,3,7,8 TCDD equivalent	NA [4]	1 ppb [5,6]	
Fuel Oil	NV [7]	NV	
Copper	25 ppm or SB [8]	NA	
Chromium	10 ppm or SB	NA	
Arsenic	7.5 ppm or SB	NA	

NOTES

1 Division Technical and Administrative Guidance Memorandum (TAGM) 4046: Determination of Soil Cleanup Objectives and Cleanup Levels (1994)
2 ppm = parts per million (equivalent to milligrams per kilogram)
3 MDL = Method Detection Limit
4 NA = Not Available
5 ppb = parts per billion (equivalent to micrograms per kilogram)
6 TAGM 4046 does not include a soil cleanup objective for dioxins and furans, but a value of 1 ppb has been used as a cleanup goal at hazardous waste sites and this value has been adopted as a screening concentration for Camp Summit.
7 NV = No value is listed in TAGM 4046 for this COPC
8 SB = Site Background

Table 9 - Technology Evaluation Summary for Soil
Camp Summit, Fulton, New York

General Response Actions	Remedial Technology Type	Process Options	Effectiveness	Implementability	Cost	Retained
No Action	None	Not Applicable	Does not achieve remedial action objectives	Readily implementable	Negligible	Yes
Institutional and/or Engineering Controls	Institutional and/or Engineering Controls	Access Restrictions	Depends upon continued future implementation	Readily implementable	Negligible	Yes
		Notice of Covenant on Deed Transfers	Depends upon continued future implementation	Appropriate legal actions required	Negligible	Yes
		Zoning Restrictions	Depends upon continued future implementation	Approval of local government required	Negligible	Yes
Containment	Surface Controls	Diversion Channels, Revegetation, Grading	Effective in preventing erosion	Implementable	Low capital and maintenance	Yes
	Capping	Permeable Soil Cover	Not effective in containing VOCs and SVOCs	Implementable, restricts future land use	Moderate capital and maintenance	No
		Low Permeability Soil Cover	Effective, susceptible to cracking	Implementable, restricts future land use	Moderate capital and maintenance	No
		Asphalt / Concrete Cap	Effective, susceptible to cracking	Implementable, restricts future land use	Moderate capital and maintenance	No
		Multi Layered Cap	Effective	Implementable, restricts future land use	High capital and maintenance	Yes
Excavation	Shallow Excavation	Not Braced	Effective in reducing on-site volume and toxicity	Implementable	Moderate capital	Yes
	Deep Excavation	Engineering Controls Employed Above Water Table	Effective in reducing on-site volume and toxicity, however, mobility may be increased during implementation of deeper excavations	Implementable, dependent on subsurface characteristics	Moderate to high capital	Yes
		Engineering Controls Employed Below Water Table	Effective in reducing on-site volume and toxicity, however, mobility may be increased during implementation of deeper excavations	Implementable, dependent on subsurface characteristics	High capital	Yes

Table 9 - Technology Evaluation Summary for Soil
Camp Summit, Fulton, New York

General Response Actions	Remedial Technology Type	Process Options	Effectiveness	Implementability	Cost	Retained
Disposal	Disposal	On-site Disposal	Effective in reducing contaminant mobility	Requires construction and maintenance of a containment cell, which may limit site use	Moderate capital and high maintenance	Yes
		Off-site Disposal	Effective in reducing contaminant mobility	Implementable	Moderate capital	Yes
In-situ Treatment	In-situ Biological Treatment	Enhanced Biodegradation	No data available showing effectiveness of HRC in treating dioxins	Implementable	Moderate capital and low maintenance	No
	In-situ Physical / Chemical Treatment	Stabilization	Lack of overall demonstrated effectiveness in treating organic constituents	Implementable, dense soils hinder process	Moderate capital and low maintenance	No
		Vitrification	Effective; innovative technology	Implementation requires intensive site preparation, special equipment, and significant electrical supplies	High capital and low maintenance	No
	In-situ Thermal Treatment	Thermal Desorption	Effective; innovative technology	Requires off-gas treatment; dense soils and separate areas of impact hinder implementation	High capital and low maintenance; sole vendor leads to non-competitive pricing; implementation issues increase costs	No
Ex-situ Treatment (assuming excavation)	Ex-situ Biological Treatment	Bioremediation	Effective	Requires large area of land for an extended period of time	Moderate capital and high maintenance	No
	Ex-situ Physical / Chemical Treatment	Stabilization	Effective in reducing inorganic contaminant mobility; treatment of organics is innovative	Implementable	Moderate capital and low maintenance	No
		Dechlorination	More toxic forms of dioxin may be generated	Implementable	High capital and low maintenance	No
		Soil Washing	Lack of overall demonstrated effectiveness	Implementable, produces large volumes of washwater and requires extensive equipment and off-gas treatment	High capital and low maintenance	No
	Ex-situ Thermal Treatment	Thermal Desorption	Effective in treating organic compounds	Requires off-gas treatment; dense soils hinder process; power soure required	High capital and low maintenance	No

FIGURES

APPENDIX A

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

APPENDIX A

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT for the CAMP SUMMIT SITE

NYSDEC Site No. 4-48-006

May 2, 2002

Prepared for:
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7015

TABLE OF CONTENTS:

1.0 QUALITATIVE HUMAN EXPOSURE ASSESSMENT 1
- 1.1 EXPOSURE SETTING 1
- 1.2 IDENTIFICATION OF EXPOSURE PATHWAYS 2
  - *1.2.1 Source of Contamination 3*
  - *1.2.2 Fate and Transport 3*
- 1.3 POINTS OF EXPOSURE 5
  - *1.3.1 Soil 6*
  - *1.3.2 Sediment 9*
  - *1.3.3 Groundwater 10*
  - *1.3.4 Fish Tissue 11*
- 1.4 POTENTIAL RECEPTORS AND EXPOSURE ROUTES 11
- 1.5 CONCLUSIONS 12

2.0 REFERENCES 15

1.0 QUALITATIVE HUMAN EXPOSURE ASSESSMENT

Exposure assessment is the process of identifying potential current and future receptors, and characterizing the nature of their contact with a chemical. A qualitative exposure assessment was performed for the Camp Summit site in order to determine potential exposure pathways associated with current site conditions in the absence of remediation.

The qualitative exposure assessment results in the creation of site-specific exposure profiles, which provide the narrative description of the mechanisms by which exposure to contaminants may occur at a site. Chemical, physical, and toxicological parameters for the chemicals of potential concern are also identified and taken into account when developing the exposure profiles.

1.1 Exposure Setting

The exposure setting is evaluated with respect to both current and future land uses of the site and surrounding area in order to aid in the identification of potential receptors, exposure points and exposure pathways.

Camp Summit is a large complex of New York State Department of Environmental Conservation (NYSDEC) crew headquarters and an active New York Department of Corrective Services (NYDCS) incarceration facility, situated in the town of Fulton, Schoharie County, New York. Camp Summit is bordered on the southeast by New York State land and the remainder of the facility is bordered by private property, some of which is used for residential purposes. A small pond is located on-site; its outlet feeds a tributary of Panther Creek. The outlet is a Class C (fish propagation) stream, and Panther Creek is a Class C (TS) (trout spawning) stream. A NYSDEC Regulated Wetland is located approximately 0.5 miles southeast of the site. The surrounding area is rural, generally consisting of undeveloped forest and farmland.

Wood treatment operations were conducted at Camp Summit between 1962 and 1975. Based on previous investigations several areas potentially impacted by releases at the site have been identified, including:

- The NYSDEC office (Building 48);
- the former wood treatment plant (Building 49);
- the planer room in the old sawmill (Building 51);
- the former staging areas for treated lumber;
- the shale pit and several satellite areas previously used for waste disposal;
- the Pond and associated drainage area on-site.

