Soil Gas Investigation Report and Health Risk Assessment for Parcels C, D, F, G, and H, Revision 0

Nevada Environmental Response Trust Site
Henderson, Nevada

Prepared for:
Nevada Environmental Response Trust

Prepared by:
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Soil Gas Investigation Report and Health Risk Assessment for Parcels C, D, F, G, and H, Revision 0

Nevada Environmental Response Trust Site
(Former Tronox LLC Site)
Henderson, Nevada

Nevada Environmental Response Trust (NERT) Representative Certification

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the system(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

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Date: 9/23/13

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Nevada Environmental Response Trust
(Former Tronox LLC Site)
Henderson, Nevada

Responsible Certified Environmental Manager (CEM) for this project

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and, to the best of my knowledge, comply with all applicable federal, state and local statutes, regulations and ordinances.

July 25, 2013

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Acronyms

%	percent
AECOM	AECOM Incorporated
AST	aboveground storage tank
ATSDR	Agency for Toxic Substances and Disease Registry
BCL	Basic Comparison Level
BEC	Basic Environmental Company
bgs	below ground surface
BMI	Black Mountain Industrial
BRC	Basic Remediation Company
Cal/EPA	California Environmental Protection Agency
CEM	Certified Environmental Manager
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIH	Certified Industrial Hygienist (or incident handler?)
CLP	Contract Laboratory Program
Converse	Converse Consultants
COPC	chemical of potential concern
CSM	conceptual site model
CV	coefficient of variation
DQA	data quality assessment
DQI	data quality indicator
DVSR	Data Validation Summary Report
EC	exposure concentration
ECAO	Environmental Criteria and Assessment Office
EDD	Electronic Data Deliverable
ENSR	ENSR Corporation
ENVIRON	ENVIRON International Corporation
EPC	exposure point concentration
ERM-West	ERM-West, Inc.
ESA	Environmental Site Assessment
ETBE	Ethyl tert-butyl ether
ft	feet

GC/MS	gas chromatography/mass spectroscopy
H+A	Hargis & Associates, Inc.
HEAST	Health Effects Assessment Summary Tables
HI	hazard index
HQ	hazard quotient
HRA	Health Risk Assessment
HHRA	Human Health Risk Assessment
IDW	investigation-derived waste
IRIS	Integrated Risk Information System
ITRC	Interstate Technology Regulatory Council
IWF	Interceptor Well Field
J	estimated value
LC/LCD	laboratory control duplicate
LCS	laboratory control standard
LDC	Laboratory Data Consultants, Inc.
LOU	Letter of Understanding
µg/kg	microgram per kilogram
µg/m^3	microgram per cubic meter
µg/L	microgram per liter
m	meters
MDC	minimum detectable concentrations
mph	miles per hour
MS/MSD	matrix spike duplicate
MTBE	Methyl tertiary butyl ether
NAPL	non-aqueous phase liquid
NCEA	National Center for Environmental Assessment
NDEP	Nevada Division of Environmental Protection
NERT	Nevada Environmental Response Trust (the Trust)
Northgate	Northgate Environmental Management, Inc.
NV	Nevada
NYSDOH	New York State Department of Health
OEHHA	Office of Environmental Health Hazard Assessment

Olin	Olin Corporation
OSSM	Olin Chlor Alkali/Stauffer/Syngenta/Montrose
PCE	tetrachloroethene
PPRTV	Provisional Peer Reviewed Toxicity Values
QA	quality assurance
QAPP	Quality Assurance Project Plans
Qal	Quaternary alluvial deposits
QC	quality control
RBC	risk-based concentration
RfC	reference concentration
RME	reasonable maximum exposure
RPD	relative percent difference
Site	Nevada Environmental Response Trust Site
SQL	sample quantitation limits
Study Area	Parcels C, D, F, G, and H
TAME	tert-Amyl methyl ether
TCE	trichloroethene
Tronox	Tronox LLC
Trust	Nevada Environmental Response Trust
U	nondetected
UMCf	Upper Muddy Creek Formation
UR	unit risk
USEPA	US Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

Executive Summary

This report presents the results of the 2013 Soil Gas Investigation and Health Risk Assessment (HRA) for Parcels C, D, F, G, and H (the Study Area) at the Nevada Environmental Response Trust Site in Henderson, Nevada. This Soil Gas HRA was conducted to evaluate potential risks to future workers associated with inhalation of volatile organic compounds (VOCs) in indoor air (the vapor intrusion pathway) and inhalation of VOCs released to outdoor air. The evaluation was based on soil gas data collected in 2008 as part of the Phase B investigation and additional soil gas data collected in March 2013 to address data gaps in the available sampling data. The report also presents a summary of cumulative risks to workers associated with the inhalation pathways evaluated in this report and the soil pathways evaluated in the Soil HRA that was presented in a report prepared by Northgate Environmental Management, Inc., titled *Post-Remediation Screening Health Risk Assessment Report for Parcels C, D, F, G, and H, Revision 2* (Northgate 2013).

All chemicals detected in at least one soil gas sample from 2008 or 2013 were selected as chemicals of potential concern (COPCs) for evaluation in the Soil Gas HRA. As a conservative screening-level approach, noncancer hazard indices (HIs) and cancer risks associated with the inhalation of all 68 detected VOCs (except chloroform) were estimated based on the maximum concentration of each COPC within the Study Area, which as summarized below, resulted in total risk estimates well below levels of concern. For chloroform (the primary contributor to the risk estimates), risks were estimated separately for each parcel. The total cancer risk and HI were then conservatively estimated for the individual Study Area parcels as the sum of (1) the parcel-specific cancer risk and HI for chloroform and (2) the total cancer risk and HI for the remaining COPCs (estimated based on the maximum detected concentration for the Study Area).

Soil Gas HRA

The total cancer risks and noncancer HIs estimated for all chemicals other than chloroform (based on the maximum detected concentrations within the Study Area) were 2.6×10^{-7} and 0.025, respectively, for an indoor commercial/industrial worker, and 4.8×10^{-9} and less than 0.001, respectively, for an outdoor commercial/industrial worker. As shown in Table ES-1, the estimated cancer risks for all chemicals combined for future indoor commercial/industrial workers in Parcels C, D, and F are at the lower end of the target risk range established by the US Environmental Protection Agency (USEPA) of 1×10^{-6} to 1×10^{-4} and below the target risk range in Parcels G and H. The estimated cancer risks were below 1×10^{-6} in all Study Area parcels for future outdoor commercial/industrial workers. For all Study Area parcels, the estimated HIs for future indoor and outdoor commercial/industrial workers were below 1, the level of concern established by the USEPA.

Cancer risks and HIs associated with inhalation of outdoor air were not quantitatively evaluated for a short-term construction worker. However, qualitative consideration of the assumed years of exposure of a construction worker (1 year) as compared with the assumed years of exposure of an outdoor commercial/industrial worker (25 years) indicate that the cancer risk for the construction worker would be approximately 25-fold lower than the risk estimated for the

outdoor commercial/industrial worker. For noncancer endpoints, the estimated HIs for the outdoor commercial/industrial worker provides an upper-bound estimate of the HI for the construction worker.

TABLE ES-1. Cancer Risks and Noncancer Hazards for Inhalation Pathways

Parcel	Indoor Commercial/ Industrial Worker[a]		Outdoor Commercial/ Industrial Worker[b]	
	Cancer Risk	HI	Cancer Risk	HI
Parcel C	**2.4E-06**	0.028	4.8E-08	0.00054
Parcel D	**1.2E-06**	0.026	2.5E-08	0.00052
Parcel F	**1.8E-06**	0.027	3.6E-08	0.00053
Parcel G	3.4E-07	0.025	6.3E-09	0.00049
Parcel H	2.6E-07	0.025	4.8E-09	0.00049

[a] Inhalation of VOCs in indoor air (vapor intrusion)
[b] Inhalation of VOCs in outdoor air

Cumulative Cancer Risk for Soil and VOC Inhalation Pathways

The cumulative cancer risk and noncancer HI for indoor and outdoor commercial/industrial workers were estimated by combining the soil pathway risk and HI from the Soil HRA (Northgate 2013) and the VOC inhalation pathway risk and HI summarized in Table ES-1.[1] As shown in Table ES-2, the cumulative cancer risks are at or below the lower end of the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4} for both indoor and outdoor commercial/industrial workers. The cumulative HIs are below 1 for all Study Area parcels.

For the short-term construction worker, the cumulative cancer risk and HIs were estimated for the soil and VOC inhalation pathways based on the combined results for the outdoor inhalation pathway estimated in this report for the outdoor commercial/industrial worker and for the soil pathways estimated in the Northgate (2013) Soil HRA for a construction worker. The cumulative cancer risks were below the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4} and the cumulative HI was below 1 for all Study Area parcels.

[1] The results will be updated, as appropriate, in the final revision of this HRA following NDEP approval of the *Post-Remediation Screening Health Risk Assessment Report for Parcels C, D, F, G, and H, Revision 2* and approval of this Soil Gas HRA.

TABLE ES-2. Cumulative Cancer Risks and Noncancer Hazards

Parcel	Indoor Commercial/ Industrial Worker[a]		Outdoor Commercial/ Industrial Worker[b]		Construction Worker[b]	
	Cumulative Cancer Risk	Cumulative HI	Cumulative Cancer Risk	Cumulative HI	Cumulative Cancer Risk	Cumulative HI
Parcel C	**2.7E-06**	0.15	**1.1E-06**	0.24	1.8E-07	0.86
Parcel D	**1.6E-06**	0.15	**1.1E-06**	0.24	1.5E-07	0.86
Parcel F	**2.1E-06**	0.15	**1.1E-06**	0.24	1.6E-07	0.86
Parcel G	7.2E-07	0.15	**1.1E-06**	0.24	1.3E-07	0.86
Parcel H	6.4E-07	0.15	**1.1E-06**	0.24	1.3E-07	0.86

[a] Indoor air vapor intrusion and soil ingestion

[b] Inhalation of VOCs and airborne particulates in outdoor air, soil ingestion, and dermal contact with soil

1.0 Introduction

This Soil Gas Investigation Report and Health Risk Assessment (the HRA) has been prepared by ENVIRON International Corporation (ENVIRON) on behalf of the Nevada Environmental Response Trust (the Trust) for Parcels C, D, F, G, and H at the Nevada Environmental Response Trust Site (the Site) located in Henderson, Nevada. For purposes of this HRA, Parcels C, D, F, G, and H are collectively referred to as the Study Area. The HRA was conducted to evaluate potential risks to future workers associated with inhalation of volatile organic compounds (VOCs) in indoor air (the vapor intrusion pathway) and inhalation of VOCs released to outdoor air.

A draft *Site-Wide Soil Gas Human Health Risk Assessment* (2010 Site-Wide HRA), which included an evaluation of soil gas in Parcels C, D, F, G, and H, was prepared by Northgate Environmental Management, Inc. (Northgate) in 2010 (Northgate 2010d). Although the 2010 Site-Wide HRA has not been formally reviewed by the Nevada Division of Environmental Protection (NDEP), in a letter to the Trust dated August 7, 2012, NDEP commented that the soil gas sampling data collected for the 2010 Site-Wide HRA were not adequate to characterize risk when the parcels were evaluated individually (see Comment #12 of NDEP 2012c). In addition, based on a review of figures showing a chloroform plume in shallow groundwater, NDEP noted that the 2008 soil gas samples from the Phase B investigation were collected from locations where results for VOCs would likely be biased low. Finally, NDEP commented that it may be reasonable to use the site-wide soil gas data reported in the 2010 Site-Wide HRA in conjunction with groundwater data to evaluate potential risks for the vapor intrusion pathway.

To respond to these comments, and as proposed in the *Draft Soil Gas Investigation Work Plan for Parcels C, D, F, G, and H* (ENVIRON 2012a), additional soil gas samples were collected in the Study Area in March 2013. This updated HRA for the Study Area, which supersedes the draft 2010 Site-Wide HRA, estimates potential risks to future workers associated with inhalation of VOCs in indoor air (the vapor intrusion pathway) and inhalation of VOCs released to outdoor air.[2] The HRA methodology was presented in the *Soil Gas Investigation and Human Health Risk Assessment Work Plan for Parcels C, D, F, G, and H* (the March 2013 Work Plan) (ENVIRON 2013a), which was approved by NDEP on April 9, 2013 (NDEP 2013d).[3] This HRA follows the methodology presented in the March 2013 Work Plan, but also incorporates revisions proposed in NDEP's April 9, 2013 comments on the March 2013 Work Plan. In addition, the HRA includes data analyses specifically requested by NDEP during a February 21, 2013 teleconference (NDEP 2013c).

[2] The vapor intrusion pathway (also referred to as the indoor air pathway in this report) refers to the migration of volatile chemicals from contaminated groundwater or soil into an overlying building.

[3] The term HRA was used for risk assessments conducted at the Site prior to its transfer to the Trust. For the Trust, all environmental investigations excluding those on the Parcels A, B, C, D, F, G, and H are being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The term human health risk assessment (HHRA) is consistent with terminology under CERCLA and is adopted for risk assessments conducted on behalf of the Trust for the Site, excluding the parcels. The March 2013 Work Plan used the term HHRA, while this report uses the term HRA, since this investigation focuses on the parcels.

The primary objectives of this report are as follows:

- Present the results of the March 2013 soil gas sampling event;
- Evaluate potential risks to workers associated with the vapor intrusion pathway (specifically, inhalation of indoor air) and the inhalation of VOCs in outdoor air; and
- Present cumulative risks to workers associated with both exposures to remediated soils in the Study Area and exposures from the vapor intrusion and outdoor air pathways.[4]

Other risk assessments have been completed or are currently in progress or proposed for the different areas of the Site and/or the different contaminated media. Figure 1 presents a schematic of these HRAs and highlights the specific areas and media addressed in this HRA.

The HRA approach is consistent with risk assessment guidance from the US Environmental Protection Agency (USEPA). Additionally, NDEP guidance and NDEP correspondence applicable to risk assessment, as provided at NDEP's Technical Topics web site (http://ndep.nv.gov/bmi/technical.htm) were followed. Documents that guided the preparation of the Data Validation Summary Report (DVSR) and HRA include the following:

- *Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual (Part A)* (USEPA 1989);
- *Guidance for Data Usability in Risk Assessment (Parts A and B)* (USEPA 1992a,b);
- *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)* (USEPA 2002a);
- *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* (USEPA 2004);
- *Technical and Regulatory Guidance, Vapor Intrusion Pathway: A Practical Guideline* (Interstate Technology & Regulatory Council 2007);
- *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment)* (USEPA 2009a);
- *Statistical Analysis Recommendations for Field Duplicates and Field Splits, BMI Plant Sites and Common Areas Projects, Henderson, Nevada* (NDEP 2008a);
- *Guidance on the Development of Summary Statistic Tables, BMI Plant Sites and Common Area Projects, Henderson, Nevada* (NDEP 2008c);
- *Supplemental Guidance on Data Validation, BMI Plant Sites and Common Areas Projects, Henderson, Nevada* (NDEP 2009);
- *Soil Physical and Chemical Property Measurement and Calculation Guidance, BMI Plant Sites and Common Areas Projects, Henderson, Nevada* (NDEP 2010b);
- *Supplemental Guidance for Assessing Data Usability for Environmental Investigations at the BMI Complex and Common Areas in Henderson, Nevada* (NDEP 2010d);

[4] Risks for soil-related pathways are estimated in the *Post-Remediation Screening Health Risk Assessment for Parcels C, D, F, G, and H* (Northgate Environmental Management, Inc. 2013).

- *Revised Guidance on Qualifying Data due to Blank Contamination for the BMI Complex and Common Areas, Henderson, Nevada* (NDEP 2012a); and
- *Guidance* on *Unified Chemical Electronic Data Deliverable Format, BMI Plant Sites and Common Areas Projects, Henderson, Nevada* (NDEP 2012b).

In addition, as recommended by NDEP (2013d), the following references were considered during the preparation of this HRA:

- *Office of Inspector General's Evaluation Report: Lack of Final Guidance on Vapor Intrusion Impedes Efforts to Address Indoor Air Risks* (USEPA 2009c);
- *Review of the Draft 2002 Subsurface Vapor Intrusion Guidance. Office of Solid Waste and Emergency Response* (USEPA 2010); and
- *EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings* (USEPA 2012a).

1.1 Report Organization

The overall format of the report follows:

- The remainder of Section 1 presents background information on the Site and Study Area, including a brief summary of the ownership and operational history, physical setting, climate, geology, and hydrogeology of the area;
- Section 2 summarizes features and historical uses of the Study Area and summarizes the results of previous soil and groundwater investigations;
- Section 3 presents the field sampling investigation, including a description of sampling methodology, soil gas sampling locations, analytical methods, equipment decontamination, and management of investigation-derived waste;
- Section 4 presents the data usability assessment, the sources of data used in the HRA, and data analyses;
- Section 5 presents the HRA approach, selection of chemicals of potential concern (COPCs); toxicity assessment, equations and input values used to calculate potential exposure for each of the identified COPCs; and the estimated risks and hazard indices associated with potential exposure to the COPCs;
- Section 6 presents the uncertainty analysis, which discusses the relative impact of the primary assumptions used in the HRA;
- Section 7 presents the data quality assessment;
- Section 8 presents the summary and the conclusions of the report; and
- Section 9 lists the references cited in this report.

1.2 Site Background

The approximately 410-acre Site is located within Sections 1, 12, and 13 of Township 22 S, Range 62 E within the Black Mountain Industrial (BMI) Complex in unincorporated Clark County,

Nevada (Figure 2). The BMI Complex (including the Site) is surrounded by the City of Henderson. Parcels C, D, F, G, and H (comprising the Study Area) are generally located towards the Site perimeter, to the north, west, and south (Figure 3). Also within the Site boundaries are Parcels A, B, and E.[5] Parcels A and B have generally been investigated on a timeline separate from environmental investigations of the Study Area and the remainder of the Site (see ENVIRON 2012b, 2013b). Only limited investigations of Parcel E have been conducted due to the continued operation of the Olin Chlor Alkali/Stauffer/Syngenta/Montrose (OSSM) groundwater treatment system (NDEP 2010a).

Tronox LLC (Tronox) currently leases a portion of the Site from the Trust (Figure 3), on which it operates a chemical manufacturing business. The Site is surrounded by several facilities owned and operated by a number of chemical companies (Figure 4).

The Site has been the subject of extensive environmental investigations since the 1970s. In 1994, NDEP identified 69 Letter of Understanding (LOU) Potential Source Areas (NDEP 1994), and in 2005 identified an additional potential source area (NDEP 2005) that was further evaluated during the Phase B 2008 investigation (NDEP 2011). These areas are referred to in this and other reports as LOUs. LOUs within the Study Area are identified in Section 2.

1.3 Climate

The climate of Las Vegas Valley is arid, consisting of mild winters and dry, hot summers. Average annual precipitation as measured in Las Vegas from 1971 to 2000 was 4.49 inches. Precipitation generally occurs during two periods, December through March and July through September. Winter storms generally produce low intensity rainfall over a large area. Summer storms generally produce high intensity rainfall over a smaller area for a short duration. The violent summer thunderstorms account for most of the documented floods in the Las Vegas area. Winds frequently blow from the south or northwest at a mean velocity of approximately 9 miles per hour (mph); however, velocities in excess of 50 mph are not atypical when weather fronts move through the area. During these windy events, dust, sand, and soil at the ground surface can become airborne and may travel several miles. Temperatures can rise to 120°F in the summer, and the average relative humidity is approximately 20%. The mean annual evaporation rate from lake and reservoir surfaces ranges from 60 to 82 inches per year (summarized from Kleinfelder [1993]).

1.4 Geologic and Hydrogeological Setting

The Site is located within Las Vegas Valley, which occupies a topographic and structural basin trending northwest-southeast and extending approximately 55 miles from near Indian Springs on the north to Railroad Pass on the south. The valley is bounded by the Las Vegas Range, Sheep Range, and Desert Range to the north, by Frenchman and Sunrise Mountains to the east, by the McCullough Range and River Mountains to the south and southeast, and the Spring Mountains to the west. The mountain ranges bounding the east, north, and west sides of the valley consist primarily of Paleozoic and Mesozoic sedimentary rocks (limestones, sandstones, siltstones, and fanglomerates), whereas the mountains on the south and southeast consist

[5] Former Parcels I and J (and a portion of Parcel B) were sold and are no longer part of the Site.

primarily of Tertiary volcanic rocks (basalts, rhyolites, andesites, and related rocks) that overlie Precambrian metamorphic and granitic rocks (ENSR Corporation [ENSR] 2007). The Study Area is located on Quaternary alluvial deposits (Qal) that slope north toward Las Vegas Wash. The thickness of the alluvial deposits ranges from less than 1 foot (ft) to more than 50 ft beneath the Site. Soil types identified in on-site soil borings include poorly sorted gravel, silty gravel, poorly sorted sand, well sorted sand, and silty sand (ENSR 2005). The Upper Muddy Creek Formation (UMCf) of Pleistocene age occurs in Las Vegas Valley as valley-fill deposits that are coarse-grained near mountain fronts and become progressively finer-grained toward the center of the valley. Where encountered beneath the Site, the UMCf is composed of at least two thicker units of fine-grained sediments of clay and silt (the first and second fine-grained facies, respectively) interbedded with at least two thinner units of coarse-grained sediments of sand, silt, and gravel (the first and second coarse-grained facies, respectively) (ENSR 2005).

Depth to groundwater ranges from about 25 to 40 ft below ground surface (bgs) across the Study Area and is generally deepest in the southernmost portion of the Site (where Parcel H is located), becoming shallower as it approaches the Las Vegas Wash to the north. The groundwater flow direction at the Site is generally north to north-northwesterly, whereas north of the Site, the direction changes slightly to the north-northeast (ENSR 2005).

A major feature of the alluvial deposits is the stream-deposited sands and gravels that were laid down within paleochannels that were eroded into the surface of the UMCf during infrequent flood runoff periods. These deposits are thickest within the paleochannel boundaries, which are narrow and linear and trend northeastward. The paleochannels (shown on Figure 4) act as preferential pathways for groundwater flow, which may significantly influence the chemical distribution in the alluvium (ENSR 2005). Additional details on the regional and local geology and hydrogeology, including information on the water-bearing zones, are provided in the *Remedial Investigation and Feasibility Study Work Plan* (ENVIRON 2012b) submitted to NDEP on December 17, 2012 and currently under review.

An on-site Interceptor Well Field (IWF) and groundwater barrier wall are shown on Figure 3. The groundwater barrier wall was constructed in 2001 as a physical barrier across the higher concentration portion of an existing perchlorate/chromium plume. The IWF captures the highest concentrations of the groundwater plume located downgradient of on-site source areas. The interceptor wells and barrier wall have significantly decreased chemical concentrations in the alluvium downgradient of the IWF.

2.0 Study Area Description, Historical Uses, and Previous Investigations

This section describes features and historical uses of the Study Area. In addition, results from previous soil and groundwater investigations for VOCs are summarized to support source-area identification for the vapor intrusion and outdoor air pathways conceptual site model (CSM). Specifically, as described in Section 2.6, available information and investigation results indicate that groundwater is the primary source of VOCs in soil gas beneath the Study Area.

The following listing identifies Phase I Environmental Site Assessments (ESAs) and soil investigations completed for the Study Area.

- Phase 1 ESAs: In March 2007, Converse Consultants (Converse) completed a Phase 1 ESA that included the areas occupied by Parcels C, D, F, and H (Converse 2007) and a May 21, 2007 addendum to the Phase 1 ESA that included the area occupied by Parcel G (as reported by Tronox [2007]). As part of the Phase 1 ESA, Converse conducted a site visit and reviewed historical aerial photographs dating from 1950 through 2006. In addition, an earlier Phase 1 was completed in 2005 by Tetra Tech EM Inc. for Parcel F (as reported by Converse [2007]).

- Phase 2 soil investigations: Phase 2 soil sampling plans were prepared for Parcels C and D (Basic Environmental Company [BEC] 2007a), Parcel F (BEC 2007b), Parcel G (BEC 2007c), and Parcel H (BEC 2007d,e) to identify and characterize the distribution of Site-related chemicals based on the findings of the Phase A Investigation (ENSR 2007) in the vicinity of future land-use features (e.g., warehouses, commercial office buildings) and historical site features (e.g., identified for further investigation based on information presented in the Phase 1 ESAs). At most locations, samples were collected at both the ground surface and approximately 10 ft bgs and analyzed for VOCs by USEPA Method SW8260B. At some locations, samples were collected at approximately 5 ft bgs instead of 10 ft bgs.

- Phase 2 supplemental soil investigation: Based on the results of the Phase 2 soil investigations, a supplemental soil investigation was conducted in 2008 to address potential data gaps and to define the aerial extent of detected compounds (BEC 2008a). At most locations, samples were collected at the ground surface and approximately 10, 20, 30, and 40 ft bgs and analyzed for VOCs by USEPA Method SW8260B.

NDEP reviewed and approved the soil sampling work plans identified above (approval dates are provided in Section 9, References) and the resulting DVSRs (ERM-West, Inc [ERM-West] 2008a,b; 2009). It is noted that VOC soil contamination was not the subject of any of the interim soil removals completed within the Study Area following the investigations described above. Specifically, the removals addressed contaminants exceeding remediation goals, i.e., primarily asbestos contamination, as well as elevated levels of dioxins/furans at one location in Parcel C and elevated levels of benzo(a)pyrene at one location in Parcel G (BEC 2008b). Confirmation sampling results indicated that all detected analytes or analyte groups (i.e., asbestos, dioxins,

SVOCs, PCBs, and arsenic) were below their respective NDEP Basic Comparison Levels (BCLs) and met the NDEP target goals for asbestos (Northgate 2012).

LOUs within and upgradient of the Study Area parcels are listed in Table 1 and shown on Figure 5. As shown, NDEP has not specifically identified VOCs as potential contaminants for most LOUs within or immediately upgradient of the Study Area (NDEP 2011). However, it is noted that the initial identification of potential LOU contaminants was based on a review of historical operations and the limited sampling data available at the time of the LOU designations in 1994 (NDEP 1994). Given that the Study Area parcels are situated within the Trust's property, as well as in the vicinity of other BMI companies, it is possible that environmental media within one or more of the parcels could have been indirectly impacted. Further, an operational history for an area that included former use of VOCs does not necessarily mean that environmental media in the area were impacted. While information on operational history was used to inform the soil sampling plans developed for the Study Area, the soil sampling results provide confirmatory evidence for the presence or absence of contamination.

2.1 Parcel C

Parcel C is a 20.4-acre parcel located directly north and adjacent to the former Trade Effluent Settling Ponds (LOU 1). The parcel is entirely vacant land. The Phase 1 ESA reported that sometime prior to 1950, multiple ditches (lined with French drains) oriented north-south were installed across Parcel C, perpendicular to and leading from a main French drain that traversed east-west along the northern berm of the former Trade Effluent Ponds (LOU 1), which were located immediately to the south of Parcel C. The drains were constructed because infiltration from the former, unlined Trade Effluent Ponds resurfaced in Parcel C (Converse 2007). At some point, these ditches were disturbed and possibly graded over (Northgate 2012). Stained soil and gravel and a number of debris piles (reportedly not associated with industrial waste or disposal) were identified based on the review of historical aerial photographs (Converse 2007). No LOUs are located within Parcel C; however, a number of LOUs, including LOUs 1, 2,10, 22, 23, 32, 55, and 58, are located upgradient of Parcel C (Figure 6).

Fifteen soil samples were collected in Parcel C at the surface and at a depth of 10 ft bgs during the Phase 2 soil investigation. With the exception of acetone, a common laboratory contaminant, the following VOCs were detected at low concentrations: chloroform; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; ethylbenzene; isopropylbenzene; methyl ethyl ketone; n-propyl benzene; tetrachloroethylene; toluene; 1,2,3-trichlorobenzene; 1,2,4-trichlorobenzene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; and xylenes. During the Phase 2 supplemental soil investigation, acetone and methyl ethyl ketone were detected in the single surface sample collected in Parcel C; VOCs were not detected in the 10 ft bgs sample from this same location (ERM-West 2009).

2.2 Parcel D

Parcel D is a 24.6-acre parcel located directly north of Parcel C. The entire parcel is vacant land, although the Phase 1 ESA reported that a number of debris piles (reportedly not associated with industrial waste or disposal) were present. A small debris pile from a homeless encampment near Warm Springs Road on the western portion of Parcel D was noted during a site visit conducted by ENVIRON on March 8, 2013. ENVIRON is in the planning process of

removing the debris pile. Southern Nevada Auto Parts (a former Kerr-McGee tenant) operated an auto impound yard where wrecked, police-impounded, and repossessed vehicles were stored. NDEP identified this area as LOU 68. The southern portion of the lease area appeared to have minor soil staining (Kleinfelder 1993). The ditches (French drains) described above for Parcel C extended into and terminated in the eastern two-thirds of Parcel D (Northgate 2012). LOU 6 (the Unnamed Drainage Ditch Segment, also referred to as the Northwest Ditch) extends across Parcel D. The Northwest Ditch, which originated near the Beta Ditch (LOU 5) and crossed the northern portion of the Site (Kleinfelder 1993), conveyed process waste streams from the BMI Complex facilities to the BMI Common Area and was identified under the Phases I and II BMI Common Area Consent Agreement as a BMI Common Areas issue (ENSR 2005; Broadbent & Associates, Inc. 2011).

Seven samples were collected in Parcel D at the surface and at a depth of 10 ft bgs during the Phase 2 soil investigation. Two VOCs (acetone and 1,3-dichlorobenzene) were detected in the same sample at 10 ft bgs, and seven VOCs (acetone; ethylbenzene; n-propyl benzene; toluene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene;,and xylenes) were detected in three surface samples. Of note, VOCs were not detected in samples collected in the Northwest Ditch (LOU 6) (ERM-West 2008a). No additional samples for VOC analysis were collected in Parcel D during the 2008 Phase 2 supplemental soil investigation (ERM-West 2009).

2.3 Parcel F

Parcel F is a 7.2-acre parcel on the western boundary of the Site. Most of the parcel is vacant land, although portions of a building foundation are located within the parcel. In October 2005, Tetra Tech EM Inc. completed a Phase I ESA for Parcel F (as reported by Converse [2007] and Northgate [2012]) that identified an empty steel tank, three 55-gallon drums (no longer present on March 8, 2013), soil and gravel staining, a subsurface storm sewer system (LOU 59), and a painted surface on the interior of a building. The Phase 1 ESA review of historical aerial photographs identified a building present on Parcel F in 1950 that was no longer visible in 2006 (Converse 2007).

LOUs 63, 65c, and a portion of LOU 59 are located in Parcel F. Parcel F was leased from 1980 to 1986 by W.S. Hatch Company, a trucking operation. The area within Parcel F that now comprises LOU 63 was leased by J.B. Kelley (also a trucking operation) from 1986 through at least 1993 (Kleinfelder 1993). The company hauled commodities such as lime and soda ash. The specific areas of interest within LOU 63 included a 10,000-gallon fiberglass diesel underground storage tank (UST), a ceramic-lined 600-gallon waste-oil UST, and a truck washing area with eight open concrete vaults that served as foundations for peat storage buildings during World War II. Rinsate from truck washing was reportedly discharged to the former vault floors, metal containment tanks, a storm sewer, and/or the ground surface. Chemicals identified as being in the rinsate included lime, soda ash, barite, and magnesium chloride brine. VOCs were not specifically identified as being present in the rinsate. On-site wash activities ceased in 1991. Additional fluids from truck maintenance activities, such as oil changes, were reportedly discharged to the storm sewer, which conveyed the wash water and other fluids northward to the Beta Ditch (Kleinfelder 1993). Field investigations of the diesel waste-oil USTs were conducted, and both tanks, which were found to have leaked, were

removed in 1991. Contaminated soil in the tank pits was reportedly excavated at the time of the tank removal (Kleinfelder 1993).

The area identified as LOU 65c was formerly occupied by Nevada Pre-Cast Concrete, which used office space near the J.B. Kelley Site operations from January 1973 to May 1978. As reported by Kleinfelder (1993), Nevada Pre-Cast Concrete used the area only for offices. No waste streams or chemical uses were reported for LOU 65c.

Segments of LOU 59 (the Storm Sewer System) are located in Parcel F. NDEP has not specifically identified VOC contamination as an issue of concern for this LOU (NDEP 2011).

LOUs 4, 25, 26, 27, 28, 41, 60, 65a, 65c, and 65d are upgradient of Parcel F. Historically, VOC use was associated with six of these LOUs (LOUs 4, 28, 41, 65a, 65c, and 65d), while VOC use was not reported for the remaining LOUs (LOUs 25, 26, 27, and 60) (NDEP 2011). In addition, several empty aboveground storage tanks (ASTs) are located upgradient of Parcel F that historically stored sodium chlorate; however, there is no reported history of the tanks leaking. Although the ASTs are at a higher elevation than that of Parcel F, the ASTs are within a bermed and lined containment area designed to hold 110 percent (%) of the contents of the largest tank.

Fifteen soil samples were collected in Parcel F at the surface and at a depth of 10 ft bgs during the 2007 Phase 2 investigation. Of the seven sample locations in LOU 63 (J.B. Kelley Trucking Inc.), acetone was detected at low levels at one sample location at depths of 0 and 10 ft bgs, and methyl ethyl ketone, methyl n-butyl ketone, and 1,2,4-trimethylbenzene were detected at low levels in one surface sample. VOCs were not detected in the one sample location in LOU 65c (Nevada Precast Concrete Products). With the exception of common laboratory contaminants (acetone, methylene chloride, and methyl ethyl ketone), ethylbenzene, 1-nonanal, n-propyl benzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and xylenes were detected at low levels in six other samples in Parcel F, outside of the LOUs (ERM-West 2008a). During the 2008 Phase 2 supplemental investigation, only two VOCs (carbon tetrachloride and chloroform) were detected at 20 and 30 ft bgs, and three VOCs (acetone, methylene chloride, and 1,2,4-trimethylbenzene) were detected at the surface at all three sample locations. All VOCs were detected at low concentrations, except for chloroform which was detected at concentrations of 410 micrograms per kilogram (µg/kg) and 200 µg/kg at depths of 20 and 30 ft bgs at one location. Samples were collected at two of the same sample locations in LOU 63 during the Phase 2 supplemental investigation as in the Phase 2 investigation; acetone, chloroform, and methylene chloride were detected at low concentrations in two samples (ERM-West 2009). No samples were collected in LOU 65c (ERM-West 2009).

2.4 Parcel G

Parcel G is a 2.8-acre parcel on the western side of the Site. The parcel is comprised primarily of vacant land, although a building is located on the northern portion of the parcel, and a utility vault, portions of a rail line, and several drain inlets are also present. The Phase 1 ESA identified staining and some debris, indicating the presence of stormwater evaporative residue as reported by BEC (2007c).

LOUs 59, 60, and 65d are located within Parcel G. Segments of LOUs 59 (the Storm Sewer System) and 60 (the Acid Drain System) are located in the parcel. No waste streams or chemical uses have been identified for LOU 65d. Green Ventures International (LOU 65d) leased a building ("S3 Changehouse") from August 1980 to September 1981 for use as a marketing office by a green farming operation. Only office activities were conducted by Green Ventures International (Kleinfelder 1993). NDEP has not specifically identified VOC contamination as an issue of concern for LOUs 59 and 60, while NDEP identified VOCs as potential contaminants for LOU 65d based on historical operations and limited sampling data (NDEP 2011). Further, no LOUs are located immediately upgradient of Parcel G.

Five soil samples were collected at the surface and a depth of 5 ft bgs in Parcel G during the Phase 2 soil investigation. Acetone, methyl ethyl ketone, toluene, and 1,2,4-trimethylbenzene were detected at low levels in 11 samples at all five sample locations. During the 2008 Phase 2 supplemental investigation, soil samples were collected at the surface and at approximately 10, 20, 30, and 40 ft bgs. Of the 82 VOCs analyzed, three VOCs (carbon tetrachloride, chloroform, and trichloroethene [TCE]) were detected at a depth of 40 ft bgs, and acetone and methylene chloride were detected at low levels at the surface. Chloroform was detected in two samples at two locations at concentrations of 1.5 µg/kg and 110 µg/kg. In the same location of the high chloroform detection, carbon tetrachloride and TCE were also detected. These samples were collected from sample locations within 50 ft to the east and west of LOU 65d (Nevada Precast Concrete Products) (ERM-West 2009).

2.5 Parcel H

Parcel H is a 26-acre parcel in the southern portion of the Site. The parcel is comprised primarily of vacant land that is crossed by dirt roads and drainage channels (Converse 2007). BEC (2007e) and Converse (2007) reported that a pad-mounted transformer (no longer present on March 8, 2013), three debris piles (two of which were no longer present on March 8, 2013), and an abandoned water supply line that served the landscaping area along Lake Mead Parkway are also located within the parcel. BEC (2007e) reported that based on the age of the transformer, it is unlikely that the transformer contained PCBs. (The age of the transformer was not provided by BEC [2007e].) No LOUs were identified within Parcel H.

Nineteen samples were collected at the surface and at a depth of 10 ft bgs in Parcel H during the Phase 2 soil investigation. Acetone, acetonitrile, dichloromethane, toluene, and 1,2,4-trimethylbenzene were detected at low levels in 28 samples at 12 sample locations. Soil samples from Parcel H were not analyzed for VOCs during the Phase 2 supplemental investigation (ERM-West 2009).

2.6 Study Area CSM: Groundwater as the Source of Soil Gas VOCs

Available information and investigation results indicate that the apparent source of VOCs in soil gas beneath the Study Area is groundwater that was historically impacted by on-site and/or off-site releases of VOCs. While VOCs were detected in soil during the Phase 2 investigations described in Sections 2.1 through 2.5, with the exception of common laboratory contaminants (i.e., acetone, methylene chloride, and methyl n-butyl ketone), detected concentrations were generally less than 25 µg/kg in the surface and 10 ft bgs samples. Similarly, during the Phase 2 supplemental investigation, VOCs (other than chloroform and common laboratory contaminants)

were detected at concentrations of less than approximately 5 µg/kg at all depths sampled. At one location in Parcel F, chloroform was detected at relatively high concentrations (i.e., between 200 and 410 µg/kg) at depths of 20 and 30 ft bgs; however, chloroform was not detected in the surface and 10 ft bgs samples from the same location. Chloroform was also detected at a relatively high concentration of 110 µg/kg at 40 ft bgs in Parcel G, but was not detected in the 0, 10, 20, or 30 ft bgs samples from the same location. These results are consistent with groundwater as the source of chloroform (and other VOCs) in soil gas samples.

As discussed in the *Remedial Investigation and Feasibility Study Work Plan* (ENVIRON 2012b), the Olin Corporation (Olin) property to the west of the Site (Figure 4) occupies the location of the former BMI Complex chloralkali production facility. In 1947, manufacturing facilities were constructed to produce pesticides and chlorinated organic compounds. Over time, extensive volumes of process effluents and solid wastes were disposed of in unlined ponds and buried on the Olin property. These wastes contained high levels of TDS, chlorinated VOCs, and phosphoric acid. Prior to 1976, certain process effluents were routed to the Upper and Lower BMI Ponds. Due to the direction of groundwater flow in the region (generally north to northeasterly), a groundwater contaminant plume has migrated onto the Study Area (and other areas of the Site) from the Olin facility, as shown on Figures 6 through 10 in Appendix A and discussed further in Appendix I. Contaminants include VOCs, non-aqueous phase liquid (NAPL), and pesticides.[6] Figures 6 through 10 depict current groundwater concentrations of benzene, chlorobenzene, chloroform, 1,2-dichlorobenzene, and 1,4-dichlorobenzene for areas within and upgradient of Parcels C, D, and F and upgradient of Parcel G. As shown in Table I-2 of Appendix I, maximum groundwater concentrations of benzene, chlorobenzene,1,2-dichlorobenzene, and 1,4-dichlorobenzene (ranging from 1,900 to 80,000 micrograms per liter [µg/L] in 2011) were detected in well AA-BW-04A, located in Parcel C, directly upgradient of the OSSM groundwater treatment system. The maximum groundwater concentration of chloroform (2,000 µg/L in 2010), was detected in well TR-6, located in Parcel F, near the Olin facility. As shown on Figures 6 through 10, these chemicals were either not detected or detected at low concentrations downgradient of the OSSM groundwater treatment system (i.e., within and near Parcel D). The responsible parties for this plume are currently operating a groundwater treatment system and performing groundwater monitoring under NDEP oversight (ENVIRON 2011b). Figure I-1 of Appendix I shows the chloroform concentrations depicted on Figure 8 of Appendix A in addition to the groundwater wells and chloroform concentrations of wells located on or near the Study Area.