Each of these areas is indicated on **Figure 2** in the Remedial Investigation Report.

1.2 Identification of Exposure Pathways

For identified receptors to be exposed to a chemical of potential concern at the site, a current or reasonable future potential exposure pathway must be established leading from the source to the receptor. The exposure pathway is the course that the chemical takes from the source of the material to the receptor of concern. An exposure pathway has five elements:

- a contaminant source
- contaminant release and transport mechanisms
- a point of exposure
- a route of exposure
- a potential receptor

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future.

1.2.1 Source of Contamination

One of the work projects at Camp Summit was the operation of a wood treatment facility and sawmill. During this time, copper naphthenate and pentachlorophenol (PCP) were the principle chemical biocides used in treating lumber at the site. The PCP was mixed with fuel oil for treatment. During the treatment process (located in Building 49), poles were lowered into dip tanks filled with the wood preservative. After treatment, poles were hoisted from the tank and allowed to drip over the tank for a period of time. Poles were finally moved to a designated treated material storage area outside the building. Therefore, the sources of release to the environment are historical surficial spills of wood treatment products (PCP, copper naphthenate, and fuel oil) to soil. In addition, there was a diesel fuel spill at the old sawmill (Building 51) in April 1990. The sawmill operations were moved to the former treatment building (Building 49) in 1990 in order to facilitate cleanup of this spill. It is possible that residual impacts from this spill remain within or near the former treatment building.

1.2.2 Fate and Transport

Contaminant release and transport mechanisms carry contaminants from the source to points where individuals may be exposed. Chemical migration between media such as soil and groundwater is influenced by chemical parameters such as water solubility or molecular size or shape, in addition to the chemical and physical characteristics particular to a site's media. This section discusses information about the fate and transport of the source chemicals present at the site.

Copper Naphthenate

Copper naphthenate is a wood preservative/biocide comprised of copper compounds and naphthenic acid. The United States Environmental Protection Agency classifies copper naphthenate as a general-use (unrestricted) pesticide. Most preparations consist of 6-8% copper as copper naphthenate is typically diluted in solvents such as diesel fuel or mineral spirits (Merichem, 1999). Naphthenic acids are predominantly alicyclic (saturated, non-aromatic), and are naturally-occurring byproducts of petroleum.

Horizontal and vertical migration of copper naphthenate from a release area is not anticipated to be significant, as the preservative has a strong tendency to bind to soil and/or organic particles. Adsorption of copper is particularly dependent on the soil's chemical and physical composition, such as pH, amount of organic matter, and cation exchange capacity, with the greatest potential for leaching occurring in acidic, sandy soils (ATSDR, 2000). In water, copper naphthenate will generally adsorb to or complex with mineral or organic constituents. At higher pHs, copper may precipitate out of solution (ATSDR, 2000). Volatilization and biodegradation of copper naphthenate may occur in soil and groundwater (Merichem, 1999).

The bioconcentration factor (BCF) of copper may range considerably among species, from 10 in fish to 30,000 in molluscs; the potential for uptake may be influenced by feeding mechanisms, such as filter-feeding, as opposed to dermal or gill absorption (ATSDR, 2000). Copper is not known to biomagnify through the food chain (ATSDR, 2000). There is little information regarding the bioconcentration potential of napthenic acids.

Pentachlorophenol

Pentachlorophenol has low water solubility and a strong tendency to adsorb onto soil or sediment particles in the environment. Adsorption to soils and sediments is highly pH-dependent, and is more likely to occur under acidic conditions than under neutral or basic conditions; no adsorption occurs above pH 6.8 (ATSDR 2000; Howard, 1991). Therefore, leaching of PCP from soil to groundwater may be possible, particularly at lower pHs. Disassociated forms of PCP may be rapidly photolyzed by sunlight; PCP may also undergo biodegradation by microorganisms, animals, and plants, although degradation is generally slow (Howard, 1991).

PCP has an octanol-water partition coefficient (Kow) of 100,000 (Howard, 1991), which indicates that it is lipid-soluble and therefore has a tendency to bioaccumulate in organisms. Bioaccumulation is largely pH-dependent, with considerable variation among species. Bioconcentration factors (BCFs) for PCP are generally under 1,000, but some studies have reported BCFs up to 10,000. Significant biomagnification of PCP in either terrestrial or aquatic foodchains, however, has not been demonstrated (ATSDR, 2000).

Pentachlorophenol products often contain impurities such as chlorophenols, dioxins, and furans. Of particular concern are the chlorinated dibenzo-p-dioxins (CDDs) and dibenzofurans (CDFs), which may also be formed through the degradation of PCP. Once released to the environment, these compounds generally adsorb to soil or sediment particles, due to their low water solubilities. CDDs and CDFs may undergo degradation through biological action or by photolysis, with a half-life ranging from weeks to months. Photolysis and hydrolysis are generally not significant processes, however, as these compounds persist in the adsorbed phase (USEPA, 2002). Soil or sediment adsorption is highly pH-dependent (Howard, 1991).

Due to their high propensity for adsoprtion, CDDs are not expected to leach from soil, although some leaching of disassociated forms of the compounds may occur, especially at lower pHs

(USEPA, 2002). Volatilization from either subsurface soil or water is not expected to be a major transport pathway, although may be significant for surficial impacts (ATSDR, 2000). As with PCP and other lipophilic pesticides, CDDs and CDFs tend to bioaccumulate in exposed organisms, with BCFs ranging from 5,000 to 10,000 (Montgomery, 1996).

Fuel Oil

PCP and copper naphthenate are oilborne preservatives. At the site, PCP and CN were mixed with fuel oil as the carrier fluid. Fuel oils are mixtures of numerous aliphatic and aromatic hydrocarbons. Individual components of fuel oil include n-alkanes, branched alkanes, benzene and alkylbenzenes, naphthalenes, and PAHs (ATSDR, 2000). Soil adsorption, volatilization to air, and leaching potential depend on a PAH's individual chemical characteristics; however, as a class of compounds, they are generally insoluble in water, with a strong tendency to bind to soil or sediment particles. Some of the lighter-weight PAHs (such as naphthalene, acenaphthene, and phenanthrene) may volatilize from soil or groundwater into the air. Degradation may occur through photolysis, oxidation, biological action, and other mechanisms.

As nonpolar, organic compounds, PAHs may be accumulated in organisms from water, soil sediments, and food. BCFs vary among PAHs and receptor species, but in general, bioconcentration is greater for the higher molecular weight compounds than for the lower molecular weight compounds (ATSDR, 2000).

1.3 Points of Exposure

The exposure point is a location where actual or potential human contact with a contaminated medium may occur. Analytical results for samples collected at Camp Summit indicate that soil, sediment, and groundwater have been impacted by numerous contaminants, including the following:

- Pentachlorophenol (PCP) and other phenolic compounds;
- Polychlorinated dioxins (CDDs) and dibenzofurans (CDFs);
- Petroleum hydrocarbons;
- Polycyclic aromatic hydrocarbons (PAHs); and
- Metals, including arsenic, chromium, copper, lead, and zinc.

The potentially impacted media are discussed below.

1.3.1 Soil

Historical and recent analytical results from samples collected across the site indicate that shallow soils have been impacted by PCP under and on the northeast end of Building 49. Concentrations in this area were as high as 6300 ug/kg at sampling location SS-16. Samples previously collected southwest of Building 50 have also shown impacts by PCP, as evidenced by immunoassay analysis of soil samples from this area for PCP. The maximum PCP concentration in this area was 253,000 ug/kg, although the next highest result from this area was 4790 ug/kg, making the maximum concentration suspect. Surface soils in the drum-washing area, located southeast of Building 52, have also been impacted. Previous soil samples tested (using immunoassay methods) showed concentrations of PCP up to 80,000 ug/kg in this area.

Subsurface soils have also been impacted by PCP. Shallow test pit samples (generally taken 2 – 4 feet below grade) from southwest of Building 51 showed subsurface PCP concentrations ranging up to 26,000 ug/kg. The higher concentrations appeared to be found in samples taken away from Building 51 and closer to Building 52 (STP-18, 19, 21, and 22). Test Pit samples taken at various locations around the site generally included a depth interval of 0-10 feet below grade. PCP was detected in 14 of 33 test pit samples, although 10 of these detections were estimated concentrations occurring below the laboratory reporting limit of 1600 ug/kg. The highest concentration (42,000 ug/kg) was detected in TP-1, located at the suspected disposal area along the access road to the shale pit. The next highest sample result was taken from TP-33, located north of Building 49, which exhibited a PCP concentration of 23,000 ug/kg. A sample from SB-3, in the same general area as TP-33, contained 9600 ug/kg PCP at 8 -10 feet below grade. A sample from MW-7, located outside Building 48, showed PCB concentrations of 29,000 ug/kg at a depth of 2-4 feet below grade. Previous samples from borings installed around Building 48 showed PCP concentrations (as measured by immunoassay methods) as high as 83,000 ug/kg at a depth of three (3) feet below grade.

Soil samples taken from beneath the buildings during previous investigations were analyzed for PCP using immunoassay methods. The highest concentrations were reported under the northwestern side of Building 49 where concentrations were as high as 820,000 ug/kg at depths of three (3) feet below grade. In the Remedial Investigation two borings were installed in Building 49. One of these (SB-2) contained a PCP concentration of 9800 ug/kg, and the other had a low concentration of 160 ug/kg (estimated below the reporting limit). A soil sample taken from MW-6 during this investigation at a depth of 6-8 feet below grade had low concentrations of

PCP (24 ug/kg). PCP was detected historically at low concentrations (<100 ug/kg) in samples from under Building 53.

Several other SVOCs have been detected in soils at the site, including polycyclic aromatic hydrocarbons (PAHs) and phthalate esters. These compounds were generally detected at low concentrations estimated at less than the reporting limit in surface and subsurface soils. However, several test pit samples exhibited higher concentrations of some PAHs indicative of fuel oils (e.g. napthalene and 2-methylnapthalene), including TP-16, 32 and 33. TP-16 is located in the drum-washing area, and TP-32 and TP-33 are located on the north side of Building 49.

Four of the test pit samples were also analyzed for VOCs. In TP-1, several VOCs were detected at relatively high concentrations, including acetone, 2-butanone, ethyl benzene, and xylenes. Lower VOC concentrations were also detected at TP-33.

Numerous soil samples at the site have been analyzed for dioxins. The highest concentration of dioxins in surface soils was reported at surface sample SS-23 (3.8 ng/g 2,3,7,8-TCDD equivalents), located northeast of Building 49. PCP concentrations at this location was relatively low, 110 ug/kg (estimated below the reporting limit), although much higher PCP concentrations were found in other soil samples from the same area. The highest concentration reported in the subsurface was 7.4 ng/g 2,3,7,8-TCDD equivalents found at TP-1. Previous investigations reported the presence of dioxins northwest of Building 50, in the drum washing area, and under Building 49. The maximum concentration reported anywhere at the site was in soils from under the northwest corner of Building 49 at a concentration of 24.2 ng/g 2,3,7,8-TCDD equivalents.

Metals have been detected in site soils, although most are present at concentrations likely to be representative of background concentrations. Three background surface soil samples were taken south of the site on the opposite side of the access road. However, due to the expected high variability expected in background conditions, site concentrations were compared to New York State or Eastern United States background concentrations as reported in NYSDEC (1994), as well as site background concentrations. Site concentrations were considered representative of background if:

- All site concentrations were less than average site background concentrations;
- Mean site concentrations were less than average site background concentrations;

- All concentrations were less than New York State or Eastern United States or background concentrations.

Based on these considerations, arsenic, copper, lead, magnesium, nickel, mercury and zinc were identified as having site concentrations greater than background concentrations. Each of these are discussed briefly below.

The mean site background concentration of arsenic was 9.1 mg/kg and the maximum New York State background concentration was 12 mg/kg (NYSDEC 1994). A few concentrations at the site exceeded this latter value (8 out of 36 samples), however, the maximum concentration was 17.9 mg/kg at SS-2. The seven remaining samples exhibited arsenic concentrations greater than 12 mg/kg but less than 14 mg/kg. It appears possible, therefore, that arsenic concentrations are representative of background at this site given that most results were only slightly higher than the maximum state background concentration.

The mean site background concentration of copper was 10.8 mg/kg and the maximum eastern United States background concentration was 50 mg/kg. All site concentrations were less than this latter value, with the exception of one sample from TP-16 where the copper concentration was reported as 126 mg/kg. This was, however, an estimated concentration as the analysis was not within the quality control limits. This location had elevated concentrations of 2-methylnapthalene and napthalene, indicating the possible presence of fuel oil or other petroleum product comingled with the copper.

The mean site background concentration of lead was 17.8 mg/kg. NYSDEC (1994) indicates that background levels for lead can be expected to vary widely, but average levels in rural areas may range up to 61 mg/kg. Only one (1) of 36 samples exceeded this latter value. This sample was collected at SS-26, exhibiting an estimated concentration of 104 mg/kg. This location had no detected PCP or constituents that appeared to be related to fuel oil.

The mean site background concentration of magnesium was 2300 mg/kg and the maximum eastern United States background concentration was 5000 mg/kg. Five (5) of 36 site samples exceeded this latter value, with a maximum of 5570 mg/kg. Since these concentrations are close to the limit of 5000 mg/kg and there is no known source of magnesium, it appears likely that magnesium concentrations observed at the site are attributable to background conditions.

The mean site background concentration of nickel was 14.9 mg/kg and the maximum eastern United States background concentration was 25 mg/kg. Site concentrations ranged from 15.9 to 39.7 mg/kg, with 21 of 36 samples exceeding 25 mg/kg. Since the range of site concentrations is relatively narrow, and there is no known source of nickel at the site, it appears possible that site concentrations are representative of background conditions.

The mean site background concentration of mercury was 0.045 mg/kg and the maximum eastern United States background concentration was 0.2 mg/kg. The only site concentration that exceeded this latter concentration was the surface soil sample taken from SS-26 where the mercury concentration was 0.256 mg/kg. This is the same location where the lead concentration was elevated, and may be indicative of paint chips or residual materials in the sample or localized area.

The mean site background concentration of zinc was 67.4 mg/kg, although the maximum background concentration reported for the eastern United States (NYSDEC, 1994) was 50 mg/kg. Numerous site concentrations exceeded both of these values, ranging from 52.5 to 255 mg/kg, with 33 of 36 samples having concentrations greater than 67.4 mg/kg. Some of the higher zinc concentrations were found at locations where PCP was also detected (SS-19 and STP-19), but this was not always the case. Nevertheless, it appears that zinc concentrations at the site are likely related to historical activities.