[6] Figures 6 through 10 in Appendix A are intended to provide information on upgradient sources and current groundwater concentrations of chemicals consistently detected at elevated concentrations in the shallow and middle zones on the Olin facility and on the western portion of the Site. The Trust does not typically analyze groundwater samples for VOCs or other organic compounds. The data presented in these figures represent our current understanding of groundwater, and all available groundwater data sampled in 2012 were incorporated into these figures as reported by Hargis & Associates, Inc. (H+A) in (H+A 2012, 2013). Therefore, not all groundwater monitoring wells evaluated in this HRA and located on and near the Study Area are shown.

3.0 Field Sampling Investigation

This section summarizes the field sampling investigation conducted on March 7, 8, and 13, 2013.

3.1 Sampling Locations

In NDEP's January 29, 2013 comment letter on the October 2012 Draft Work Plan, NDEP approved the field work, including collection of the nine sampling locations that had been identified. The field work was also discussed in a February 21, 2013 teleconference (NDEP 2013c), and the approved field work was implemented the week of March 4, 2013. Although NDEP had suggested collecting four additional samples if the parcels were to be evaluated individually (NDEP 2013d), these additional samples were not collected given that the original nine sample locations were intentionally biased and had been placed in areas of higher predicted chloroform concentrations in shallow groundwater.

As described in the March 2013 Work Plan, a total of 9 soil gas samples were collected as part of the 2013 soil gas investigation from a depth of 5 ft bgs (2 in Parcel C, 2 in Parcel D, 3 in Parcel F, 2 in Parcel G, and none in Parcel H), as listed in Table 2 and shown on Figure 6. Also shown on Figure 6 are an additional 32 soil gas sample locations within and near the Study Area collected as part of the Phase B investigation in 2008 (ENSR 2008a) that were used for conducting the HRA, spatial, or other related analyses.

The following factors were considered in identifying the 2013 soil gas sampling locations: (1) chloroform concentrations in shallow groundwater beneath and upgradient of the Study Area parcels, (2) direction of groundwater flow, (3) LOUs at which VOCs may have been used, and (4) VOC results for soil samples collected within the Study Area parcels. The locations of paleochannels, the Olin extraction well field, and the IWF (shown on Figure 3) were also considered. Additionally, several soil gas samples were located near groundwater wells analyzed for VOCs during the Phase B investigation or by the former Montrose Chemical Corporation of California and by Stauffer Management Company LLC/Syngenta Crop Protection, Inc. facilities and current Olin facility (located to the west of the Site). The purpose of locating soil gas samples near groundwater monitoring wells was to investigate the correlation between soil gas and underlying groundwater concentrations, as recommended by NDEP (NDEP 2012c, 2013b).

Figure 6 also shows (1) the locations of shallow groundwater wells sampled for VOCs (identified from NDEP's regional database,[7] the Phase A Investigation [ENSR 2007], and the Phase B Groundwater Investigation [Northgate 2010a]), (2) LOUs within and upgradient of the Study Area parcels as discussed in Section 2, (3) the locations of soil property samples used for fate and transport modeling as discussed further in Section 5.2.3.1, and (4) chloroform concentrations in shallow groundwater, based on results from the Phase A and B Groundwater Investigations and data obtained from NDEP's regional database. The chloroform plume map was developed by Northgate, as presented in Northgate (2010d).

[7] The NDEP regional database is available at: http://ndep.neptuneinc.org/ndep_gisdt/home/index.xml.

3.2 Sampling Methodology

Nine soil gas samples (E-SG-1 through E-SG-9) were collected at the locations shown on Figure 6. All probes were installed at a depth of five ft bgs and using all new materials as specified in the March 2013 Work Plan (ENVIRON 2013a) and shown in Tables B-1 and B-2 of Appendix B. Probes were installed using direct-push tooling as described in the March 2013 Work Plan and no adjustments of probe depth were required during installation. Sampling was conducted in accordance with the March 2013 Work Plan.

Prior to sampling and as part of the leak-check procedure, a shut-in test was performed at each location to confirm the air-tightness of the sampling train. All shut-in tests were completed successfully. In addition, helium gas was used as a leak check compound during purging and sampling. Shroud concentrations ranged from 20.0% to 34.7% and averaged 28.7%. Helium was not detected in the probes with the exception of probe E-SG-1 (2.85%) and E-SG-3 (0.5%); however, the laboratory detections for these samples were 0.0067% and 0.0082%, respectively, so the field detections do not appear to have impacted the samples. Helium detections are shown in Table B-3. Once connections were checked, soil gas was withdrawn from the Teflon® tubing using an evacuated purge Summa™ canister connected via a shut-off valve. The first three dead volumes of soil gas were discarded to purge the sample tubing, sand pack, and void space of the dry bentonite in the annular space.

After purging, the soil gas sample was collected in a 1-liter Summa™ canister while monitoring the fill time and the in-line vacuum gauge. The sample fill time and initial and final vacuums were recorded in the field notes. Following sampling, the tubing was pulled from the ground and the surface patched to match surroundings.

ENVIRON was present during drilling and maintained a log of the borings, made observations of the work area conditions, conducted health and safety monitoring of possible organic vapors encountered during drilling, screened and logged soil cores, directed the installation of the soil probes, performed leak testing, and collected and maintained custody of soil gas and field quality control (QC) samples. Field QC samples for this investigation consisted of one duplicate soil gas sample collected at the same time as primary samples using a T-fitting, and one trip blank sample per sample shipment to the lab. Replicate sampling was not performed.

3.3 Sample Handling and Chain-of-Custody

Each lot of sampling containers was certified as contaminant-free by the laboratory. Samples were collected, handled, and stored in such a manner that they were representative of their original condition and chemical composition. Summa™ canisters and sample trains identified as having leaks or being incapable of holding a vacuum were not used during sampling and were returned to the lab and identified as unused due to leaks.

Identification of samples and maintenance of custody are important elements and were utilized to ensure samples characterize site conditions. All samples were properly identified and maintained under chain-of-custody protocol to protect sample integrity as described in the March 2013 Work Plan.

As the samples were shipped to the laboratory, the original chain-of-custody relinquishing the samples was sealed inside a plastic bag within the shipping box and the box was sealed by the last person listed on the chain-of-custody. US Department of Transportation shipping requirements were followed and the sample shipping receipt was retained in the project files as part of the permanent chain-of-custody document. The shipping company (Federal Express) did not sign the chain-of-custody forms as a receiver; instead the laboratory signed as a receiver when the samples were received.

3.4 Analytical Testing

The soil gas and associated QC samples were submitted to McCampbell Analytical, Inc., a qualified licensed analytical laboratory, under chain-of-custody protocol for analysis of VOCs by USEPA Method TO-15 and helium on a standard 5-day turn-around time. The laboratory's ability to achieve sample quantitation limits (SQLs) that are below concentrations corresponding to either a cancer risk level of1×10^{-6} for carcinogens or a hazard quotient (HQ) of 1 for non-carcinogens was confirmed prior to sampling and shown in Table 3.

3.5 Equipment Decontamination

Prior to mobilizing the direct-push rig to the Study Area, the rig and all associated equipment were cleaned with a high-pressure, steam washer to remove any oil, grease, mud, tar, and other foreign matter. In order to minimize the potential for cross-contamination, equipment used during the field investigation (including all non-dedicated sampling equipment) was decontaminated between uses at each sampling location. Decontamination consisted of a detergent wash (Alconox) followed by a clean water wash, and finally a clean water rinse.

Sample containers, soil gas manifolds, and critical orifice flow controllers with integral particulate filters are dedicated sampling equipment and were received as certified-clean from the laboratory. Materials used for probe construction (tubing, filters, and fittings) were purchased new and not reused.

3.6 Management of Investigation-Derived Waste

Solid investigation-derived waste (IDW) was collected in a 5-gallon bucket that was labeled and sealed following completion of field activities. Liquid waste created during decontamination was collected in a 5-gallon bucket and was drained into the GW-11 pond for treatment. Each container was marked with water-proof labels and water-proof markers. Following characterization, each container of material will be disposed of as appropriate per federal, state and local requirements.

4.0 Data Evaluation

This section describes the sources and types of data that are considered in the HRA as well as the data evaluation process.

4.1 Data Usability

The primary objective of the data usability evaluation is to identify appropriate data for use in the HRA. All relevant site characterization data were evaluated in accordance with the NDEP *Supplemental Guidance for Assessing Data Usability for Environmental Investigations at the BMI Facility in Henderson, NV* (NDEP 2010d), which is based on USEPA's *Guidance for Data Usability in Risk Assessment* (Parts A and B) (USEPA 1992a,b).

The USEPA data usability evaluation framework provides the basis for identifying and evaluating uncertainties in HRAs with regard to site characterization data. USEPA (1992a) states that "data usability is the process of assuring or determining that the quality of data generated meets the intended use," and that when risk assessment is the intended use, USEPA's guidance "provide[s] direction for planning and assessing analytical data collection activities for the HRA…" USEPA has established a specific guidance framework to provide risk assessors with a consistent basis for making decisions about the minimum quality and quantity of environmental analytical data sufficient to support risk assessment decisions (USEPA 1992a,b; NDEP 2010d). The USEPA data usability guidance provides the following explicit set of data quality criteria that are used to evaluate the usability of site characterization data in the risk assessment process:

- Reports to Risk Assessor;
- Documentation;
- Data Sources;
- Analytical Methods and Detection Limits;
- Data Review; and
- Data Quality Indicators.

An evaluation of the data relative to these criteria is presented in the following sections.

4.1.1 Criterion I – Reports to Risk Assessor

The usability analysis of the site characterization data requires the availability of sufficient data for review. The required information is available from the following documentation associated with the site data and data collection efforts:

- A detailed property description is provided in the March 2013 Work Plan (ENVIRON 2013a) and in Sections 1 and 2 of this report. Information on the regional and local geology, hydrogeology, and historical industrial operations is provided in the Site *Remedial Investigation and Feasibility Study Work Plan* (ENVIRON 2012b).

- A site map with 2008 and 2013 soil gas sample locations is provided as Figure 6 in this report. Because all soil gas samples were collected from a depth of 5 ft bgs, this information is not provided on the map.

- The sampling design, rationale, and procedures for the 2008 and 2013 sampling events are provided in the 2008 Work Plan (ENSR 2008a) and the March 2013 Work Plan (ENVIRON 2013a), respectively.

- The laboratory provided a quality assurance/quality control (QA/QC) narrative with each analytical data package, and the data review provides a narrative of qualified analytical results. A description of the analytical methods, including analytical preparation, extraction, determination methods, and detection limits, are provided. These narratives are included as part of the DVSR for the 2013 soil gas data (included as Appendix C-1) and the Revised DVSR for the 2008 soil gas data (included as Appendix C-2).

- Soil gas data collected on March 7, 8, and 13, 2013 are presented in the Electronic Data Deliverable (EDD) (attached as Appendix D). The EDD includes an Access© compatible data file (on the report CD) containing the analytical results. Validation of laboratory data was completed on April 24, 2013. The 2013 DVSR (attached as Appendix C-1) was prepared in accordance with NDEP guidance (NDEP 2008b, 2009, 2012a,c). Soil gas data collected during the 2008 investigation are presented in an Access© compatible database in the *Revised DVSR, Phase B Source Area Investigation Soil Gas Survey* (2008 DVSR) (ENSR 2008d, attached as Appendix C-2), and approved by NDEP on October 20, 2008.[8] Both sets of soil gas data results are provided on a per-sample basis, qualified for analytical limitations and error, and accompanied by SQLs.

- Method-specific QC results are provided in each laboratory report, along with associated raw data. The laboratory reports and QC results are included as part of the 2013 DVSR (Appendix C-1) and the 2008 DVSR (Appendix C-2).

- Data flags used by the laboratories were defined and described adequately in the 2008 and 2013 DVSRs (Section 1.0 of Appendix C-1 and Table E-1 of Appendix C-2). The qualification findings are summarized in Section 4.1.5.

- Laboratory reports for the 2008 data set are included in the 2008 DVSR in Appendix C-2, and laboratory reports for the 2013 data set are included in Appendix E. Laboratory reports include the name and address of the laboratory, unique identification of the test report, client and project name, and dates of sample receipt and analysis. Each analytical report describes the analytical method used, and provides results on a sample-by-sample basis along with SQLs, method detection limits, reporting limits, gas chromatography/mass spectroscopy (GC/MS) tuning, initial and continuing calibrations, method and canister blanks, surrogate spike recoveries, internal standard results,

[8] The soil gas data presented in the 2008 DVSR (ENSR 2008b) included data collected across the entire Site. The 2008 data discussed in this section only includes the soil gas samples collected in or near the Study Area and evaluated in this HRA.

laboratory control samples, field duplicate results, laboratory duplicate results, target compound identification and dilution factors. Reported sample analysis results were imported into the project database. Units of measurement are identified and a narrative that describes the effect that any noncompliance with work plan and laboratory QA/QC has on the sample results along with the name(s) and function(s) is included. Signature(s) authorizing the report along with a date of issue are also provided.

- Field conditions are discussed in Section 3.2 and associated field data, including soil gas probe construction details, soil gas purging and sampling, and soil gas probe leak checking are provided in Appendix B. Physical parameter data for site-specific soil property determination are discussed in Section 5.2.3.1 and provided in Table 4 of this report. Additionally, boring logs used to determine the soil layer present in the Study Area are provided in Appendix F.

The DVSRs, accompanying lab reports, 2008 Work Plan (ENSR 2008c), and the March 2013 Work Plan (ENVIRON 2013a) are considered complete for HRA purposes.

4.1.2 Criterion II – Documentation

The objective of the documentation review is to ensure that the analytical results provided are associated with a specific sample location and appropriate collection procedure, using available documentation. For the purposes of this data usability analysis, the chain-of-custody forms prepared in the field were reviewed and compared to the analytical data results provided by the laboratory to ensure completeness of the data set. Based on the documentation review, all samples analyzed by the laboratory were correlated to the correct geographic location at the property. All 2008 and 2013 soil gas locations were surveyed as described in BRC SOP-10 (ERM-West and MWH 2008). Reviewed reports provide adequate information regarding sample results relative to location, time of sampling and analysis, and sampling procedures. A comprehensive sample location figure of soil gas samples used for conducting the HRA (Figure 7) and associated data summary tables (Tables 7 and 8) are included.

4.1.3 Criterion III – Data Sources

The review of data sources is performed to ensure that the analytical techniques are appropriate to identify COPCs for evaluation in the HRA; that appropriate analytical methods have been used; and that adequate sample coverage of source areas has been obtained.

The data are used in this report for two primary purposes: (1) to evaluate soil gas results relative to the Study Area CSM (Figure 8), and (2) to characterize potential risks to human health associated with the vapor intrusion and outdoor air pathways. Additionally, field measurement data including depth to groundwater for each parcel, soil type, dry bulk density, grain density, soil total porosity, and volumetric water content are provided in the March 2013 Work Plan and in Section 5.2.3.1 of this report.

Available data used in the HRA included:

- Historical soil gas samples from the Phase B Site-Wide Soil Gas Survey that were collected in or near the Study Area and analyzed for VOCs by USEPA Method TO-15; and
- Nine additional soil gas samples collected in the Study Area during March 2013 and analyzed for VOCs by USEPA Method TO-15.

Figure 6 demonstrates that samples collected in accordance with the 2008 Work Plan were placed within LOUs where VOCs may have been used in historical operations, located to evaluate potential on-site and western off-site boundary groundwater plumes, and also selected randomly throughout the Site to obtain overall coverage as well as co-locate near groundwater monitoring wells. Samples collected in 2013 were biased in order to adequately cover locations not previously sampled in 2008 where the maximum chloroform locations were likely to occur based on the underlying chloroform plume (Northgate 2010d). Therefore, sample coverage was adequate for purposes of this HRA. Analytical techniques were appropriate to identify the broad spectrum of VOCs in soil gas for each parcel within the Study Area. Based on the sample locations and results, and the Study Area CSM, the data were deemed representative to evaluate Study Area conditions.

4.1.4 Criterion IV – Analytical Methods and Detection Limits

In addition to the appropriateness of the analytical techniques evaluated as part of Criterion III, the SQLs or minimum detectable concentrations (MDCs) were evaluated to confirm that they were sufficiently low for risk characterization. As presented in the 2008 (ENSR 2008a) and March 2013 (ENVIRON 2013a) Work Plans, the soil gas samples and QC samples collected in 2008 and 2013 were analyzed for VOCs by a routine analytical method, USEPA Method TO-15. Because NDEP has not derived BCLs for soil gas, the maximum SQLs from the 2008 and 2013 data sets for each soil gas analyte not detected were compared to 10% of the concentrations corresponding to either a cancer risk level of 1×10^{-6} for carcinogens or an HQ of 1 for non-carcinogens (referred to as the risk-based concentration [RBC]) as shown in Table 5. Based on this comparison, no chemicals had maximum SQLs greater than 10% of its RBC. SQLs were confirmed to be adequate for risk assessment applications.

4.1.5 Criterion V – Data Review

The laboratory results for the March 2013 soil gas investigation and the 2008 Phase B Source Area Soil Gas Survey were subjected to formal data validation consistent with (1) USEPA guidance on data validation (USEPA 1999, 2001, 2008, 2009b), (2) the BMI Plant Site Specific Supplemental Guidance on Data Validation from NDEP (NDEP 2009), and (3) BRC SOP 40 and Data Review/Validation (BRC 2009). The specific data validation procedures for the 2008 and 2013 data are summarized in the following paragraphs.

The 2008 and 2013 data from the laboratory were submitted to Exponent and ENVIRON, respectively, as Contract Laboratory Program (CLP)-like data packages in PDF format and EQuIS® format electronic data deliverables (EDDs). The EDDs were imported into an EQuIS® database specifically created for this project. ENSR and Laboratory Data Consultants, Inc. (LDC) validated the data using the PDF data packages plus EDDs and subsequently entered the validation qualifiers into the database. Soil gas results from 2008 were compared to the

goals established in the Quality Assurance Project Plans (QAPP) (ENSR 2008b) and the soil gas results from 2013 were compared to goals established in the QAPP (AECOM Incorporated [AECOM] and Northgate 2009).

The quality of the 2008 analytical results was reviewed by Renee Kalmes, CIH, and Gregory Brorby, DABT, of Exponent, and the quality of the 2013 analytical results was reviewed by Andrew Kong, Senior Chemist, of LDC. As part of the 2008 DVSR, individual validation memoranda were developed for batches of soil gas samples (ENSR 2008d). Attachment B of the 2008 DVSR (Appendix C-2) presents these documents. Exponent reviewed the ENSR validation memoranda from the 2008 DVSR and ENVIRON reviewed the 2013 DVSR, both of which reported on the verification and examination of the following data elements:

- Data package completeness;
- Holding times;
- Initial and continuing calibrations;
- Method blanks/canister blanks;
- Surrogate spike recoveries;
- Internal standard results;
- Laboratory control sample results;
- Field duplicate results;
- Laboratory duplicate results;
- Quantitation limits and sample results; and
- Helium trace gas concentrations.

Attachments A through D of Appendix C-1 summarize the qualifications findings as presented in the 2013 DVSR with regard to calibrations, field duplications, quantitation problems, and blank contamination, respectively. Tables E-4 through E-9 in Appendix C-2 summarize the qualification findings as presented in the 2008 DVSR (ENSR 2008d) with regard to blank contamination, calibrations, field duplications, quantitation problems, and helium tracer results. Use of J-qualified data is not expected to have a substantial impact on the overall conclusions of the report, and all J-qualified data were considered usable and were retained for purposes of the HRA.

4.1.6 Criterion VI – Data Quality Indicators

Data quality indicators (DQIs) are used to verify that sampling and analytical systems as they relate to uncertainties in selection of COPCs, characterization of exposure concentrations (ECs), and risk descriptors used in support of project activities are addressed and that the quality of the data generated is appropriate for making decisions affecting future activities. The

DQIs include completeness, comparability, representativeness, precision, and accuracy. The QAPPs (ENSR 2008b, AECOM and Northgate 2009), which provide the definitions and specific criteria for assessing DQIs using field and laboratory QC samples, are the basis for determining the overall quality of the data set.

4.1.6.1 Completeness

Completeness is measured by the total number of acceptable data points and total number of samples collected by source area and exposure area. Field completeness is defined as the percentage of samples actually collected versus those intended to be collected as specified in the sampling design. Laboratory completeness is defined as the percentage of valid data points versus the total expected from the laboratory analyses.

The field completeness goal stated in the 2008 and 2009 QAPPs was greater than 90%. For both 2008 and 2013 data sets, the actual field completeness was 100%, exceeding the goals established for the 2008 (ENSR 2008b) and 2013 (AECOM and Northgate 2009) soil gas sampling. This field completeness calculation is based on the total sample locations scheduled in the 2008 and 2013 Work Plans compared to the chain-of-custody requests sent to the laboratories. All chain-of-custody requests were faithfully executed by the laboratories, with minor exceptions detailed in the data validation memoranda.

The goals stated in the 2008 and 2009 QAPPs were greater than 95% laboratory completeness. Actual laboratory completeness for the 2008 and 2013 data sets was 100% on the basis of sample analysis (i.e., all requested analyses were performed and reported by the laboratories), and 99% completeness for 2008 soil gas samples and 100% completeness for 2013 soil gas samples based on valid data.

4.1.6.2 Comparability

Comparability is a qualitative characteristic expressing the confidence with which one data set can be combined with another for purposes of estimating exposure. Comparability is a qualitative expression of the measure of confidence that two or more data sets may contribute to a common analysis. In general, comparability of data was maximized by using standard methods for sampling and analysis, reporting data, and data validation over the 2008 and 2013 sampling programs. Samples were collected from 5 ft bgs, and helium was used as a liquid tracer gas as a means of checking for leaks during collection of soil gas samples in both 2008 and 2013 sampling programs. USEPA Method TO-15 was used in both sampling programs and the majority of chemicals analyzed were the same. The 2008 and 2013 sample results were reported in the same units of measure (micrograms per cubic meter [$\mu g/m^3$]). Additionally, the same sample preservation, extraction, and preparation techniques were used and similar site conditions existed during the 2008 and 2013 sampling programs. In many cases, the SQLs were over 2 to approximately 30-fold lower in the 2013 data set than in the 2008 data set since the Low-Level USEPA Method TO-15 was used in 2013 to ensure that the SQLs were sufficiently low as shown in Table 3. However, because maximum detected concentrations were used in the HRA, the range in detection limits does not affect the results of the HRA.

4.1.6.3 Representativeness

Representativeness is the degree to which data accurately and precisely represent a characteristic of the population at a sampling point or an environmental condition. There is no standard method or formula for evaluating representativeness, which is a qualitative term. Representativeness is achieved through selection of sampling locations that are appropriate relative to the objective of the specific sampling task, and by collection of an adequate number of samples from relevant types of locations.

As previously discussed in Section 4.1.3, soil gas locations were placed at LOUs where VOCs may have been used in past operations in the 2008 sampling. Soil gas locations were also selected to evaluate potential on-site and trespassing (western site boundary) groundwater plumes, while other locations were spread randomly throughout the Site to obtain overall coverage. Additionally, some soil gas locations were co-located near groundwater monitoring wells.

As noted in Section 3.1, 2013 soil gas locations were selected based on the following factors: (1) chloroform concentrations in shallow groundwater beneath and upgradient of the Study Area parcels, (2) direction of groundwater flow, (3) LOUs at which VOCs may have been used, and (4) VOC results for soil samples collected within the Study Area parcels. Additionally, several soil gas samples were located near groundwater wells analyzed for VOCs to investigate the correlation between soil gas and underlying groundwater concentrations. Overall, for each parcel within the Study Area, at least one soil gas sample was located over the locations of the highest VOC concentrations in the underlying groundwater plume, consistent with the project objective of sampling within areas of highest anticipated soil gas concentrations. Collectively, the combined 2008 and 2013 data sets are representative of source terms, the Study Area, and the individual parcels.

The possible entrainment of contaminants and dilution of surface air could impact the representativeness of the soil gas samples. Helium, which was used as a tracer gas in both the 2008 and 2013 sampling programs, was detected at concentrations greater than 1% of that detected in the shroud at one location (SG17) in the 2008 data set and one location in the 2013 data set (E-SG-6). In the 2008 sampling program, if the helium concentration was between 1% and 10% of the shroud average, then the USEPA TO-15 VOC results were qualified as estimated (J) based on the possible contamination and dilution by surface air. If the helium concentration exceeded 10% of the shroud average, then the results were rejected (R). This rule was based on a conservative interpretation of the Interstate Technology Regulatory Council (ITRC) document *Vapor Intrusion Pathway: A Practical Guideline* (ITRC 2007) and the New York State Department of Health (NYSDOH) document *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH 2006). One sample data set (71 results) were qualified as estimated based on these criteria in 2008, and no sample results were rejected in the 2008 data set used in the HRA. In the 2013 data set, ten sample data sets (650 results) were qualified as detected or nondetected (U) estimated values (J) due to the presence of helium in ten samples; no samples were rejected. It is noted that in nine of the ten samples, the helium concentration was equal to or less than 0.25% of the shroud average. In summary, data from only a single location (SG17B) in 2008 and from seven locations in 2013 as shown in Table B-3 in Appendix B were potentially impacted by surface air contamination/dilution. Since

the helium results are less than 10% of the shroud levels, and in most cases less than 0.25% of the shroud levels, the assumptions used for data qualification based on helium tracer results were conservative and the data quality is not significantly impacted.

All 2008 and 2013 soil gas samples were analyzed within the method-specified holding time of 30 days, and sample preservation and sample integrity criteria were met. Method blanks, trip blanks, and equipment blanks were analyzed to evaluate representativeness. The concentration for an individual target compound in any of the QA/QC blanks was used for data qualification. Low levels of common laboratory contaminants were detected in some method blanks in 2008, and no data were qualified due to contaminants detected in method blanks in 2013. As a result of contamination found in method blanks in 2008, six results from SG16 and SG19 were negated (U) as described further in Appendix C-2. Due to contamination found in the trip blanks in 2013, 13 results were qualified as estimated (J). No target compounds were detected in equipment blanks in 2008. Fourteen results were qualified due to contaminants found in equipment blanks in 2013. The affected compounds in the trip blanks and equipment blanks did not include three of the four primary risk contributors, (i.e., chloroform, 1,2-dichloroethane, and TCE). As a result of contamination found in the equipment blanks, one result analyzed for one of the primary risk contributors, carbon tetrachloride, was qualified (J). The qualified results due to contamination in the method, trip, and equipment blanks are discussed further in the 2013 (Appendix C-1) and 2008 DVSRs (Appendix C-2).

4.1.6.4 Precision

Precision is a measure of the degree of agreement between replicate measurements of the same source or sample. Precision is expressed by the relative percent difference (RPD) between replicate measurements. Replicate measurements can be made on the same sample or on two samples from the same source. Field precision for the Study Area samples was assessed by evaluating the field duplicate results.

Field duplicate samples were collected at ten locations (SG26, SG28, SG40, SG41, SG51, SG53, SG56, SG65, and SG83) in 2008 and from one location (E-SG-6) in 2013 as specified in the 2008 and March 2013 Work Plans, respectively. (In 2008, none of the field duplicate samples were collected from locations in or near the Study Area). The field duplicate samples were evaluated for acceptable precision with RPDs or difference in instances where the results were less than five times the reporting limit for the compounds. In the 2008 sampling event, 84 sample result values in nine primary sample/field duplicate pairs were qualified as estimated values (J); 40 sample result values in one primary sample/field duplicate pair were similarly qualified in 2013. All qualified field duplicates are presented in the associated 2013 DVSR and 2008 DVSR tables (Attachment B of Appendix C-1 and Table E-6 of Appendix C-2). Since field duplicate samples were not collected from locations in or near the Study Area in 2008, the 2008 data set does not have any qualified data due to RPD exceedances. In the 2013 data set, three of the four primary risk contributors (i.e., chloroform, carbon tetrachloride, and TCE) either showed RPD values below the established objective of less than or equal to 50% or differences within the acceptance criteria. One of the primary risk contributors, 1,2-dichloroethane, had differences outside the acceptance criteria as discussed in Appendix C-1; however, both primary and duplicate sample results were less than 1 $\mu g/m^3$.

Laboratory precision was assessed through the RPD results for matrix duplicates. In the 2008 data set, laboratory duplicates were performed on seven samples. (One of the seven laboratory duplicates was performed on a sample associated with a location near the Study Area [SG68] as shown on Figure 6). The laboratory duplicate precision was acceptable in both 2008 and 2013 sampling programs and no results were qualified during validation.

Sampling and analytical precision were quantitated for each laboratory data batch using data for laboratory control versus laboratory control duplicate (LC/LCD) and/or data for matrix spike versus matrix spike duplicate (MS/MSD).

4.1.6.5 Accuracy

Accuracy is a measure of overestimation or underestimation of reported concentrations and is evaluated from the results of spiked samples. Accuracy is quantitated for each laboratory data batch using data for laboratory control (LC) samples and/or (preferably) data for matrix spike (MS) samples. Several QC parameters are used to evaluate the accuracy of reported analytical results:

- Holding times;
- Field and method blanks;
- Field and analytical spike recovery; and
- Laboratory control standard (LCS) percent recovery.

As indicated above, all 2008 and 2013 samples were analyzed for VOCs using USEPA Method TO-15, a routine analytical method. Additionally, all samples were analyzed within the method-specified holding time. Surrogate percent recovery and LCS percent recovery met the QC acceptance criteria or 70-130% for all sample analyses. As indicated in Section 4.1.6.3, low levels of common laboratory contaminants were detected in some method blanks in 2008. Blank result validation represents 1.4% of the total data points collected in 2008. While no chemicals were detected in method blanks, 13 results were qualified due to contamination in trip blanks and 14 results were qualified due to contamination in equipment blanks as discussed in Section 4.1.6.3 and discussed further in Appendix C-1. These sample results, provided in Attachment D of Appendix C-1, were considered usable. All data points were considered usable in the HRA dataset. All QC parameters and data points carried into the HRA that had laboratory QC issues are discussed further in the 2008 and 2013 DVSRs.

4.2 Data Analysis

As described by NDEP (2010d), the purpose of the data analysis step is to “use simple exploratory data analysis to compare data to the expectations of the CSM, to determine if the data adequately represent the source terms and exposure areas or evaluation areas.” Consistent with the NDEP guidance, summary statistics, data plots, and spatial plots of the data were prepared. Additionally, as requested by NDEP (2013b), specific data analyses were prepared, as described in Sections 4.2.3 through 4.2.5 below.

4.2.1 Soil Gas Data

All analytical results from the 2008 and 2013 soil gas sampling programs were deemed useable for preparing cross plots and spatial plots of the results and/or conducting the HRA.[9] As shown in Table 2 and in Figure 7, 21 sample locations (located within or near the Study Area) were used for conducting the HRA while all 41 sample locations shown on Figure 6 (some of which extend well beyond the boundaries of the Study Area) were used for spatial and other related analyses. A complete set of soil gas data is provided in Appendix G-1.

In summary, the soil gas data set comprises a total of 21 soil gas samples (12 samples collected in 2008 from within or near the Study Area and 9 samples collected 2013), all collected from a depth of 5 ft bgs. As shown on Table 6, 19 of the samples were located within (or on the border of) the Study Area, while two samples were located near the Study Area. The rationale for including samples located on the border of or near the Study Area is provided in Section 5.2.3. Summary statistics for 2013 data set and the combined 2008 and 2013 data set are presented in Tables 7 and 8, respectively. Consistent with NDEP (2008b) guidance, one-half the SQL was used as the detection limit for all samples reported as not detected. As discussed above, field duplicate samples were collected at 1 location in 2013 and no locations in or near the Study Area in 2008 (duplicate samples were collected only outside the Study Area). For field duplicate samples, only the data from the primary samples were used for calculating the summary statistics and risk estimates. This approach is consistent with the criteria for Option 1 in the NDEP guidance for Field Duplicates and Field Splits (NDEP 2008a). Specifically, the duplicate samples did not exhibit obvious lower variance than the primary samples. Further, 14 analytes were detected in the primary sample which were not detected in the duplicate sample. Therefore, use of the primary sample was considered adequately protective from a risk perspective.

As shown in Table 7, 56 of the 65 VOCs analyzed were detected in at least one sample and 17 chemicals were detected in 100% of the samples. As shown in Table 8, 69 of the 76 VOCs analyzed in both 2008 and 2013 were detected in at least one soil gas sample, and 13 VOCs were detected in 100% of the samples. Three of these 13 chemicals, chloroform, hexane, and tetrachloroethene (PCE), were detected at the highest concentrations, 3,900 µg/m^3, 6,100 µg/m^3, and 1,100 µg/m^3, respectively, of the VOCs analyzed. No other VOC was detected at concentrations of over 1,000 µg/m^3. The majority of chemicals were detected at concentrations less than 100 µg/m^3. Most of the maximum detection limits (one half of the SQL was used as the detection limit) were very low (less than 2 µg/m^3) although some were elevated (up to 37 µg/m^3 for cychlohexane and 4.0 µg/m^3 for acetone, ethanol, and vinyl acetate) due to sample dilutions. All but 5 of the 69 maximum detected concentrations occurred in Parcels C, D, or F,

Coefficients of variation (CVs) were calculated to provide a measure of dispersion of the data. Overall, the majority of the detected chemicals had a high variance (CV greater than 1). The chemicals with the highest variance included: hexane, trichlorofluoromethane, TCE, PCE, and

[9] As previously noted, 2008 samples collected both within and near the Study Area are included in the summary statistics presented in Table 8, while only the 2013 samples collected within the Study Area are included in the summary statistics presented in Table 7.

1,1-dichloroethane. These chemicals are described further in Sections 4.2.4. It is noted that the variance observed for hexane is due to uncertainty in the field duplicate collected in one sample in 2013, thus the CV is likely overstated as discussed further in Section 6.1.

4.2.2 Cross Plots for Co-located Soil Gas and Groundwater Samples

As summarized in Figure 9, a total of eight co-located soil gas and shallow groundwater sampling locations within Parcels C and D were identified with results for VOCs; an additional four locations were identified near Parcels C and D. As shown in Figure 10, there are six co-located soil gas and shallow groundwater sampling locations within Parcels F, G, and H and three locations near Parcels F, G, and H that were identified with results for VOCs.[10] (ENVIRON notes that 2008 groundwater data were used when available for 2008 co-located soil gas samples in and near the Study Area. For eight wells where 2008 data were not available, 2006, 2009, and 2010 data were used instead. The most recent groundwater data [2008, 2009, and 2011] were used for 2013 co-located soil gas samples in and near the Study Area). The groundwater data set used for the co-located evaluation is included in Appendix G-2.

For the total 21 co-located soil gas and shallow groundwater sampling locations collected in or near the Study Area, the 2008 and 2013 chloroform soil gas and groundwater data were plotted and a linear regression model applied, as shown on Figures 9 and 10, respectively. Figure 9 presents the 12 samples collected within and near Parcels C and D, while Figure 10 presents the 9 samples collected within and near Parcels F, G, and H. In order to show the relationship between soil gas and groundwater concentrations at low concentrations, both sets of data were plotted on a logarithmic scale in addition to an arithmetic scale. Pearson's correlation coefficient (r of 0.88 and r of 0.62) indicates a strong positive correlation between groundwater and soil gas chloroform concentrations in and near Parcels C and D and in and near Parcels F, G, and H, respectively. This provides further evidence to support the CSM that groundwater is the source of chloroform in soil gas.

4.2.3 Spatial Analysis of VOCs in Soil Gas

Based on a review of the soil gas results, a subset of chemicals was selected for spatial distribution. These VOCs include: carbon tetrachloride, chloroform, 1,1-dichloroethane, PCE, and TCE (Figure 11). Chloroform, carbon tetrachloride, 1,2-dichloroethane, and TCE contributed the most to the total cancer risk and were detected in more than one sample. Hexane, trichlorofluoromethane, 1,1-dichloroethane, TCE, and PCE showed the highest CV. Hexane was not selected for spatial presentation since the variance observed is due to uncertainty in the field duplicate sample collected as discussed further in Section 6.1, and trichlorofluoromethane was not selected given only one sample was detected over 4 µg/m^3 (E-SG-4 was detected at 48 µg/m^3). Lastly, 1,2-dichloroethane was not selected for spatial presentation since another degradation product of TCE and PCE, 1,1-dichloroethane, which exhibited a higher CV was already selected, and 1,2-dichloroethane and 1,1-dichloroethane

[10] Two middle-water bearing zone wells, MC-MW-17 and MC-MW-32, were previously misidentified as shallow wells in the *Soil Gas Investigation and Human Health Risk Assessment Work Plan for Parcels C, D, F, G, and H* (ENVIRON 2013). Since soil gas sample, E-SG-4, is co-located with both MC-MW-17 and TR-6, only TR-6 was included in the cross plots presented in Figures 7 and 8. Although MC-MW-32 is co-located with soil gas sample, E-SG-1, this well was not included in the cross plots presented in Figures 7 and 8.

were detected at nearly all of the same locations and the highest concentrations were both detected at E-SG-2 and E-SG-3. As shown in Figure 11, the data presented represent the data evaluated to estimate cancer risks and noncancer hazards (the maximum detected soil gas concentration within and near the Study Area) as described further in Section 5.1.

4.2.4 Temporal Comparison of VOCs in Groundwater

VOC concentrations presented in the 2010 Site-Wide HRA (Northgate 2010d) were compared with the most recent groundwater sample results for the same wells to evaluate any temporal changes to VOC concentrations in groundwater, as requested in NDEP's January 29, 2013 comment letter (NDEP 2013b). Northgate presented groundwater concentrations for chloroform, carbon tetrachloride, and TCE in Figures 5, 6, and 7, respectively, of the Site-Wide HRA.

The 2008/2009 chloroform, carbon tetrachloride, and TCE concentrations presented on Figures 5, 6, and 7 of the 2010 Site-Wide HRA (Northgate 2010c) are highlighted gray in Table 9, while the most recent groundwater results are shown in bold font. As shown, 23 shallow wells[11] within the Study Area were identified with VOC results (8 in Parcel C, 8 in Parcel D, 2 in Parcel F, 1 in Parcel G, and 4 in Parcel H). Well locations are shown on Figure 6. For most wells, more recent sampling data were not available, as Tronox, and now the Trust, have not sampled for VOCs since 2008. For the 11 wells included in the Site-Wide HRA for which more recent data are available, carbon tetrachloride, chloroform, and TCE concentrations remain approximately the same or show a general downward trend as compared with the 2008/2009 sampling results.

[11] Shallow groundwater is defined by NDEP as groundwater at depths of up to 90 ft bgs.

5.0 Health Risk Assessment

This section presents the HRA for future workers potentially exposed to VOCs in indoor air (the vapor intrusion pathway) and outdoor air. The evaluation is based on soil gas data collected in 2008 as part of the Phase B investigation and additional soil gas data collected in March 2013, as described in previous sections of this report. As part of the uncertainties analysis for this HRA (Section 6), potential risks for these pathways are estimated based on groundwater data and compared with the risk estimates based on the soil gas data. Finally, the HRA includes a summary of cumulative risks to workers associated with the inhalation pathways evaluated in this HRA and soil pathways evaluated in a HRA prepared by Northgate (2013).

As presented in the following sections, the HRA was conducted using a conservative, screening-level approach in which the cancer risks and noncancer hazard indices (HIs) associated with the inhalation of all 68 detected VOCs (except chloroform) are estimated based on the maximum concentration of each COPC within the Study Area. For chloroform (the primary contributor to the risk estimates), risks are estimated separately for each parcel. The total cancer risk and HI are then conservatively estimated for the individual Study Area parcels as the sum of (1) the parcel-specific cancer risk and HI for chloroform and (2) the total cancer risk and HI for the remaining COPCs.

The following sections present the HRA, conducted following USEPA's (1989) four-step process: selection of COPCs, exposure assessment, toxicity assessment, and risk characterization.

5.1 Selection of Chemicals of Potential Concern

All chemicals detected in one or more validated soil gas samples collected at five ft bgs during the 2008 or 2013 investigations were selected as COPCs, as recommended by NDEP in their April 9, 2013 comment letter (NDEP 2013d). Using this selection criteria, 69 VOCs were identified as COPCs (Table 10).