1.3.2 Sediment

In previous investigations, sediment samples were taken from the pond adjacent to the site, as well as the drainage swale that feeds the pond. No detectable PCP was found at the facility end of the drainage swale, and 1 mg/kg PCP was detected at the pond end of the drainage swale. PCP was detected in nine (9) of the eleven (11) samples taken from within the pond. The maximum concentration was 3.7 mg/kg, in a sample collected near the drainage swale outlet; all other concentrations were 0.5 mg/kg or less. PCP was not detected in a sample located at the southern end of the pond (although the detection limit for this sample was 28 mg/kg). Two of these samples were also analyzed for dioxins and furans. These constituents were detected at both locations above the 0.0114 2,3,7,8-TCDD screening level site specific at concentrations of 0.031 and 0.042 ng/g 2,3,7,8-TCDD equivalents. Several PAHs were also detected in the sample near the drainage swale outlet, although the concentrations were 1.1 mg/kg or less.

The sediment sampling conducted during the Remedial Investigation focused on the northern edge of the pond, the wetlands/creek north of the pond, and near the outlet of the creek. PCP was not detected in any of these samples (at a reporting limit of 1600 ug/kg). Benzo(a)pyrene, a PAH, was detected in one sample at a concentration of 690 ug/kg. Di-n-octyl, phthalate a common laboratory contaminant, was detected in several samples, and is not known to be site related. Of the dioxins and furans, only the octachlorodibenzo dioxins (OCDD) were detected in three (3) of the ten (10) samples. Two of these samples were from the 0-1 foot interval, and the other from 0–2 inch interval. The maximum concentration reported was 8.5 ng/g OCDD. Using the sediment-wildlife toxic equivalence factors discussed previously, this concentration would equate to 0.00000021 ng/g as 2,3,7,8-TCDD below the location specific screening value of 0.01008 ng/g.

1.3.3 Groundwater

During previous investigations two of the eight water supply wells located on the property were sampled. Wells 7 and 8 were reportedly the only ones in use by the facility at that time (1997). These wells were sampled and analyses conducted for a wide variety of contaminants. The only contaminants that were detected were attributed to laboratory contamination. These wells are located south and south east of the facility and upgradient of site operations.

During the Remedial Investigation, five other water supply wells (Wells 1,2, 3, 4, and 5) were sampled. Of these, Well 4 is located generally downgradient of the treatment building (Building 49). The only SVOCs detected in any of these wells were phthalate esters, common laboratory contaminants. Concentrations were estimated concentrations below or slightly above the reporting limit. PCP was not detected in any of these water supply wells.

A number of metals were detected in these water supply wells, including barium, calcium, copper, iron, lead, magnesium, manganese, sodium, and zinc. Aluminum, arsenic, chromium, cobalt, nickel, and potassium were also detected, but at concentrations below the laboratory quantitation limits. Concentrations were generally lower at Well 4 compared to the other supply wells, suggesting that these concentrations may not be a result of releases at the site. These samples were not filtered and the metals results likely represent the presence of suspended solids. Total metals concentrations would likely be lower if the samples were filtered. It is also possible that groundwater concentrations of metals are indicative of background conditions in this area, however, no site specific data are available to demonstrate this comparison.

Site monitoring wells were also sampled during this investigation. Fuel oil was detected at a concentration of 24,000 ug/L in MW-4 which is immediately down gradient from Building 49. PCP was detected at this location at a concentration of 190 ug/L, as were several other phenols at much lower concentrations. Napthalene, indicative of the fuel oil, was also detected at this location at 100 ug/L. PCP concentrations were higher at MW-7 (490 ug/L), adjacent to Building 48, as were other phenols. Fuel oil or its constituents were not detected at this location. PCP was also detected at MW-6 at 28 ug/l and MW-8 at 0.8 ug/L. At other monitoring wells, the only other SVOCs detected were phthalate esters, common laboratory contaminants, were detected at estimated concentrations below reporting limits. Metals detected in monitoring wells were similar to those detected in the water supply wells.

Groundwater samples from site monitoring wells MW-2, MW-3, MW-4, and MW-5 were analyzed for dioxins and furans. Concentrations of 2,3,7,8-TCDD equivalents exceeded the screening value of 0.0007 in MW-3 and MW-4.

1.3.4 Fish Tissue

Trout samples were taken from various locations within Panther Creek which is located downgradient of the site. These samples (whole and fillets) were analyzed for dioxins and furans. Of the 30 samples analyzed, dioxins and furans were detected in 17 samples. For the most part, only octachlorodibenzo dioxins (OCDD) were detected, although TCDF and HpCDD were also detected. The maximum concentration detected was 0.00061 pg/g as 2,3,7,8-TCDD equivalents. It is possible that these concentrations are a result of site activities, but may also be related to other sources, as dioxins and furans can be found in fish tissue as a result of non-specific sources. None of the samples collected exceeded the wildlife bioaccumulation criteria of 3.0 ng/g.

1.4 Potential Receptors and Exposure Routes

Exposure assessment includes a description of the potentially exposed persons who live, work, play, visit, or otherwise come to the site or surrounding environment. Consideration is given to the characteristics of the current populations (including sensitive subpopulations) as well as those of any potential future populations that may be exposed under future site activities and uses.

Camp Summit is currently maintained as a NYSDEC management area and as a NYSDCS correctional facility, located in a heavily wooded, rural area. Inmates at Camp Summit and NYSDEC employees occasionally visit the former wood treatment areas. There are currently no deed restrictions on the property that would restrict future land use. Therefore, the following receptors have been identified for the site under current and possible future land use scenarios:

- Adult inmates and employees at Camp Summit;
- Construction workers performing excavation activities;
- Recreational user of the area (i.e., hunter, fisher, or trespasser); and
- Future adult or child resident of the site.

The route of exposure is the manner in which a contaminant actually enters or contacts the body (i.e., ingestion, inhalation, dermal absorption). The following exposure routes were identified based on the nature of the chemicals of potential concern, the types of media impacted at the site, and land use scenarios.

- Direct contact with exposed surficial soil. Exposure routes include incidental ingestion of, dermal contact with, and inhalation of volatile or particulate-bound contaminants.

- Direct contact with subsurface soil and/or groundwater. Future construction activities involving excavation in the area of concern may allow exposure to impacted soil and shallow groundwater. Exposure routes include incidental ingestion of and dermal contact with soil and groundwater, and the inhalation of volatile or particulate-bound contaminants.

- Direct contact with groundwater used as a future drinking water source. Routes of exposure include ingestion and dermal contact. Currently, there are eight water supply wells located at the site. Recent analysis of samples from five of the water supply wells currently not in use have also shown that contaminants related to the wood processing activities are not present. However, there are no restrictions on the property that would limit the future placement of a water supply well in any area of the site.

- Ingestion of fish or of game species such as deer or wild turkey. As the site and surrounding area provide ample habitat for game species and the opportunity for hunting, there is the potential for site-associated compounds (like dioxin) to accumulate in tissues of animals that forage at the site. Hunters may later ingest these contaminated tissues. Analysis of fish tissue samples have shown the presence of dioxins and furans that may or may not be related to wood processing activities.

1.5 Conclusions

Complete exposure pathways have been identified for potential current and future human receptors based on exposure to contaminated soil, groundwater, fish tissue, and sediment. Under current conditions, prison inmates, NYSDEC and NYSDCSS staff, and other receptors such as hunters may visit impacted soil areas of Camp Summit. Additionally, Panther Creek and the tributary to Panther Creek are trout spawning and fish propagation streams, respectively, and fishing may occur in these areas. Therefore, fishermen may come into contact with sediment in the pond and fish tissue through consumption of fish caught in the tributary or Panther Creek.

The supply wells Well-2,3,4 and 5 have not been shown to be impacted by site activities, and therefore do not constitute complete current exposure pathways. However, groundwater at other locations of the site has been impacted and constitutes a complete future exposure pathway.

Surface and subsurface soils are impacted with dioxins and PCP in various areas around the site, including in and around Buildings 48, 49, 50, 51, and 52. In addition, several suspected disposal locations, including the drum rinsing area have been shown to be impacted. Recent groundwater data show impacts from the site releases in wells close to Buildings 48 and 49.

Concentrations of PCP are above the applicable objectives at shallow soil locations around Building 49 (SS-6, SS-7, SS-16, SS-19, and SS-22) when compared to NYSDEC soil cleanup objectives (NYSDEC, 1995). Concentrations of PCP in subsurface soils are above the applicable objective at SB-2 and SB-3, (under and outside of Building 49); at SB-5 and MW-7 (outside of Building 48); at STP-18, STP-19, STP-21, and STP-22 (south of Building 52); at TP-1 at the suspected disposal area along the access road to the shale pit; and at TP 32 and TP-33, north of Building 49. Previous samples analyzed by immunoassay methods showed concentrations above the applicable objective at locations under Buildings 48 and 49, south of Building 50, and in the drum washing area.

The only other SVOC detected above NYSDEC cleanup objective was 2-methylnapthalene at TP-32, located north of Building 49. The VOC compounds acetone, 2-butanone, ethylbenzene, methylene chloride, and xylenes exceeded applicable cleanup objectives at TP-1, and concentrations of toluene exceeded applicable standards at TP-33.

Concentrations of dioxins (as 2,3,7,8-TCDD equivalents) are above the criteria of 1 ug/kg that NYSDEC has used at other sites at surface soil sampling locations SS-12, SS-17, SS-19, and SS-23. Concentrations of dioxins are above this criteria in subsurface soil sampling locations STP-17, STP-19 ,TP-1, TP-3, and MW-7.

Numerous metals were detected in site soils. In most cases concentrations appear to be related to background conditions. Copper and zinc are present at concentrations that may be a result of site activities since the observed concentrations are inconsistent with site background and eastern United States background. Concentrations of zinc in almost all site soil samples exceeded the soil cleanup objective of 20 mg/kg and site background. Concentrations of copper exceeded the cleanup objective of 25 mg/kg and site background at SS-12, SS-19, SS-24, and TP-16. In addition, mercury exceeded the cleanup objective of 0.1 at SS-26 and SS-27. Lead exceeded the average background concentration in rural areas at SS-26.

Concentrations of PCP in groundwater exceeded New York Groundwater Quality Standards (6NYCRR Chapter X Part 703) for total phenols of 1 ug/L at MW-4, MW-6 and MW-7. This standard is based on aesthetics, and does not necessarily imply human health impacts. Concentrations of napthalene also exceeded the Groundwater Quality Standard of 10 ug/L at MW-4 and fuel oil was also detected at 24,000 ug/L. Several other SVOCs exceeded applicable groundwater quality standards at MW-7 including acenapthene, 2,4-dinitrotoluene, 1,4-dichlorobenzene, n-nitroso-di-n-propylamine, pyrene, and 1,2,4-trichlorobenzene. The estimated concentration of 8 ug/L for bis-2-ethylhexyl phthalate at Well 3 also exceeded the applicable groundwater quality standard, although this may be a result of lab contamination.

Concentrations of dioxins and furans exceed the groundwater quality standard of 0.0007 ng/L as 2,3,7,8-TCDD equivalents at MW-3 and MW-4.

Concentrations of iron and manganese exceed the respective groundwater quality standards of 300 ug/L (iron) and 500 ug/L for the total at all sampling locations. This standard is based on aesthetics and may not imply a human health impact. In addition, the samples represent total metals and may not represent actual exposure conditions if groundwater were to be used for drinking water purposes. Sodium also exceeded the groundwater quality standard of 20,000 ug/L at almost all sampling locations. None of these metals appear to be related to site activities and may be related to the geology and typical groundwater conditions in the area of the site.

There is considerable uncertainty about levels of exposure to consumers of game species. Terrestrial game likely to be hunted in this area would include species such as white-tailed deer and turkey. Both species consume vegetation; additionally, turkeys are opportunistic feeders that will also include invertebrates to their diet. PCP, dioxins, and associated compounds are known persistent and bioaccumulative substances in plants and soil-dwelling fauna. There is also the potential for significant bioaccumulation of these compounds in game species through dietary consumption, and therefore, people who ingest these species may likewise be exposed to these contaminants. Further analysis of exposure through this pathway is warranted.

2.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. ATSDR's Toxicological Profiles on CD-ROM, Version 3.1. Chapman & Hall/CRC.

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. ATSDR – ToxFAQs: Dioxin. 2/5/2002. Online document: http://www.atsdr.cdc.gov/tfacts104.html

Howard, P.H. 1991. *Handbook of Environmental Fate and Exposure Data for Organic Chemicals. Vol. III: Pesticides.* Lewis Publ., Inc., Chelsea, MI.

New York State Department of Environmental Conservation (NYSDEC). 1995. *Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels.*

New York State Department of Environmental Conservation (NYSDEC). 1998. *Division of Water Technical and Operational Guidance Series 1.1.1, Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations.*

APPENDIX B

FISH AND WILDLIFE IMPACT ASSESSMENT
STEP IIA

APPENDIX B

STEP IIA FISH AND WILDLIFE IMPACT ANALYSIS
for the
CAMP SUMMIT SITE

NYSDEC Site No. 4-48-006

May 2, 2002

Prepared for:
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7015

TABLE OF CONTENTS:

1.0 STEP II FISH AND WILDLIFE IMPACT ANALYSIS 1
1.1 POTENTIAL RECEPTORS 1
1.2 CHEMICAL MIGRATION 2
1.3 PATHWAYS OF CHEMICAL MOVEMENT AND EXPOSURE 3
1.3.1 Fish Sample Results 4
2.0 CONCLUSIONS 6
3.0 REFERENCES 7

TABLES:

1. Biota Analytical Results

FIGURES:

1. Biota Sampling Locations

1.0 STEP II FISH AND WILDLIFE IMPACT ANALYSIS

Step II of the FWIA is a contaminant specific Impact Assessment that evaluates potential exposure pathways for fish and wildlife resources. This step involves reviewing data concerning fish, wildlife and natural communities on-site, the physical characteristics of the site, and the type and extent of chemical impacts documented at the site. Based on this review, potential affected wildlife receptors and complete pathways of exposure are identified.

Pathways of chemical movement and exposure are determined based on information concerning sources, transport media, chemical-specific environmental fate, exposure points, routes of exposure, and potentially exposed populations. A complete exposure pathway consists of 1) a chemical release from a source, 2) an exposure point where contact with an organism can occur, and 3) a route of exposure (oral, dermal and inhalation) through which the chemical can be taken into the organism.

A small pond is located on-site at Camp Summit and its outlet feeds a tributary of Panther Creek. The outlet is a Class C (fish propagation) stream, and Panther Creek is a Class C (TS) (trout spawning) stream. An NYSDEC Regulated Wetland is located approximately 0.5 miles southeast of the site. The surrounding area is rural, generally consisting of undeveloped forest and farmland. Based on historical information a release of PCP/fuel oil mixture into the pond caused a fish kill and resulted in the closing of the treatment plant. Fish and a turtle were collected for analysis of dioxins from the pond during the Preliminary Investigation. During the Remedial Investigation, trout samples were collected from Panther Creek to assess whether the contaminant migrated into Panther Creek and subsequently impacted fish species that habituate this environment. This report focuses on the results of the most recent fish analyzed as well as historic wildlife tissues analyzed (turtle and fish).

1.1 Potential Receptors

The Camp Summit site supports a variety of common wildlife species. The on-site pond and Panther Creek support a diverse assemblage of aquatic wildlife species. It can be assumed, therefore, that a variety of fish and wildlife (both resident and transient) have the potential to be present on, or adjacent to the site. Potential wildlife receptors at the site include plants, terrestrial wildlife such as insects, birds and mammals, and aquatic wildlife such as benthic invertebrates and fish.