5.2 Exposure Assessment

The following subsections present the exposure assessment methodology, including the CSM, exposure assumptions, fate and transport modeling to predict indoor and outdoor air concentrations, and estimation of exposure concentrations (ECs).[12]

5.2.1 Conceptual Site Model

A CSM depicts the relationships between a chemical source, exposure pathway, and potential receptor at a site. It also identifies the potential exposure routes (e.g., inhalation of air) for contacting impacted media. These source-pathway-receptor relationships provide the basis for the quantitative exposure assessment. Only complete source-pathway-receptor relationships are included in the quantitative risk evaluation. The CSM for the Site (including the Study Area)

[12] The term exposure concentration (EC) is used for the inhalation pathway, consistent with current USEPA guidance (2009) for evaluating inhalation exposures. As used in this HRA, the term EC is synonymous with the more familiar term, exposure point concentration (EPC), used for evaluating other (non-inhalation) pathways.

was presented in the *Remedial Investigation/Feasibility Study Work Plan* submitted to NDEP on December 17, 2012 (ENVIRON 2012b). For this HRA, the potentially exposed populations and exposure pathways associated with inhalation of VOCs in indoor air (the vapor intrusion pathway) and inhalation of VOCs released to outdoor air for the Study Area are shown in the CSM presented in Figure 8.

Key elements of the CSM considered in identifying potentially exposed receptors are summarized below:

- Current and proposed future land use;
- Surrounding land use is predominantly industrial; and
- The nearest residential developments are located to the north and south of the Site, with residential developments to the east and west located at a greater distance. Given the highly industrialized nature of the 5,000-acre BMI complex (which includes the Study Area, the overall Site, and adjacent facilities), and the long-term lease with Tronox, future use of the Site and Study Area is expected to remain industrial/commercial.

This HRA evaluates inhalation of VOCs released from soil gas to indoor air for long-term indoor commercial/industrial workers and released to ambient air for long-term outdoor commercial/industrial workers (Figure 8). Other potential receptors include on-site short-term construction workers, off-site indoor commercial/industrial workers, off-site residents, visitors, and trespassers. In accordance with Northgate's *Health Risk Assessment Work Plan* (Northgate 2010b) approved by NDEP on March 16, 2010 and the 2013 HRA Work Plan (ENVIRON 2013a), off-site receptors, visitors, and trespassers were not quantitatively evaluated in the HRA. A qualitative discussion of the potential risks to these receptors is presented in Section 6.6.

5.2.2 Exposure Assumptions

Exposure parameters common to all inhalation pathways are the exposure time, exposure frequency, exposure duration, and averaging time. The values used for these parameters are presented in Table 11.

5.2.3 Exposure Concentrations

The following subsections describe the fate and transport modeling and approach used for calculating ECs. As described in Section 5.1, ECs in soil gas were based on the maximum detected concentration of the 2008 and the 2013 data set for each individual parcel for chloroform and the maximum detected concentration of the 2008 and 2013 data set for the remaining 68 COPCs and included samples collected on the border of the Study Area parcels and near parcel samples. Since the maximum detected concentrations were used to calculate ECs, near parcel samples were included in the data set evaluated in the HRA (shown in Figure 7) for purposes of developing a more conservative, robust data set. The near parcel samples were selected according to the following selection criteria:

- Any soil gas sample located within 25 ft of the Study Area boundary;
- Any soil gas sample located in the former, southern portion of Parcel G; and
- Any soil gas sample located within Parcel E between Parcels C and D.

It is noted that the sample (SG45) located in the former, southern portion of Parcel G is very near the current border of Parcel G and provides data relevant to the eastern side of the parcel; the sample (SG17) located between Parcels C and D provides additional data relevant to the northwest portion of Parcel C and the southwest portion of Parcel D. Further, two samples (E-SG-1 and SG18) located on the border of Parcels C and D were included in the evaluation of both parcels. This soil gas sample provides additional data relevant to the northwest portion of Parcel C and the southwest portion of Parcel D.

5.2.3.1 Fate and Transport Modeling

Chemicals detected in soil gas (sourcing from soil and groundwater) can potentially migrate through the unsaturated zone to ambient or indoor air.[13] This migration is quantified for the purposes of this assessment through an intermedia transfer factor. When the transfer factor is multiplied by the source concentration of a chemical in soil gas (in $\mu g/m^3$), the product is the predicted steady-state concentration in indoor or ambient air (in $\mu g/m^3$).

Intermedia transfer factors were estimated using the screening-level model described by Johnson and Ettinger (1991) which was developed to predict vapor migration into buildings using a combination of diffusion and advection. Specifically, Version 3.1 of the spreadsheet implementation developed by the USEPA was used (USEPA 2004). The Johnson and Ettinger spreadsheets for one representative example of the indoor air modeling are included in Appendix H. The Study Area and parcel-specific input parameters used in the Johnson and Ettinger model are listed in Table 12, and the physical/chemical properties used in the Johnson and Ettinger model for all COPCs are presented in Table 13. Unless otherwise noted, all properties were obtained from USEPA (2004). The transfer factors from soil gas to indoor air and from soil gas to outdoor air are shown in Table 14. For exposure of current/future on-site workers, transfer factors for soil gas to indoor air and outdoor air or ambient air were derived using transport of soil gas from 5 ft bgs into a commercial slab-on-grade building and ambient air.

Soil samples were collected to determine site-specific soil properties representative of the unsaturated zone as part of the 2010 Site-Wide HRA (Northgate 2010d). Soil samples were analyzed in accordance with NDEP guidance (NDEP 2010b) at 16 locations at depths of 9 to 15 ft bgs (mostly at 10 ft) across the Site as shown in Figure 6 to determine volumetric water content, soil total porosity, dry bulk density, and grain density. The results of the soil testing were used for modeling purposes and are shown in Table 4.

Reviews of boring logs (provided in Appendix F) and cross-sections indicated that the Site has a layer of alluvium, comprised of loamy sand approximately 20-50 ft thick. The soil samples

[13] Chemicals detected in groundwater can also potentially migrate through the unsaturated zone to ambient or indoor air. The evaluation of these pathways is discussed in Appendix I.

shown in Table 4 were all collected in the alluvium. Below the alluvium lies the UMCf, with a higher percentage of clay and silt. Across most of the Site, the unsaturated zone is composed entirely of alluvium. However, in some areas of the Site, the lower portion of the unsaturated zone includes a few ft of the finer-grained UMCf, located just above the groundwater table. The soil properties for the Johnson and Ettinger model were conservatively selected assuming that the entire unsaturated zone is alluvium with site-specific soil properties based on the average of measured values shown in Table 4. It is a conservative assumption to neglect the presence of the UMCf in areas where it is part of the unsaturated zone because the finer-grained UMCf would act to reduce vapor transport of COPCs.

As there are no buildings present in Parcels C, D, F, and H, a conservative default building, as shown in Table 12, was used. The default building size of 100 meters (m) by 100 m (USEPA 2004) was selected. While many commercial buildings are larger, often such a building is partitioned into smaller areas or offices which may represent smaller isolated breathing zones. This building size would have a default vapor flow rate of 5 liters/minute into the building (USEPA 2004). California's default air exchange rate of 1 air change per hour (Cal/EPA 2011) was used in the absence of a default rate from USEPA. As there is no default value for the height of a commercial building, a conservative height of 10 ft was used, although many commercial buildings have higher first floor ceilings. As shown in Table 12, a parcel-specific depth to groundwater was used.

5.2.3.2 Exposure Concentrations

The specific soil gas results for use in the HRA were identified based on the results of the data evaluation step described in Section 4.1, and the approach for estimating ECs is described in Sections 5.1 and 5.2.3. Using the soil gas concentrations as model input, indoor and ambient air concentrations were modeled using the Johnson and Ettinger model and a basic diffusion model, respectively. The contaminant concentration in air, rather than contaminant intake, is used as the basis for estimating chemical inhalation risks based on guidance described in *Part F, Supplemental Guidance for Inhalation Risk Assessment* (USEPA 2009). The ECs for noncarcinogens and carcinogens are estimated as follows:

$$EC = \frac{C \times TF \times ET \times EF \times ED}{AT}$$

where:

EC = exposure concentration (µg/m^3)
C = COPC concentration in soil gas (µg/m^3)
TF = transfer factor (µg/m^3 per µg/m^3)
ET = exposure time (hr/d)
EF = exposure frequency (d/yr)
ED = exposure duration (yr)
AT = averaging time (hr); based on ED (yr) × 365 d/yr × 24 hr/d for non-carcinogens (AT_{nc}) and based on a 70 yr (average lifetime) for carcinogens (AT_c)

The transfer factors and ECs for soil gas are shown in Tables 14 and 15, respectively.

5.3 Toxicity Assessment

Consistent with the NDEP hierarchy for selecting toxicity values to derive BCLs (NDEP 2013a), cancer and noncancer toxicity values were identified based on the following sources, listed in general order of preference:

- USEPA's Integrated Risk Information System (IRIS). IRIS is an on-line database of USEPA-approved oral and inhalation toxicity values (USEPA 2013a);
- USEPA's Provisional Peer Reviewed Toxicity Values (PPRTVs). PPRTVs are interim toxicity values developed by the Office of Research and Development/National Center for Environmental Assessment/Superfund Health Risk Technical Support Center. PPRTV values are listed in NDEP's table of BCLs;
- National Center for Environmental Assessment (NCEA), or other current USEPA sources;
- USEPA's Health Effects Assessment Summary Tables (HEAST) (USEPA 1997). HEAST provides an older listing of provisional toxicity values;
- California Environmental Protection Agency (Cal/EPA) toxicity criteria;
- Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profiles, which list minimum risk levels for evaluating noncarcinogens (ATSDR, 2013);
- USEPA's Environmental Criteria and Assessment Office (ECAO);
- NDEP-identified toxicological surrogates; and
- ENVIRON-identified toxicological surrogates (discussed further in the Uncertainty Analysis, Section 6.7).

The toxicity values used in the HRA and their sources are provided in Table 16.

5.4 Risk Characterization

As described in NDEP BCL Guidance (NDEP 2013a), the NDEP point of departure for most chemicals is a cumulative incremental cancer risk of one-in-a-million (1×10^{-6}) and a hazard quotient of one (1) for the noncancer endpoint. USEPA considers 1×10^{-6} to one-in-one-thousand (1×10^{-4}) to be the target range for acceptable risks at sites where remediation is considered (USEPA 1990). Estimates of lifetime excess cancer risk associated with exposure to chemicals of less than 1×10^{-6} are considered to be so low as to warrant no further investigation or analysis (USEPA 1990).

This section describes the final step of the HRA, the risk characterization step. In this final step, quantitative information on human exposure and chemical toxicity are combined to estimate corresponding receptor-specific cancer risk and hazard indices (an estimate of the potential for the occurrence of health effects other than cancer). The risk characterization results in this section and associated figures and tables are presented to two significant figures. ENVIRON recognizes that due to the uncertainties in the risk estimates, the precision in a given risk estimate is best represented by one significant figure. However, use of two significant figures facilitates the checking of the risk results and helps reduce what can appear to be

inconsistencies when summarizing either HIs or cancer risks (e.g., risks do not sum because of rounding).

5.4.1 Assessment of Cancer Risks

Carcinogenic risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to COPCs. The following equations were used to calculate chemical-specific risk and total risk:

$$Chemical\text{-}Specific\ Risk_{inhalation} = EC \times UR$$

where:

EC = exposure concentration (µg/m^3)
UR = unit risk (µg/m^3)$^{-1}$

and

$$Total\ Risk = \sum Chemical\text{-}Specific\ Risk$$

The estimated excess cancer risks associated with exposure of indoor and outdoor commercial/industrial workers to COPCs in soil gas through inhalation of vapors in indoor and outdoor air are summarized in Tables 17, 18, and 19. Table 17 presents the Study Area-wide cancer risk for all COPCs except chloroform from soil gas for both indoor and outdoor commercial/industrial workers. Table 18 presents the parcel-specific cancer risk for chloroform from soil gas. Table 19 presents the parcel-specific cumulative risk for all chemicals from soil gas. As shown in Table 19, the total excess cancer risk estimates due to exposure to all COPCs in soil gas ranges from 2.6×10^{-7} (Parcel H) to 2.4×10^{-6} (Parcel C) for an indoor commercial/industrial worker and ranges from 4.8×10^{-9} (Parcel H) to 4.8×10^{-8} (Parcel C) for an outdoor commercial/industrial worker.

5.4.2 Assessment of Noncancer Health Effects

The potential for noncancer adverse health effects were estimated as follows:

$$Hazard\ Quotient_{inhalation} = \frac{EC \times CF}{RfC}$$

where:

EC = exposure concentration (µg/m^3)
CF = conversion factor (10^{-3} mg/µg)
RfC = reference concentration (mg/m^3)

The HQs for each COPC are summed to obtain the hazard index (HI).

$$Hazard\ Index = \sum Hazard\ Quotients$$

The estimated HQs associated with exposure of an indoor and an outdoor commercial/industrial worker to the COPCs in soil gas through inhalation of vapors in indoor and outdoor air are summarized in Tables 17, 18, and 19. Table 17 presents the Study Area-wide noncancer hazard for all COPCs except chloroform from soil gas for both indoor and outdoor commercial/industrial workers. Table 18 presents the parcel-specific noncancer hazard for chloroform from soil gas. Table 19 presents the parcel-specific cumulative noncancer hazard for all chemicals from soil gas. As shown in Table 19, the total estimated noncancer hazard due to exposure to all COPCs in soil gas ranges from 0.025 (Parcels G and H) to 0.028 (Parcel C) for an indoor commercial/industrial worker and is less than 0.001 in all parcels for an outdoor commercial/industrial worker.

5.4.3 Cumulative Cancer Risk and Hazard Index

The cumulative cancer risk and noncancer hazard are estimated for the soil and vapor intrusion pathways for an indoor and an outdoor commercial/industrial worker. The cumulative risks are based on the combined results for the vapor intrusion pathway as estimated from soil gas results in this HRA and for the soil ingestion and dermal evaluation for indoor and outdoor commercial/industrial workers and construction workers, as reported in the *Revised Post-Remediation Screening Health Risk Assessment Report for Parcels C, D, F, G, and H* (Northgate 2013). As noted previously, the soil HRA was submitted to NDEP on June 27, 2013; the final evaluation of cumulative risks will be based on the NDEP-approved risk estimates for soil gas and soil.

To estimate cumulative risk and HI for the indoor commercial/industrial worker, it is assumed that the worker is exposed to COPCs in soil (via incidental ingestion) and soil gas (via inhalation of vapors in indoor air of a commercial building). Similarly, for the outdoor commercial/industrial worker and construction worker, it is assumed that the worker is exposed to COPCs in soil (via incidental ingestion and dermal contact) and soil gas (via inhalation of vapors in ambient air). The cumulative risk and HI are estimated as represented by the following equations:

$$Cumulative\ Risk = Risk_{inhalation} + Risk_{soil\ pathways}$$

$$Cumulative\ Hazard\ Index = Hazard\ Index_{inhalation} + Hazard\ Index_{soil\ pathways}$$

The cumulative cancer risk and HIs for the indoor and outdoor commercial/industrial workers and the construction worker are provided in Table 20 and discussed further below:

- Indoor Commercial/Industrial Worker: The cumulative cancer risk for the indoor commercial/industrial worker exceeds 1×10^{-6} in Parcels C, D, and F (2.7×10^{-6} in Parcel C, 1.6×10^{-6} in Parcel D, and 2.1×10^{-6} in Parcel F) and is below 1×10^{-6} in Parcels G and H (7.2×10^{-7} in Parcel G and 6.4×10^{-7} in Parcel H). In Parcels C, D, and

F, indoor air contributed between 76% and 86% of the cumulative cancer risk and as discussed, the largest contributor to the cumulative cancer risk in indoor air is chloroform. The cumulative HI for the indoor commercial/industrial worker is well below 1 in all Study Area parcels (0.15).

- Outdoor Commercial/Industrial Worker: The cumulative cancer risk for the outdoor commercial/industrial worker slightly exceeds 1×10^{-6} in all Study Area parcels (1.1×10^{-6}). However, the soil pathway contributed 96% or more of the cumulative cancer risk, and the inhalation pathway cancer risks were well below 1×10^{-6} as described in Section 5.5.1. The cumulative HI for the outdoor commercial/industrial worker is below 1 in all Study Area parcels (0.24).
- Construction Worker: Although the vapor intrusion pathway is not quantitatively assessed for the construction worker as depicted in the CSM (Figure 8), the cumulative cancer risk and HIs were estimated for the soil and VOC inhalation pathways based on the combined results for the outdoor inhalation pathway estimated in this report for the outdoor commercial/industrial worker and for the soil pathways estimated in the Northgate (2013) soil HRA for a construction worker. The cumulative cancer risk for the construction worker is below 1×10^{-6} in all Study Area parcels (ranging from 1.3×10^{-7} in Parcels G and H to 1.8×10^{-7} in Parcel C), and the cumulative HI is also below 1 in all Study Area parcels (0.86).

A best estimate and an upper-bound estimate were calculated for exposures to asbestos to outdoor commercial/industrial workers and future construction workers in the *Revised Post-Remediation Screening Health Risk Assessment Report for Parcels C, D, F, G, and H* (Northgate 2013). These results are summarized in this HRA. As shown in Table 20, the estimated risks for death from lung cancer or mesothelioma for asbestos exposures to future on-site outdoor commercial/industrial workers and construction workers are less than or equal to 1×10^{-6}, except for upper-bound estimates of exposure to amphibole fibers by future construction workers in all Study Area parcels. The upper-bound estimates were slightly above 1×10^{-6} for exposure to amphibole fibers by future construction workers; however the estimates were based on constant lifetime exposures, not short-term exposure during typical construction activities. Therefore, exposures to asbestos in soil should not result in unacceptable risks for future on-site outdoor commercial workers or future construction workers. Consistent with USEPA (1990), Northgate did not evaluate the best estimate for chrysotile risk in Parcel G or the best estimate for amphibole risk in any of the Study Area parcels because the estimates of lifetime excess cancer risk associated with exposure to chemicals of less than 1×10^{-6} are considered to be so low as to warrant no further investigation or analysis. The best estimate and upper bound concentrations of asbestos range from 1.8×10^{-9} (best estimate in Parcel H) to 1.7×10^{-7} (upper bound estimate in Parcel F) for chrysotile fibers, and from 2.0×10^{-7} (upper bound estimate in Parcel H) to 6.0×10^{-6} (upper bound estimate in Parcel G) for amphibole fibers (no long amphibole structures have been detected at the Study Area).

5.4.4 Cancer Risk Comparisons

Specific risk evaluations were conducted as requested by NDEP (2013b) and are described below and in Appendix I.

Cancer risks estimated from 2008 chloroform concentrations in soil gas and 2013 chloroform concentrations in soil gas were compared and presented in Table 21. Chloroform results were selected for presentation as the cancer risks and HQs for chloroform are higher than any other COPC. Because both the 2008 and 2013 samples locations were biased, the 2013 sample locations were intentionally located in regions of higher predicted chloroform concentrations in shallow groundwater, and no 2008 or 2013 samples were co-located, direct comparisons are limited.

The maximum cancer risk in Parcels C and D is higher based on 2008 samples while the maximum cancer risk in Parcels F and G is higher among 2013 samples. As discussed above, the 2013 samples in Parcels F and G were placed nearer to the chloroform plume and were therefore anticipated to present higher risks. Because the 2008 soil gas samples in those parcels are further from the plume the risk difference is to be expected. Parcel H risks in 2008 were far below significance. As a result, and because of its distance from the chloroform plume, it was not sampled in 2013.

6.0 Uncertainty Analysis

The process of estimating risk has inherent uncertainties associated with the calculations and assumptions used. The approach used in the HRA is health protective and tends to overestimate potential exposure. This results in estimated risk and hazard levels that are likely to be higher than the actual risks or hazards experienced by exposed populations. A discussion of key uncertainties associated with the available data and the methodology used to estimate potential risks and hazards are below.

6.1 Site Characterization Data

Soil gas samples collected from 12 locations in 2008 and nine locations in 2013 within and near the Study Area were used to estimate cancer risks and noncancer hazards in the HRA. The majority of 2008 sampling locations were located within one of the 18 LOUs identified as being potential sources of VOCs, targeted to co-locate with nearby groundwater wells, or in areas where VOCs had been detected in soil or groundwater (ENSR 2008a). The majority of 2013 sampling locations were placed in regions of higher predicted chloroform concentrations (ENVIRON 2013a). All soil gas samples were analyzed for the full suite of VOCs. Because most of the 2008 and all of the 2013 soil gas sampling locations were placed in areas with the highest VOC concentrations, and samples from these locations were analyzed for chemicals associated with historical operations and VOC detections in soil or groundwater, the relative uncertainty in the site characterization data is considered to be low.

Three soil gas samples were directly north of Parcel H within the former State Industries, Inc. (LOU 62) in 2008. The former State Industries, Inc. manufacturing warehouse and storage area were historically associated with VOCs from process waste streams potentially containing leftover paint, paint thinner, or paint constituents (ENSR 2008c). Based on the potential surface sources of VOCs associated with this LOU, the soil gas samples SG47, SG66, and SG67 were not used to estimate cancer risks and noncancer hazards for Parcel H, since these soil gas samples may not be representative of the vapor intrusion risks within Parcel H. However, using the soil gas results of these three samples the cancer risks and noncancer hazards for Parcel H are still well below the target risk levels. Therefore, the exclusion of these three samples is health conservative and does not affect the results of the HRA.

In NDEP's April 9, 2013 comment letter, NDEP recommended collecting four additional samples if the parcels are evaluated individually as discussed in Section 3.1. Since the maximum detected chloroform concentrations are used for each parcel and the samples collected were located in the areas of higher predicted chloroform concentrations, additional samples would likely not affect the results of the HRA. Therefore, these additional four samples were not collected.

At the soil gas location of the field duplicate sample collected in 2013 (E-SG-6), three of the four primary risk contributors (i.e., chloroform, carbon tetrachloride, and TCE) showed low RPD values between the primary and duplicate sample results as described in Section 4.2.1. One of the primary risk contributors, 1,2-dichloroethane, had differences outside the acceptance criteria as discussed in Appendix C-1. However, both primary and duplicate sample results were less than 1 $\mu g/m^3$ and since the maximum detected concentration of 33 $\mu g/m^3$ was used to calculate

ECs, there is no impact on the results of the HRA. In addition, hexane was detected over 900-fold higher in the primary sample (6,100 µg/m^3) than the duplicate sample (6.5 µg/m^3). The summary statistics of the Study Area characterization data presented in Table 8 suggest that the high detection in the primary sample does not adequately characterize the sample location. Specifically, hexane was detected at concentrations less than 4 µg/m^3 at the remaining eight locations sampled in 2013. Since only the primary samples were used in the risk assessment calculations, the HQs calculated from hexane were likely overstated and by using the primary sample result as the EC, the results are conservative. However, there is relatively little impact on the total HI. Lastly, all ECs based on maximum detected concentrations from E-SG-6 (as shown in Table 8) that had RPDs outside of the acceptance criteria are also conservative. Specifically, for chemicals with RPDs outside of the acceptance criteria, the maximum detected concentrations in the primary sample collected at E-SG-6 were higher than those detected in the duplicate sample, and therefore, the estimated indoor and outdoor air concentrations for these chemicals are conservative.

6.2 Data Usability/Data Evaluation

The soil gas data were evaluated in two DVSRs. As discussed in Section 4.1.6.3, a small number of data points were found to be qualified based on minor method blank, field duplicate, and quantitation issues but were deemed acceptable and were not biased low. All 2008 and 2013 soil gas data were deemed to be usable for risk assessment.

6.3 Selection of COPCs

A total of 69 chemicals were detected in at least one soil gas sample in the 2008 or 2013 data set and were conservatively included as COPCs. For the seven chemicals (allyl chloride, bromoform, 1,3-butadiene, tert-butylbenzene, chloromethane, diisopropyl ether, and tetrahydrofuran) not included as COPCs, the maximum detection limit was less than 2 µg/m^3. Therefore, exclusion of these chemicals does not affect the results of the quantitative HRA.

6.4 Exposure Concentrations

In soil gas, estimated cancer risks and HQs were calculated using maximum chloroform concentrations for each parcel and maximum COPC concentrations (except for chloroform) across the Study Area. This approach may overestimate the risk estimates for an indoor commercial/industrial since a wide range of COPC concentrations exist within each parcel and across the Study Area, and the maximum concentration is not likely representative for an entire building footprint. Furthermore, this may be an overly conservative procedure for purposes of estimating potential health risks associated with inhalation of vapors in outdoor air, because it is likely than an outdoor commercial/industrial worker would spend time over a wider area than an indoor commercial/industrial worker.

6.5 Fate and Transport Modeling

Fate-and-transport models were used in this HRA to estimate indoor and outdoor air concentrations from measured soil gas concentrations. For indoor air, the USEPA Johnson and Ettinger model spreadsheet was used. As discussed in Section 5.2.3.1, the Johnson and Ettinger model has numerous assumptions and limitations, each of which may over- or underestimate the predicted indoor air concentration. In this case, site-specific soil physical parameters were used in the modeling, which should reduce the uncertainty in the model

estimates. For outdoor air, an approach analogous to that used by USEPA to estimate outdoor air concentrations from chemicals in soil was used. This model also has assumptions that may over- or underestimate the predicted concentrations.

6.6 Exposure Assessment

The exposure assessment in this HRA is based on a reasonable maximum exposure (RME) scenario, which is defined by USEPA as the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site (USEPA 1989). To achieve this goal, the RME scenario uses highly conservative exposure assumptions. For example, this HRA assumes that a future on-site commercial/industrial worker is present at the Study Area 250 days (indoor commercial/industrial worker) or 225 days (outdoor commercial/industrial worker) per year, for 25 years. These upper-bound, default estimates of exposure most likely overestimate the potential health risks associated with the Site.

Other potential receptors that were not evaluated in the quantitative HRA include on-site short-term construction workers, off-site indoor commercial/industrial workers, off-site residents, and visitors and trespassers. The uncertainty associated with the exclusion of these receptors from the quantitative HRA is discussed below.

Inhalation of VOCs by on-site commercial/industrial workers serves as an upper-bound estimate of potential exposures to VOCs by construction workers. Qualitative consideration of the assumed years of exposure of a construction worker (1 year) as compared with the assumed years of exposure of an outdoor commercial/industrial worker (25 years) indicate that the cancer risk for the construction worker would be approximately 25-fold lower than the risk estimated for the outdoor commercial/industrial worker. For noncancer endpoints, the estimated HIs for the outdoor commercial/industrial worker provides an upper-bound estimate of the HI for the construction worker.

In accordance with Northgate's *Health Risk Assessment Work Plan* (Northgate 2010b) approved by NDEP on March 16, 2010, off-site receptors were not quantitatively evaluated in the HRA. Inhalation of VOCs by on-site indoor and outdoor commercial/industrial workers serves as an upper-bound estimate of potential exposures to VOCs by off-site receptors. Correspondingly, cancer risks and noncancer hazards for off-site indoor commercial/industrial workers and off-site residents will be less than cancer risks and noncancer hazards for the on-site commercial/industrial workers.

As discussed in USEPA's *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA 2002b), evaluation of exposures to members of the public entering an operating facility is generally not warranted for two reasons: (1) public access is restricted or controlled at industrial sites and (2) while the public may have access to a property, exposures of an on-site worker would be much higher than those of a visitor because workers spend substantially more time at a site. Accordingly, on-site visitors and trespassers were not quantitatively evaluated in the HRA.

6.7 Toxicity Assessment

The availability and quality of toxicological data is another source of uncertainty in the risk assessment. The majority of the available toxicity data are from animal studies; these data are extrapolated using mathematical models or multiple uncertainty factors to predict what might occur in humans. Sources of conservatism in the toxicity criteria used in this HRA include:

- The use of conservative methods and assumptions to extrapolate from high-dose animal studies to predict the possible response in humans at exposure levels far below those administered to animals;
- The assumption that chemicals considered to be carcinogens do not have thresholds (i.e., for all doses greater than zero, some risk is assumed to be present); and
- The fact that epidemiological studies (i.e., human exposure studies) are limited and are not generally considered in a quantitative manner in deriving toxicity values.

These assumptions lead to overestimates of risk. A discussion of chemicals for which surrogate criteria were used is provided below. Surrogate toxicity criteria were used for the following COPCs as provided in NDEP (2010c, 2013a) or, in the absence of NDEP surrogates, as based on professional judgment:

COPC	Surrogate
Bromodichloromethane	Dichloromethane
n-Butylbenzene	Isopropylbenzene (cumene)
sec-Butylbenzene	Isopropylbenzene (cumene)
tert-Butylbenzene	Isopropylbenzene (cumene)
t-Butyl alcohol	sec-Butyl alcohol
1,3-Dichlorobenzene	1,2-Dichlorobenzene
cis-1,2-Dichloroethene	trans-1,2-Dichloroethene
1,2-Dichlorotetrafluoroethane	1,1,2-Trichloro-1,2,2-trifluoroethane
Ethyl acetate	Methyl methacrylate
Ethyl tert-butyl ether (ETBE)	Methyl tertiary butyl ether (MTBE)
4-Ethyltoluene	Isopropylbenzene (cumene)
n-Heptane	n-Hexane
4-Isopropyltoluene	Isopropylbenzene (cumene)
alpha-Methylstyrene	Styrene
n-Octane	C5-C8 alkanes and cylcoalkanes
n-Propylbenzene	Isopropylbenzene (cumene)
tert-Amyl methyl ether (TAME)	MTBE

NDEP (2010c, 2013a) identified surrogates for all chemicals except ETBE and TAME. The MTBE noncancer toxicity value was used to evaluate the noncancer endpoint for ETBE and TAME based on professional judgment. While a cancer toxicity value exists for MTBE, cancer risks were not calculated for ETBE and TAME for use in the quantitative risk assessment and are only discussed for purposes of evaluating uncertainty. The cancer risks from exposures to ETBE and TAME in soil gas are 3.5×10^{-12} and 3.3×10^{-12} for the indoor commercial/industrial worker and are 6.5×10^{-14} and 6.2×10^{-14} for the outdoor commercial/industrial worker. Given

that the cancer risks estimated for ETBE and TAME using the MTBE cancer toxicity value are well below 1×10^{-6}, there is no impact on the results of the total cancer risk.

6.8 Risk Characterization

The uncertainties associated with risk characterization are generally the result of the combined uncertainties in the site conditions, exposure assumptions, and toxicity criteria. In this HRA, potential health risks were quantified for future on-site commercial workers associated with exposure to chemicals in soil gas through inhalation of vapors in indoor or outdoor air. Given the highly conservative nature of the exposure parameters used to characterize this pathway, especially for the RME scenario, it is highly unlikely that the same receptor would be exposed at that level over the entire duration of exposure. These conservative estimates of exposure were then combined with even more conservative estimates of carcinogenic potency (UR) or acceptable exposure (RfC) to estimate the likelihood (cancer) or magnitude (noncancer) of potential effects. Current methodology for estimating the carcinogenic potential of chemicals is believed to not underestimate the true risk, but could overestimate the true risk by a considerable degree.

6.9 Use of Groundwater Data for Estimating Exposure

Potential exposure to groundwater via inhalation of VOCs was evaluated for future on-site indoor commercial/industrial workers and outdoor commercial/industrial workers using the same exposure assumptions, fate and transport modeling, calculation of ECs, toxicity assessment, and risk characterization as presented in this report. This evaluation is presented in Appendix I. A discussion of key uncertainties associated with the groundwater data and the methodology used to estimate potential risks and hazards are below.

Similar to the exposure concentrations estimated from soil gas data, there is uncertainty associated with the exposure concentrations estimated using groundwater data. Using the maximum concentration obtained during the most recent sampling event for each parcel for all COPCs to calculate cancer risks and HQs may overestimate the risk estimates for an indoor commercial/industrial worker. Specifically, a wide range of COPC concentrations exist within each parcel and across the Study Area. Therefore, the maximum concentration is not likely representative for an entire building footprint. Furthermore, this may be an overly conservative procedure for purposes of estimating potential health risks associated with inhalation of vapors in outdoor air, because it is likely than an outdoor commercial/industrial worker would spend time over a wider area than an indoor commercial/industrial worker.

Fate-and-transport models were also used to estimate indoor and outdoor air concentrations from measured groundwater concentrations. For indoor air, the USEPA Johnson and Ettinger model spreadsheet was used. As discussed in Section 5.2.3.1, the Johnson and Ettinger model has numerous assumptions and limitations, each of which may over- or underestimate the predicted indoor air concentration. In this case, site-specific soil physical parameters were used in the modeling, which should reduce the uncertainty in the model estimates. For outdoor air, an approach analogous to that used by USEPA to estimate outdoor air concentrations from chemicals in soil was used. This model also has assumptions that may over- or underestimate the predicted concentrations.

Lastly, it is expected that the soil gas sampling will provide a more accurate risk characterization because the samples are collected closer to the receptor. In general, the closer the sampled medium is to the receptor, the more relevant the data are for estimating exposure and greater its weight of evidence (Cal/EPA 2011). Partitioning assumptions in modeling soil gas concentrations from groundwater data increase the uncertainty in the modeling (Wong-Yim et al. 2007). Additionally, certain chemicals (i.e. benzene) are expected to have significant bioattenuation throughout the vadose zone and risks estimated using the groundwater data can be substantially overestimated (USEPA 2012c). Therefore risks estimated using the soil gas data presented in the main report are used as the primary line of evidence for the inhalation of VOCs in indoor air and inhalation of VOCs released to outdoor air pathways.

7.0 Data Quality Assessment

Data quality assessment (DQA) is an analysis that is performed after the risk assessment to determine whether enough data have been collected to support the risk-based decisions that are recommended by the risk assessment.

In this HRA, the evaluation of the risk of vapor intrusion was based on maximum detected soil gas concentrations, rather than on a measure of mean concentrations such as the 95% upper confidence limit. Therefore, for the purposes of the data quality assessment, the risk evaluation was conceptualized as a statistical test of the proportion of the soil gas sampling locations that are associated with an unacceptable risk of vapor intrusion. As summarized in Table 19, the maximum cumulative cancer risk over all parcels is at the low end of the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4}, and the noncancer hazard is below 1.0. The number of sampling locations for almost all chemicals of concern is 21 (see Table 8). Since the estimated risks and hazards at all of the sampling locations are acceptable, the proportion of samples with unacceptable risks is 0 out of 21 samples, or 0%.

In a hypothesis testing framework, we can use a binomial test of proportions to evaluate the possibility that there is a greater-than-zero proportion of samples with unacceptable risk. The null hypothesis is that the proportion of samples with unacceptable risk is 0 (p_0=0). The alternative hypothesis is that the proportion is greater than p_1, which is p_0 plus an appropriate effect size (i.e., population proportion) that the test should be able to detect. As a starting point, we consider an effect size of 0.05, which would be equivalent to 1 sample out of 21 having unacceptable risk. In general when employing this hypothesis test, the null hypothesis would be rejected if 1 or more samples with unacceptable risk were observed. In the HRA, none of the samples had unacceptable risk so the null hypothesis is not rejected.

Specifying a null hypothesis with a proportion of 0 is a special case of the typical binomial hypothesis test which has a null proportion greater than 0. Because the probability distribution under the null hypothesis has a zero probability for any non-zero proportion, we can reject the null hypothesis whenever one or more observations have unacceptable risk with a false rejection error rate (α) of 0, independent of the sample size and other parameters. Thus, there is no chance that the test would reject the null hypothesis when the null hypothesis is actually correct.

It is also important to examine the power of the hypothesis test, which is the probability that the test will reject the null hypothesis when the null hypothesis is false. In this case, power would represent the probability that an unacceptable risk would be detected if one actually existed in the population of soil gas samples that could be collected. Because the sample size of 21 is small, we calculate the power using exact methods that are not based on an approximation of the binomial distribution. The calculations were done using the software program G*Power version 3.1.7 (Faul et al. 2009). For an effect size of 0.05 (approximately equivalent to 1 sample out of 21), the power of the test is 66%. For an effect size of 0.1 (approximately equivalent to 2 samples out of 21), the power is almost 90%, which is quite high. A plot of power versus effect size (i.e., population proportion with unacceptable risk) is presented in Figure 12.

For the data quality assessment, we have conceptualized the evaluation of risks associated with vapor intrusion from soil gas samples as a statistical hypothesis test of proportions. The null hypothesis that no soil gas samples would have unacceptable risk is not rejected based on observation that all of 21 samples collected have acceptable risks. This hypothesis test has a zero false rejection error rate and very good power for detecting proportions of 0.1 or greater. Based on this analysis, the number of soil gas samples collected is sufficient for purposes of risk characterization.

8.0 Summary and Conclusions

The objective of the HRA was to evaluate potential risks for future workers associated with inhalation of VOCs in indoor air (the vapor intrusion pathway) and inhalation of VOCs released to outdoor air. The evaluation was based on soil gas data collected in 2008 as part of the Phase B investigation and additional soil gas data collected in March 2013 to address data gaps in the available sampling data. In addition, the report presents a summary of cumulative risks to workers associated with the inhalation pathways evaluated in this report and soil pathways evaluated in a separate report (Northgate 2013).

All chemicals detected in 2008 and/or 2013 soil gas samples were selected as COPCs. As a conservative screening-level approach, noncancer HIs and cancer risks associated with the inhalation of all 68 detected VOCs (except chloroform) were estimated based on the maximum concentration of each COPC within the Study Area, which as summarized below, resulted in total risk estimates well below levels of concern. For chloroform (the primary contributor to the risk estimates), risks were estimated separately for each parcel. The total cancer risk and (HI) were then conservatively estimated for the individual Study Area parcels as the sum of (1) the parcel-specific cancer risk and HI for chloroform and (2) the total cancer risk and HI for the remaining COPCs (estimated based on the maximum detected concentration for the Study Area). The results of the HRA are summarized below:

Soil Gas HRA

The total cancer risks estimated from exposure to all COPCs in soil gas range from 2.6×10^{-7} to 2.4×10^{-6} for an indoor commercial/industrial worker and range from 4.8×10^{-9} to 4.8×10^{-8} for an outdoor commercial/industrial worker. The total noncancer HIs estimated from exposure to all COPCs in soil gas for both an indoor and outdoor commercial/industrial worker are well below 1.

Cancer risks and HIs associated with inhalation of outdoor air were not quantitatively evaluated for a short-term construction worker. However, qualitative consideration of the assumed years of exposure of a construction worker (1 year) as compared with the assumed years of exposure of an outdoor commercial/industrial worker (25 years) indicate that the cancer risk for the construction worker would be approximately 25-fold lower than the risk estimated for the outdoor commercial/industrial worker. For noncancer endpoints, the estimated HIs for the outdoor commercial/industrial worker provides an upper-bound estimate of the HI for the construction worker.

Cumulative Cancer Risk for Soil and VOC Inhalation Pathways

Cumulative cancer risks and noncancer HIs for indoor and outdoor commercial/industrial workers and construction workers were estimated by combining the soil pathway risk and HI from the Soil HRA (Northgate 2013) and the VOC inhalation pathway risk and HI summarized in Table ES-1. These estimates likely overstate risks to a worker as they assume long-term exposure to the maximum concentrations of chemicals in both soil and soil gas. The cumulative cancer risk for the indoor commercial/industrial worker for Parcels C, D, and F are at the lower

end of the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4}. The cumulative cancer risk for the indoor commercial/industrial worker for Parcels G and H is below 1×10^{-6}. The cumulative cancer risk for the outdoor commercial/industrial is also at the lower end of the acceptable cancer risk range in all Study Area parcels. The cumulative HI for both the indoor and outdoor commercial/industrial worker is below 1 in all Study Area parcels.

For the short-term construction worker, the cumulative cancer risk and HIs were estimated for the soil and VOC inhalation pathways based on the combined results for the outdoor inhalation pathway estimated in this report for the outdoor commercial/industrial worker and for the soil pathways estimated in the Northgate (2013) Soil HRA for a construction worker. The cumulative cancer risks were below the acceptable cancer risk range of 1×10^{-6} to 1×10^{-4} and the cumulative HI was below 1 for all Study Area parcels.

The results indicate that exposure to residual chemicals in the upper 10 ft of soil in the Study Area parcels should not result in unacceptable risks for all on-site and off-site receptors.