1.2 Chemical Migration

Environmental sampling and analysis have determined that soil, sediment and groundwater at the site have been impacted by past releases from wood processing and treatment practices. Chemicals of potential concern include pentachlorophenol (PCP), chlorinated dioxins and dibenzofurans, and heavy metals such as arsenic, copper and chromium. There is impact in surficial soil at the site, although the greatest impacts were observed in the vicinity of the former treatment building, the former treated lumber storage area and satellite disposal area. Groundwater is impacted in the areas of where treatment activities took place, and there is evidence of site-associated chemicals in sediments of the on-site pond.

Pentachlorophenol has a low water solubility and a strong tendency to adsorb onto soil or sediment particles in the environment. Adsorption to soils and sediments is highly pH-dependent, and is more likely to occur under acidic conditions than under neutral or basic conditions; no adsorption occurs above pH 6.8 (ATSDR 2000; Howard, 1991). Disassociated forms of pentachlorophenol may be rapidly photolyzed by sunlight; PCP may also undergo biodegradation by microorganisms, animals, and plants (Howard, 1991). PCP has an octanol-water partition coefficient (Kow) of 100,000 (Howard, 1991), which indicates that it is lipid-soluble and therefore has a tendency to bioaccumulate in organisms. Bioaccumulation is largely pH-dependent, with considerable variation among species. Bioconcentration factors (BCFs) for PCP are generally under 1,000, but some studies have reported BCFs up to 10,000. Significant biomagnification of PCP in either terrestrial or aquatic foodchains, however, has not been demonstrated (ATSDR, 2000).

Pentachlorophenol products often contain impurities such as chlorophenols, dioxins, and furans. Of particular concern are the chlorinated dibenzo-p-dioxins (CDDs) and dibenzofurans (CDFs). Once released to the environment, these compounds generally adsorb to soil or sediment particles due to their low water solubilities. CDDs and CDFs may undergo degradation through biological action or by photolysis, with a half-life ranging from weeks to months. Photolysis and hydrolysis are generally not significant processes, however, as these compounds persist in the adsorbed phase (USEPA, 2002). Soil or sediment adsorption is highly dependent on pH (Howard, 1991). CDDs are not expected to leach from soil, but some leaching of disassociated forms of the compound may occur, especially at lower pHs (USEPA, 2002). Volatilization from either subsurface soil or water is not expected to be a major transport pathway (ATSDR, 2000). As with PCP and other lipophilic pesticides, CDDs and CDFs tend to bioaccumulate in exposed organisms, with BCFs reported up to approximately 10,000 (Montgomery, 1996). There is ambiguity, however, regarding potential biomagnification of these compounds through the food chain (Kamrin and Rodgers, 1985).

Metals such as arsenic, copper, and chromium are known to be persistent and mobile in soil and water. Heavy metals have also been found to move through the food chain and bioaccumulate in organisms at higher trophic levels (Howard, 1991; Merian, 1991).

Organic humus and soil cover may immobilize organic chemicals detected in subsurface media at the site, thereby limiting direct exposure to fish and wildlife. However, elevated chemical concentrations were found in surficial soils, making them potentially accessible to many species, especially those that either forage on the ground or burrow beneath the ground surface.

Drainage patterns at the site indicate that much of the surface flow moves toward the on-site pond, which suggests that this waterbody may receive some surface water run-off and eroded material from impacted areas of the site following storm events. Sediment data from the on-site pond indicate that chemical migration into this waterbody has occurred through overland flow.

Most of the site is well-vegetated by woody and herbaceous plant species. Vegetation on the site reduces (but does not eliminate) chemical migration via dust emissions, soil erosion, volatilization, and infiltrating precipitation. However, the vegetation can also take up certain compounds such as heavy metals that can then be passed on to wildlife that feed on the foliage and fruit of these plants. Since no sampling of plant tissue has been conducted, it is not known if any of the compounds documented in soil have been taken up by terrestrial or aquatic vegetation. Most of the metals documented on-site are known to be taken up by plants (Howard, 1989; Merian, 1991).

Likewise, the more lipophilic compounds like dioxins may be readily adsorbed by terrestrial or aquatic animals. Studies have demonstrated that tissue levels of TCDD, for example, are directly related to the organism's contact with soil; benthic-dwelling species, filter- or bottom-feeders, or species that live underground, burrow, or groom extensively generally will have the highest body burdens (Kamrin and Rodgers, 1988). This being the case, it is reasonable to assume that these compounds are available to numerous species of fish and wildlife representing all trophic levels.

1.3 Pathways of Chemical Movement and Exposure

Site conditions indicate that: 1) various species of fish and wildlife are likely to be present at and adjacent to the site; 2) compounds that are mobile, persistent, and have the potential to bioaccumulate have been documented on the site; and 3) these compounds exist at or near the surface of soil, and have the potential to be taken up by plants and animals. Therefore, the following pathways of chemical movement and exposure to fish and wildlife are considered possible:

- Dermal contact with chemicals present in the surface soil, groundwater (at seep areas), and sediment;
- Ingestion of chemicals in surface soil, groundwater, sediment, and food sources; and
- Direct uptake of chemicals in soil, sediment, or groundwater by terrestrial and aquatic plants.

Future remedial activities could also result in chemical exposure to terrestrial organisms through the inhalation of volatiles from or direct contact with disturbed soil.

1.3.1 Fish Sample Results

Because 2,3,7,8-TCDD is the most toxic form of dioxin, the USEPA has established factors that equate the toxicity for other dioxin congeners and furans to that of 2,3,7,8-TCDD. Therefore, concentrations of dioxin and furan results will be discussed as the 2,3,7,8-TCDD equivalence, rather than reporting each individual congener.

The 2,3,7,8-TCDD fish concentration data was compared to risk calculations which evaluate possible effects on wildlife through the consumption of fish contained in the NYSDEC's *Division of Fish, Wildlife and Marine Resources Technical Guidance for Screening Contaminated Sediments* which is based on *The Niagra River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife*, A.J. Newell et al.,July 1987, NYSDEC Technical Report 87-3. The criteria listed are 3.0 pg/g (ppt).

A total of 30 trout were collected from three stations along Panther Creek as indicated on **Figure 1** in accordance with the workplan. Fish samples were collected by electroshock sampling methods. For trout measuring less than six (6) inches in length the whole fish was submitted for analysis. For trout larger than six (6) inches the filet was submitted for analysis. Samples collected were sent for the laboratory analysis of dioxins. The analytical results are summarized on **Table 1**.

According to the Preliminary Investigation two fish and a turtle were collected from the on-site pond for dioxin analysis. Two fish possessed a 2,3,7,8-TCDD equivalence of 2.07 ppt and 3.36 ppt. The fat tissue from the turtle had a 2,3,7,8-TCDD equivalence of 48.6 ppt. All three samples were above the 3.0 ppt screening level. Additional fish samples were collected during the Remedial Investigation to determine if fish have been affected beyond the pond.

Dioxins and furans were detected in 18 of the 30 samples analyzed. For the most part, only octachlorodibenzo dioxins (OCDD) were detected, although TCDF and HpCDD were also detected. The maximum concentration detected was 0.00061 pg/g as 2,3,7,8-TCDD equivalents. It is possible that these concentrations are a result of site activities, but may also be related to other sources, as dioxins and furans can be found in fish tissue as a result of non-specific sources. None of the samples collected exceeded the wildlife bioaccumulation criteria of 3.0 ng/g.

2.0 CONCLUSIONS

A Step IIA FWIA was prepared for the Camp Summit site. Chemical impacts have been identified in soil, groundwater, and sediment. Various terrestrial and rivertine ecosystems are found at the site and within the surrounding area. Potential biological receptors include the fish and wildlife species indigenous to the area.

Given the nature of the chemicals present at the site (i.e., dioxins, phenols, PAHs, and heavy metals) and the distribution of impact, complete exposure pathways were identified for terrestrial and aquatic receptors. Aquatic invertebrate tissue analysis was conducted and dioxins were not detected above the appropriate wildlife protection criteria beyond the on-site pond.

3.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. ATSDR's Toxicological Profiles on CD-ROM, Version 3.1. Chapman & Hall/CRC.

Howard, P.H. 1991. *Handbook of Environmental Fate and Exposure Data for Organic Chemicals. Vol. III: Pesticides.* Lewis Publ., Inc., Chelsea, MI.

Kamrin, M.A. and P.W. Rodgers. 1985. *Dioxins in the Environment*. Hemisphere Publishing Corporation, Washington.

Merian, E. 1991. *Metals and their Compounds in the Environment: Occurrence, Analysis and Biological Relevance.* VCH Verlagsgesellschaft mbH. Weinham, Federal Republic of Germany.

Montgomery, J.H. 1996. *Groundwater Chemicals Desk Reference, 2nd Edition.* Lewis Publishers, Boca Raton.

New York State Department of Environmental Conservation (NYSDEC). 1994a. *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites.* Division of Fish and Wildlife, Albany, NY.

New York State Department of Environmental Conservation (NYSDEC). 1994b. *Technical Guidance for Screening Contaminated Sediments.* Division of Fish and Wildlife, Division of Marine Resources, Albany, NY.

United States Environmental Protection Agency. 2002. Technical Drinking Water and Health Contaminant Specific Fact Sheets: Dioxin (2,3,7,8-TCDD). Office of Water online publication: http://www.epa.gov/OGWDW/dwh/t-soc/dioxin.html.

APPENDIX C

REMEDIAL ALTERNATIVE COST ESTIMATES

COST ESTIMATE SUMMARY
ALTERNATIVE 1 - NO ACTION

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: No further action would be taken to address the presence of COPCs at the Site.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES
CAPITAL COSTS (Year 0)					
Site Monitoring					
Groundwater Sampling Labor	40	HR	$65.00	$2,600	
Groundwater Sampling Equipment	1	LS	$400.00	$400	
Groundwater Laboratory Analysis	1	LS	$17,850.00	$17,850	
SUBTOTAL				$20,850	
Scope Contingency	10%			$2,085	
SUBTOTAL				$22,935	
Bid Contingency	5%			$1,043	
SUBTOTAL				$23,978	
Project Management	10%			$2,398	
TOTAL CAPITAL COST				**$26,375**	
O&M COSTS (Year 1-30)					
Site Monitoring					
Groundwater Sampling Labor	40	HR	$65.00	$2,600	annual groundwater monitoring was assumed for cost estimating purposes.
Groundwater Sampling Equipment	1	LS	$400.00	$400	
Groundwater Laboratory Analysis	1	LS	$17,850.00	$17,850	
SUBTOTAL				$20,850	
Scope Contingency	10%			$2,085	
SUBTOTAL				$22,935	
Bid Contingency	5%			$1,043	
SUBTOTAL				$23,978	
Project Management	5%			$1,199	
Technical Support	10%			$2,398	
TOTAL ANNUAL O&M COST				**$27,574**	
TOTAL O&M COST				**$827,224**	
Discount Factor	15.372				
PRESENT VALUE OF TOTAL O&M COST				**$423,882**	
GRAND TOTAL				**$450,257**	

COST ESTIMATE SUMMARY ALTERNATIVE 1 - NO ACTION					
Site: Camp Summit **Location:** Fulton, NY **Phase:** Feasibility Study (-30% - +50%) **Date:** February, 2004	**Description:** No further action would be taken to address the presence of COPCs at the Site.				
DESCRIPTION	**QTY**	**UNIT**	**UNIT COST**	**TOTAL COST**	**NOTES**

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude cost estimate that is expected to be within -30% to +50% of the actual project cost.

Discount Factor = $\frac{(1+i)^n - 1}{i\,(1+i)^n}$ where i = 5% and n = 30 years

A discount rate (i) of 5% was directed by the NYSDEC.

Sources / References:

A Guide to Developing and Documenting Cost Estimates During the Feasibility Study , USEPA, July 2000.
Building Construction Cost Data , RS Means, 2002.
Environmental Cost Data - Unit Price , RS Means, 2002.

COST ESTIMATE SUMMARY
ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: Soil impacts exceeding SCGs would be addressed via the excavation of approximately 12,900 cubic yards of soil. Excavated soil would be transported to a permitted off-site facility for treatment/disposal.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES
CAPITAL COSTS (Year 0)					
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	$58,111.10	$58,112	represents 5% of construction costs, not including transport and disposal
Submittals/Implementation Plans	1	LS	$25,000.00	$25,000	
Temporary Facilities & Utilities	1	LS	$1,500.00	$1,500	
Post-Construction Submittals	1	LS	$25,000.00	$25,000	
SUBTOTAL				$109,612	
Scope Contingency	15%			$16,442	
Site Work					
Demolition of Treatment Building	7,600	SF	$4.23	$32,148	
Grading and Seeding	14,600	SY	$2.11	$30,806	
SUBTOTAL				$62,954	
Scope Contingency	15%			$9,443	
Excavation and Backfilling (assuming no sheeting, shoring, or bracing required)					
Erosion and Sediment Controls	4,500	LF	$3.16	$14,220	
Removal and Crushing of Slab	140	CY	$25.00	$3,500	
Excavation of Soil	12,900	CY	$12.00	$154,800	
Stabilization of Saturated Soil	810	TON	$8.46	$6,853	
Confirmatory Sidewall Samples	105	EA	$560.00	$58,800	
Backfilling w/ Clean Soil & Compaction	13,000	CY	$22.92	$297,960	
SUBTOTAL				$536,133	
Scope Contingency	55%			$294,873	
Dewatering of Excavation					
Trash Pump, 300 GPM	2	EA	$69.16	$139	
Frac Tank, Delivery and Pickup	3	EA	$912.00	$2,736	
Frac Tank Rental	90	DAY	$30.00	$2,700	cost for 3 tanks for 30 days each
Transport & Disposal	1,000,000	GAL	$1.72	$1,720,000	providing no pretreatment required
SUBTOTAL				$1,725,575	
Scope Contingency	35%			$603,951	
Transport & Disposal of Excavated Soils - Hazardous Waste					
Testing of Excavated Fill Samples	926	EA	$560.00	$518,560	1 sample per 22 tons
Transport & Disposal	20,370	TON	$375.00	$7,638,750	providing no pretreatment required
SUBTOTAL				$8,157,310	
Scope Contingency	15%			$1,223,597	
Decontamination					
PPE	90	DAY	$100.00	$9,000	
Equipment	1	LS	$20,000.00	$20,000	
Stormwater Controls	1	LS	$10,000.00	$10,000	
SUBTOTAL				$39,000	
Scope Contingency	15%			$5,850	
SUBTOTAL				$12,784,740	
Bid Contingency	15%			$1,594,588	
SUBTOTAL				$14,379,327	
Project Management	5%			$718,966	
Remedial Design	6%			$862,760	
Construction Management	6%			$862,760	

COST ESTIMATE SUMMARY
ALTERNATIVE 3 - EXCAVATION AND OFF-SITE DISPOSAL

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: Soil impacts exceeding SCGs would be addressed via the excavation of approximately 12,900 cubic yards of soil. Excavated soil would be transported to a permitted off-site facility for treatment/disposal.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES
Institutional Controls	1	LS	$2,000.00	$2,000	
TOTAL CAPITAL COST				**$16,825,813**	
O&M COSTS (Year 1-5)					
Site Monitoring					
Groundwater Sampling Labor	40	HR	$65.00	$2,600	annual groundwater monitoring was assumed for cost estimating purposes.
Groundwater Sampling Equipment	1	LS	$400.00	$400	
Groundwater Laboratory Analysis	1	LS	$17,850.00	$17,850	
SUBTOTAL				$20,850	
Scope Contingency	10%			$2,085	
SUBTOTAL				$22,935	
Bid Contingency	5%			$1,043	
SUBTOTAL				$23,978	
Project Management	5%			$1,199	
Technical Support	10%			$2,398	
TOTAL ANNUAL O&M COST				**$27,574**	
TOTAL O&M COST				**$137,871**	
Discount Factor	15.372				
PRESENT VALUE OF TOTAL O&M COST				**$423,882**	
GRAND TOTAL				**$17,249,695**	

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude cost estimate that is expected to be within -30% to +50% of the actual project cost.