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Tables

TABLE 1. LOUs Within and Upgradient of the Study Area Parcels
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	LOUs[a]			Potential Contaminants[b]
	#	Name	Location	
Parcel C	1	Trade Effluent Settling Ponds	upgradient	VOCs (benzene derivatives)
	10	On-Site Hazardous Waste Landfill	upgradient	no VOCs
	22	Pond WC-West and Associated Piping	upgradient	no VOCs
	23	Pond WC-East and Associated Piping	upgradient	no VOCs
	32	Groundwater Remediation Unit	upgradient	no VOCs
	55	Area Affected by July 1990 Fire	upgradient	no VOCs
	58	AP Plant Area New D-1 Building Washdown	upgradient	no VOCs
Parcel D	6	Unnamed Drainage Ditch Segment (BMI Landfill)	within	no VOCs
	68	Southern Nevada Auto Parts Site (Kerr-McGee tenant)	within	no VOCs
Parcel F	4	Former Hardesty Chemical Company Site	upgradient	VOCs (benzene derivatives)
	25	Process Hardware Storage Area	upgradient	no VOCs
	26	Trash Storage Area	upgradient	no VOCs
	27	PCB Storage Area	upgradient	no VOCs
	28	Hazardous Waste Storage Area	upgradient	VOCs
	41	Unit 1 Tenants - Stains	upgradient	VOCs
	59	Storm Sewer System	within	no VOCs
	60	Acid Drain System	upgradient	no VOCs
	63	J.B. Kelley Trucking Inc. Site (Kerr-McGee tenant)	within	VOCs
	65a-d	Nevada Precast Concrete Products (Kerr-McGee tenant)	65c within; 65a,b and d upgradient	VOCs
Parcel G	59	Storm Sewer System	within	no VOCs
	60	Acid Drain System	within	no VOCs
	65d	Green Ventures International (Kerr-McGee tenant)	within	VOCs
Parcel H	--	--	--	--

Notes:
-- = No LOUs are within or upgradient of the Parcel
LOU = Letter of Understanding
VOC = Volatile organic compound

[a] Gray highlighted LOUs indicated that NDEP identified them for no further action (ENSR 2007).
[b] The contaminants listed for each parcel were identified in NDEP (2011).

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TABLE 2. Soil Gas and Groundwater Sampling Locations
Nevada Environmental Response Trust Site, Henderson, Nevada

Sample Location[a]	HRA[b]	Other Analyses[c]
Soil Gas		
E-SG-1	X	X
E-SG-2	X	X
E-SG-3	X	X
E-SG-4	X	X
E-SG-5	X	X
E-SG-6	X	X
E-SG-7	X	X
E-SG-8	X	X
E-SG-9	X	X
SG01		X
SG02		X
SG03		X
SG04		X
SG05		X
SG06		X
SG07		X
SG08		X
SG09		X
SG10		X
SG11		X
SG12		X
SG13		X
SG14		X
SG15		X
SG16	X	X
SG17	X	X
SG18	X	X
SG19	X	X
SG24	X	X
SG33		X
SG34	X	X
SG39		X
SG44		X
SG45	X	X
SG47		X
SG48		X
SG49	X	X
SG50	X	X
SG63		X
SG64		X
SG66		X
SG67		X
SG68		X
SG72		X
SG73		X
SG74	X	X
SG88		X
SG90	X	X
SG91	X	X

TABLE 2. Soil Gas and Groundwater Sampling Locations
Nevada Environmental Response Trust Site, Henderson, Nevada

Sample Location[a]	HRA[b]	Other Analyses[c]
Groundwater		
AA-BW-03A		X
AA-BW-04A	X	X
AA-BW-05A		X
AA-MW-23		X
H-21R		X
H-28	X	X
H-48		X
H-49A		X
H-56A		X
H-58A		X
M-6A	X	X
M-7B	X	X
M-10		X
M-13		X
M-23	X	X
M-44		X
M-48		X
M-92	X	X
M-94		X
M-95		X
M-96		X
M-97		X
M-98	X	X
M-99	X	X
M-100	X	X
M-103	X	X
M-120	X	X
M-121	X	X
M-124		X
M-137		X
M-138		X
M-144		X
MC-3	X	X
MC-09R	X	X
MC-45	X	X
MC-47		X
MC-48		X
MC-49		X
MC-50	X	X
MC-53	X	X
MC-62		X
MC-65		X
MC-66		X
MC-94	X	X
MC-97		X
MC-111		X
MC-113	X	X
MC-114	X	X
PC-37		X
PC-40		X

TABLE 2. Soil Gas and Groundwater Sampling Locations
Nevada Environmental Response Trust Site, Henderson, Nevada

Sample Location[a]	HRA[b]	Other Analyses[c]
PC-72		X
TR-6	X	X
TR-8	X	X
TR-10	X	X
WELL-M2		X
WELL-N		X
WELL-O		X

Notes:
HRA = Health risk assessment

[a] Soil gas sample locations with the prefix "E-SG" were collected in 2013, while soil gas sample locations with the prefix "SG" were collected in 2008.

[b] Listed samples include locations used for conducting the HRA.

[c] Listed samples include locations used for cross plots, spatial plots, and temporal analyses in Sections 4.2.2, 4.2.3, and 4.2.4, respectively.

TABLE 3. Comparison of Sample Quantitation Limits to Risk-Based Concentrations - 2008 and 2013 Data
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Maximum SQL ($\mu g/m^3$)[a]	Data Set[b]	RBC ($\mu g/m^3$)	Ratio of Maximum SQL to 10% RBC	Count of NDs > 10% RBC
Acetone	7.9	2008 Data Set	4.1E+08	1.9E-07	0
Acrylonitrile	1.7	2008 Data Set	5.6E+02	3.0E-02	0
Allyl chloride	0.34	2008 Data Set	--	--	--
Benzene	NA	NA	6.2E+03	NA	NA
Benzyl chloride	0.34	2008 Data Set	1.3E+03	2.7E-03	0
Bromodichloromethane	0.18	2008 Data Set	3.2E+03	5.6E-04	0
Bromoform	2.7	2013 Data Set	--	--	--
Bromomethane	0.34	2008 Data Set	1.0E+05	3.4E-05	0
1,3-Butadiene	0.44	2013 Data Set	--	--	--
2-Butanone (MEK)	0.79	2008 Data Set	9.0E+07	8.8E-08	0
N-Butylbenzene	NA	NA	9.7E+06	NA	NA
sec-Butylbenzene	1.7	2008 Data Set	9.6E+06	1.8E-06	0
tert-Butylbenzene	0.68	2008 Data Set	--	--	--
Carbon Disulfide	0.79	2008 Data Set	1.1E+07	7.4E-07	0
Carbon Tetrachloride	NA	NA	8.8E+03	NA	NA
Chlorobenzene	0.34	2008 Data Set	9.9E+05	3.4E-06	0
Chloroethane	0.34	2008 Data Set	8.6E+07	3.9E-08	0
Chloroform	NA	NA	1.9E+03	NA	NA
Chloromethane	0.34	2008 Data Set	--	--	--
Cyclohexane	73	2013 Data Set	1.1E+08	6.6E-06	0
1,2-Dibromo-3-chloropropane	1.7	2008 Data Set	1.8E+01	9.3E-01	0
Dibromochloromethane	0.34	2008 Data Set	6.4E+03	5.3E-04	0
1,2-Dibromoethane (EDB)	0.34	2008 Data Set	2.6E+02	1.3E-02	0
1,2-Dichlorobenzene	0.34	2008 Data Set	4.2E+06	8.2E-07	0
1,3-Dichlorobenzene	0.34	2008 Data Set	4.1E+06	8.2E-07	0
1,4-Dichlorobenzene	0.18	2013 Data Set	5.3E+03	3.4E-04	0
Dichlorodifluoromethane	NA	NA	2.1E+06	NA	NA
1,1-Dichloroethane	0.82	2013 Data Set	3.4E+04	2.4E-04	0
1,2-Dichloroethane	0.34	2008 Data Set	1.6E+03	2.1E-03	0
1,1-Dichloroethene	0.33	2008 Data Set	3.4E+06	9.7E-07	0
cis-1,2-Dichloroethene	0.34	2008 Data Set	1.2E+06	2.9E-06	0
trans-1,2-Dichloroethene	0.34	2008 Data Set	1.2E+06	2.8E-06	0
1,2-Dichloropropane	0.34	2008 Data Set	5.3E+03	6.4E-04	0
cis-1,3-Dichloropropene	1.7	2008 Data Set	1.6E+04	1.1E-03	0
trans-1,3-Dichloropropene	1.7	2008 Data Set	1.6E+04	1.1E-03	0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.7	2008 Data Set	5.7E+08	3.0E-08	0
Diisopropyl ether (DIPE)	1.7	2008 Data Set	--	--	--
1,4-Dioxane	1.7	2008 Data Set	5.5E+03	3.1E-03	0
Ethanol	7.9	2008 Data Set	8.3E+08	9.5E-08	0
Ethyl acetate	NA	NA	1.3E+07	NA	NA
Ethyl tert-butyl ether (ETBE)	1.7	2008 Data Set	2.3E+05	7.2E-05	0
Ethylbenzene	1.6	2008 Data Set	2.2E+04	7.3E-04	0
4-Ethyltoluene	1.6	2008 Data Set	8.7E+06	1.8E-06	0
Heptane	1.7	2008 Data Set	7.1E+07	2.4E-07	0
Hexachlorobutadiene	0.34	2008 Data Set	3.1E+03	1.1E-03	0
Hexane	NA	NA	7.1E+06	NA	NA
2-Hexanone	0.23	2013 Data Set	5.2E+05	4.4E-06	0
Isopropylbenzene	1.7	2008 Data Set	8.7E+06	1.9E-06	0
4-Isopropyltoluene	1.7	2008 Data Set	9.7E+06	1.8E-06	0
Methylene chloride	0.85	2008 Data Set	4.4E+06	1.9E-06	0
Methyl methacrylate	1.7	2008 Data Set	1.3E+07	1.3E-06	0
4-Methyl-2-pentanone	1.7	2008 Data Set	5.8E+07	2.9E-07	0
Methyl-t-butyl ether (MTBE)	0.89	2013 Data Set	1.7E+05	5.4E-05	0
alpha-Methylstyrene	1.7	2008 Data Set	2.2E+07	7.6E-07	0
Naphthalene	0.42	2013 Data Set	1.9E+03	2.2E-03	0

TABLE 3. Comparison of Sample Quantitation Limits to Risk-Based Concentrations - 2008 and 2013 Data
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Maximum SQL ($\mu g/m^3$)[a]	Data Set[b]	RBC ($\mu g/m^3$)	Ratio of Maximum SQL to 10% RBC	Count of NDs > 10% RBC
n-Octane	1.7	2008 Data Set	1.9E+08	9.2E-08	0
N-Propylbenzene	1.6	2008 Data Set	9.3E+06	1.7E-06	0
Styrene	1.7	2008 Data Set	2.0E+07	8.4E-07	0
tert-Amyl methyl ether (TAME)	1.7	2008 Data Set	2.3E+05	7.2E-05	0
t-Butyl alcohol (TBA)	NA	NA	4.9E+08	NA	NA
1,1,1,2-Tetrachloroethane	0.16	2013 Data Set	7.7E+03	2.1E-04	0
1,1,2,2-Tetrachloroethane	0.34	2008 Data Set	9.8E+02	3.5E-03	0
Tetrachloroethene	NA	NA	2.2E+05	NA	NA
Tetrahydrofuran	1.4	2013 Data Set	--	--	--
Toluene	NA	NA	8.7E+07	NA	NA
1,2,4-Trichlorobenzene	0.33	2008 Data Set	8.4E+04	3.9E-05	0
1,1,1-Trichloroethane	0.34	2008 Data Set	9.5E+07	3.6E-08	0
1,1,2-Trichloroethane	0.34	2008 Data Set	3.3E+03	1.0E-03	0
Trichloroethene	NA	NA	1.3E+04	NA	NA
Trichlorofluoromethane	1.2	2013 Data Set	1.2E+07	9.8E-07	0
1,1,2-Trichlorotrifluoroethane	1.9	2013 Data Set	5.7E+08	3.3E-08	0
1,2,4-Trimethylbenzene	NA	NA	1.6E+05	NA	NA
1,3,5-Trimethylbenzene	1.7	2008 Data Set	1.6E+05	1.0E-04	0
Vinyl Acetate	7.9	2008 Data Set	3.5E+06	2.2E-05	0
Vinyl Chloride	0.34	2008 Data Set	9.6E+03	3.5E-04	0
m,p-Xylene	NA	NA	1.9E+06	NA	NA
o-Xylene	NA	NA	1.7E+06	NA	NA
Xylenes, Total	NA	NA	1.9E+06	NA	NA

Notes:
-- = Not detected; RBCs were not calculated
> = Greater than
NA = Not applicable; chemical was detected in all samples
ND = Nondetects
RBC = Risk-based concentration
SQL = Sample quantitation limit

$\mu g/m^3$ = micrograms per cubic meter

[a] The maximum SQL for chemicals not detected.
[b] The data set of the maximum SQL for chemicals not detected.

TABLE 4. Soil Properties Data[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Sample ID	Depth (ft)	Volumetric Water Content[b]	Dry Bulk Density[c] (g/cm^3)	Grain Density[d] (g/cm^3)	Soil Total Porosity[e] (g/cm^3)	Soil Type
SA56-10BSPLP	10	0.134	1.689	2.719	0.379	Loamy Sand
RSAM3-10BSPLP	10	0.145	1.593	2.674	0.404	Loamy Sand
SA166-10BSPLP	10	0.100	1.721	2.681	0.358	Loamy Sand
SA182-10BSPLP	10	0.182	1.740	2.601	0.331	Sandy Loam
RSAJ3-10BSPLP	10	0.154	1.770	2.682	0.340	Loamy Sand
RSAI7-10B	10	0.138	1.661	2.682	0.381	Sand
SA34-10BSPLP	10	0.169	1.738	2.696	0.355	Loamy Sand
SA52-15BSPLP	15	0.239	1.405	2.710	0.481	Sand
RSAQ8-10BSPLP	10	0.148	1.697	2.695	0.370	Sand
RSAN8-10BSPLP	10	0.189	1.679	2.683	0.374	Loamy Sand
RSAQ4-10BSPLP	10	0.141	1.841	2.705	0.319	Sand
SA148-10BSPLP	10	0.119	1.762	2.732	0.355	Sand
SA30-9BSPLP	9	0.160	1.805	2.711	0.334	Sand
SA128-10BSPLP	10	0.156	1.654	2.654	0.377	Loamy Sand
SA102-10BSPLP	10	0.135	1.769	2.696	0.344	Sand
SA64-10BSPLP	10	0.148	1.717	2.651	0.352	Sand
Mean	10.25	0.154	1.703	2.686	0.366	Loamy Sand
Mininum	9	0.100	1.405	2.601	0.319	NA
Maximum	15	0.239	1.841	2.732	0.481	NA
Median	10	0.148	1.719	2.689	0.357	NA

Notes:

NA = not applicable

g/cm^3 = grams per cubic centimeter

[a] The soil properties were reported in Northgate (2010d).

[b] As measured according to ASTM D 2216.

[c] As measured according to ASTM D 2937.

[d] As measured according to ASTM D 854.

[e] Calculated from dry bulk density and grain density.

Reference:

Northgate Environmental Management, Inc. (Northgate), 2010d. Site-Wide Soil Gas Human Health Risk Assessment, Tronox LLC, Henderson, Nevada. November 22.

TABLE 5. Comparison of Sample Quantitation Limits to Risk-Based Concentrations - 2013 Data
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Maximum SQL ($\mu g/m^3$)[a]	RBC ($\mu g/m^3$)	Ratio of Maximum SQL to 10% RBC	Count of NDs > 10% RBC
Acetone	NA	4.1E+08	NA	NA
Acrylonitrile	0.12	5.6E+02	2.1E-03	0
Benzene	NA	6.2E+03	NA	NA
Benzyl chloride	0.071	1.3E+03	5.6E-04	0
Bromodichloromethane	0.1	3.2E+03	3.1E-04	0
Bromoform	2.7	--	--	--
Bromomethane	0.21	1.0E+05	2.1E-05	0
1,3-Butadiene	0.44	--	--	--
2-Butanone (MEK)	NA	9.0E+07	NA	NA
Carbon Disulfide	0.051	1.1E+07	4.8E-08	0
Carbon Tetrachloride	NA	8.8E+03	NA	NA
Chlorobenzene	0.07	9.9E+05	7.0E-07	0
Chloroethane	0.092	8.6E+07	1.1E-08	0
Chloroform	NA	1.9E+03	NA	NA
Chloromethane	0.027	--	--	--
Cyclohexane	73	1.1E+08	6.6E-06	0
1,2-Dibromo-3-chloropropane	0.21	1.8E+01	1.1E-01	0
Dibromochloromethane	0.11	6.4E+03	1.7E-04	0
1,2-Dibromoethane (EDB)	0.1	2.6E+02	3.8E-03	0
1,2-Dichlorobenzene	0.15	4.2E+06	3.6E-07	0
1,3-Dichlorobenzene	0.13	4.1E+06	3.1E-07	0
1,4-Dichlorobenzene	0.18	5.3E+03	3.4E-04	0
Dichlorodifluoromethane	NA	2.1E+06	NA	NA
1,1-Dichloroethane	0.82	3.4E+04	2.4E-04	0
1,2-Dichloroethane	0.09	1.6E+03	5.5E-04	0
1,1-Dichloroethene	0.048	3.4E+06	1.4E-07	0
cis-1,2-Dichloroethene	0.068	1.2E+06	5.7E-07	0
trans-1,2-Dichloroethene	0.064	1.2E+06	5.2E-07	0
1,2-Dichloropropane	0.12	5.3E+03	2.3E-04	0
cis-1,3-Dichloropropene	0.084	1.6E+04	5.3E-05	0
trans-1,3-Dichloropropene	0.25	1.6E+04	1.6E-04	0
1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	5.7E+08	2.8E-09	0
Diisopropyl ether (DIPE)	0.07	--	--	--
1,4-Dioxane	0.1	5.5E+03	1.8E-04	0
Ethyl acetate	NA	1.3E+07	NA	NA
Ethyl tert-butyl ether (ETBE)	0.088	2.3E+05	3.8E-06	0
Ethylbenzene	NA	2.2E+04	NA	NA
4-Ethyltoluene	1.2	8.7E+06	1.4E-06	0
Heptane	0.077	7.1E+07	1.1E-08	0
Hexachlorobutadiene	0.14	3.1E+03	4.5E-04	0
Hexane	NA	7.1E+06	NA	NA
2-Hexanone	0.23	5.2E+05	4.4E-06	0
Methylene chloride	0.078	4.4E+06	1.8E-07	0
4-Methyl-2-pentanone	NA	5.8E+07	NA	NA
Methyl-t-butyl ether (MTBE)	0.89	1.7E+05	5.4E-05	0
Naphthalene	0.42	1.9E+03	2.2E-03	0
Styrene	0.052	2.0E+07	2.6E-08	0
tert-Amyl methyl ether (TAME)	0.08	2.3E+05	3.4E-06	0
t-Butyl alcohol (TBA)	NA	4.9E+08	NA	NA
1,1,1,2-Tetrachloroethane	0.16	7.7E+03	2.1E-04	0
1,1,2,2-Tetrachloroethane	0.075	9.8E+02	7.7E-04	0
Tetrachloroethene	NA	2.2E+05	NA	NA

TABLE 5. Comparison of Sample Quantitation Limits to Risk-Based Concentrations - 2013 Data
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Maximum SQL ($\mu g/m^3$)[a]	RBC ($\mu g/m^3$)	Ratio of Maximum SQL to 10% RBC	Count of NDs > 10% RBC
Tetrahydrofuran	1.4	--	--	--
Toluene	NA	8.7E+07	NA	NA
1,2,4-Trichlorobenzene	0.22	8.4E+04	2.6E-05	0
1,1,1-Trichloroethane	0.096	9.5E+07	1.0E-08	0
1,1,2-Trichloroethane	0.1	3.3E+03	3.0E-04	0
Trichloroethene	NA	1.3E+04	NA	NA
Trichlorofluoromethane	1.2	1.2E+07	9.8E-07	0
1,1,2-Trichlorotrifluoroethane	1.9	5.7E+08	3.3E-08	0
1,2,4-Trimethylbenzene	NA	1.6E+05	NA	NA
1,3,5-Trimethylbenzene	0.16	1.6E+05	9.9E-06	0
Vinyl Acetate	NA	3.5E+06	NA	NA
Vinyl Chloride	0.12	9.6E+03	1.2E-04	0
Xylenes, Total	NA	1.9E+06	NA	NA

Notes:
-- = Not detected; RBCs were not calculated
> = Greater than
NA = Not applicable; chemical was detected in all samples
ND = Nondetects
RBC = Risk-based concentration
SQL = Sample quantitation limit

$\mu g/m^3$ = micrograms per cubic meter

[a] The maximum SQL for chemicals not detected.

TABLE 6. Soil Gas Sampling Locations Evaluated in the HRA[a]
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel[b]	Sample ID Number	Data Source	Sample Location	
			In Study Area[c]	Near Study Area
Parcel C	E-SG-1	ENVIRON 2013a	X	
	E-SG-2	ENVIRON 2013a	X	
	E-SG-3	ENVIRON 2013a	X	
	SG17	ENSR 2008a		X
	SG18	ENSR 2008a	X	
	SG19	ENSR 2008a	X	
	SG24	ENSR 2008a	X	
	SG90	ENSR 2008a	X	
	SG91	ENSR 2008a	X	
Parcel D	E-SG-1	ENVIRON 2013a	X	
	E-SG-9	ENVIRON 2013a	X	
	SG16	ENSR 2008a	X	
	SG17	ENSR 2008a		X
	SG18	ENSR 2008a	X	
Parcel F	E-SG-4	ENVIRON 2013a	X	
	E-SG-5	ENVIRON 2013a	X	
	E-SG-6	ENVIRON 2013a	X	
	SG34	ENSR 2008a	X	
	SG74	ENSR 2008a	X	
Parcel G	E-SG-7	ENVIRON 2013a	X	
	E-SG-8	ENVIRON 2013a	X	
	SG45	ENSR 2008a		X
Parcel H[d]	SG49	ENSR 2008a	X	
	SG50	ENSR 2008a	X	

Notes:
bgs = below ground surface
HRA = health risk assessment

[a] ENVIRON (2013a) and Phase B soil gas samples (ENSR 2008a) used in support of the HRA were collected at a depth of 5 feet bgs.
[b] For each parcel, listed samples include locations within or near the parcel. Results for sample locations outside the a parcel were discussed in the HRA to understand the extent of contamination and used in the quantitative evaluation.
[c] Includes samples collected on or near the border (i.e., within 25 feet) of the Study Area.
[d] No additional ENVIRON samples were collected in Parcel H because adequate soil gas and groundwater samples exist to characterize the contaminant distribution as described in (ENVIRON 2013a).

References:
ENSR Corporation (ENSR), 2008a. Phase B Source Area Investigation Work Plan, Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada, March.
ENVIRON International Corporation (ENVIRON), 2013a. Soil Gas Investigation and Human Health Risk Assessment Work Plan for Parcels C, D, F, G, and H, Nevada Environmental Response Trust Site, Henderson, Nevada. March 18.

TABLE 7. Soil Gas Data Summary Statistics – 2013 Data[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	No. of Samples	No. of Detects	% Detects	Nondetects (µg/m^3)[b]		Detects (µg/m^3)					
				Minimum	Maximum	Minimum	Median	Mean	Maximum	Standard Deviation	Coefficient of Variation
Acetone	9	9	100%	--	--	6.2	16	20	67	19	0.9
Acrylonitrile	9	0	0%	0.05	0.06	ND	ND	ND	ND	ND	NA
Benzene	9	9	100%	--	--	1.4	2.1	4.0	12	4.0	1.0
Benzyl chloride	9	1	11%	0.03	0.04	0.43	0.43	0.43	0.43	NA	NA
Bromodichloromethane	9	6	67%	0.05	0.05	0.3	1.3	1.1	1.7	0.5	0.4
Bromoform	9	0	0%	1	1	ND	ND	ND	ND	ND	NA
Bromomethane	9	2	22%	0.1	0.1	0.36	0.6	0.6	0.84	0.3	0.6
1,3-Butadiene	9	0	0%	0.1	0.2	ND	ND	ND	ND	ND	NA
2-Butanone (MEK)	9	9	100%	--	--	3.2	4.9	5.7	9.9	2.3	0.4
Carbon Disulfide	9	0	0%	0.02	0.03	ND	ND	ND	ND	ND	NA
Carbon Tetrachloride	9	9	100%	--	--	0.3	25	38.0	110	41	1.1
Chlorobenzene	9	6	67%	0.04	0.04	0.12	1.4	4.7	17	6.8	1.4
Chloroethane	9	2	22%	0.04	0.05	100	120	120	140	28	0.2
Chloroform	9	9	100%	--	--	2.2	460	1,038	2,900	1,215	1.2
Chloromethane	9	0	0%	0.01	0.01	ND	ND	ND	ND	ND	NA
Cyclohexane	9	2	22%	0.09	37	4.7	4.8	4.8	4.9	0.1	0.0
1,2-Dibromo-3-chloropropane	9	1	11%	0.1	0.1	1.7	1.7	1.7	1.7	NA	NA
Dibromochloromethane	9	1	11%	0.06	0.06	1.2	1.2	1.2	1.2	NA	NA
1,2-Dibromoethane (EDB)	9	1	11%	0.05	0.05	1.4	1.4	1.4	1.4	NA	NA
1,2-Dichlorobenzene	9	4	44%	0.08	0.08	1.5	3.1	3.4	6.1	1.9	0.6
1,3-Dichlorobenzene	9	3	33%	0.05	0.07	0.12	13	17	38	19	1.1
1,4-Dichlorobenzene	9	4	44%	0.09	0.09	0.94	2.8	4	10	4.2	1.0
Dichlorodifluoromethane	9	9	100%	--	--	1.5	2.1	2.0	2.6	0.4	0.2
1,1-Dichloroethane	9	4	44%	0.4	0.4	1	146	156	330	179	1.2
1,2-Dichloroethane	9	4	44%	0.05	0.05	0.15	13.4	15	33	17	1.1
1,1-Dichloroethene	9	2	22%	0.02	0.02	13	23	23	33	14	0.6
cis-1,2-Dichloroethene	9	3	33%	0.03	0.03	0.32	0.89	1.2	2.3	1.0	0.9
trans-1,2-Dichloroethene	9	3	33%	0.03	0.03	0.94	2.1	1.7	2.2	0.7	0.4
1,2-Dichloropropane	9	2	22%	0.06	0.06	1	1.2	1.2	1.4	0.3	0.2
cis-1,3-Dichloropropene	9	1	11%	0.04	0.04	0.75	0.75	0.75	0.75	NA	NA
trans-1,3-Dichloropropene	9	1	11%	0.1	0.1	0.68	0.68	0.68	0.68	NA	NA
1,2-Dichloro-1,1,2,2-tetrafluoroethane	9	1	11%	0.08	0.08	1.4	1.4	1.4	1.4	NA	NA
Diisopropyl ether (DIPE)	9	0	0%	0.03	0.04	ND	ND	ND	ND	ND	NA
1,4-Dioxane	9	1	11%	0.05	0.05	0.64	0.64	0.64	0.64	NA	NA
Ethyl acetate	9	9	100%	--	--	0.75	2.5	4.4	14	4.5	1.0
Ethyl tert-butyl ether (ETBE)	9	1	11%	0.04	0.04	0.82	0.82	0.82	0.82	NA	NA
Ethylbenzene	9	9	100%	--	--	0.61	0.79	1.3	4.4	1.2	1.0
4-Ethyltoluene	9	2	22%	0.5	0.6	1.2	2.15	2.15	3.1	1.3	0.6
Heptane	9	7	78%	0.04	0.04	0.91	1.7	1.7	2.4	0.7	0.4

TABLE 7. Soil Gas Data Summary Statistics – 2013 Data[a]
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	No. of Samples	No. of Detects	% Detects	Nondetects (µg/m^3)[b]		Detects (µg/m^3)					
				Minimum	Maximum	Minimum	Median	Mean	Maximum	Standard Deviation	Coefficient of Variation
Hexachlorobutadiene	9	4	44%	0.07	0.07	1.1	3.1	4	7.1	2.6	0.7
Hexane	9	9	100%	--	--	0.95	1.7	680	6,100	2,033	3.0
2-Hexanone	9	5	56%	0.1	0.1	0.52	0.7	1	2.3	0.7	0.7
Methylene chloride	9	3	33%	0.04	0.04	2.9	14	12	19	8.2	0.7
4-Methyl-2-pentanone	9	9	100%	--	--	0.77	2.1	2.6	7.2	2.0	0.8
Methyl-t-butyl ether (MTBE)	9	0	0%	0.05	0.4	ND	ND	ND	ND	ND	NA
Naphthalene	9	8	89%	0.2	0.2	0.89	1.35	1.9	5.2	1.4	0.8
Styrene	9	3	33%	0.03	0.03	0.098	0.26	0.4	0.74	0.3	0.9
tert-Amyl methyl ether (TAME)	9	1	11%	0.04	0.04	0.78	0.78	0.78	0.78	NA	NA
t-Butyl alcohol (TBA)	9	9	100%	--	--	0.92	2.8	2.5	4.8	1.2	0.5
1,1,1,2-Tetrachloroethane	9	1	11%	0.08	0.08	1.1	1.1	1.1	1.1	NA	NA
1,1,2,2-Tetrachloroethane	9	1	11%	0.04	0.04	1.1	1.1	1.1	1.1	NA	NA
Tetrachloroethene	9	9	100%	--	--	1.2	17	188	1,100	368	2.0
Tetrahydrofuran	9	0	0%	0.6	0.7	ND	ND	ND	ND	ND	NA
Toluene	9	9	100%	--	--	0.77	5.7	6.3	15	4.7	0.7
1,2,4-Trichlorobenzene	9	3	33%	0.1	0.1	1.2	9.9	30.0	79	43	1.4
1,1,1-Trichloroethane	9	1	11%	0.05	0.05	1	1	1	1	NA	NA
1,1,2-Trichloroethane	9	3	33%	0.05	0.05	1.1	8.2	10	21	10	1.0
Trichloroethene	9	9	100%	--	--	0.34	3.9	98.7	570	188	1.9
Trichlorofluoromethane	9	6	67%	0.6	0.6	1.2	1.7	9.6	48	19	2.0
1,1,2-Trichlorotrifluoroethane	9	0	0%	0.8	1.0	ND	ND	ND	ND	ND	NA
1,2,4-Trimethylbenzene	9	9	100%	--	--	0.44	0.9	1.3	3.2	1.0	0.8
1,3,5-Trimethylbenzene	9	3	33%	0.08	0.08	0.67	1.1	0.99	1.2	0.3	0.3
Vinyl Acetate	9	9	100%	--	--	1.8	3.5	4.4	10	2.6	0.6
Vinyl Chloride	9	3	33%	0.06	0.06	0.4	2.3	2.4	4.4	2.0	0.8
Xylenes, Total	9	9	100%	--	--	2.9	3.7	5.8	21	5.8	1.0

Notes:
-- = No value
NA = Not applicable
ND = Nondetects

µg/m^3 = microgram per cubic meter

[a] Summary statistics presented for all locations across the Study Area.
[b] The minimum and maximum non-detected values are represented by one half of the sample quantitation limit.

Table 8. Soil Gas Summary Statistics – 2008 and 2013 Data[a]
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	No. of Samples	No. of Detects	% Detects	Nondetects (µg/m^3)[b]		Detects (µg/m^3)						
				Minimum	Maximum	Minimum	Median	Mean	Maximum	Standard Deviation	Coefficient of Variation	Location of Maximum Detect
Acetone	21	20	95%	4.0	4.0	6.2	16	18	67	14	0.8	E-SG-6
Acrylonitrile	21	2	10%	0.050	0.85	0.11	0.13	0.13	0.15	0.028	0.2	SG17
Allyl chloride	12	0	0%	0.075	0.17	ND	ND	ND	ND	ND	NA	NA
Benzene	21	21	100%	--	--	1.4	2.2	3.1	12	2.7	0.9	E-SG-2
Benzyl chloride	21	1	5%	0.034	0.17	0.43	0.43	0.43	0.43	NA	NA	E-SG-6
Bromodichloromethane	21	14	67%	0.050	0.090	0.14	0.825	0.9	1.8	0.5	0.6	SG34
Bromoform	21	0	0%	0.38	1.4	ND	ND	ND	ND	ND	NA	NA
Bromomethane	21	2	10%	0.075	0.17	0.36	0.6	0.60	0.84	0.34	0.6	E-SG-6
1,3-Butadiene	9	0	0%	0.14	0.22	ND	ND	ND	ND	ND	NA	NA
2-Butanone (MEK)	21	20	95%	0.40	0.40	2.9	4.9	5.9	13	2.9	0.5	SG24
N-Butylbenzene	12	12	100%	--	--	0.18	0.315	0.56	2.4	0.63	1.1	SG18
sec-Butylbenzene	12	3	25%	0.38	0.85	0.12	0.23	0.20	0.24	0.07	0.3	SG18
tert-Butylbenzene	12	0	0%	0.15	0.34	ND	ND	ND	ND	ND	NA	NA
Carbon Disulfide	21	11	52%	0.021	0.40	0.75	2.5	6.7	32	9	1.4	SG50
Carbon Tetrachloride	21	21	100%	--	--	0.12	6.2	38	260	63	1.7	SG90
Chlorobenzene	21	9	43%	0.035	0.17	0.11	0.43	3.4	17	5.7	1.7	E-SG-2
Chloroethane	21	9	43%	0.038	0.17	0.14	1.3	30	140	52	1.7	E-SG-3
Chloroform	21	21	100%	--	--	0.83	180	858	3,900	1160	1.4	SG90
Chloromethane	21	0	0%	0.011	0.17	ND	ND	ND	ND	ND	NA	NA
Cyclohexane	9	2	22%	0.090	37	4.7	4.8	4.8	4.9	0.14	0.0	E-SG-1
1,2-Dibromo-3-chloropropane	21	1	5%	0.10	0.85	1.7	1.7	1.7	1.7	NA	NA	E-SG-6
Dibromochloromethane	21	1	5%	0.055	0.17	1.2	1.2	1.20	1.2	NA	NA	E-SG-6
1,2-Dibromoethane (EDB)	21	1	5%	0.048	0.17	1.4	1.4	1.4	1.4	NA	NA	E-SG-6
1,2-Dichlorobenzene	21	7	33%	0.075	0.17	0.29	2.7	4.4	16	5.5	1.2	SG19
1,3-Dichlorobenzene	21	8	38%	0.050	0.17	0.12	0.285	6.6	38	13	2.0	E-SG-2
1,4-Dichlorobenzene	21	16	76%	0.090	0.090	0.35	4.3	13	80	21	1.6	SG34
Dichlorodifluoromethane	21	21	100%	--	--	1.5	2.0	2.0	2.6	0.27	0.1	E-SG-3
1,1-Dichloroethane	21	11	52%	0.075	0.41	0.35	1.4	58	330	125	2.2	E-SG-2
1,2-Dichloroethane	21	10	48%	0.045	0.17	0.15	0.82	6.5	33	12	1.9	E-SG-3
1,1-Dichloroethene	21	6	29%	0.020	0.17	0.1	23	32	110	41	1.3	SG74
cis-1,2-Dichloroethene	21	6	29%	0.034	0.17	0.14	0.61	0.87	2.3	0.83	1.0	E-SG-2
trans-1,2-Dichloroethene	21	3	14%	0.032	0.17	0.94	2.1	1.7	2.2	0.7	0.4	E-SG-3
1,2-Dichloropropane	21	6	29%	0.055	0.17	0.36	0.82	0.85	1.4	0.41	0.5	E-SG-3
cis-1,3-Dichloropropene	21	1	5%	0.040	0.85	0.75	0.75	0.75	0.75	NA	NA	E-SG-6
trans-1,3-Dichloropropene	21	1	5%	0.12	0.85	0.68	0.68	0.68	0.68	NA	NA	E-SG-6

Table 8. Soil Gas Summary Statistics – 2008 and 2013 Data[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	No. of Samples	No. of Detects	% Detects	Nondetects (µg/m^3)[b]		Detects (µg/m^3)						
				Minimum	Maximum	Minimum	Median	Mean	Maximum	Standard Deviation	Coefficient of Variation	Location of Maximum Detect
1,2-Dichloro-1,1,2,2-tetrafluoroethane	21	7	33%	0.080	0.85	0.085	0.095	0.28	1.4	0.49	1.7	E-SG-6
Diisopropyl ether (DIPE)	21	0	0%	0.029	0.85	ND	ND	ND	ND	ND	NA	NA
1,4-Dioxane	21	5	24%	0.048	0.85	0.25	0.51	0.54	0.83	0.2	0.4	SG49
Ethanol	12	11	92%	4.0	4.0	2.2	5.6	5.2	7.4	1.5	0.3	SG74
Ethyl acetate	9	9	100%	--	--	0.75	2.5	4.4	14	4.5	1.0	E-SG-1
Ethyl tert-butyl ether (ETBE)	21	1	5%	0.042	0.85	0.82	0.82	0.82	0.82	NA	NA	E-SG-6
Ethylbenzene	21	20	95%	0.80	0.80	0.13	0.64	1.3	8.9	2.0	1.6	SG91
4-Ethyltoluene	21	12	57%	0.40	0.80	0.11	0.475	1.19	5.1	1.5	1.3	SG91
Heptane	21	14	67%	0.037	0.85	0.14	0.71	1.0	2.4	0.9	0.9	E-SG-3 & E-SG-6
Hexachlorobutadiene	21	11	52%	0.070	0.17	0.26	4	13	56	21	1.6	SG24
Hexane	9	9	100%	--	--	0.95	1.7	680	6,100	2033	3.0	E-SG-6
2-Hexanone	21	17	81%	0.11	0.12	0.17	0.52	0.66	2.3	0.49	0.7	E-SG-6
Isopropylbenzene	12	2	17%	0.38	0.85	0.14	0.35	0.35	0.55	0.29	0.8	SG91
4-Isopropyltoluene	12	8	67%	0.40	0.85	0.18	0.77	0.8	1.9	0.6	0.8	SG50
Methylene chloride	21	14	67%	0.039	0.43	0.097	1.22	3.7	19	5.8	1.6	E-SG-2
Methyl methacrylate	12	1	8%	0.38	0.85	0.14	0.14	0.14	0.14	NA	NA	SG50
4-Methyl-2-pentanone	21	17	81%	0.40	0.85	0.24	1.2	1.8	7.2	1.8	1.0	E-SG-2
Methyl-t-butyl ether (MTBE)	21	2	10%	0.048	0.45	0.13	0.30	0.3	0.47	0.2	0.8	SG34
alpha-Methylstyrene	12	4	33%	0.38	0.85	0.19	0.26	0.31	0.54	0.2	0.5	SG16
Naphthalene	21	20	95%	0.21	0.21	0.36	1.25	2.2	18	3.9	1.7	SG18
n-Octane	12	6	50%	0.40	0.85	0.11	0.35	2.1	11	4	2.1	SG91
N-Propylbenzene	12	9	75%	0.40	0.8	0.088	0.34	0.66	3.0	0.90	1.4	SG91
Styrene	21	9	43%	0.025	0.85	0.098	0.25	0.29	0.74	0.20	0.7	E-SG-6
tert-Amyl methyl ether (TAME)	21	1	5%	0.038	0.85	0.78	0.78	0.78	0.78	NA	NA	E-SG-6
t-Butyl alcohol (TBA)	21	21	100%	--	--	0.23	0.7	1.4	4.8	1.2	0.9	E-SG-6
1,1,1,2-Tetrachloroethane	9	1	11%	0.075	0.080	1.1	1.1	1.1	1.1	NA	NA	E-SG-6
1,1,2,2-Tetrachloroethane	21	2	10%	0.036	0.17	0.17	0.64	0.64	1.1	0.66	1.0	E-SG-6
Tetrachloroethene	21	21	100%	--	--	0.47	17	103	1,100	246	2.4	E-SG-3
Tetrahydrofuran	9	0	0%	0.60	0.70	ND	ND	ND	ND	ND	NA	NA
Toluene	21	21	100%	--	--	0.56	3.2	5.5	24	5.9	1.1	SG91
1,2,4-Trichlorobenzene	21	7	33%	0.075	0.17	0.14	6.3	17	79	28	1.7	E-SG-2
1,1,1-Trichloroethane	21	1	5%	0.046	0.17	1.00	1.00	1.0	1	NA	NA	E-SG-6
1,1,2-Trichloroethane	21	6	29%	0.050	0.17	0.18	1.2	5.5	21	8.2	1.5	E-SG-3
Trichloroethene	21	21	100%	--	--	0.14	3.9	47	570	128	2.7	E-SG-2
Trichlorofluoromethane	21	18	86%	0.55	0.60	0.98	1.15	4	48	11	2.8	E-SG-4

Table 8. Soil Gas Summary Statistics – 2008 and 2013 Data[a]
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	No. of Samples	No. of Detects	% Detects	Nondetects (µg/m^3)[b]		Detects (µg/m^3)						
				Minimum	Maximum	Minimum	Median	Mean	Maximum	Standard Deviation	Coefficient of Variation	Location of Maximum Detect
1,1,2-Trichlorotrifluoroethane	21	12	57%	0.80	0.95	0.45	0.47	0.48	0.54	0.03	0.1	SG34
1,2,4-Trimethylbenzene	21	21	100%	--	--	0.25	0.91	2.4	15	4.0	1.7	SG91
1,3,5-Trimethylbenzene	21	10	48%	0.075	0.85	0.180	0.72	1.3	4.5	1.4	1.1	SG91
Vinyl Acetate	21	20	95%	4.0	4.0	1.8	3.25	4.5	16	3.4	0.8	SG50
Vinyl Chloride	21	4	19%	0.060	0.17	0.094	1.35	1.8	4.4	2.0	1.1	E-SG-2
Xylenes, Total	21	21	100%	--	--	0.94	3.7	7.1	63	13	1.9	SG91

Notes:
-- = No value
NA = Not applicable
ND = Nondetects

µg/m^3 = microgram per cubic meter

[a] Summary statistics presented for all locations across the Study Area.
[b] The minimum and maximum non-detected values are represented by one half of the sample quantitation limit.

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Parcel C	AA-BW-04A	1/26/2009	<0.042	1300	11
		1/26/2009	NS	940	NS
		1/26/2009	NS	1400	NS
		1/26/2009	<0.042	1200	11
		4/20/2009	NS	3400	NS
		4/20/2009	<0.073	3100	4.2
		4/20/2009	<0.073	4000	3.9
		4/20/2009	NS	4000	NS
		4/20/2009	NS	900	NS
		4/20/2009	NS	910	NS
		7/21/2009	<36	1100	<46
		10/21/2009	<0.073	480	9.7
		10/21/2009	<0.073	490	11
		10/21/2009	NS	800	NS
		10/21/2009	NS	740	NS
		5/12/2010	NS	480	NS
		5/12/2010	<0.063	410	12
		10/28/2010	<38	400	<32
		10/28/2010	<38	330	<32
		3/24/2011	<38	380	<32
		3/24/2011	<38	500	<32
		10/20/2011	**<38**	**320**	**<32**
		10/20/2011	**<38**	**330**	**<32**
	H-28	3/18/1981	NS	200	NS
		7/1/1981	NS	ND	NS
		10/13/1981	NS	ND	NS
		2/9/1982	NS	ND	NS
		6/23/1982	NS	ND	NS
		12/7/1982	NS	ND	NS
		3/3/1998	NS	ND	NS
		4/29/1998	<5	<5.0	<5
		8/20/1998	<5	<5.0	<5
		11/18/1998	<5	<5.0	<5
		3/18/1999	<5	<5.0	<5
		12/13/2007	<1	<0.66J	4.2
		12/13/2007	NS	0.66	4.3
		4/22/2009	<0.073	0.90J	6.60
		7/22/2009	<0.73	1.2	5.2
		7/22/2009	<0.73	1.1	5.2
		10/20/2009	<1.5	0.70J	5.10
		4/21/2010	<0.063	0.32J	2.9
		10/26/2010	<0.76	0.64J	5.9
		3/24/2011	<0.95	<0.80	4.7J
		10/20/2011	**<0.76**	**<0.64**	**6.2**
	M-6A	**6/27/2008**	**<1**	**2.2**	**<1**
	M-7B	11/30/2006	<5	2.3J	<5
		12/18/2007	<1	2.2	<1
		6/26/2008	<1	2.1	<1
		2/3/2009	<0.042	1.3	<0.11
		4/23/2009	<0.073	1.1	<0.091
		7/28/2009	<0.073	1.4	<0.091

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Parcel C (Continued)	M-7B (Continued)	7/28/2009	<0.073	1.4	<0.091
		10/28/2009	<0.073	1.5	<0.091
		4/22/2010	<0.063	1.3	<0.21
		10/28/2010	<0.19	<0.16	<0.16
		3/30/2011	<0.19	1.9	<0.16
		10/26/2011	**<0.19**	**1.5**	**<0.16**
	M-98	**11/30/2006**	**9.6**	**810**	**<5**
	M-99	**5/6/2010**	**1.1J**	**150**	**0.35J**
	M-100	**12/4/2006**	**<5**	**38**	**<5**
		12/4/2006	**<5**	**36**	**<5**
	MC-3	**5/27/2009**	**<18**	**16J**	**15J**
Parcel D	M-23	**6/25/2008**	**2.9J**	**130**	**<1**
	MC-09R	7/24/2009	<0.28	7.9	<0.26
		5/19/2010	0.28	4.3	0.26
		4/22/2011	**<0.28**	**6.5**	**<0.26**
	MC-113	11/7/2008	<0.28	2.6	<0.26
		1/22/2009	<0.28	<0.33	<0.26
		4/14/2009	<0.28	2.6	<0.26
		4/22/2010	**<5**	**3**	**<2**
	MC-114	11/7/2008	<0.56	37.0	<0.52
		1/22/2009	<2.8	<3.3	<2.6
		4/14/2009	<0.28	16.0	<0.26
		4/22/2010	**<5**	**5.4**	**2.1**
	MC-45	1/17/1986	NS	ND	NS
		2/19/1986	NS	ND	NS
		7/15/1986	NS	ND	NS
		12/6/2006	<5	3.0J	<5
		6/25/2008	**<1**	**3.0**	**<1**
	MC-50	4/1/2004	<5	55	<5
		6/29/2004	<5	25	<5
		9/29/2004	<0.5	9.3	<0.5
		1/26/2005	<0.5	4.7	<0.5
		4/20/2005	<0.5	3.4	<0.5
		10/27/2005	<0.5	<0.5	<0.5
		2/1/2006	<5	270	<5
		4/26/2006	<0.5	6.3	<0.5
		7/27/2006	<0.5	3.1	<0.5
		11/29/2006	<0.28	<0.33	<0.26
		1/18/2007	<0.28	4	<0.26
		4/18/2007	<0.28	15	<0.26
		7/16/2007	<0.28	6.2	<0.26
		12/21/2007	<0.56	<0.66	<0.52
		1/29/2008	<1.1	<1.3	<1
		4/9/2008	<0.28	7.6	<0.26
		7/10/2008	<0.28	5	<0.26
		7/10/2008	<0.28	4.2	<0.26
		11/6/2008	<0.28	3.2	<0.26
		1/21/2009	<0.28	3.4	<0.26
		4/13/2009	<0.28	2.9	<0.26
		4/21/2010	**<5**	**3.2**	**<2**
	MC-53	4/1/2004	<2.5	9.0	12.0

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Parcel D (Continued)	MC-53 (Continued)	6/29/2004	<1	31	11
		9/28/2004	<2.5	220	10
		1/26/2005	<0.5	30	2.6
		4/20/2005	<0.5	15	1.8
		10/26/2005	<0.5	17	1.1
		2/1/2006	<0.5	2.7	<0.5
		4/26/2006	<1.5	300	4.7
		7/26/2006	<0.5	25	2.1
		12/4/2006	<0.28	4.0	0.66J
		1/17/2007	<0.28	6.6	<0.26
		4/18/2007	<0.28	9.6	<0.26
		7/16/2007	<0.28	8.1	<0.26
		12/21/2007	<0.28	5.1	<0.26
		1/29/2008	<0.28	10	<0.26
		4/9/2008	<0.28	36	<0.26
		6/25/2008	<1	13	0.57J
		7/10/2008	<0.28	11	<0.26
		11/6/2008	<0.28	7.3	<0.26
		1/21/2009	<0.28	9.3	<0.26
		4/14/2009	<0.28	7.1	<0.26
		4/21/2010	**<5**	**5.0**	**0.3**
	MC-94	**10/7/2009**	**<0.36**	**5.4**	**0.27J**
Relevant Nearby Locations for Parcels C and D	AA-BW-03A	12/13/2007	NS	2.4	0.37J
		12/13/2007	<1	<2.6	0.34J
		1/21/2009	<0.042	<0.08	0.34J
		4/28/2009	<0.073	0.61J	0.44J
		7/23/2009	<0.073	0.99J	0.33J
		10/27/2009	0.13J	3.2	0.45J
		4/26/2010	<0.063	0.66J	0.3J
		10/28/2010	<0.19	<0.16	0.27J
		3/29/2011	<0.19	4.9	0.37J
		10/25/2011	**<0.19**	**3.4**	**<0.16**
	AA-BW-05A	1/23/2009	NS	70	NS
		1/23/2009	<0.042	61	22
		4/21/2009	<0.073	44	11
		7/21/2009	<3.6	41	10
		10/20/2009	<7.3	17	13
		10/20/2009	<7.3	16	14
		5/12/2010	<0.063	29	15
		10/27/2010	<19	33J	17J
		3/24/2011	<0.95	28	34
		10/20/2011	**<19**	**<16**	**33J**
	H-21R	8/24/1999	NS	490	NS
		12/8/1999	NS	780	NS
		3/27/2000	NS	ND	NS
		6/15/2000	NS	<300	NS
		9/21/2000	NS	<300	NS
		11/8/2000	NS	<300	NS
		1/18/2001	NS	<300	NS
		5/24/2001	NS	54	NS
		7/26/2001	NS	37	NS
		10/25/2001	NS	<250	NS

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels C and D (Continued)	H-21R (Continued)	2/14/2002	NS	35	NS
		4/11/2002	NS	69	NS
		8/2/2002	NS	<250	NS
		11/8/2002	NS	<250	NS
		2/27/2003	NS	23	NS
		6/5/2003	NS	24	NS
		8/21/2003	NS	72	NS
		12/11/2003	NS	48	NS
		3/11/2004	NS	61	NS
		6/22/2004	NS	11	NS
		9/16/2004	NS	89	NS
		1/11/2005	NS	13	NS
		2/22/2005	NS	19	NS
		5/24/2005	<5	5.5	30
		9/23/2005	<25	<25	28
		10/25/2005	<5	20	70
		2/2/2006	<5	<5.0	17
		2/2/2006	<5	<5	17
		4/25/2006	<5	11	31
		4/25/2006	<5	9.0	29.0
		7/26/2006	<5	11	42
		7/26/2006	<5	12	41
		12/1/2006	<28	<33	<26
		12/1/2006	<28	<33	<26
		1/23/2007	<28	<33	<26
		4/20/2007	<5.6	<6.6	<5.2
		7/17/2007	<11	<13	<10
		11/15/2007	<0.28	19	29
		11/15/2007	<0.28	21	28
		1/30/2008	<14	<16	<13
		4/2/2008	<56	<66	<52
		7/11/2008	<110	<130	<100
		7/11/2008	<110	<130	<100
		11/5/2008	<56	<66	<52
		1/19/2009	<28	<33	<26
		1/23/2009	<0.042	<0.08	<110
		1/23/2009	NS	NS	47
		4/16/2009	<0.28	<0.33	<0.26
		4/20/2010	**<250**	**<100**	**54**
	H-48	9/1/1981	NS	900	NS
		10/14/1981	NS	400	NS
		11/10/1981	NS	300	NS
		2/9/1982	NS	ND	NS
		4/13/1982	NS	300	NS
		6/23/1982	NS	ND	NS
		8/16/1982	NS	ND	NS
		10/19/1982	NS	400	NS
		12/6/1982	NS	ND	NS
		2/14/1983	NS	200	NS
		2/29/1984	NS	1000	NS
		6/19/2008	**<1**	**<1**	**<1**
	H-49A	9/16/2004	NS	10	NS

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels C and D (Continued)	H-49A (Continued)	11/30/2004	NS	6.0	NS
		2/22/2005	NS	<5.0	NS
		5/24/2005	<5	<5.0	<5
		9/23/2005	<5	7.6	8.7
		10/25/2005	<5	7.0	9.3
		2/2/2006	<5	<5.0	<5
		4/25/2006	<5	<5.0	<5
		7/25/2006	<5	<5.0	<5
		11/30/2006	<0.28	<0.33	2
		1/18/2007	<0.28	3.4	2.3
		4/17/2007	<0.28	2.3	2.2
		7/11/2007	<0.28	2.0	2.5
		11/14/2007	<0.28	3.2	<0.26
		1/30/2008	<0.28	<0.33	2.1
		4/3/2008	<0.28	<0.33	2.9
		4/3/2008	<0.28	<0.33	2.9
		6/24/2008	<1	3.0	0.76J
		7/11/2008	<0.28	<0.33	2.8
		11/5/2008	<0.28	2.0	4.0
		1/19/2009	<0.28	<0.33	2.5
		4/15/2009	<0.28	<0.33	2.3
		4/20/2010	**<5**	**1.4**	**3.3**
	H-56A	9/16/2004	NS	ND	NS
		2/22/2005	NS	<5.0	NS
		5/24/2005	<5	<5.0	<5
		9/23/2005	<5	<5.0	<5
		10/25/2005	<5	<5.0	<5
		1/31/2006	<5	<5.0	<5
		4/25/2006	<5	<5.0	<5
		7/19/2006	<0.28	1.1	<0.26
		7/25/2006	<5	<5.0	<5
		11/30/2006	<0.28	<0.33J	<0.26
		1/17/2007	<0.28	<0.33	<0.26
		4/18/2007	<0.28	<0.33	<0.26
		4/18/2007	<0.28	<0.33	<0.26
		7/11/2007	<0.28	<0.33	<0.26
		11/14/2007	<0.28	<0.33	<0.26
		1/30/2008	<0.28	<0.33	<0.26
		4/3/2008	<0.28	<0.33	<0.26
		7/11/2008	<0.28	<0.33	<0.26
		11/5/2008	<0.28	<0.33	<0.26
		1/19/2009	<0.28	<0.33	<0.26
		4/15/2009	<0.28	<0.33	<0.26
		4/19/2010	<5	2.0	<2
		7/28/2010	**<1**	**2.0**	**<1**
	H-58A	9/16/2004	NS	ND	NS
		2/22/2005	NS	<5.0	NS
		5/24/2005	<5	<5.0	<5
		9/23/2005	<5	9.6	5.1
		10/25/2005	<5	17	<5
		2/2/2006	<5	7.7	<5

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels C and D (Continued)	H-58A (Continued)	4/25/2006	<5	4.9	<5
		7/25/2006	<5	16	<5
		11/30/2006	<0.28	<0.33	2.6
		1/18/2007	<0.28	4.3	2.7
		4/18/2007	<0.28	4.6	2.7
		7/11/2007	<0.28	6.6	2.1
		11/14/2007	<0.28	5.6	2.6
		1/30/2008	<0.28	9.7	3.4
		1/30/2008	<0.28	9.0	3.0
		4/3/2008	<0.28	8.6	2.5
		7/11/2008	<0.28	4.8	2.2
		11/5/2008	<0.28	2.4	2.9
		1/19/2009	<0.28	2.0	2.2
		4/15/2009	<0.28	<0.33	<0.26
		4/19/2010	**<5**	**2.2**	**1.4**
	M-44	**6/24/2008**	**2.1**	**34**	**0.53J**
	M-48	12/6/2006	1.4J	99	<5
		7/9/2008	**2.2**	**180**	**<1**
	M-94	**6/23/2008**	**2.1**	**50**	**0.57J**
	M-95	12/4/2006	6.1	350	<5
		6/27/2008	**2.6**	**390**	**1.1**
	M-96	**7/9/2008**	**<1**	**28**	**1**
	MC-111	1/26/2005	<0.5	<0.5	<0.5
		12/12/2007	<1	<0.96J	<1
		12/12/2007	NS	1	NS
		12/12/2007	<1	<0.99J	<1
		12/12/2007	**NS**	**1**	**NS**
	MC-47	9/29/2004	<0.5	7.1	<0.5
		1/25/2005	<0.5	1.7	<0.5
		4/19/2005	<0.5	1.9	<0.5
		10/26/2005	<0.5	4.5	<0.5
		1/31/2006	<0.5	4.3	<0.5
		4/26/2006	<0.5	16	<0.5
		7/26/2006	<0.5	4.9	<0.5
		11/29/2006	<0.28	<0.33	<0.26
		1/17/2007	<0.28	2.7	<0.26
		4/18/2007	<0.28	3.6	<0.26
		7/13/2007	<0.28	11	<0.26
		12/20/2007	<0.28	8	<0.26
		1/29/2008	<0.28	12	<0.26
		1/29/2008	<0.28	13	<0.26
		4/9/2008	<0.28	8.1	<0.26
		4/9/2008	<0.28	7.5	<0.26
		7/10/2008	<0.28	7.2	<0.26
		11/7/2008	<0.28	8.2	<0.26
		1/20/2009	<0.28	11.0	<0.26
		4/13/2009	<0.28	5.9	<0.26
		4/20/2010	**<5**	**10.0**	**<2**
	MC-48	1/15/1986	NS	ND	NS
		2/20/1986	NS	ND	NS
		7/15/1986	NS	ND	NS
		3/31/2004	<5	13	<5

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels C and D (Continued)	MC-48 (Continued)	6/29/2004	<1.5	8.1	8.5
		9/28/2004	<0.5	1.4	3
		1/25/2005	<0.5	1	<0.5
		4/19/2005	<0.5	1.8	<0.5
		10/26/2005	<0.5	2.1	1.7
		2/1/2006	<0.5	14	<0.5
		4/26/2006	<0.5	31	<0.5
		7/26/2006	<0.5	6.4	<0.5
		11/29/2006	<0.28	<0.33J	0.57J
		1/24/2007	<0.28	2.3	<0.26
		4/18/2007	<0.28	9.3	<0.26
		7/13/2007	<0.28	14	<0.26
		12/20/2007	<0.28	4.5	<0.26
		12/20/2007	<0.28	4.4	<0.26
		1/29/2008	<0.28	57	<0.26
		4/9/2008	<0.28	7.9	<0.26
		7/10/2008	<0.28	2.2	<0.26
		11/7/2008	<0.28	<0.33	<0.26
		1/20/2009	<0.28	<0.33	<0.26
		4/13/2009	<0.28	<0.33	<0.26
		4/21/2010	**<5**	**2.7**	**<2**
	MC-49	1/16/1986	NS	2100	NS
		2/20/1986	NS	1000.0	NS
		7/15/1986	NS	1600	NS
		4/1/2004	<5	<5	12
		6/29/2004	<1	13	6.7
		9/28/2004	<1.5	5.3	6.3
		1/26/2005	<1	5.1	7.3
		4/19/2005	<1	4.6	2.8
		10/27/2005	<2.5	13	9.5
		10/27/2005	<2.5	13	9.3
		2/2/2006	<10	<10	<10
		2/2/2006	<10	<10	<10
		4/27/2006	<2.5	39	5.4
		4/27/2006	<2.5	37	5.3
		7/27/2006	<2.5	9.1	<2.5
		7/27/2006	<2.5	9.2	<2.5
		12/4/2006	<280	2.2	<260
		12/4/2006	<0.28	440J	1.9J
		1/19/2007	<0.28	2.2	<0.26
		4/19/2007	<0.28	6.7	<0.26
		7/13/2007	<0.28	12	<0.26
		7/13/2007	<0.28	13	<0.26
		12/20/2007	<0.28	3.5	<0.26
		1/29/2008	<0.28	55	<0.26
		4/9/2008	<0.28	5.2	<0.26
		7/10/2008	<0.28	<0.33	<0.26
		11/6/2008	<0.28	<0.33	<0.26
		1/20/2009	<0.28	<0.33	<0.26
		4/13/2009	<0.28	<0.33	<0.26
		4/21/2010	**<5**	**1.6**	**1.4**
	MC-62	1/25/2005	<0.5	3.4	<0.5

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels C and D (Continued)	MC-62 (Continued)	4/19/2005	<0.5	2.8	<0.5
		10/27/2005	<0.5	4.3	<0.5
		2/1/2006	<1	68	<1
		4/27/2006	<1	8	<1
		7/27/2006	<0.5	4.6	<0.5
		6/23/2008	**<10**	**2.3J**	**2.2J**
	MC-65	**6/20/2008**	**0.54J**	**8.3**	**0.78J**
	MC-66	**6/20/2008**	**0.82J**	**5.2**	**0.58J**
		6/20/2008	**0.7J**	**5.3**	**0.54J**
	MC-97	**6/25/2008**	**<1**	**3.8**	**0.22J**
	PC-37	**6/20/2008**	**0.38J**	**2.0**	**0.76J**
	PC-40	12/17/1998	<5	<5.0	<5
		5/26/2000	<5	<5.0	<5
		12/1/2006	<5	4J	4.5J
		6/18/2008	**<1**	**1.6**	**3.5**
	PC-72	**6/23/2008**	**1.5**	**29**	**0.56J**
	WELL-M2	10/24/2008	<5.6	150	66
		4/23/2010	**<200**	**<80**	**83**
	WELL-N	**4/23/2010**	**<10**	**4.0**	**89.0**
	WELL-O	**4/23/2010**	**<500**	**920**	**<200**
Parcel F	M-92	11/29/2006	<5	30	3.8J
		7/15/2009	0.67J	30	3.1
		5/14/2010	**0.64J**	**28**	**3.5**
	TR-6	7/17/2009	58	2700	<1
		7/27/2010	**38**	**2000**	**<5**
Parcel G	TR-8	3/20/2006	NS	9.4	1.3J
		3/20/2006	<5	13	1.1J
		3/20/2006	<5	14	<5
		7/14/2009	**0.37J**	**9.8**	**0.5J**
Parcel H	M-103	3/20/2006	<5	<5.0	<5
		3/21/2006	<5	<5.0	<5
		7/8/2009	**<1**	**0.54J**	**<1**
	M-120	3/22/2006	<5	<5.0	<5
		11/28/2006	<5	1.1J	<5
		7/7/2009	<1	1.5	<1
		7/27/2010	**<5**	**1.1J**	**<5**
	M-121	3/23/2006	<5	<5.0	<5
		7/10/2009	**<1**	**2.6**	**<1**
	TR-10	3/13/2006	<5	<5.0	<5
		3/21/2006	<5	1.6J	<5
		7/14/2009	**<0.36**	**2.6**	**<0.13**
Relevant Nearby Locations for Parcels F, G, and H	AA-MW-23	7/16/2008	0.84J	24	1.8J
		7/16/2008	1J	28	2.2
		10/29/2008	**<0.28**	**24**	**<0.26**
	M-10	**7/10/2009**	**0.77J**	**55**	**<1**
	M-124	7/11/2008	4.6	240	2.9
		11/10/2008	**6.2**	**200**	**3.4**
	M-13	12/1/2006	<5	40	33
		6/25/2009	**<0.36**	**36**	**25**
		6/25/2009	**<0.36**	**35**	**23**
	M-137	**10/29/2009**	**<0.36**	**2.8**	**18**

TABLE 9. Historical and Recent VOC Concentrations in Shallow Groundwater[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Well ID	Date Sampled[b]	Carbon Tetrachloride (µg/L)[b]	Chloroform (µg/L)[b]	Trichloroethene (µg/L)[b]
Relevant Nearby Locations for Parcels F, G, and H (Continued)	M-138	**10/28/2009**	**<0.36**	**5.1**	**1.5**
		10/28/2009	**<0.36**	**5.0**	**1.5**
	M-144	**10/27/2009**	**<0.36**	**2.3**	**1.2**
	M-97	11/29/2006	<5	12	<5
		7/16/2009	**<0.36**	**10**	**2.5**

Notes:

< = Sample not detected

J = Associated value is an estimated quantity

ND = Sample not detected and detection limit not available

NS = No sample

µg/L = microgram per liter

[a] ENVIRON identified these wells using NDEP's Regional Database available at http://ndep.neptuneinc.org/ndep_gisdt/home/index.xml, the Data Validation Summary Reports for the Phase A Investigation (ENSR 2007) and the Phase B Groundwater Investigation (Northgate 2010a).

[b] Sample results highlighted in gray were presented in the Site-Wide Soil Gas HRA (Northgate 2010d) and bolded sample results represent the most recent chloroform sample results.

References:

ENSR Corporation (ENSR), 2007. Phase A Source Area Investigation Results Report, Tronox LLC Facility, Henderson, Nevada, September. NDEP approved the Report November 30, 2007 and Appendix G – Data Validation Summary Report (DVSR) December 17, 2007.

Northgate Environmental Management, Inc. (Northgate), 2010a. Revised Data Validation Summary Report, Phase B Investigation Groundwater, Tronox LLC, Henderson, Nevada. April 7. NDEP approved April 14, 2010.

Northgate, 2010d. Site-Wide Soil Gas Human Health Risk Assessment, Tronox LLC, Henderson, Nevada. November 22. Not reviewed by NDEP.

TABLE 10. Chemicals of Potential Concern

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	CASRN	Chemical of Potential Concern	
		Soil Gas	Groundwater
Acetone	67-64-1	X	
Acrylonitrile	107-13-1	X	
Benzene	71-43-2	X	X
Benzyl chloride	100-44-7	X	
Bromodichloromethane	75-27-4	X	
Bromomethane	74-83-9	X	
2-Butanone (MEK)	78-93-3	X	
N-Butylbenzene	104-51-8	X	
sec-Butylbenzene	135-98-8	X	
Carbon Disulfide	75-15-0	X	
Carbon Tetrachloride	56-23-5	X	X
Chlorobenzene	108-90-7	X	X
Chloroethane	75-00-3	X	
Chloroform	67-66-3	X	X
Cyclohexane	110-82-7	X	
1,2-Dibromo-3-chloropropane	96-12-8	X	
Dibromochloromethane	124-48-1	X	
1,2-Dibromoethane (EDB)	106-93-4	X	
1,2-Dichlorobenzene	95-50-1	X	X
1,3-Dichlorobenzene	541-73-1	X	
1,4-Dichlorobenzene	106-46-7	X	X
Dichlorodifluoromethane	75-71-8	X	
1,1-Dichloroethane	75-34-3	X	
1,2-Dichloroethane	107-06-2	X	X
1,1-Dichloroethene	75-35-4	X	
cis-1,2-Dichloroethene	156-59-2	X	
trans-1,2-Dichloroethene	156-60-5	X	
1,2-Dichloropropane	78-87-5	X	
cis-1,3-Dichloropropene	10061-01-5	X	
trans-1,3-Dichloropropene	10061-02-6	X	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	X	
1,4-Dioxane	123-91-1	X	
Ethanol	64-17-5	X	
Ethyl acetate	141-78-6	X	
Ethyl tert-butyl ether (ETBE)	637-92-3	X	
Ethylbenzene	100-41-4	X	
4-Ethyltoluene	622-96-8	X	
Heptane	142-82-5	X	
Hexachlorobutadiene	87-68-3	X	
Hexane	110-54-3	X	
2-Hexanone	591-78-6	X	
Isopropylbenzene	98-82-8	X	
4-Isopropyltoluene	99-87-6	X	
Methylene chloride	75-09-2	X	
Methyl methacrylate	80-62-6	X	
4-Methyl-2-pentanone	108-10-1	X	

TABLE 10. Chemicals of Potential Concern

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	CASRN	Chemical of Potential Concern	
		Soil Gas	Groundwater
Methyl-t-butyl ether (MTBE)	1634-04-4	X	
alpha-Methylstyrene	98-83-9	X	
Naphthalene	91-20-3	X	
n-Octane	111-65-9	X	
N-Propylbenzene	103-65-1	X	
Styrene	100-42-5	X	
tert-Amyl methyl ether (TAME)	994-05-8	X	
t-Butyl alcohol (TBA)	75-65-0	X	
1,1,1,2-Tetrachloroethane	630-20-6	X	
1,1,2,2-Tetrachloroethane	79-34-5	X	
Tetrachloroethene	127-18-4	X	
Toluene	108-88-3	X	
1,2,4-Trichlorobenzene	120-82-1	X	
1,1,1-Trichloroethane	71-55-6	X	
1,1,2-Trichloroethane	79-00-5	X	
Trichloroethene	79-01-6	X	X
Trichlorofluoromethane	75-69-4	X	
1,1,2-Trichlorotrifluoroethane	76-13-1	X	
1,2,4-Trimethylbenzene	95-63-6	X	
1,3,5-Trimethylbenzene	108-67-8	X	
Vinyl Acetate	108-05-4	X	
Vinyl Chloride	75-01-4	X	
Xylenes, Total	1330-20-7	X	

TABLE 11. Exposure Parameters

Nevada Environmental Response Trust Site, Henderson, Nevada

Exposure Parameters	Units	Symbol	Indoor Commercial/ Industrial Worker		Outdoor Commercial/ Industrial Worker	
			Value	Source	Value	Source
Exposure Frequency	days/year	EF	250	USEPA 2002b	225	USEPA 2002b
Exposure Time	hours/24 hours	ET	8	USEPA 2002b	8	USEPA 2002b
Exposure Duration	years	ED	25	USEPA 2002b	25	USEPA 2002b
Averaging Time for Cancinogens	days	AT_c	25,550	USEPA 2002b	25,550	USEPA 2002b
Averaging Time for Noncarcinogens	days	AT_{nc}	9,125	USEPA 2002b	9,125	USEPA 2002b

Notes:

USEPA = United States Environmental Protection Agency

Reference:

USEPA, 2002b. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. Office of Emergency and Remedial Response. December.

TABLE 12. Johnson and Ettinger Modeling Parameters for the Study Area

Nevada Environmental Response Trust Site, Henderson, Nevada

Parameter	Value	Units	Reference/Rationale
Vadose Zone Parameters			
Soil gas sampling depth	5	ft	Site-specific
Groundwater depth	Parcel C	ft	25
	Parcel D		30
	Parcel F		35
	Parcel G		40
	Parcel H		40
Average soil temperature	17	Celsius	Site-specific (Figure 8, USEPA 2004, p. 48). The average groundwater temperature in the Henderson, Nevada area.
USDA soil type in layer A	Loamy Sand	--	Based on laboratory-measured grain size distributions of 15 samples collected across the Site in 2009. The normalized weight percent of sand, silt, and clay was plotted on the U.S. Soil Conservation Service Classification Chart provided in the J&E Model User's Guide (USEPA 2004).
Thickness of soil layer (soil gas)	5	ft	Site-specific
Thickness of soil layer (groundwater)	Parcel Specific	ft	See groundwater depth above.
Dry bulk density	1.703	g/cm^3	Site-specific. The arithmetic mean of 15 soil samples collected across the Site in 2009 and an additional sample collected in 2008.
Grain density	2.686	g/cm^3	Site-specific. The arithmetic mean of 15 soil samples collected across the Site in 2009 and an additional sample collected in 2008.
Total porosity	0.366	unitless	Site-specific. The arithmetic mean of 15 soil samples collected across the Site in 2009.
Water-filled porosity	0.154	unitless	Site-specific. The arithmetic mean of 15 soil samples collected across the Site in 2009 and an additional sample collected in 2008.
USDA soil type above water table (Alluvium)	Loamy Sand	--	Based on laboratory-measured grain size distributions of 15 samples collected across the Site in 2009. The normalized weight percent of sand, silt, and clay was plotted on the U.S. Soil Conservation Service Classification Chart provided in the J&E Model User's Guide (USEPA 2004).
Capillary fringe thickness	18.75	cm	Default value for loamy sand (USEPA 2004)
Capillary fringe total porosity	0.366	unitless	Site-specific. The arithmetic mean of 15 soil samples collected across the Site in 2009.
Capillary fringe water-filled porosity	0.303	unitless	Default value for loamy sand (USEPA 2004)
Surface Barrier Parameters - **Indoor Air Scenarios**			
Thickness of foundation	10	cm	Model default (USEPA 2004)
Depth below grade to bottom of floor	15	cm	Model default, slab on grade (USEPA 2004)
Foundation crack ratio	0.005	unitless	Model default (CalEPA 2011)
Average vapor flow rate into building (Q_{soil})	5	L/min	Model default (USEPA 2004)
Air Dispersion Parameters - **Indoor Scenarios**			
Air exchange rate (AER)	1	1/hr	Cal/EPA (2011). Recommended value for general offices within commercial buildings.
Length of building	1000	cm	Model default (USEPA 2004)
Width of building	1000	cm	Model default (USEPA 2004)
Enclosed space height	300	cm	Conservative assumption.
Air Dispersion Parameters - **Outdoor Scenarios**			
Q/C_{vol} [a]	43.9	(g/m^2-s per kg/m^3)	Site-specific. (USEPA 2002b)

Notes:

bgs = below ground surface
Cal/EPA = California Environmental Protection Agency
HHRA = Human Health Risk Assessment
J&E = Johnson & Ettinger
NA = Not applicable
Q/C_{vol} = Outdoor air dispersion factor
U.S. = United States
USDA = United States Department of Agriculture
USEPA = United States Environmental Protection Agency

cm = centimeter
ft = feet
g = gram
hr = hour
L = liter
m = meter
min = minute
s = second

TABLE 12. Johnson and Ettinger Modeling Parameters for the Study Area
Nevada Environmental Response Trust Site, Henderson, Nevada

[a] The following equation was used to calculate Q/C_{vol} using the constants for the Las Vegas, Nevada meterological station (USEPA 2002b). The most conservative Q/C_{vol} was used across the Study Area using the largest A_{site} (Parcel H) of 26.3 acres.

$$Q/C_{vol} = A \times exp\left[\frac{(\ln A_{site} - B)^2}{C}\right]$$

A = 13.3093
B = 19.8387
C = 230.1652
A_{site} = Area of parcel in acres

References:

Cal/EPA, 2011. Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). Final. Department of Toxic Substances Control. October.

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TABLE 13. Physical/Chemical Properties of COPCs

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Molecular Weight MW (g/mol)	Organic Carbon Partition Coefficient, K_{oc} (cm^3/g)	Diffusivity in Air, D_a (cm^2/s)	Diffusivity in Water, D_w (cm^2/s)	Pure Component Water Solubility, S (mg/L)	Henry's Law Constant at 25° C H (atm-m^3/mol)	Normal Boiling Point, T_B (^oK)	Critical Temperature, T_C (^oK)	Enthalpy of Vaporization at the Normal Boiling Point, ΔHv,b (cal/mol)	Source Notes
Acetone	58.08	5.8E-01	1.2E-01	1.1E-05	1.0E+06	3.9E-05	329.20	508.10	6955.00	
Acrylonitrile	53.06	5.9E+00	1.2E-01	1.3E-05	7.4E+04	1.0E-04	350.30	519.00	7786.00	
Benzene	78.11	5.9E+01	8.8E-02	9.8E-06	1.8E+03	5.5E-03	353.24	562.16	7342.00	
Benzyl chloride	126.59	5.2E+02	6.3E-02	8.8E-06	2.0E+01	4.1E-04	452.15	----	----	(a)
Bromodichloromethane	163.83	5.5E+01	3.0E-02	1.1E-05	6.7E+03	1.6E-03	363.15	585.85	7800.00	
Bromomethane	94.94	1.1E+01	7.3E-02	1.2E-05	1.5E+04	6.2E-03	276.71	467.00	5714.00	
2-Butanone (MEK)	72.11	2.3E+00	8.1E-02	9.8E-06	2.2E+05	5.6E-05	352.50	536.78	7480.70	
N-Butylbenzene	134.22	1.1E+03	5.7E-02	8.1E-06	2.0E+00	1.3E-02	456.46	660.50	9289.93	
sec-Butylbenzene	134.22	9.7E+02	5.7E-02	8.1E-06	3.9E+00	1.4E-02	446.50	679.00	88730.00	
Carbon Disulfide	76.13	4.6E+01	1.0E-01	1.0E-05	1.2E+03	3.0E-02	319.00	552.00	6391.00	
Carbon Tetrachloride	153.82	1.7E+02	7.8E-02	8.8E-06	7.9E+02	3.0E-02	349.90	556.60	7127.00	
Chlorobenzene	112.56	2.2E+02	7.3E-02	8.7E-06	4.7E+02	3.7E-03	404.87	632.40	8410.00	
Chloroethane	64.51	4.4E+00	2.7E-01	1.2E-05	5.7E+03	8.8E-03	285.30	460.40	5879.40	
Chloroform	119.38	4.0E+01	1.0E-01	1.0E-05	7.9E+03	3.7E-03	334.32	536.40	6988.00	
Cyclohexane	84.16	1.5E+02	8.0E-02	9.1E-06	5.5E+01	1.5E-01	353.85	----	----	(a)
1,2-Dibromo-3-chloropropane	236.33	1.2E+02	3.2E-02	8.9E-06	1.2E+03	1.5E-04	469.15	----	----	(a)
Dibromochloromethane	208.28	6.3E+01	2.0E-02	1.1E-05	2.6E+03	7.8E-04	416.14	678.20	5900.00	
1,2-Dibromoethane (EDB)	187.86	2.5E+01	2.2E-02	1.2E-05	4.2E+03	7.4E-04	404.60	583.00	8310.03	
1,2-Dichlorobenzene	147.00	6.2E+02	6.9E-02	7.9E-06	1.6E+02	1.9E-03	453.57	705.00	9700.00	
1,3-Dichlorobenzene	147.00	2.0E+03	6.9E-02	7.9E-06	1.3E+02	3.1E-03	446.00	684.00	9230.18	
1,4-Dichlorobenzene	147.00	6.2E+02	6.9E-02	7.9E-06	7.9E+01	2.4E-03	447.21	684.75	9271.00	
Dichlorodifluoromethane	120.92	4.6E+02	6.7E-02	9.9E-06	2.8E+02	3.4E-01	243.20	384.95	9421.36	
1,1-Dichloroethane	98.96	3.2E+01	7.4E-02	1.1E-05	5.1E+03	5.6E-03	330.55	523.00	6895.00	
1,2-Dichloroethane	98.96	1.7E+01	1.0E-01	9.9E-06	8.5E+03	9.8E-04	356.65	561.00	7643.00	
1,1-Dichloroethene	96.94	5.9E+01	9.0E-02	1.0E-05	2.3E+03	2.6E-02	304.75	576.05	6247.00	
cis-1,2-Dichloroethene	96.94	3.6E+01	7.4E-02	1.1E-05	3.5E+03	4.1E-03	333.65	544.00	7192.00	
trans-1,2-Dichloroethene	96.94	5.3E+01	7.1E-02	1.2E-05	6.3E+03	9.4E-03	320.85	516.50	6717.00	(a)
1,2-Dichloropropane	112.99	4.4E+01	7.8E-02	8.7E-06	2.8E+03	2.8E-03	369.52	572.00	7590.00	
cis-1,3-Dichloropropene	110.97	4.6E+01	6.3E-02	1.0E-05	2.8E+03	1.8E-02	381.15	587.38	7900.00	(b)
trans-1,3-Dichloropropene	110.97	4.6E+01	6.3E-02	1.0E-05	2.8E+03	1.8E-02	381.15	587.38	7900.00	(b)
1,2-Dichloro-1,1,2,2-tetrafluoroethane	170.92	2.0E+02	7.8E-02	8.2E-06	4.3E+01	1.5E+00	276.95	----	----	(c)
1,4-Dioxane	88.10	2.6E+00	8.7E-02	1.1E-05	1.0E+06	4.8E-06	374.65	----	----	(a)
Ethanol	46.07	1.0E+00	2.7E-01	1.2E-05	7.9E+05	5.0E-06	351.35	----	----	(d)
Ethyl acetate	88.11	5.6E+00	8.2E-02	9.7E-06	8.0E+04	1.3E-04	350.25	---	---	(a)
Ethyl tert-butyl ether (ETBE)	102.18	2.1E+01	6.5E-02	7.8E-06	2.6E+03	1.6E-03	346.25	----	----	(e)
Ethylbenzene	106.17	3.6E+02	7.5E-02	7.8E-06	1.7E+02	7.9E-03	409.34	617.20	8501.00	
4-Ethyltoluene	120.20	7.2E+02	6.5E-02	7.1E-06	8.0E+01	5.0E-03	435.15	----	----	(f)
Heptane	100.21	2.4E+02	2.0E-01	7.8E-06	3.6E+00	2.0E+00	371.65	----	----	(g)

TABLE 13. Physical/Chemical Properties of COPCs
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Molecular Weight MW (g/mol)	Organic Carbon Partition Coefficient, K_{oc} (cm^3/g)	Diffusivity in Air, D_a (cm^2/s)	Diffusivity in Water, D_w (cm^2/s)	Pure Component Water Solubility, S (mg/L)	Henry's Law Constant at 25° C H (atm-m^3/mol)	Normal Boiling Point, T_B (^oK)	Critical Temperature, T_C (^oK)	Enthalpy of Vaporization at the Normal Boiling Point, ΔHv,b (cal/mol)	Source Notes
Hexachlorobutadiene	260.76	5.4E+04	5.6E-02	6.2E-06	3.2E+00	8.1E-03	486.15	738.00	10206.00	
Hexane	86.18	4.3E+01	2.0E-01	7.8E-06	1.2E+01	1.7E+00	341.70	508.00	6895.15	
2-Hexanone	100.16	1.3E+01	8.5E-02	8.8E-06	1.8E+04	4.4E-05	400.75	----	----	(h)
Isopropylbenzene	120.19	4.9E+02	6.5E-02	7.1E-06	6.1E+01	1.5E-02	425.56	631.10	10335.30	
4-Isopropyltoluene	134.22	1.1E+03	5.7E-02	8.1E-06	2.8E+01	1.1E-02	449.65	----	----	(i)
Methylene chloride	84.93	1.2E+01	1.0E-01	1.2E-05	1.3E+04	2.2E-03	313.00	510.00	6706.00	
Methyl methacrylate	100.13	7.0E+00	7.7E-02	8.6E-06	1.5E+04	3.4E-04	373.5	567.0	8974.9	
4-Methyl-2-pentanone	100.16	9.1E+00	7.5E-02	7.8E-06	1.9E+04	1.4E-04	389.5	571.0	8243.1	
Methyl-t-butyl ether (MTBE)	88.15	7.3E+00	1.0E-01	1.1E-05	5.1E+04	6.2E-04	328.3	497.1	6677.7	
alpha-Methylstyrene	118.18	7.0E+02	6.3E-02	8.2E-06	1.2E+02	2.6E-03	438.6	----	----	(a)
Naphthalene	128.18	2.0E+03	5.9E-02	7.5E-06	3.1E+01	4.8E-04	491.1	748.4	10373.0	
n-Octane	114.23	4.4E+02	2.0E-01	7.8E-06	1.2E+00	3.0E+00	398.8	----	----	(g)
N-Propylbenzene	120.19	5.6E+02	6.0E-02	7.8E-06	6.0E+01	1.1E-02	432.2	630.0	9123.0	
Styrene	104.15	7.8E+02	7.1E-02	8.0E-06	3.1E+02	2.7E-03	418.3	636.0	8737.0	
tert-Amyl methyl ether (TAME)	102.18	2.3E+01	6.5E-02	7.8E-06	2.6E+03	1.3E-03	348.4	----	----	(j)
t-Butyl alcohol (TBA)	74.12	2.1E+00	8.6E-02	9.3E-06	2.2E+05	9.1E-06	355.6	----	----	(k)
1,1,1,2-Tetrachloroethane	167.85	1.2E+02	7.1E-02	7.9E-06	1.1E+03	2.4E-03	403.5	624.0	9768.3	
1,1,2,2-Tetrachloroethane	167.85	9.3E+01	7.1E-02	7.9E-06	3.0E+03	3.4E-04	419.6	661.2	8996.0	
Tetrachloroethene	165.83	1.6E+02	7.2E-02	8.2E-06	2.0E+02	1.8E-02	394.4	620.2	8288.0	
Toluene	92.14	1.8E+02	8.7E-02	8.6E-06	5.3E+02	6.6E-03	383.8	591.8	7930.0	
1,2,4-Trichlorobenzene	181.45	1.8E+03	3.0E-02	8.2E-06	4.9E+01	1.4E-03	486.2	725.0	10471.0	
1,1,1-Trichloroethane	133.40	1.1E+02	7.8E-02	8.8E-06	1.3E+03	1.7E-02	347.2	545.0	7136.0	
1,1,2-Trichloroethane	133.41	5.0E+01	7.8E-02	8.8E-06	4.4E+03	9.1E-04	386.2	602.0	8322.0	
Trichloroethene	131.39	1.7E+02	7.9E-02	9.1E-06	1.5E+03	1.0E-02	360.4	544.2	7505.0	
Trichlorofluoromethane	137.36	5.0E+02	8.7E-02	9.7E-06	1.1E+03	9.7E-02	296.7	471.0	5998.9	
1,1,2-Trichlorotrifluoroethane	187.38	1.1E+04	7.8E-02	8.2E-06	1.7E+02	4.8E-01	320.7	487.3	6462.6	
1,2,4-Trimethylbenzene	120.20	1.4E+03	6.1E-02	7.9E-06	5.7E+01	6.1E-03	442.3	649.2	9368.8	
1,3,5-Trimethylbenzene	120.20	1.4E+03	6.0E-02	8.7E-06	2.0E+00	5.9E-03	437.9	637.3	9321.0	
Vinyl Acetate	86.09	5.3E+00	8.5E-02	9.2E-06	2.0E+04	5.1E-04	345.7	519.1	7800.0	
Vinyl Chloride	62.50	1.9E+01	1.1E-01	1.2E-05	8.8E+03	2.7E-02	259.3	432.0	5250.0	
Xylenes, Total	106.17	3.9E+02	7.7E-02	8.4E-06	1.9E+02	7.6E-03	411.5	616.2	8525.0	(l)

Notes:

atm-m^3/mol = atmosphere-cubic meter per mole
cm^3/g = cubic centimeter per gram
cm^2/s = square centimeter per second
g/mol = gram per mole
mg/L = milligrams per Liter
^oK = degrees Kelvin
cal/mol = calories per mole

Volatile compounds defined by USEPA (1991) as chemicals with molecular weights below 200 g/mol and Henry's constant greater than 10^{-5} atm-m^3/mol.