Discount Factor = $\frac{(1+i)^n - 1}{i\,(1+i)^n}$ where i = 5% and n = 30 years

A discount rate (i) of 5% was directed by the NYSDEC.

Sources / References:

A Guide to Developing and Documenting Cost Estimates During the Feasibility Study , USEPA, July 2000.
Building Construction Cost Data , RS Means, 2002.
Environmental Cost Data - Unit Price , RS Means, 2002.

COST ESTIMATE SUMMARY
ALTERNATIVE 4 - EXCAVATION AND ON-SITE CONSOLIDATION WITH LIMITED OFF-SITE DISPOSAL

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: Soil impacts exceeding SCGs would be addressed via the excavation of approximately 12,900 cubic yards of soil. Excavated soil would be managed through a combination of on-site consolidation and off-site disposal.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES
CAPITAL COSTS (Year 0)					
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	$79,016.15	$79,017	represents 5% of construction costs
Submittals/Implementation Plans	1	LS	$15,000.00	$15,000	
Temporary Facilities & Utilities	1	LS	$1,500.00	$1,500	
Post-Construction Submittals	1	LS	$10,000.00	$10,000	
SUBTOTAL				$105,517	
Scope Contingency	15%			$15,828	
Site Work					
Demolition of Treatment Building	7,600	SF	$4.23	$32,148	
Grading and Seeding	196,000	SY	$2.11	$413,560	
SUBTOTAL				$445,708	
Scope Contingency	15%			$66,856	
Excavation and Backfilling (assuming no sheeting, shoring, or bracing required)					
Erosion and Sediment Controls	5,000	LF	$3.16	$15,800	
Removal and Crushing of Slab	140	CY	$25.00	$3,500	
Excavation of Soil	12,900	CY	$12.00	$154,800	
Stabilization of Saturated Soil	810	TON	$8.46	$6,853	
Placement of Soil in Landfill	10,780	CY	$3.97	$42,797	
Confirmatory Sidewall Samples	105	EA	$560.00	$58,800	
Backfilling w/ Clean Soil & Compaction	13,000	CY	$22.92	$297,960	
SUBTOTAL				$580,510	
Scope Contingency	55%			$319,281	
Dewatering of Excavation					
Trash Pump, 300 GPM	2	EA	$69.16	$139	
Frac Tank, Delivery and Pickup	3	EA	$912.00	$2,736	
Frac Tank Rental	90	DAY	$30.00	$2,700	cost for 3 tanks for 30 days each
Transport & Disposal	1,000,000	GAL	$1.72	$1,720,000	providing no pretreatment required
SUBTOTAL				$1,725,575	
Scope Contingency	35%			$603,951	
Multi-Layer Geomembrane Cap					
Vegetative Layer	1,300	CY	$42.98	$55,874	6 inches of topsoil
Drainage Layer	5,200	CY	$42.98	$223,496	24 inches of sand
High Density Polyethylene Liner	7,700	SY	$7.00	$53,900	40 mil
Geosynthetic Clay Liner	7,700	SY	$9.00	$69,300	
SUBTOTAL				$402,570	
Scope Contingency	20%			$80,514	
Transport & Disposal of Excavated Soils - Hazardous Waste					
Testing of Excavated Fill Samples	191	EA	$560.00	$106,960	1 sample per 22 tons
Transport & Disposal	4,200	TON	$555.00	$2,331,000	providing no pretreatment required
SUBTOTAL				$2,437,960	
Scope Contingency	15%			$365,694	
Decontamination					
PPE	90	DAY	$100.00	$9,000	
Equipment	1	LS	$20,000.00	$20,000	
Stormwater Controls	1	LS	$10,000.00	$10,000	

COST ESTIMATE SUMMARY
ALTERNATIVE 4 - EXCAVATION AND ON-SITE CONSOLIDATION WITH LIMITED OFF-SITE DISPOSAL

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: Soil impacts exceeding SCGs would be addressed via the excavation of approximately 12,900 cubic yards of soil. Excavated soil would be managed through a combination of on-site consolidation and off-site disposal.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES
SUBTOTAL				$39,000	
Scope Contingency	15%			$5,850	
SUBTOTAL				$7,194,814	
Bid Contingency	15%			$860,526	
SUBTOTAL				$8,055,340	
Project Management	5%			$402,767	
Remedial Design	8%			$644,427	
Construction Management	6%			$483,320	
Institutional Controls	1	LS	$2,000.00	$2,000	
TOTAL CAPITAL COST				**$9,587,854**	
O&M COSTS (Year 1-30)					
Site Monitoring					
Groundwater Sampling Labor	40	HR	$65.00	$2,600	annual groundwater monitoring was assumed for cost estimating purposes.
Groundwater Sampling Equipment	1	LS	$400.00	$400	
Groundwater Laboratory Analysis	1	LS	$17,850.00	$17,850	
SUBTOTAL				$20,850	
Scope Contingency	10%			$2,085	
Site Maintenance					
Maintenance of Cap	1	LS	$500.00	$500	
SUBTOTAL				$500	
Scope Contingency	10%			$50	
SUBTOTAL				$23,485	
Bid Contingency	5%			$1,068	
SUBTOTAL				$24,553	
Project Management	7%			$1,719	
Technical Support	10%			$2,455	
TOTAL ANNUAL O&M COST				**$28,726**	
TOTAL O&M COST				**$861,793**	
Discount Factor	15.372				
PRESENT VALUE OF TOTAL O&M COST				**$441,596**	
GRAND TOTAL				**$10,029,450**	

COST ESTIMATE SUMMARY
ALTERNATIVE 4 - EXCAVATION AND ON-SITE CONSOLIDATION WITH LIMITED OFF-SITE DISPOSAL

Site: Camp Summit
Location: Fulton, NY
Phase: Feasibility Study (-30% - +50%)
Date: February, 2004

Description: Soil impacts exceeding SCGs would be addressed via the excavation of approximately 12,900 cubic yards of soil. Excavated soil would be managed through a combination of on-site consolidation and off-site disposal.

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL COST	NOTES

The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This is an order-of-magnitude cost estimate that is expected to be within -30% to +50% of the actual project cost.

Discount Factor = $\frac{(1+i)^n - 1}{i\,(1+i)^n}$ where i = 5% and n = 30 years

A discount rate (i) of 5% was directed by the NYSDEC.

Sources / References:

A Guide to Developing and Documenting Cost Estimates During the Feasibility Study , USEPA, July 2000.
Building Construction Cost Data , RS Means, 2002.
Environmental Cost Data - Unit Price , RS Means, 2002.