TABLE 13. Physical/Chemical Properties of COPCs
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Molecular Weight MW (g/mol)	Organic Carbon Partition Coefficient, K_{oc} (cm^3/g)	Diffusivity in Air, D_a (cm^2/s)	Diffusivity in Water, D_w (cm^2/s)	Pure Component Water Solubility, S (mg/L)	Henry's Law Constant at 25° C H (atm-m^3/mol)	Normal Boiling Point, T_B (^oK)	Critical Temperature, T_C (^oK)	Enthalpy of Vaporization at the Normal Boiling Point, ΔHv,b (cal/mol)	Source Notes

All properties from USEPA (2004) unless otherwise noted.

[a] Values are from the Regional Screening Levels (RSLs) (USEPA 2012b).

[b] cis- and trans-1,3-Dichloropropene: 1,3-Dichloropropene (total) was used as a surrogate for all properties.

[c] 1,2-Dichloro-1,1,2,2-tetrafluoroethane: 1,1,2-trichloro-1,2,2-trifluoroethane was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[d] Ethanol: chloroethane was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[e] Ethyl tert-butyl ether (ETBE): diisopropyl ether was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[f] 4-Ethyltoluene: cumene was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[g] Heptane and n-Octane: n-hexane was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[h] 2-Hexanone: ethylbenzene was used as a surrogate for D_a and D_w; all other properties from EPISuite (USEPA 2013).

[i] 4-Isopropyltoluene: sec-butylbenzene was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[j] tert-Amyl methyl ether (TAME): diisopropyl ether was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[k] t-Butyl alcohol (TBA): isobutyl alcohol was used as a surrogate for D_a and D_w; all other properties are from EPISuite (USEPA 2013).

[l] para-Xylene used as a surrogate for total xylenes.

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TABLE 14. Transfer Factors

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Soil gas to Indoor Air Transfer Factor (α), unitless	Soil gas to Outdoor Air Transfer Factor (α), unitless
Acetone	3.3E-04	8.1E-06
Acrylonitrile	3.2E-04	7.9E-06
Benzene	2.5E-04	5.6E-06
Benzyl chloride	2.0E-04	4.0E-06
Bromodichloromethane	1.0E-04	1.9E-06
Bromomethane	2.2E-04	4.6E-06
2-Butanone (MEK)	2.4E-04	5.3E-06
N-Butylbenzene	1.8E-04	3.6E-06
sec-Butylbenzene	1.8E-04	3.7E-06
Carbon Disulfide	2.9E-04	6.6E-06
Carbon Tetrachloride	2.3E-04	5.0E-06
Chlorobenzene	2.2E-04	4.7E-06
Chloroethane	5.1E-04	1.7E-05
Chloroform	2.9E-04	6.6E-06
Cyclohexane	2.4E-04	5.1E-06
1,2-Dibromo-3-chloropropane	1.1E-04	2.1E-06
Dibromochloromethane	7.1E-05	1.3E-06
1,2-Dibromoethane (EDB)	7.8E-05	1.4E-06
1,2-Dichlorobenzene	2.1E-04	4.4E-06
1,3-Dichlorobenzene	2.1E-04	4.4E-06
1,4-Dichlorobenzene	2.1E-04	4.4E-06
Dichlorodifluoromethane	2.0E-04	4.2E-06
1,1-Dichloroethane	2.2E-04	4.7E-06
1,2-Dichloroethane	2.9E-04	6.6E-06
1,1-Dichloroethene	2.6E-04	5.7E-06
cis-1,2-Dichloroethene	2.2E-04	4.7E-06
trans-1,2-Dichloroethene	2.1E-04	4.5E-06
1,2-Dichloropropane	2.3E-04	5.0E-06
cis-1,3-Dichloropropene	1.9E-04	4.0E-06
trans-1,3-Dichloropropene	1.9E-04	4.0E-06
1,2-Dichloro-1,1,2,2-tetrafluoroethane	2.3E-04	5.0E-06
1,4-Dioxane	2.9E-04	6.7E-06
Ethanol	5.3E-04	1.8E-05
Ethyl acetate	2.4E-04	5.3E-06
Ethyl tert-butyl ether (ETBE)	2.0E-04	4.1E-06
Ethylbenzene	2.2E-04	4.8E-06
4-Ethyltoluene	2.0E-04	4.1E-06
Heptane	4.3E-04	1.3E-05
Hexachlorobutadiene	1.8E-04	3.6E-06
Hexane	4.3E-04	1.3E-05
2-Hexanone	2.5E-04	5.5E-06
Isopropylbenzene	2.0E-04	4.1E-06
4-Isopropyltoluene	1.8E-04	3.6E-06
Methylene chloride	2.8E-04	6.4E-06
Methyl methacrylate	2.3E-04	4.9E-06
4-Methyl-2-pentanone	2.3E-04	4.8E-06
Methyl-t-butyl ether (MTBE)	2.8E-04	6.5E-06

TABLE 14. Transfer Factors

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Soil gas to Indoor Air Transfer Factor (α), unitless	Soil gas to Outdoor Air Transfer Factor (α), unitless
alpha-Methylstyrene	2.0E-04	4.0E-06
Naphthalene	1.9E-04	3.8E-06
n-Octane	4.3E-04	1.3E-05
N-Propylbenzene	1.9E-04	3.8E-06
Styrene	2.2E-04	4.5E-06
tert-Amyl methyl ether (TAME)	2.0E-04	4.1E-06
t-Butyl alcohol (TBA)	2.7E-04	6.0E-06
1,1,1,2-Tetrachloroethane	2.2E-04	4.5E-06
1,1,2,2-Tetrachloroethane	2.2E-04	4.5E-06
Tetrachloroethene	2.2E-04	4.6E-06
Toluene	2.5E-04	5.5E-06
1,2,4-Trichlorobenzene	1.0E-04	1.9E-06
1,1,1-Trichloroethane	2.3E-04	5.0E-06
1,1,2-Trichloroethane	2.3E-04	5.0E-06
Trichloroethene	2.3E-04	5.0E-06
Trichlorofluoromethane	2.5E-04	5.5E-06
1,1,2-Trichlorotrifluoroethane	2.3E-04	5.0E-06
1,2,4-Trimethylbenzene	1.9E-04	3.9E-06
1,3,5-Trimethylbenzene	1.9E-04	3.8E-06
Vinyl Acetate	2.5E-04	5.4E-06
Vinyl Chloride	2.9E-04	6.8E-06
Xylenes, Total	2.3E-04	4.9E-06

TABLE 15. Exposure Concentrations

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Parcel	Maximum Detected Soil Gas Concentration (µg/m^3)
Acetone	All Parcels	67
Acrylonitrile	All Parcels	0.15
Benzene	All Parcels	12
Benzyl chloride	All Parcels	0.43
Bromodichloromethane	All Parcels	1.8
Bromomethane	All Parcels	0.84
2-Butanone (MEK)	All Parcels	13
N-Butylbenzene	All Parcels	2.4
sec-Butylbenzene	All Parcels	0.24
Carbon Disulfide	All Parcels	32
Carbon Tetrachloride	All Parcels	260
Chlorobenzene	All Parcels	17
Chloroethane	All Parcels	140
Chloroform	Parcel C	3,900
	Parcel D	1,800
	Parcel F	2,800
	Parcel G	140
	Parcel H	1.3
Cyclohexane	All Parcels	4.9
1,2-Dibromo-3-chloropropane	All Parcels	1.7
Dibromochloromethane	All Parcels	1.2
1,2-Dibromoethane (EDB)	All Parcels	1.4
1,2-Dichlorobenzene	All Parcels	16
1,3-Dichlorobenzene	All Parcels	38
1,4-Dichlorobenzene	All Parcels	80
Dichlorodifluoromethane	All Parcels	2.6
1,1-Dichloroethane	All Parcels	330
1,2-Dichloroethane	All Parcels	33
1,1-Dichloroethene	All Parcels	110
cis-1,2-Dichloroethene	All Parcels	2.3
trans-1,2-Dichloroethene	All Parcels	2.2
1,2-Dichloropropane	All Parcels	1.4
cis-1,3-Dichloropropene	All Parcels	0.75
trans-1,3-Dichloropropene	All Parcels	0.68
1,2-Dichloro-1,1,2,2-tetrafluoroethane	All Parcels	1.4
1,4-Dioxane	All Parcels	0.83
Ethanol	All Parcels	7.4
Ethyl acetate	All Parcels	14
Ethyl tert-butyl ether (ETBE)	All Parcels	0.82
Ethylbenzene	All Parcels	8.9
4-Ethyltoluene	All Parcels	5.1
Heptane	All Parcels	2.4
Hexachlorobutadiene	All Parcels	56
Hexane	All Parcels	6,100
2-Hexanone	All Parcels	2.3
Isopropylbenzene	All Parcels	0.55
4-Isopropyltoluene	All Parcels	1.9
Methylene chloride	All Parcels	19

TABLE 15. Exposure Concentrations

Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Parcel	Maximum Detected Soil Gas Concentration (µg/m^3)
Methyl methacrylate	All Parcels	0.14
4-Methyl-2-pentanone	All Parcels	7.2
Methyl-t-butyl ether (MTBE)	All Parcels	0.47
alpha-Methylstyrene	All Parcels	0.54
Naphthalene	All Parcels	18
n-Octane	All Parcels	11
N-Propylbenzene	All Parcels	3
Styrene	All Parcels	0.74
tert-Amyl methyl ether (TAME)	All Parcels	0.78
t-Butyl alcohol (TBA)	All Parcels	4.8
1,1,1,2-Tetrachloroethane	All Parcels	1.1
1,1,2,2-Tetrachloroethane	All Parcels	1.1
Tetrachloroethene	All Parcels	1,100
Toluene	All Parcels	24
1,2,4-Trichlorobenzene	All Parcels	79
1,1,1-Trichloroethane	All Parcels	1.0
1,1,2-Trichloroethane	All Parcels	21
Trichloroethene	All Parcels	570
Trichlorofluoromethane	All Parcels	48
1,1,2-Trichlorotrifluoroethane	All Parcels	0.54
1,2,4-Trimethylbenzene	All Parcels	15
1,3,5-Trimethylbenzene	All Parcels	4.5
Vinyl Acetate	All Parcels	16
Vinyl Chloride	All Parcels	4.4
Xylenes, Total	All Parcels	63

Note:

µg/m^3 = microgram per cubic meter

TABLE 16. Toxicity Criteria
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Carcinogenic Unit Risk Factor (URF) $(\mu g/m^3)^{-1}$	Key	Non-Carcinogenic Reference Concentration (RfC) (mg/m^3)	Key
Acetone	--	--	3.1E+01	A
Acrylonitrile	6.8E-05	I	2.0E-03	I
Allyl chloride	6.0E-06	C	1.0E-03	I
Benzene	7.8E-06	I	3.0E-02	I
Benzyl chloride	4.9E-05	C	1.0E-03	P
Bromodichloromethane	3.7E-05	C	1.0E+00	S
Bromoform	1.1E-06	I	--	--
Bromomethane	--	--	5.0E-03	I
2-Butanone (MEK)	--	--	5.0E+00	I
N-Butylbenzene	--	--	4.0E-01	S
sec-Butylbenzene	--	--	4.0E-01	S
tert-Butylbenzene	--	--	4.0E-01	S
Carbon Disulfide	--	--	7.0E-01	I
Carbon Tetrachloride	6.0E-06	I	1.0E-01	I
Chlorobenzene	--	--	5.0E-02	P
Chloroethane	--	--	1.0E+01	I
Chloroform	2.3E-05	I	9.8E-02	A
Chloromethane	1.8E-06	H	9.0E-02	I
Cyclohexane	--	--	6.0E+00	I
1,2-Dibromo-3-chloropropane	6.0E-03	P	2.0E-04	I
Dibromochloromethane	2.7E-05	C	--	--
1,2-Dibromoethane (EDB)	6.0E-04	I	9.0E-03	I
1,2-Dichlorobenzene	--	--	2.0E-01	H
1,3-Dichlorobenzene	--	--	2.0E-01	S
1,4-Dichlorobenzene	1.1E-05	C	8.0E-01	I
Dichlorodifluoromethane	--	--	1.0E-01	X
1,1-Dichloroethane	1.6E-06	C	--	--
1,2-Dichloroethane	2.6E-05	I	7.0E-03	P
1,1-Dichloroethene	--	--	2.0E-01	I
cis-1,2-Dichloroethene	--	--	6.0E-02	S
trans-1,2-Dichloroethene	--	--	6.0E-02	P
1,2-Dichloropropane	1.0E-05	C	4.0E-03	I
cis-1,3-Dichloropropene	4.0E-06	I	2.0E-02	I
trans-1,3-Dichloropropene	4.0E-06	I	2.0E-02	I
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	--	3.0E+01	S
1,4-Dioxane	7.7E-06	C	3.0E+00	C
Ethanol	--	--	1.0E+02	S
Ethyl acetate	--	--	7.0E-01	S
Ethyl tert-butyl ether (ETBE)	2.6E-07	C	3.0E+00	I
Ethylbenzene	2.5E-06	C	1.0E+00	I
4-Ethyltoluene	--	--	4.0E-01	S
Heptane	--	--	7.0E+00	S
Hexachlorobutadiene	2.2E-05	I	--	--
Hexane	--	--	7.0E-01	I
2-Hexanone	--	--	3.0E-02	I
Isopropylbenzene	--	--	4.0E-01	I
4-Isopropyltoluene	--	--	4.0E-01	S
Methylene chloride	1.0E-08	I	6.0E-01	I
Methyl methacrylate	--	--	7.0E-01	I
4-Methyl-2-pentanone	--	--	3.0E+00	I
Methyl-t-butyl ether (MTBE)	2.6E-07	C	3.0E+00	I

TABLE 16. Toxicity Criteria
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Carcinogenic Unit Risk Factor (URF) $(\mu g/m^3)^{-1}$	Key	Non-Carcinogenic Reference Concentration (RfC) (mg/m^3)	Key
alpha-Methylstyrene	--	--	1.0E+00	S
Naphthalene	3.4E-05	C	3.0E-03	I
n-Octane	--	--	1.8E+01	S
N-Propylbenzene	--	--	4.0E-01	S
Styrene	--	--	1.0E+00	I
tert-Amyl methyl ether (TAME)	2.6E-07	C	3.0E+00	I
t-Butyl alcohol (TBA)	--	--	3.0E+01	S
1,1,1,2-Tetrachloroethane	7.4E-06	I	--	--
1,1,2,2-Tetrachloroethane	5.8E-05	C	--	--
Tetrachloroethene	2.6E-07	I	4.0E-02	I
Toluene	--	--	5.0E+00	I
1,2,4-Trichlorobenzene	--	--	2.0E-03	P
1,1,1-Trichloroethane	--	--	5.0E+00	I
1,1,2-Trichloroethane	1.6E-05	I	2.0E-04	X
Trichloroethene	4.1E-06	I	2.0E-03	I
Trichlorofluoromethane	--	--	7.0E-01	H
1,1,2-Trichlorotrifluoroethane	--	--	3.0E+01	H
1,2,4-Trimethylbenzene	--	--	7.0E-03	P
1,3,5-Trimethylbenzene	--	--	7.0E-03	P
Vinyl Acetate	--	--	2.0E-01	I
Vinyl Chloride	4.4E-06	I	1.0E-01	I
Xylenes, Total	--	--	1.0E-01	I

Notes:
-- = No value
A = Agency for Toxic Substances and Disease Registry (ATSDR 2013)
C = California Environmental Protection Agency (Cal/EPA 2013)
H = Health Effects Assessment Summary Tables (USEPA 1997)
I = Integrated Risk Information System (USEPA 2013)
P = Provisional Peer Reviewed Toxicity Values (PPRTV, as cited in USEPA 2012b)
S = Surrogate
X = PPRTV Appendix (as cited in USEPA 2012b)

mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 2013. Minimal Risk Levels. March.
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United States Environmental Protection Agency (USEPA), 1997. Health Effects Assessment Summary Tables (HEAST). FY 1997 Update. EPA 540-R-97-036.
USEPA, 2012b. USEPA Regional Screening Levels. November. http://www.epa.gov/region9/superfund/prg/
USEPA, 2013a. Integrated Risk Information System (IRIS). USEPA on-line database: http://www.epa.gov/iris/index.html.

TABLE 17. Study Area-Wide Cancer Risks and Noncancer Hazards Estimated Using Soil Gas Results (All Chemicals except Chloroform)
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Maximum Detected Soil Gas Concentration ($\mu g/m^3$)	Indoor Air				Outdoor Air			
		Soil gas to Indoor Air Transfer Factor (α), unitless	Maximum Predicted Indoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Soil gas to Outdoor Air Transfer Factor (α), unitless	Maximum Predicted Outdoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard
Acetone	67	3.3E-04	2.2E-02	--	1.6E-07	8.1E-06	5.4E-04	--	3.6E-09
Acrylonitrile	0.15	3.2E-04	4.8E-05	2.7E-10	5.5E-06	7.9E-06	1.2E-06	5.9E-12	1.2E-07
Benzene	12	2.5E-04	3.0E-03	1.9E-09	2.3E-05	5.6E-06	6.7E-05	3.9E-11	4.6E-07
Benzyl chloride	0.43	2.0E-04	8.4E-05	3.4E-10	1.9E-05	4.0E-06	1.7E-06	6.2E-12	3.6E-07
Bromodichloromethane	1.8	1.0E-04	1.9E-04	5.6E-10	4.3E-08	1.9E-06	3.4E-06	9.3E-12	7.0E-10
Bromomethane	0.84	2.2E-04	1.8E-04	--	8.4E-06	4.6E-06	3.9E-06	--	1.6E-07
2-Butanone (MEK)	13	2.4E-04	3.2E-03	--	1.4E-07	5.3E-06	6.9E-05	--	2.8E-09
N-Butylbenzene	2.4	1.8E-04	4.3E-04	--	2.5E-07	3.6E-06	8.7E-06	--	4.5E-09
sec-Butylbenzene	0.24	1.8E-04	4.4E-05	--	2.5E-08	3.7E-06	8.8E-07	--	4.5E-10
Carbon Disulfide	32	2.9E-04	9.2E-03	--	3.0E-06	6.6E-06	2.1E-04	--	6.2E-08
Carbon Tetrachloride	260	2.3E-04	6.0E-02	2.9E-08	1.4E-04	5.0E-06	1.3E-03	5.7E-10	2.7E-06
Chlorobenzene	17	2.2E-04	3.7E-03	--	1.7E-05	4.7E-06	7.9E-05	--	3.3E-07
Chloroethane	140	5.1E-04	7.1E-02	--	1.6E-06	1.7E-05	2.4E-03	--	5.0E-08
Cyclohexane	4.9	2.4E-04	1.2E-03	--	4.4E-08	5.1E-06	2.5E-05	--	8.6E-10
1,2-Dibromo-3-chloropropane	1.7	1.1E-04	1.9E-04	9.3E-08	2.2E-04	2.1E-06	3.5E-06	1.6E-09	3.6E-06
Dibromochloromethane	1.2	7.1E-05	8.5E-05	1.9E-10	--	1.3E-06	1.5E-06	3.0E-12	--
1,2-Dibromoethane (EDB)	1.4	7.8E-05	1.1E-04	5.4E-09	2.8E-06	1.4E-06	2.0E-06	8.6E-11	4.5E-08
1,2-Dichlorobenzene	16	2.1E-04	3.4E-03	--	3.9E-06	4.4E-06	7.0E-05	--	7.2E-08
1,3-Dichlorobenzene	38	2.1E-04	8.0E-03	--	9.2E-06	4.4E-06	1.7E-04	--	1.7E-07
1,4-Dichlorobenzene	80	2.1E-04	1.7E-02	1.5E-08	4.8E-06	4.4E-06	3.5E-04	2.8E-10	9.0E-08
Dichlorodifluoromethane	2.6	2.0E-04	5.3E-04	--	1.2E-06	4.2E-06	1.1E-05	--	2.3E-08
1,1-Dichloroethane	330	2.2E-04	7.4E-02	9.6E-09	--	4.7E-06	1.6E-03	1.8E-10	--
1,2-Dichloroethane	33	2.9E-04	9.5E-03	2.0E-08	3.1E-04	6.6E-06	2.2E-04	4.2E-10	6.4E-06
1,1-Dichloroethene	110	2.6E-04	2.8E-02	--	3.2E-05	5.7E-06	6.3E-04	--	6.5E-07
cis-1,2-Dichloroethene	2.3	2.2E-04	5.1E-04	--	1.9E-06	4.7E-06	1.1E-05	--	3.7E-08
trans-1,2-Dichloroethene	2.2	2.1E-04	4.7E-04	--	1.8E-06	4.5E-06	9.9E-06	--	3.4E-08
1,2-Dichloropropane	1.4	2.3E-04	3.3E-04	2.7E-10	1.9E-05	5.0E-06	7.0E-06	5.1E-12	3.6E-07
cis-1,3-Dichloropropene	0.75	1.9E-04	1.5E-04	4.8E-11	1.7E-06	4.0E-06	3.0E-06	8.8E-13	3.1E-08
trans-1,3-Dichloropropene	0.68	1.9E-04	1.3E-04	4.3E-11	1.5E-06	4.0E-06	2.7E-06	8.0E-13	2.8E-08
1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	2.3E-04	3.2E-04	--	2.5E-09	5.0E-06	7.0E-06	--	4.8E-11
1,4-Dioxane	0.83	2.9E-04	2.4E-04	1.5E-10	1.8E-08	6.7E-06	5.6E-06	3.2E-12	3.8E-10
Ethanol	7.4	5.3E-04	3.9E-03	--	8.9E-09	1.8E-05	1.4E-04	--	2.8E-10

TABLE 17. Study Area-Wide Cancer Risks and Noncancer Hazards Estimated Using Soil Gas Results (All Chemicals except Chloroform)
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Maximum Detected Soil Gas Concentration ($\mu g/m^3$)	Indoor Air				Outdoor Air			
		Soil gas to Indoor Air Transfer Factor (α), unitless	Maximum Predicted Indoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Soil gas to Outdoor Air Transfer Factor (α), unitless	Maximum Predicted Outdoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard
Ethyl acetate	14	2.4E-04	3.4E-03	--	1.1E-06	5.3E-06	7.4E-05	--	2.2E-08
Ethyl tert-butyl ether (ETBE)	0.82	2.0E-04	1.6E-04	--	1.3E-08	4.1E-06	3.4E-06	--	2.3E-10
Ethylbenzene	8.9	2.2E-04	2.0E-03	4.1E-10	4.6E-07	4.8E-06	4.3E-05	7.8E-12	8.7E-09
4-Ethyltoluene	5.1	2.0E-04	1.0E-03	--	5.8E-07	4.1E-06	2.1E-05	--	1.1E-08
Heptane	2.4	4.3E-04	1.0E-03	--	3.4E-08	1.3E-05	3.1E-05	--	9.0E-10
Hexachlorobutadiene	56	1.8E-04	1.0E-02	1.8E-08	--	3.6E-06	2.0E-04	3.2E-10	--
Hexane	6,100	4.3E-04	2.6E+00	--	8.6E-04	1.3E-05	7.8E-02	--	2.3E-05
2-Hexanone	2.3	2.5E-04	5.8E-04	--	4.4E-06	5.5E-06	--	--	8.7E-08
Isopropylbenzene	0.55	2.0E-04	1.1E-04	--	6.3E-08	4.1E-06	2.3E-06	--	1.2E-09
4-Isopropyltoluene	1.9	1.8E-04	3.4E-04	--	2.0E-07	3.6E-06	6.9E-06	--	3.5E-09
Methylene chloride	19	2.8E-04	5.3E-03	4.3E-12	2.0E-06	6.4E-06	1.2E-04	9.0E-14	4.2E-08
Methyl methacrylate	0.14	2.3E-04	3.2E-05	--	1.1E-08	4.9E-06	6.9E-07	--	2.0E-10
4-Methyl-2-pentanone	7.2	2.3E-04	1.6E-03	--	1.2E-07	4.8E-06	3.5E-05	--	2.4E-09
Methyl-t-butyl ether (MTBE)	0.47	2.8E-04	1.3E-04	2.8E-12	1.0E-08	6.5E-06	3.1E-06	5.9E-14	2.1E-10
alpha-Methylstyrene	0.54	2.0E-04	1.1E-04	--	2.4E-08	4.0E-06	2.2E-06	--	4.5E-10
Naphthalene	18	1.9E-04	3.4E-03	9.3E-09	2.6E-04	3.8E-06	6.8E-05	1.7E-10	4.7E-06
n-Octane	11	4.3E-04	4.8E-03	--	5.9E-08	1.3E-05	1.4E-04	--	1.6E-09
N-Propylbenzene	3	1.9E-04	5.7E-04	--	3.2E-07	3.8E-06	1.1E-05	--	5.9E-09
Styrene	0.74	2.2E-04	1.6E-04	--	3.6E-08	4.5E-06	3.3E-06	--	6.9E-10
tert-Amyl methyl ether (TAME)	0.78	2.0E-04	1.6E-04	--	1.2E-08	4.1E-06	3.2E-06	--	2.2E-10
t-Butyl alcohol (TBA)	4.8	2.7E-04	1.3E-03	--	9.8E-09	6.0E-06	2.9E-05	--	2.0E-10
1,1,1,2-Tetrachloroethane	1.1	2.2E-04	2.4E-04	1.4E-10	--	4.5E-06	5.0E-06	2.7E-12	--
1,1,2,2-Tetrachloroethane	1.1	2.2E-04	2.4E-04	1.1E-09	--	4.5E-06	5.0E-06	2.1E-11	--
Tetrachloroethene	1,100	2.2E-04	2.4E-01	5.1E-09	1.4E-03	4.6E-06	5.0E-03	9.6E-11	2.6E-05
Toluene	24	2.5E-04	6.0E-03	--	2.8E-07	5.5E-06	1.3E-04	--	5.5E-09
1,2,4-Trichlorobenzene	79	1.0E-04	8.3E-03	--	9.4E-04	1.9E-06	1.5E-04	--	1.6E-05
1,1,1-Trichloroethane	1	2.3E-04	2.3E-04	--	1.1E-08	5.0E-06	5.0E-06	--	2.0E-10
1,1,2-Trichloroethane	21	2.3E-04	4.9E-03	6.4E-09	5.6E-03	5.0E-06	1.0E-04	1.2E-10	1.1E-04
Trichloroethene	570	2.3E-04	1.3E-01	4.5E-08	1.5E-02	5.0E-06	2.9E-03	8.6E-10	2.9E-04
Trichlorofluoromethane	48	2.5E-04	1.2E-02	--	3.9E-06	5.5E-06	2.7E-04	--	7.8E-08
1,1,2-Trichlorotrifluoroethane	0.54	2.3E-04	1.3E-04	--	9.5E-10	5.0E-06	2.7E-06	--	1.8E-11
1,2,4-Trimethylbenzene	15	1.9E-04	2.9E-03	--	9.3E-05	3.9E-06	5.8E-05	--	1.7E-06

TABLE 17. Study Area-Wide Cancer Risks and Noncancer Hazards Estimated Using Soil Gas Results (All Chemicals except Chloroform)
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical Name	Maximum Detected Soil Gas Concentration ($\mu g/m^3$)	Indoor Air				Outdoor Air			
		Soil gas to Indoor Air Transfer Factor (α), unitless	Maximum Predicted Indoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Soil gas to Outdoor Air Transfer Factor (α), unitless	Maximum Predicted Outdoor Air Concentration ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard
1,3,5-Trimethylbenzene	4.5	1.9E-04	8.5E-04	--	2.8E-05	3.8E-06	1.7E-05	--	5.1E-07
Vinyl Acetate	16	2.5E-04	4.0E-03	--	4.5E-06	5.4E-06	8.7E-05	--	8.9E-08
Vinyl Chloride	4.4	2.9E-04	1.3E-03	4.6E-10	2.9E-06	6.8E-06	3.0E-05	9.6E-12	6.1E-08
Xylenes, Total	63	2.3E-04	1.4E-02	--	3.3E-05	4.9E-06	3.1E-04	--	6.3E-07
Cumulative Risk/Hazard				**2.6E-07**	**2.5E-02**			**4.8E-09**	**4.9E-04**

Notes:
-- = No value

$\mu g/m^3$ = microgram per cubic meter

TABLE 18. Parcel-Specific Cancer Risks and Noncancer Hazards Estimated Using Soil Gas Results (Chloroform Only)
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	C	D	F	G	H
Sample Information					
Maximum Detected Chloroform Concentration (µg/m^3)	3,900	1,800	2,800	140	1.3
Location of Maximum Detection	SG90	SG18	E-SG-4	E-SG-8	SG49
Year of Maximum Detection	2008	2008	2013	2013	2008
Indoor Air Pathway					
IA Transfer Factor for Chloroform (α), unitless	2.9E-04	2.9E-04	2.9E-04	2.9E-04	2.9E-04
Predicted IA Concentration (µg/m^3)	1.1E+00	5.2E-01	8.0E-01	4.0E-02	3.7E-04
Cancer Risk from Chloroform	**2.1E-06**	**9.7E-07**	**1.5E-06**	**7.5E-08**	**7.0E-10**
Noncancer Hazard from Chloroform	**2.6E-03**	**1.2E-03**	**1.9E-03**	**9.3E-05**	**8.7E-07**
Outdoor Air Pathway					
OA Transfer Factor for Chloroform (α), unitless	6.6E-06	6.6E-06	6.6E-06	6.6E-06	6.6E-06
Predicted OA Concentration (µg/m^3)	2.6E-02	1.2E-02	1.9E-02	9.3E-04	8.6E-06
Cancer Risk from Chloroform	**4.4E-08**	**2.0E-08**	**3.1E-08**	**1.6E-09**	**1.5E-11**
Noncancer Hazard from Chloroform	**5.4E-05**	**2.5E-05**	**3.9E-05**	**1.9E-06**	**1.8E-08**

Notes:
IA = Indoor air
OA = Outdoor air

µg/m^3 = microgram per cubic meter

TABLE 19. Parcel-Specific Cancer Risks and Noncancer Hazards Estimated Using Soil Gas Results (All Chemicals)
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	C	D	F	G	H
Indoor Air Pathway					
Cancer Risk from all COPCs except chloroform[a]			2.6E-07		
Noncancer Hazard from all COPCs except chloroform[a]			2.5E-02		
Cancer Risk from Chloroform	2.1E-06	9.7E-07	1.5E-06	7.5E-08	7.0E-10
Noncancer Hazard from Chloroform	2.6E-03	1.2E-03	1.9E-03	9.3E-05	8.7E-07
Cumulative Risk	**2.4E-06**	**1.2E-06**	**1.8E-06**	**3.4E-07**	**2.6E-07**
Cumulative Noncancer Hazard	**2.8E-02**	**2.6E-02**	**2.7E-02**	**2.5E-02**	**2.5E-02**
Outdoor Air Pathway					
Cancer Risk from all COPCs except chloroform[a]			4.8E-09		
Noncancer Hazard from all COPCs except chloroform[a]			4.9E-04		
Cancer Risk from Chloroform	4.4E-08	2.0E-08	3.1E-08	1.6E-09	1.5E-11
Noncancer Hazard from Chloroform	5.4E-05	2.5E-05	3.9E-05	1.9E-06	1.8E-08
Cumulative Risk	**4.8E-08**	**2.5E-08**	**3.6E-08**	**6.3E-09**	**4.8E-09**
Cumulative Noncancer Hazard	**5.4E-04**	**5.2E-04**	**5.3E-04**	**4.9E-04**	**4.9E-04**

Notes:
IA = Indoor air
OA = Outdoor air

$\mu g/m^3$ = microgram per cubic meter

[a] Study Area-wide cancer risks and noncancer hazards as presented in Table 17 were used to conservatively represent individual parcel cancer risks and noncancer hazards.

TABLE 20. Cumulative Risk for Vapor Intrusion and Soil-Related Pathways
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	Risk Endpoint[a]		Indoor Commercial/ Industrial Worker			Outdoor Commercial/ Industrial Worker			Construction Worker		
			Soil[b]	Indoor Air	Cumulative[c]	Soil[b]	Outdoor Air	Cumulative[c]	Soil[b]	Outdoor Air[d]	Cumulative[c]
Parcel C	Cancer Risk (chemical)	RME	3.8E-07	2.4E-06	**2.7E-06**	1.1E-06	4.8E-08	**1.1E-06**	1.3E-07	4.8E-08	1.8E-07
	Hazard Index	RME	1.3E-01	2.8E-02	0.15	0.24	5.4E-04	0.24	8.6E-01	5.4E-04	0.86
	Asbestos	Chrysotile - *best estimate*	--	--	--	6.3E-09	--	6.3E-09	6.8E-08	--	6.8E-08
		Chrysotile - *upper bound*	--	--	--	1.1E-08	--	1.1E-08	1.2E-07	--	1.2E-07
		Amphibole - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Amphibole - *upper bound*	--	--	,	2.3E-07	--	2.3E-07	2.5E-06	--	**2.5E-06**
Parcel D	Cancer Risk (chemical)	RME	3.8E-07	1.2E-06	**1.6E-06**	1.1E-06	2.5E-08	**1.1E-06**	1.3E-07	2.5E-08	1.5E-07
	Hazard Index	RME	1.3E-01	2.6E-02	0.15	0.24	5.2E-04	0.24	8.6E-01	5.2E-04	0.86
	Asbestos	Chrysotile - *best estimate*	--	--	--	8.2E-09	--	8.2E-09	8.8E-08	--	8.8E-08
		Chrysotile - *upper bound*	--	--	--	1.5E-08	--	1.5E-08	1.6E-07	--	1.6E-07
		Amphibole - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Amphibole - *upper bound*	--	--	--	3.9E-07	--	3.9E-07	4.2E-06	--	**4.2E-06**
Parcel F	Cancer Risk (chemical)	RME	3.8E-07	1.8E-06	**2.1E-06**	1.1E-06	3.6E-08	**1.1E-06**	1.3E-07	3.6E-08	1.6E-07
	Hazard Index	RME	1.3E-01	2.7E-02	0.15	0.24	5.3E-04	0.24	8.6E-01	5.3E-04	0.86
	Asbestos	Chrysotile - *best estimate*	--	--	--	9.5E-09	--	9.5E-09	1.1E-07	--	1.1E-07
		Chrysotile - *upper bound*	--	--	--	1.5E-08	--	1.5E-08	1.7E-07	--	1.7E-07
		Amphibole - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Amphibole - *upper bound*	--	--	--	2.1E-07	--	2.1E-07	2.4E-06	--	**2.4E-06**
Parcel G	Cancer Risk (chemical)	RME	3.8E-07	3.4E-07	7.2E-07	1.1E-06	6.3E-09	**1.1E-06**	1.3E-07	6.3E-09	1.3E-07
	Hazard Index	RME	1.3E-01	2.5E-02	0.15	0.24	4.9E-04	0.24	8.6E-01	4.9E-04	0.86
	Asbestos	Chrysotile - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Chrysotile - *upper bound*	--	--	--	4.5E-09	--	4.5E-09	5.4E-08	--	5.4E-08
		Amphibole - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Amphibole - *upper bound*	--	--	--	5.0E-07	--	5.0E-07	6.0E-06	--	**6.0E-06**
Parcel H	Cancer Risk (chemical)	RME	3.8E-07	2.6E-07	6.4E-07	1.1E-06	4.8E-09	**1.1E-06**	1.3E-07	4.8E-09	1.3E-07
	Hazard Index	RME	1.3E-01	2.5E-02	0.15	0.24	4.9E-04	0.24	8.6E-01	4.9E-04	0.86
	Asbestos	Chrysotile - *best estimate*	--	--	--	1.8E-09	--	1.8E-09	1.9E-08	--	1.9E-08
		Chrysotile - *upper bound*	--	--	--	4.7E-09	--	4.7E-09	5.0E-08	--	5.0E-08
		Amphibole - *best estimate*	--	--	--	NE	--	NE	NE	--	NE
		Amphibole - *upper bound*	--	--	--	2.0E-07	--	2.0E-07	2.2E-06	--	**2.2E-06**

Notes:
-- = No value
HI = Hazard index
NE= Not evaluated
RME = Reasonable maximum exposure
UCL = Upper confidence limit
VOC = Volatile organic compound

TABLE 20. Cumulative Risk for Vapor Intrusion and Soil-Related Pathways
Nevada Environmental Response Trust Site, Henderson, Nevada

[a] The best estimate was based on the pooled analytical sensitivity multiplied by the number of asbestos fibers found, and the upper bound was based on the 95% UCL of the Poisson distribution (Northgate 2013).

[b] The estimated risks for chemicals including asbestos were evaluated in Northgate (2013).

[c] Bolded values indicate that the cumulative cancer risk exceeded 1×10^{-6}.

[d] The cumulative cancer risk and HIs were estimated for the VOC inhalation pathway based on the results for the outdoor inhalation pathway estimated for the outdoor commercial/industrial worker.

Reference:

Northgate Environmental Management, Inc. (Northgate), 2013. Revised Post-Remediation Screening Health Risk Assessment Report for Parcels C, D, F, G, and H, Nevada Environmental Response Trust Site, Henderson, Nevada. June 27.

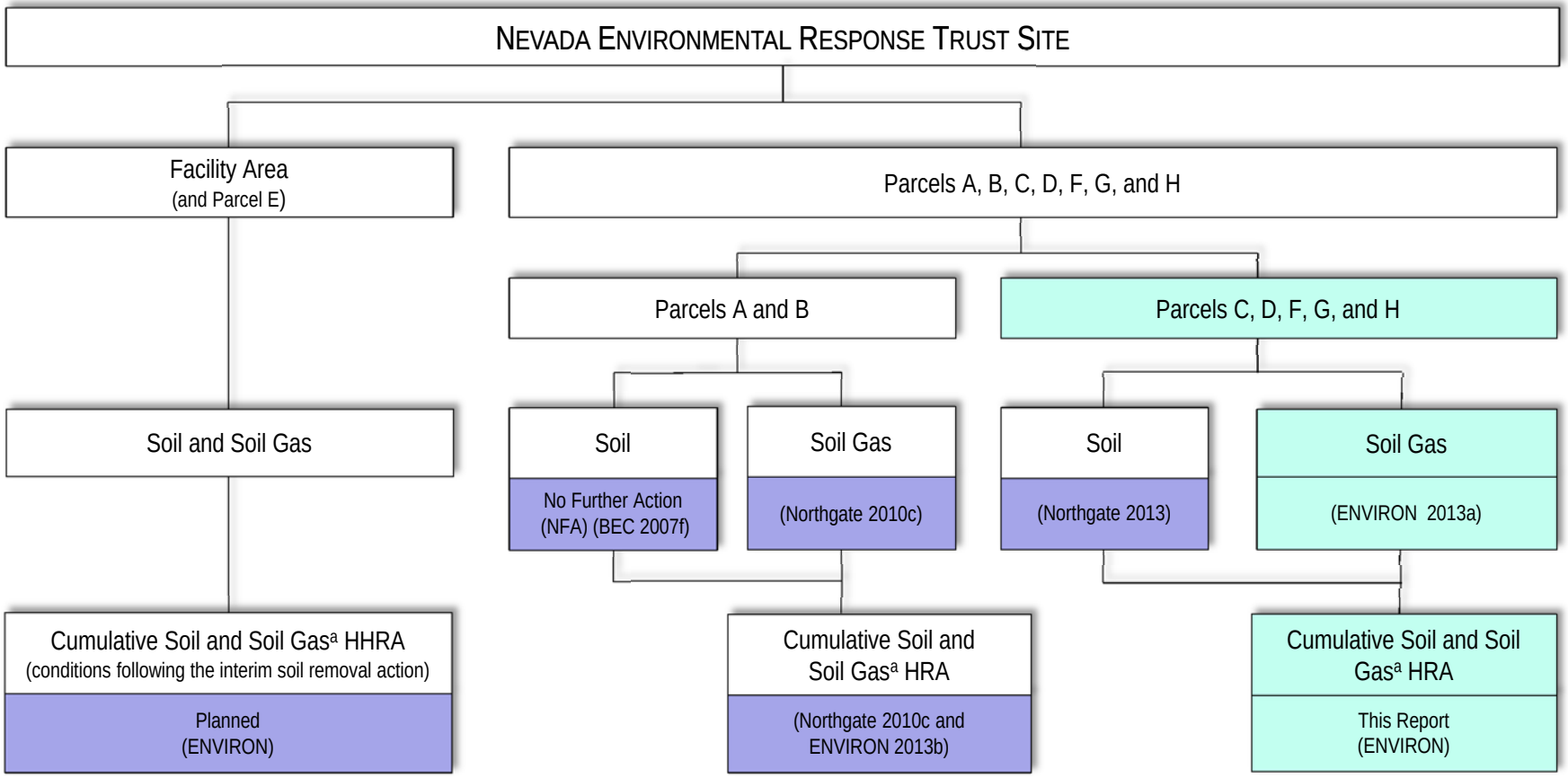
TABLE 21. Comparison of Cancer Risks Estimated Using 2008 and 2013 Soil Gas Samples
Nevada Environmental Response Trust Site, Henderson, Nevada

Parcel	2008 Maximum Detected Concentration (µg/m^3)	Maximum Cancer Risk Using 2008 Chloroform Data	2013 Maximum Detected Concentration (µg/m^3)	Maximum Cancer Risk Using 2013 Chloroform Data	Ratio of 2008 to 2013 Max
C	3,900	2.1E-06	2900	1.6E-06	1.34
D	1,800	9.7E-07	98	5.3E-08	18.37
F	640	3.4E-07	2800	1.5E-06	0.23
G	36	1.9E-08	140	7.5E-08	0.26
H	1.3	7.0E-10	NS	--	NS

Notes:
-- = Not applicable
NS = Not sampled

µg/m^3 = microgram per cubic meter

Figures



Notes:
Green highlighted boxes are the subject of this report.
HRA = Health Risk Assessment
HHRA = Human Health Risk Assessment

[a] Risks for soil gas are being addressed through evaluation of the vapor intrusion and the outdoor air pathways.

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Road Map of Site Risk Assessments
Nevada Environmental Response Trust Site, Henderson, Nevada

Figure
1

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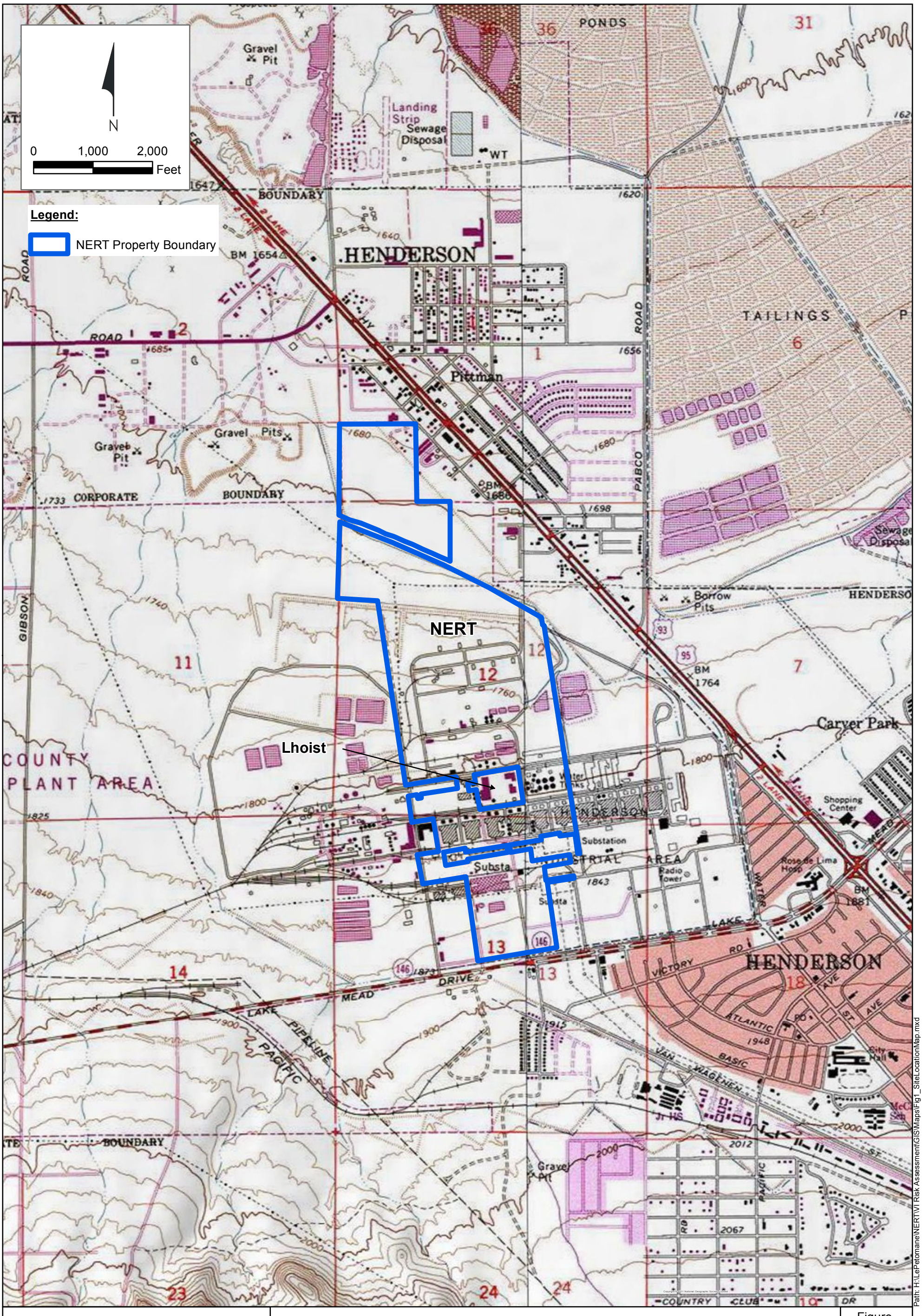

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Site Location Map

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **2**

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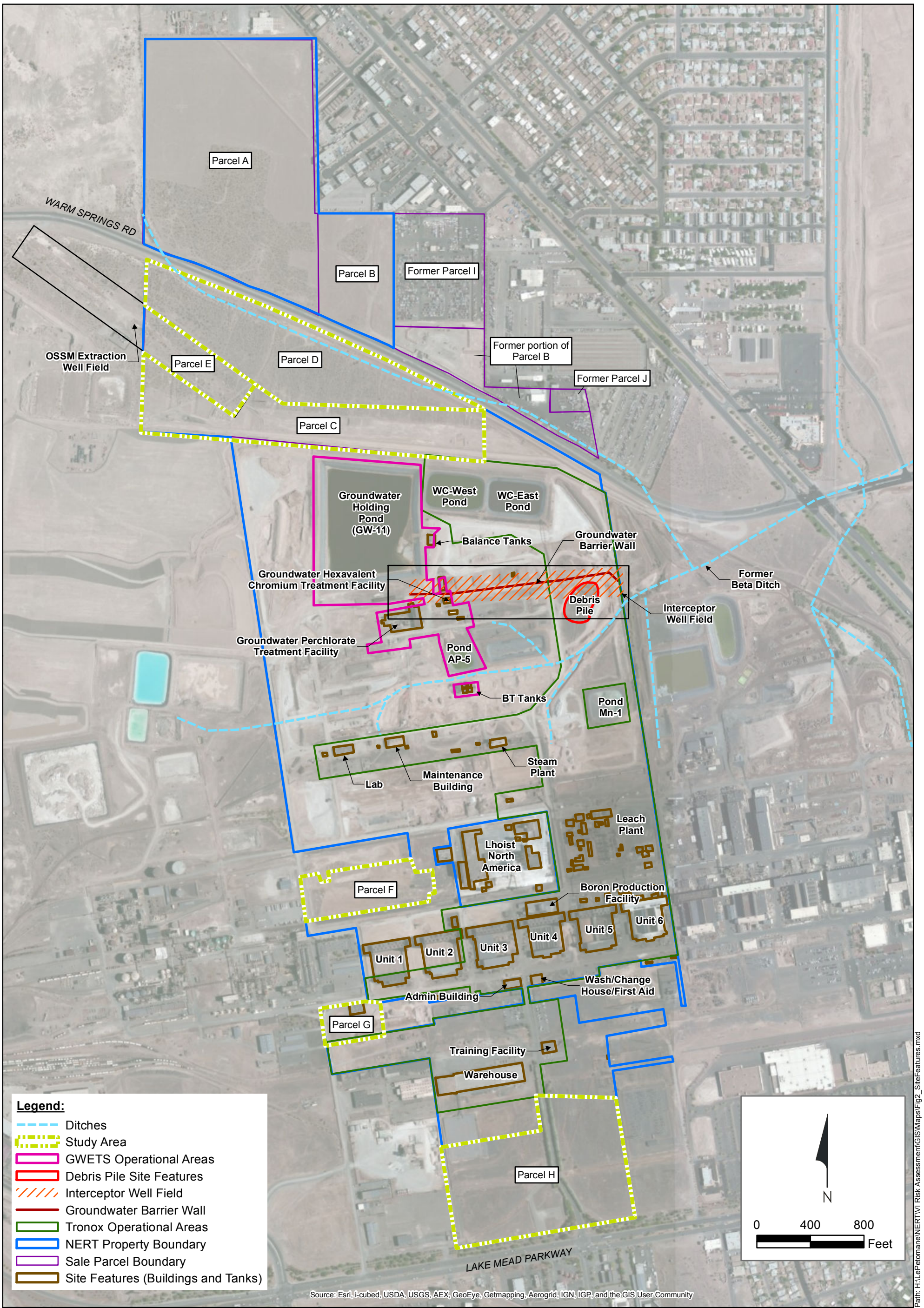

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Study Area and Site Features

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **3**

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N

1:36,000

1 inch = 3,000 feet

0 1,500 3,000 Feet

Las Vegas Wash

City of Henderson Northern Rapid Infiltration Basins (RIBs)

City of Henderson Bird Viewing Preserve

City of Henderson Water Reclamation Facility

GALLERIA RD (Formerly Athens Road)

SUNSET RD

BOULDER HWY

PABCO RD

WARM SPRINGS RD

LAKE MEAD PARKWAY

BMI Common Areas (Eastside)

Former TIMET

Parcel 4B

Former COH Southern RIBs

Parcel 4A

PARCEL OWNED BY MULTIPLE ENTITIES

BMI (CAMU)

NERT

TIMET

Olin

TIMET

LAKE MEAD PARKWAY

AMPAC (Former Pepcon)

Lhoist

Parcel Owned by Multiple Entities

WAPA

US HIGHWAY 95

Mc Cullough Range

NEVADA

HENDERSON

AERIAL SOURCE: GOOGLE EARTH PRO. JUNE 21, 2012.

Path: H:\LePetomane\NERT\GWM\Annual Performance Reports\2012 Annual\Figures\StudyAreaMap.mxd

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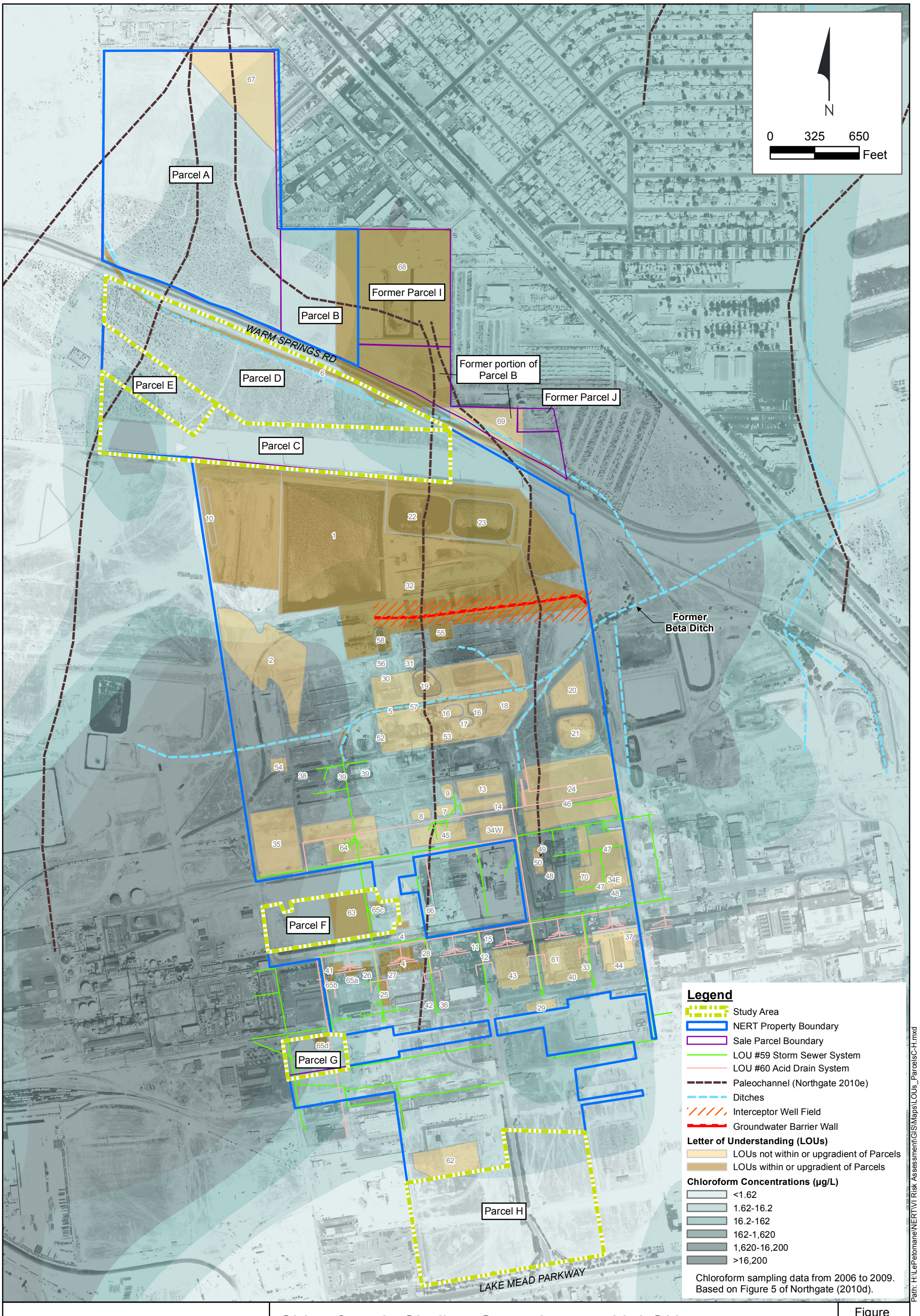
Surrounding Facilities

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure 4

Drafter: RS Date: 6/6/2013 Contract Number: 21-32100GA Approved by: Revised:



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Chloroform in Shallow Groundwater with LOUs

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **5**

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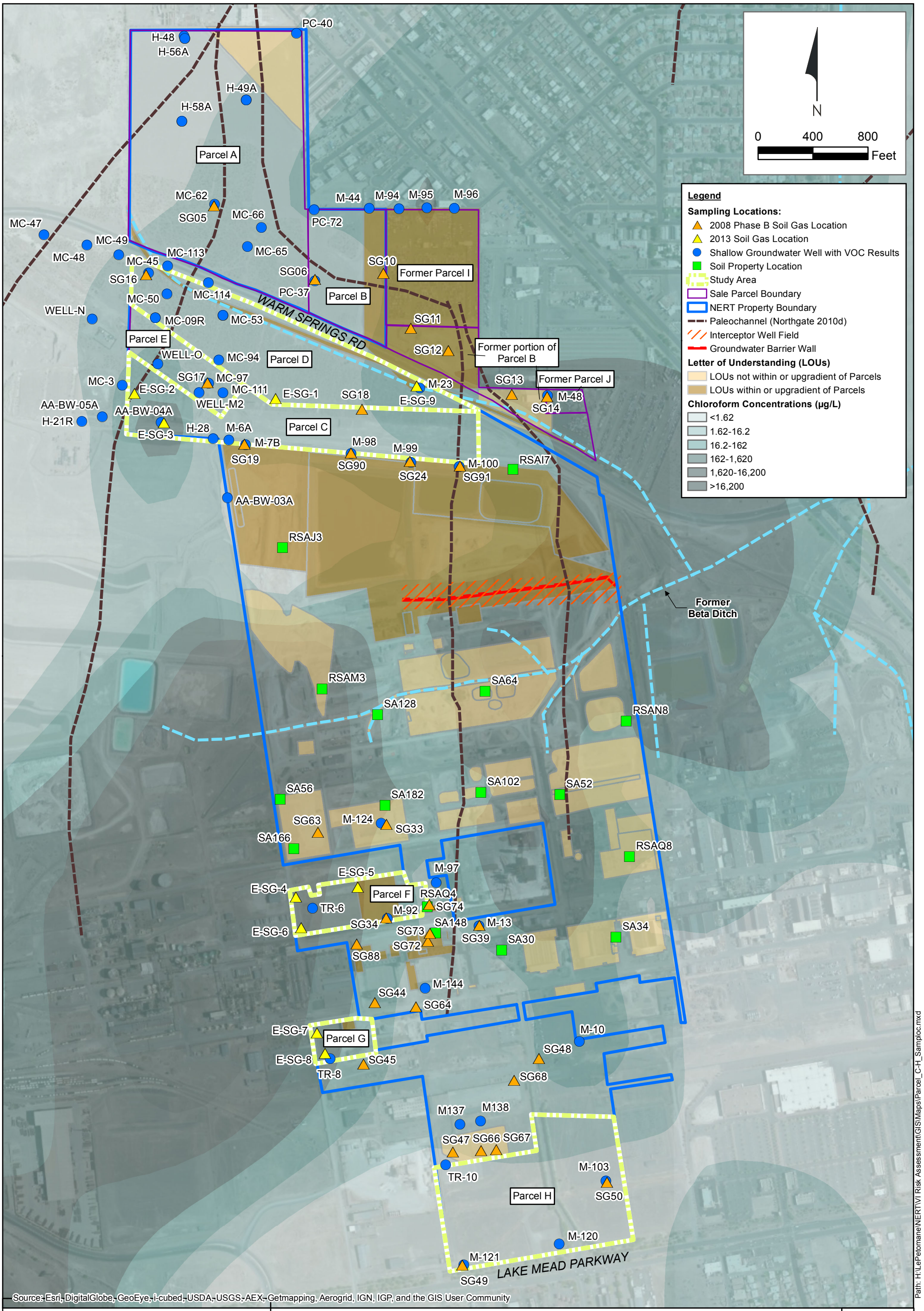

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Soil Gas, Shallow Groundwater, and Soil Property Sampling Locations

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **6**

Drafter: RS | Date: 6/17/2013 | Contract Number: 21-32100GA | Approved by: | Revised:

N

0 350 700

Feet

Legend

Sampling Locations:

- 2008 Phase B Soil Gas Location
- 2013 Soil Gas Location
- Shallow Groundwater Well with VOC Results
- Study Area
- Sale Parcel Boundary
- NERT Property Boundary
- Paleochannel (Northgate 2010d)
- Interceptor Well Field
- Groundwater Barrier Wall

Letter of Understanding (LOUs)

- LOUs not within or upgradient of Parcels
- LOUs within or upgradient of Parcels

Chloroform Concentrations (µg/L)

- <1.62
- 1.62-16.2
- 16.2-162
- 162-1,620
- 1,620-16,200
- >16,200

Parcel A
Parcel B
Parcel C
Parcel D
Parcel E
Parcel F
Parcel G
Parcel H
Former Parcel I
Former portion of Parcel B
Former Parcel J
Former Beta Ditch

MC-45
MC-113
SG16
MC-114
MC-50
MC-09R
MC-53
MC-94
MC-3
SG17
E-SG-1
SG18
E-SG-9
M-23
E-SG-2
AA-BW-04A
E-SG-3
H-28
M-7B
M-6A
SG19
M-98
SG90
M-99
SG24
M-100
SG91
E-SG-5
E-SG-4
TR-6
M-92
SG74
E-SG-6
SG34
E-SG-7
E-SG-8
TR-8
SG45
TR-10
M-103
SG50
M-120
M-121
SG49

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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Soil Gas and Shallow Groundwater Sampling Locations Evaluated in the HRA
Nevada Environmental Response Trust Site, Henderson, Nevada

Figure 7

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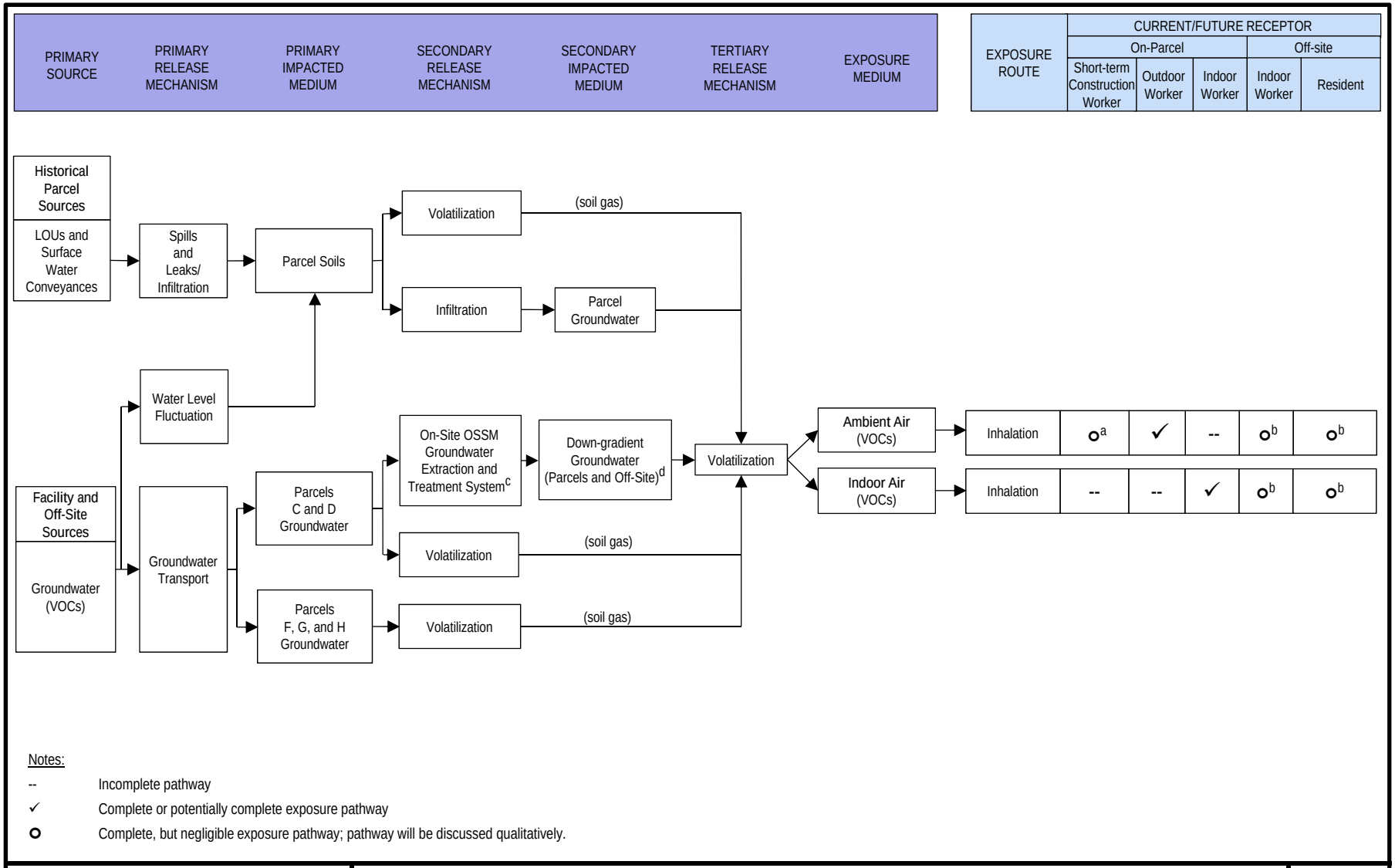

Notes:

-- Incomplete pathway

✓ Complete or potentially complete exposure pathway

o Complete, but negligible exposure pathway; pathway will be discussed qualitatively.

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Conceptual Site Model for the Study Area: Inhalation of VOCs in Indoor and Outdoor Air
Nevada Environmental Response Trust Site, Henderson, Nevada

Figure 8

Drafter: EL Date: 6/21/2013 Contract Number: 21-32100GA Approved by: Revised:

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Note:
This CSM applies specifically to the vapor intrusion pathway for Parcels C, D, F, G, and H.

EXPLANATION:

a	Inhalation of VOCs by outdoor commercial/industrial workers provides an upper-bound estimate of potential exposures to VOCs by construction workers.
b	Inhalation of VOCs by on-site workers serves provides an upper-bound estimate of potential exposures to VOCs by off-site receptors.
c	The OSSM groundwater treatment system, a portion of which is located in Parcel E, treats for VOCs.
d	Direct contact pathways from groundwater are incomplete.
CSM	Conceptual site model
Facility	The NERT Site, excluding Parcels A, B, C, D, F, G, and H
LOU	Letter of Understanding
OSSM	Olin/Stauffer Management Company, LLC/Syngenta Crop Protection LLC/Montrose Chemical Corporation of California
VOC	Volatile organic compound

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Conceptual Site Model for the Study Area: Inhalation of VOCs in Indoor and Outdoor Air
Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **8**

Drafter: EL Date: 6/21/2013 Contract Number: 21-32100GA Approved by: Revised:

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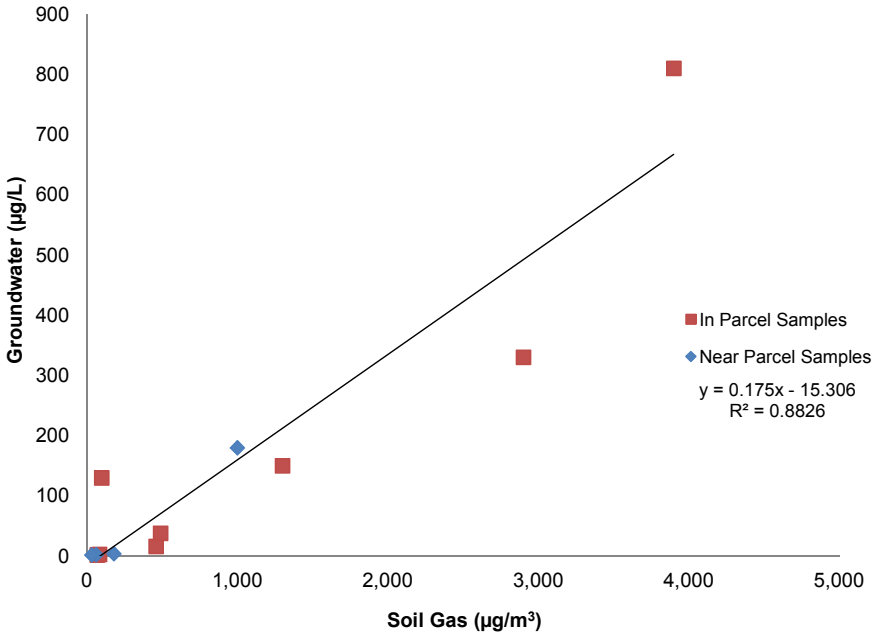
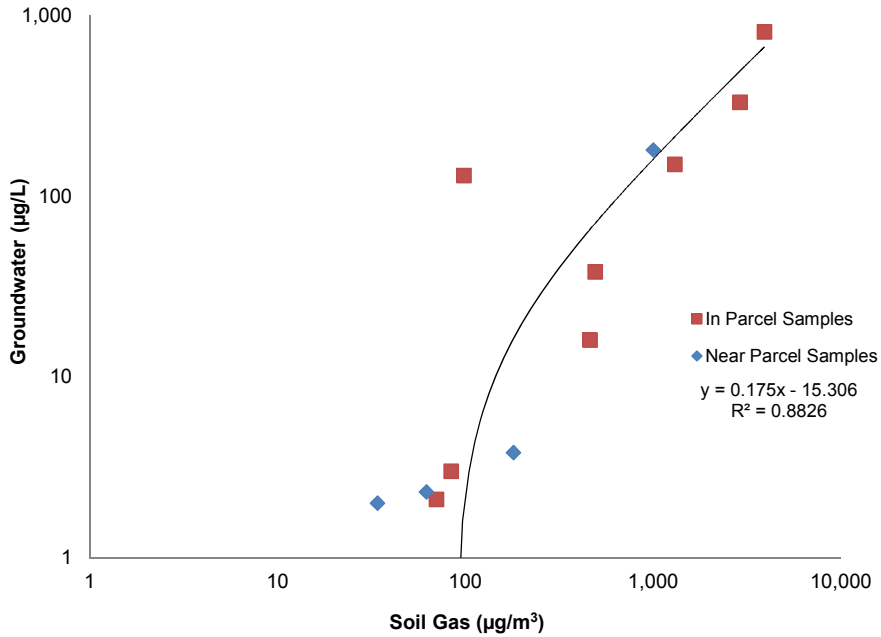
FIGURE 9. Chloroform Concentrations in Soil Gas and Shallow Groundwater in Co-located Samples Within and Near Parcels C and D
Nevada Environmental Response Trust Site, Henderson, Nevada

Location Group	Soil Gas			Groundwater		
	Boring ID	Sample Date	Chloroform ($\mu g/m^3$)	Well ID	Sample Date	Chloroform ($\mu g/L$)
Parcel C	E-SG-2	3/7/2013	460	MC-3	5/27/2009	16
	E-SG-3	3/7/2013	2,900	AA-BW-04A	10/20/2011	330
	SG19	5/28/2008	70	M-7B	6/26/2008	2.1
	SG24	5/28/2008	1,300	M-99	5/6/2010	150
	SG90	5/28/2008	3,900	M-98	11/30/2006	810
	SG91	5/21/2008	490	M-100	12/4/2006	38
Parcel D	E-SG-9	3/8/2013	98	M-23	6/25/2008	130
	SG16	5/18/2008	84	MC-45	6/25/2008	3
Relevant Nearby Locations for Parcels C and D	SG05	5/29/2008	62	MC-62	6/23/2008	2.3
	SG06	5/20/2008	34	PC-37	6/20/2008	2
	SG14	5/20/2008	1,000	M-48	7/9/2008	180
	SG17	5/18/2008	180	MC-97	6/25/2008	3.8





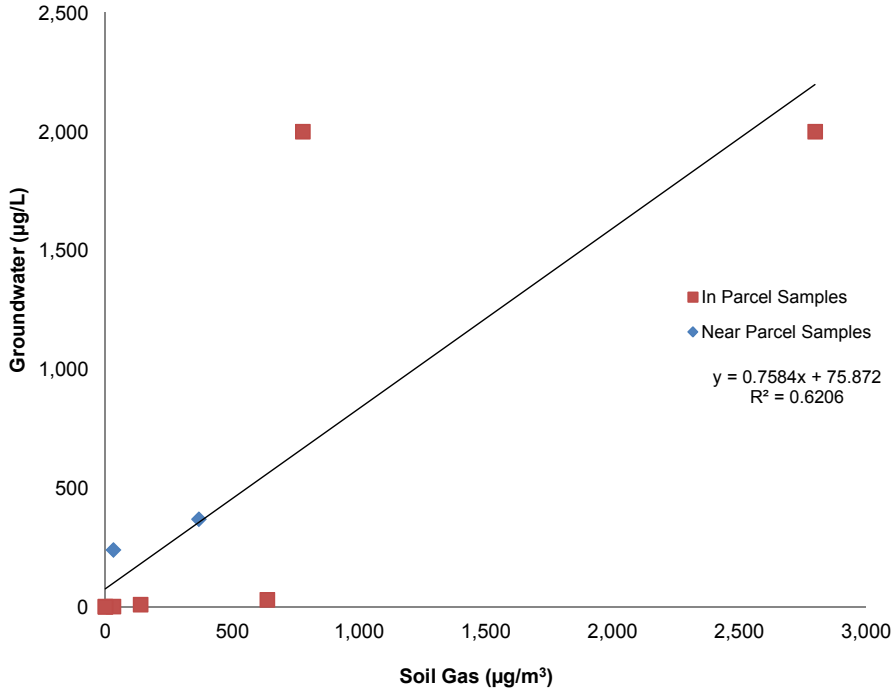
Notes:

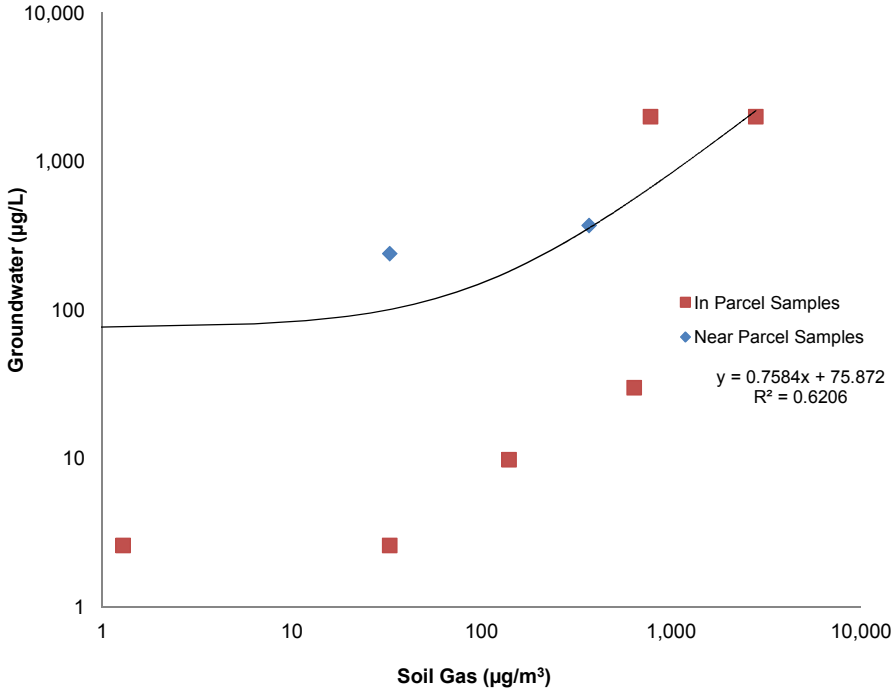
$\mu g/m^3$ = microgram per cubic meter

$\mu g/L$ = microgram per liter

FIGURE 10. Chloroform Concentrations in Soil Gas and Shallow Groundwater in Co-located Samples Within and Near Parcels F, G, and H
Nevada Environmental Response Trust Site, Henderson, Nevada

Location Group	Soil Gas			Groundwater		
	Boring ID	Sample Date	Chloroform ($\mu g/m^3$)	Well ID	Sample Date	Chloroform ($\mu g/L$)
Parcel F	E-SG-4	3/13/2013	2,800	TR-6	7/27/2010	2,000
	E-SG-6	3/8/2013	780	TR-6	7/27/2010	2,000
	SG34	5/28/2008	640	M-92	7/15/2009	30
Relevant Nearby Locations for Parcel F	SG33	5/17/2008	33	M-124	7/11/2008	240
	SG39	5/14/2008	370	M-13	6/25/2009	36
Parcel G	E-SG-8	3/13/2013	140	TR-8	7/14/2009	9.8
Parcel H	SG49	5/22/2008	1	M-121	7/10/2009	2.6
	SG50	5/22/2008	1	M-103	7/8/2009	0.54
Relevant Nearby Location for Parcel H	SG47	5/21/2008	33	TR-10	7/14/2009	2.6





Notes:
$\mu g/m^3$ = microgram per cubic meter
$\mu g/L$ = microgram per liter

N

0 350 700

Feet

Legend

Soil Gas Chemicals:

- Carbon Tetrachloride
- Chloroform
- 1,1-Dichloroethane
- Tetrachloethene
- Trichloroethene

Total Log Concentration (µg/m^3)

- 0.1 - 10
- 10.1 -100
- 100.1 - 1000
- 1000.1 - 10000

- Study
- Sale Parcel Boundary
- NERT Property Boundary
- Paleochannel (Northgate 2010d)
- Interceptor Well Field
- Groundwater Barrier Wall

Parcel A
Parcel B
Parcel C
Parcel D
Parcel E
Parcel F
Parcel G
Parcel H
Former Parcel I
Former portion of Parcel B
Former Parcel J
WARM SPRINGS RD
LAKE MEAD PARKWAY
SG16
SG17
SG18
SG19
SG24
SG34
SG45
SG49
SG50
SG74
SG90
SG91
E-SG-1
E-SG-2
E-SG-3
E-SG-4
E-SG-5
E-SG-6
E-SG-7
E-SG-8
E-SG-9

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, and the GIS User Community

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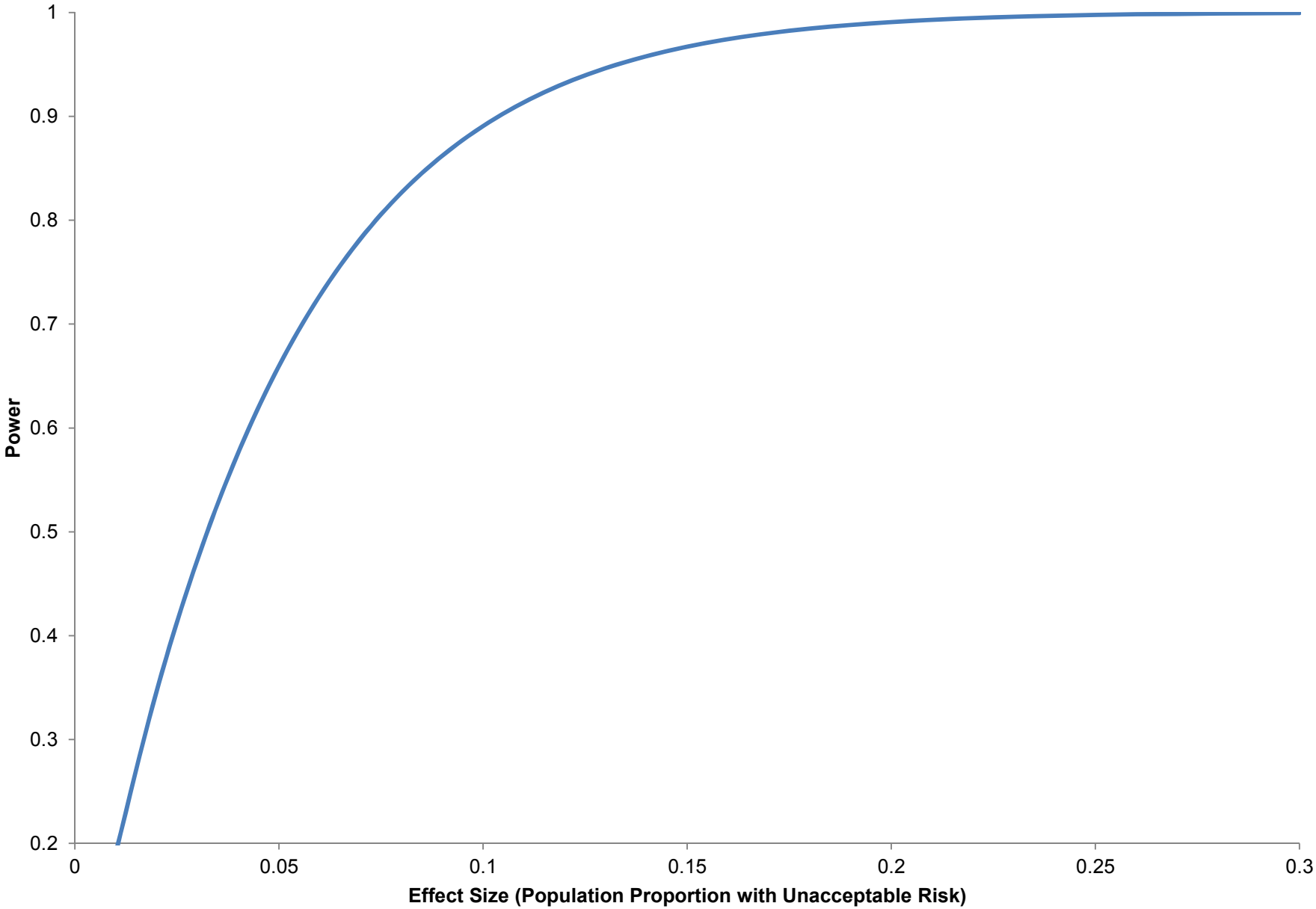
Soil Gas Results for Carbon Tetrachloride, Chloroform, 1,1-Dichloroethane, Tetrachloroethene, and Trichloroethane

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **11**

Drafter: RS | Date: 6/17/2013 | Contract Number: 21-32100GA | Approved by: | Revised:

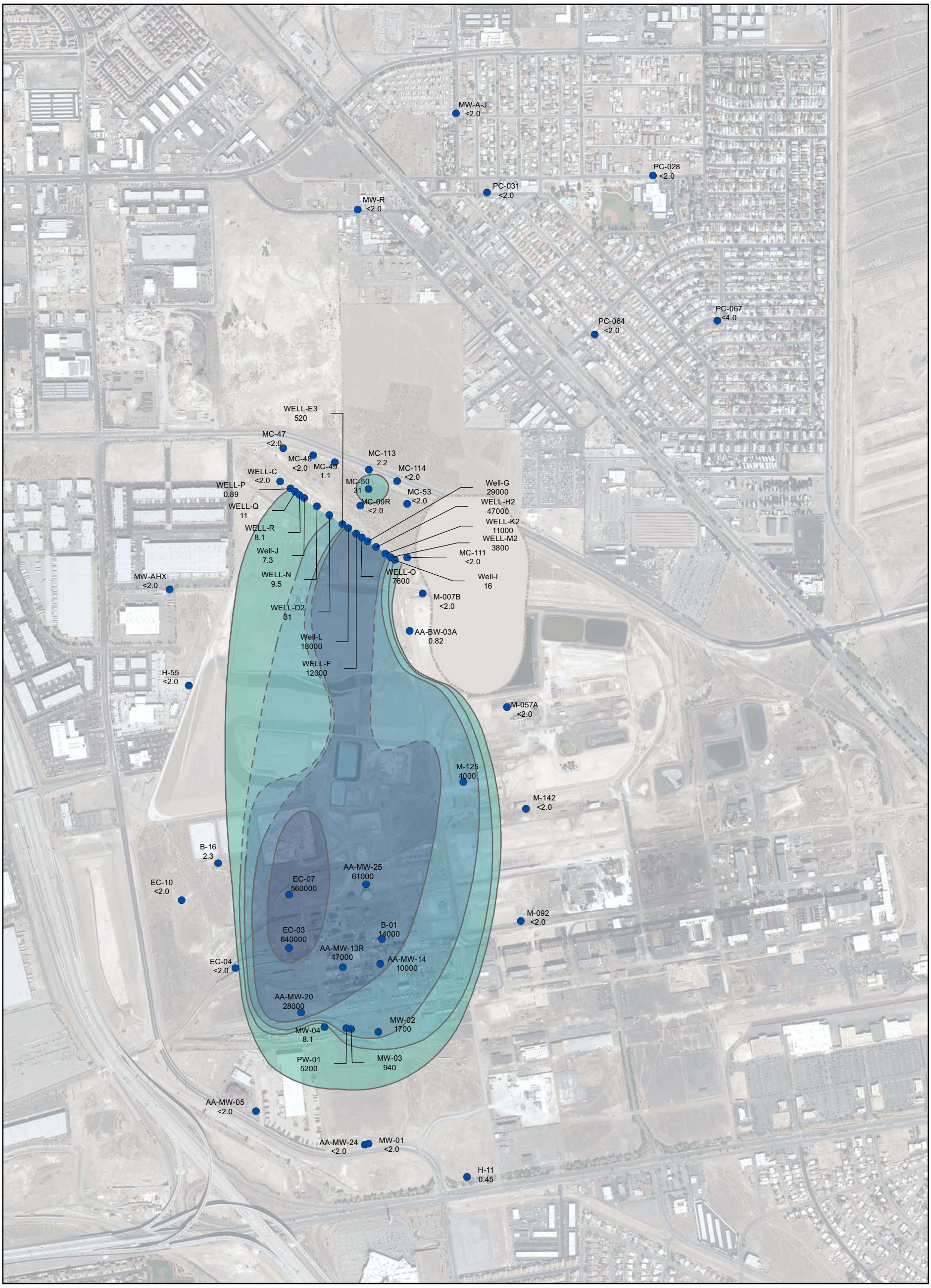
FIGURE 12. Data Quality Assessment Power Curve (n=21)



Appendices

Appendix A

Shallow Groundwater Results for Benzene, Chlorobenzene, Chloroform, 1,2-Dichlorobenzene, and 1,4-Dichlorobenzene



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EXPLANATION

BENZENE CONCENTRATION (ug/l)
EPA METHOD: 8260B

- 5 (BCL, MCL) - 99
- 100 - 999
- 1,000 - 9,999
- 10,000 - 99,999
- 100,000 - 999,999

Boundary of concentration zone is dashed where inferred, queried where uncertain

H-11 0.45 — MONITOR WELL IDENTIFIER; CONCENTRATION IN MICROGRAMS PER LITER; SECOND QUARTER 2012

< — LESS THAN; COMPOUND WAS NOT DETECTED AT OR ABOVE THE REPORTED DETECTION LIMIT

ug/l — MICROGRAMS PER LITER

AREA OF UNCERTAIN SHALLOW ZONE SATURATION

N

0 500 1,000
Feet

Note:
While additional data may be available from other BMI area companies, these maps were prepared based on water quality data generated by the OSSM companies in 2012.

2012 COMPREHENSIVE DATA EVALUATION
MONTROSE, STAUFFER AND OLIN SITES
HENDERSON, NEVADA

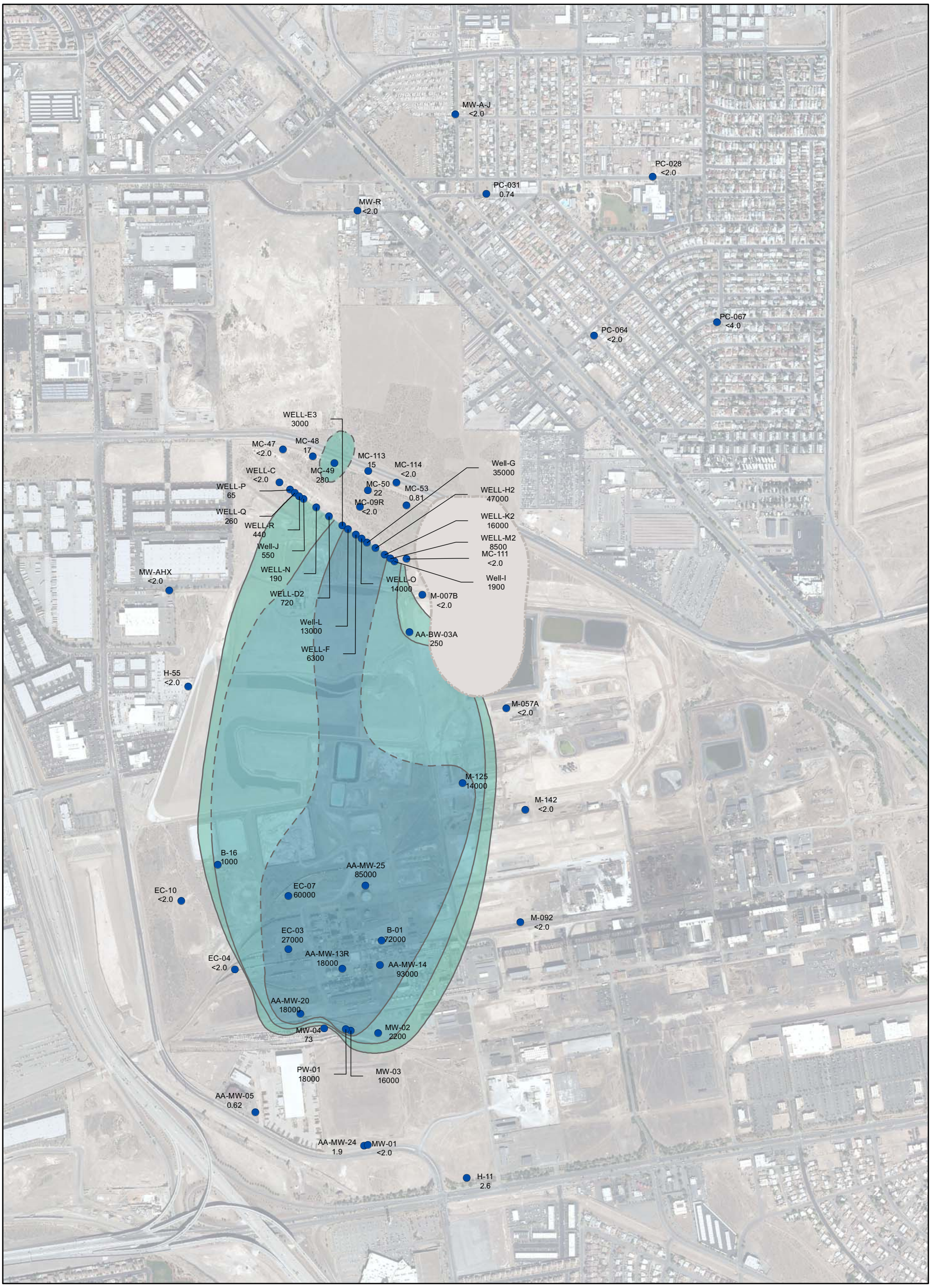
BENZENE
SHALLOW ZONE
SECOND QUARTER 2012

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY / ENGINEERING

7/23/2012

FIGURE 6

PREP BY DAT REV BY BRW RPT NO 754.86



Path: \\Phoenix02\d-drive\Project Storage\Montrose Henderson GIS\Maps\754.86 2012 Site-Wide Annual report\CBz\CBz-Shallow.mxd

EXPLANATION

CHLOROBENZENE CONCENTRATION (ug/l)
EPA METHOD: 8260B

- 100 (BCL, MCL) - 999
- 1,000 - 9,999
- 10,000 - 99,999
- 100,000 - 999,999

Boundary of concentration zone is dashed where inferred, queried where uncertain

H-11 MONITOR WELL IDENTIFIER
2.6 CONCENTRATION IN MICROGRAMS PER LITER SECOND QUARTER 2012

< LESS THAN; COMPOUND WAS NOT DETECTED AT OR ABOVE THE REPORTED DETECTION LIMIT

ug/l MICROGRAMS PER LITER

AREA OF UNCERTAIN SHALLOW ZONE SATURATION

N

0 500 1,000
Feet

Note:
While additional data may be available from other BMI area companies, these maps were prepared based on water quality data generated by the OSSM companies in 2012.

2012 COMPREHENSIVE DATA EVALUATION
MONTROSE, STAUFFER AND OLIN SITES
HENDERSON, NEVADA

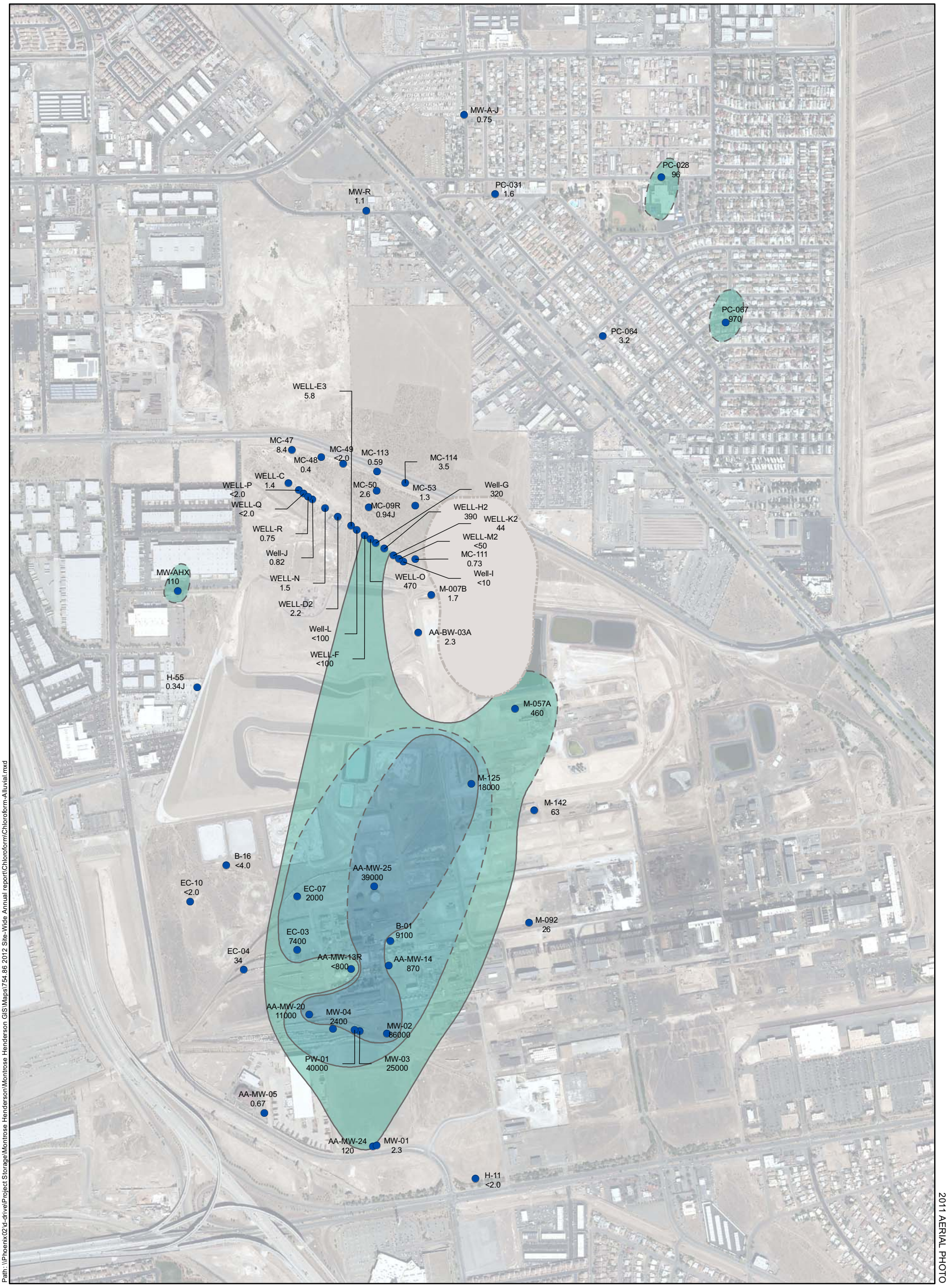
CHLOROBENZENE
SHALLOW ZONE
SECOND QUARTER 2012

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY / ENGINEERING

7/23/2012

FIGURE 7

PREP BY DAT REV BY BRW RPT NO 754.86



EXPLANATION

CHLOROFORM CONCENTRATION (ug/l)
EPA METHOD: 8260B

- 80 (TTHM MCL) - 999
- 1,000 - 9,999
- 10,000 - 99,999

Boundary of concentration zone is dashed where inferred, queried where uncertain.

H-11 MONITOR WELL IDENTIFIER
<2.0 CONCENTRATION IN MICROGRAMS PER LITER SECOND QUARTER 2012

<	LESS THAN; COMPOUND WAS NOT DETECTED AT OR ABOVE THE REPORTED DETECTION LIMIT
ug/l	MICROGRAMS PER LITER
TTHM	TOTAL TRIHALOMETHANES (BROMODICHLOROMETHANE + BROMOFORM + CHLOROFORM + DIBROMOCHLOROMETHANE)
J	THE ASSOCIATED VALUE IS AN ESTIMATED QUANTITY.
	AREA OF UNCERTAIN SHALLOW ZONE SATURATION

N

0 500 1,000
Feet

Note:
BCL = 0.193 ug/l

While additional data may be available from other BMI area companies, these maps were prepared based on water quality data generated by the OSSM companies in 2012.

2012 COMPREHENSIVE DATA EVALUATION
MONTROSE, STAUFFER AND OLIN SITES
HENDERSON, NEVADA

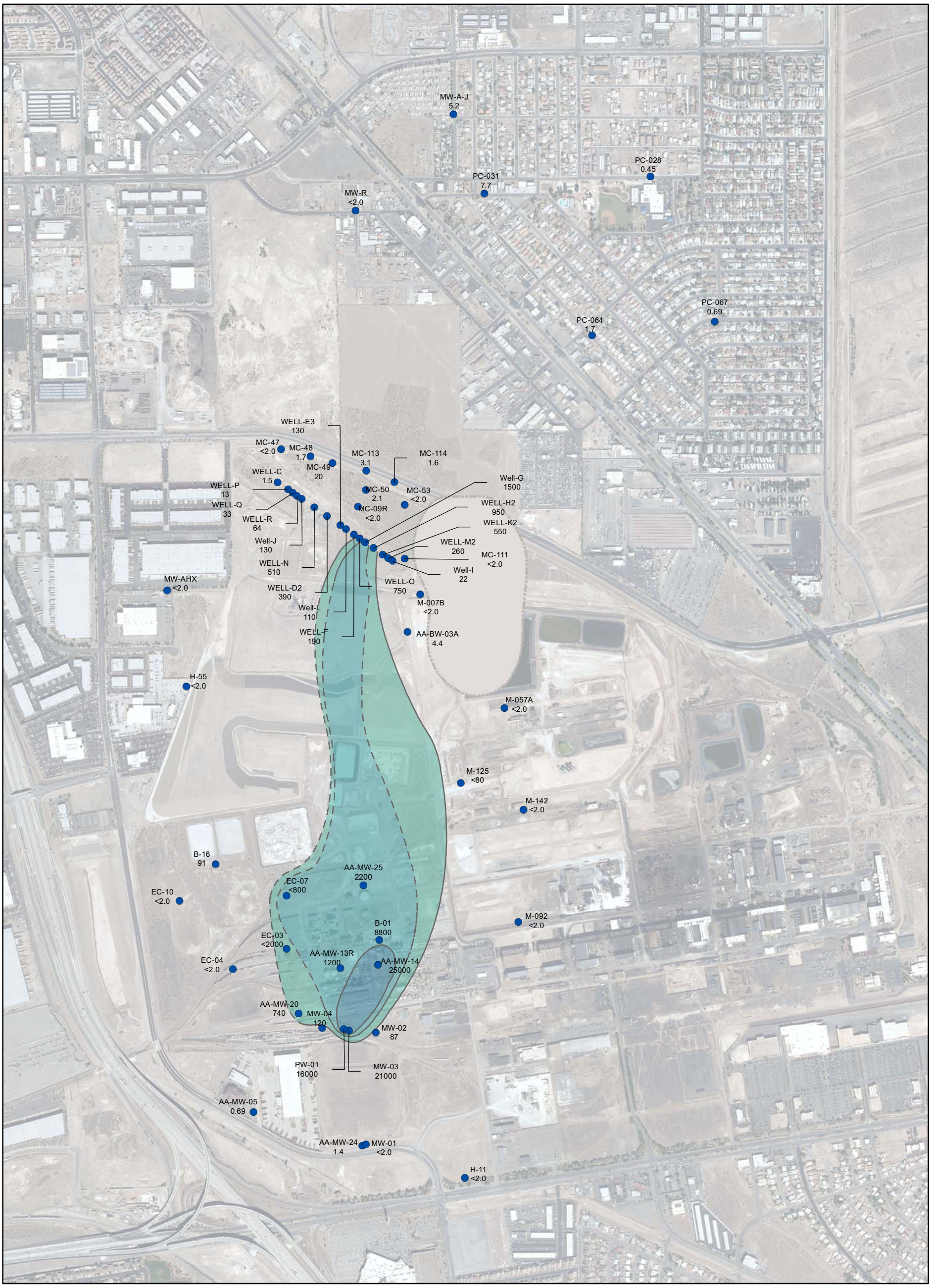
CHLOROFORM
SHALLOW ZONE
SECOND QUARTER 2012

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY / ENGINEERING

8/14/2012

FIGURE 8

PREP BY DAT REV BY BRW RPT NO 754.86



EXPLANATION

1,2-DICHLOROBENZENE CONCENTRATION (ug/l)
EPA METHOD: 8260B

- 600 (BCL, MCL) - 999
- 1,000 - 9,999
- 10,000 - 99,999

Boundary of concentration zone is dashed where inferred, queried where uncertain

H-11 MONITOR WELL IDENTIFIER
<2.0 CONCENTRATION IN MICROGRAMS PER LITER SECOND QUARTER 2012
< LESS THAN; COMPOUND WAS NOT DETECTED AT OR ABOVE THE REPORTED DETECTION LIMIT
ug/l MICROGRAMS PER LITER
AREA OF UNCERTAIN SHALLOW ZONE SATURATION

N

0 500 1,000
Feet

Note:
While additional data may be available from other BMI area companies, these maps were prepared based on water quality data generated by the OSSM companies in 2012.

2012 COMPREHENSIVE DATA EVALUATION
MONTROSE, STAUFFER AND OLIN SITES
HENDERSON, NEVADA

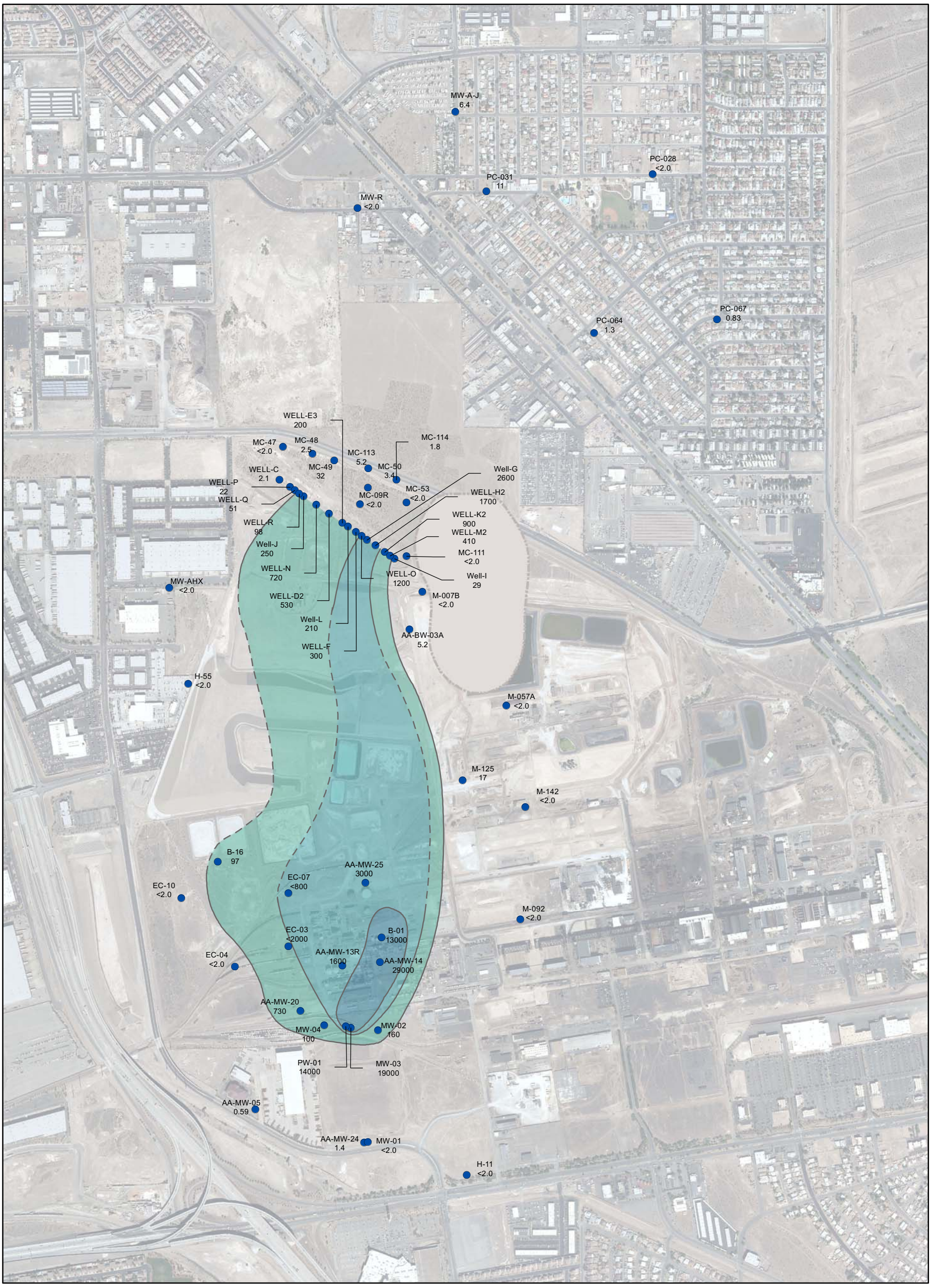
1,2-DICHLOROBENZENE
SHALLOW ZONE
SECOND QUARTER 2012

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY / ENGINEERING

7/23/2012

FIGURE 9

PREP BY DAT REV BY BRW RPT NO 754.86



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EXPLANATION

1,4-DICHLOROBENZENE CONCENTRATION (ug/l)
EPA METHOD: 8260B

- 75 (BCL, MCL) - 999
- 1,000 - 9,999
- 10,000 - 99,999

Boundary of concentration zone is dashed where inferred, queried where uncertain

H-11 <2.0 — MONITOR WELL IDENTIFIER; CONCENTRATION IN MICROGRAMS PER LITER SECOND QUARTER 2012

< — LESS THAN; COMPOUND WAS NOT DETECTED AT OR ABOVE THE REPORTED DETECTION LIMIT

ug/l — MICROGRAMS PER LITER

AREA OF UNCERTAIN SHALLOW ZONE SATURATION

N

0 500 1,000
Feet

Note:
While additional data may be available from other BMI area companies, these maps were prepared based on water quality data generated by the OSSM companies in 2012.

2012 COMPREHENSIVE DATA EVALUATION
MONTROSE, STAUFFER AND OLIN SITES
HENDERSON, NEVADA

1,4-DICHLOROBENZENE
SHALLOW ZONE
SECOND QUARTER 2012

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY / ENGINEERING

7/23/2012

FIGURE 10

PREP BY DAT REV BY BRW RPT NO 754.86

Appendix B

Field Sampling Investigation Data March 2013

TABLE B-1. Soil Gas Probe Construction Details

Nevada Environmental Response Trust Site, Henderson, Nevada

Location ID	Date Installed	Borehole Diameter (inches)	Total Depth of Boring (feet bgs)	Proposed Probe Depth (feet bgs)	Installed Probe Depth (feet bgs)	Sand Pack Interval (feet bgs)
E-SG-1	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-2	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-3	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-4	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-5	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-6	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-7	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-8	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5
E-SG-9	3/7/2013	2.25	5.5	5.0	5.0	4.5 - 5.5

Notes:

ID = identification

feet bgs = feet below ground surface

1/4" outer diameter Teflon-lined tubing with 1" stainless steel sintered filter used in all probe construction.

Cemex Lapis Lustre #3 Monterey sand used for filter pack with hydrated Cetco #8 crumbles used for seal.

TABLE B-2. Summary of Soil Gas Purging and Sampling

Nevada Environmental Response Trust Site, Henderson, Nevada

Location ID	Date Installed	Sample Date	Targeted Probe Depths (feet bgs)	Installed Probe Depths (feet bgs)	Total Tubing (feet)	Stick-Up (feet)	Filter Pack Volume[a] (mL)	3X Purge Volume (mL)	Volume Purged (mL)	PVs	Purge Rate[c] (mL/min)
E-SG-1	3/7/2013	3/8/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150
E-SG-2	3/7/2013	3/7/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	200
E-SG-3	3/7/2013	3/7/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	200
E-SG-4	3/7/2013	3/13/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150
E-SG-5	3/7/2013	3/13/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150
E-SG-6	3/7/2013	3/8/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	200
E-SG-7	3/7/2013	3/8/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150
E-SG-8	3/7/2013	3/13/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150
E-SG-9	3/7/2013	3/8/2013	5.0	5.0	7.0	2.0	273	989	1000	3.0	150

Notes:

feet bgs = feet below ground surface

mL= milliliters

PV = purge volume

[a] Filter pack volume includes dry bentonite above sand pack. Thirty percent porosity assumed.

[b] All samples were purged with Summa™ purge can.

[c] Critical orifice supplied from the lab rated to between 150-200 ml/min. A rotameter attached to the purge can was used to measure the actual purge rate.

TABLE B-3: Summary of Soil Gas Probe Leak Checking[a]

Nevada Environmental Response Trust Site, Henderson, Nevada

Location ID	Sample Date	Shut-in Test	Helium Concentration in Shroud			Helium Concentration in Probe			Lab Detection	% of Shroud Concentration[b]
			Pre-Sampling	Post-Sampling	Average	Pre-Sampling	Post-Sampling	Average		
E-SG-1	3/8/2013	PASSED	35.0	20.0	27.5	3.3	2.4	2.85	0.0067	0.024
E-SG-2	3/7/2013	PASSED	21.8	27.2	24.5	ND<0.1	ND<0.1	ND<0.1	0.0081	0.033
E-SG-3	3/7/2013	PASSED	30.0	30.0	30.0	0.1	ND<0.1	0.5	0.0082	0.027
E-SG-4	3/13/2013	PASSED	30.5	38.9	34.7	ND<0.1	ND<0.1	ND<0.1	0.010	0.029
E-SG-5	3/13/2013	PASSED	28.1	33.2	30.7	ND<0.1	ND<0.1	ND<0.1	0.0071	0.023
E-SG-6	3/8/2013	PASSED	29.6	30.3	30.0	ND<0.1	ND<0.1	ND<0.1	2.0	6.7
E-SG-6-FD	3/8/2013	PASSED	29.6	30.3	30.0	ND<0.1	ND<0.1	ND<0.1	0.076	0.25
E-SG-7	3/8/2013	PASSED	24.4	18.3	21.4	ND<0.1	ND<0.1	ND<0.1	ND<0.005	0.023
E-SG-8	3/13/2013	PASSED	31.6	31.5	31.6	ND<0.1	ND<0.1	ND<0.1	0.012	0.038
E-SG-9	3/8/2013	PASSED	31.0	21.9	26.5	ND<0.1	ND<0.1	ND<0.1	ND<0.005	0.019

Notes:

FD = field duplicate

ND = not detected above SQL

SQL = sample quantitation limit

[a] All values are reported in %.

[b] The SQL was used for samples that were not detected in the lab.

Appendix C

Data Validation Summary Reports (DVSRs)

Data Validation Summary Report
March 2013
Soil Gas Sampling
Nevada Environmental Response Trust (NERT)
Henderson, Nevada

Prepared for

ENVIRON International Corporation
Emeryville, California

Prepared by

Laboratory Data Consultants, Inc.
7750 El Camino Real, Suite 2C
Carlsbad, California 92009

July 15, 2013

Table of Contents

LIST OF TABLES

ATTACHMENT

LIST OF ACRONYMS AND ABBREVIATIONS

DQO	Data Quality Objectives
DVSR	Data Validation Summary Report
LCS	Laboratory Control Sample
LDC	Laboratory Data Consultants, Inc.
PARCC	Precision, Accuracy, Representativeness, Comparability, Completeness
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance / Quality Control
QAPP	Quality Assurance Project Plan
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SDG	Sample Delivery Group
SQL	Sample Quantitation Limit
VOC	Volatile Organic Compound
ug/m^3	Micrograms per Cubic Meter
USEPA	United States Environmental Protection Agency
%D	Percent Difference
%R	Percent Recovery
%RSD	Percent Relative Standard Deviation

1.0 INTRODUCTION

This data validation summary report (DVSR) has been prepared by Laboratory Data Consultants, Inc. (LDC) to assess the validity and usability of laboratory analytical data from the Soil Gas Sampling conducted at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada. The assessment was performed by ENVIRON as a part of the *Revised Phase B Quality Assurance Project Plan Tronox LLC Facility, Henderson, Nevada* dated May 2009 and included the collection and analyses of 13 environmental and quality control (QC) samples. The analyses were performed by the following methods:

Volatile Organic Compounds (VOCs) by EPA Method TO-15

Laboratory analytical services were provided by McCampbell Analytical, Inc. The samples were grouped into sample delivery groups (SDGs). The air samples are associated with QA/QC samples designed to document the data quality of the entire SDG or a sub-group of samples within an SDG. Table I is a cross-reference table listing each sample, analysis, SDG, collection date, laboratory sample number, and matrix. All shaded samples in Table I were reviewed under Stage 4 validation guidelines.

The laboratory analytical data were validated in accordance with procedures described in the Nevada Division of Environmental Protection (NDEP) *Data Verification and Validation Requirements - Supplement* established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada, April 13, 2009. Consistent with the NDEP requirements, approximately ninety percent of the analytical data were validated according to Stage 2B data validation procedures and ten percent of the analytical data were validated according to Stage 4 data validation procedures. The analytical data were evaluated for quality assurance and quality control (QA/QC) based on the following documents: *Basic Remediation Company (BRC) Standard Operating Procedures (SOP) 40 Data Review/Validation,* Revision 4, May 2009, *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, June 2008, *Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review*, January 2010, *Contract Laboratory Program National Functional Guidelines for Polychlorinated Dioxins/Dibenzofurans Data Review*, September 2005, and the *EPA SW 846 Third Edition, Test Methods for Evaluating Solid Waste,* update I, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IV, February 2007.

This report summarizes the QA/QC evaluation of the data according to precision, accuracy, representativeness, completeness, and comparability (PARCC) relative to the project data quality objectives (DQOs). This report provides a quantitative and qualitative assessment of the data and identifies potential sources of error, uncertainty, and bias that may affect the overall usability.

The PARCC summary report evaluates and summarizes the results of QA/QC data validation for the entire sampling program. Each analytical fraction has a separate section for each of the PARCC criteria. These sections interpret specific QC deviations and their effects on both individual data points and the analyses as a whole. Section 4.0 presents a summary of the PARCC criteria by comparing quantitative parameters with acceptability criteria defined in the project DQO's. Qualitative PARCC criteria are also summarized in this section.

Precision and Accuracy of Environmental Data

Environmental data quality depends on sample collection procedures, analytical methods and instrumentation, documentation, and sample matrix properties. Both sampling procedures and laboratory analyses contain potential sources of uncertainty, error, and/or bias, which affect the overall quality of a measurement. Errors for sample data may result from incomplete equipment decontamination, inappropriate sampling techniques, sample heterogeneity, improper filtering, and improper preservation. The accuracy of analytical results is dependent on selecting appropriate analytical methods, maintaining

equipment properly, and complying with QC requirements. The sample matrix also is an important factor in the ability to obtain precise and accurate results within a given media.

Environmental and laboratory QA/QC samples assess the effects of sampling procedures and evaluate laboratory contamination, laboratory performance, and matrix effects. QA/QC samples include: trip blanks, equipment blanks, field duplicates, method blanks, and laboratory control samples (LCSs).

Before conducting the PARCC evaluation, the analytical data were validated according to the BRC SOP-40 (May 2009) and Functional Guidelines (USEPA 2008). Samples not meeting the acceptance criteria were qualified with a flag, an abbreviation indicating a deficiency with the data. The following are flags used in data validation.

J- Estimated The associated numerical value is an estimated quantity with a negative bias. The analyte was detected but the reported value may not be accurate or precise.

J+ Estimated The associated numerical value is an estimated quantity with a positive bias. The analyte was detected but the reported value may not be accurate or precise.

J Estimated The associated numerical value is an estimated quantity. It is not possible to assess the direction of the potential bias. The analyte was detected but the reported value may not be accurate or precise. The "J" qualification indicates the data fell outside the QC limits, but the exceedance was not sufficient to cause rejection of the data.

K Estimated The associated numerical value is an estimated maximum possible concentration (EMPC). Flagged by the laboratory as estimated due to not meeting the qualitative identification criteria, target compounds reported as EMPC by the laboratory should be considered estimated.

R Rejected The data is unusable (the compound or analyte may or may not be present). Use of the "R" qualifier indicates a significant variance from functional guideline acceptance criteria. Either resampling or reanalysis is necessary to determine the presence or absence of the rejected analyte. The "R" designation is also applied to yield only one complete set of data for a given sample and eliminate redundant data.

U Nondetected Analyses were performed for the compound or analyte, but it was not detected. The "U" designation is also applied to suspected blank contamination. The "U" flag is used to qualify any result that is detected in an environmental sample and associated blank at less than the PQL.

UJ Estimated/Nondetected Analyses were performed for the compound or analyte, but it was not detected and the sample quantitation or detection limit is an estimated quantity due to poor accuracy or precision. This qualification is also used to flag possible false negative results in the case where low bias in the analytical system is indicated by low calibration response, surrogate, or other spike recovery.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

A Indicates the finding is based upon technical validation criteria.
P Indicates the finding is related to a protocol/contractual deviation.

The hierarchy of flags is listed below:

R > J The R flag will always take precedence over the J qualifier.

J > J+ or J-	A non-biased (J) flag will always supersede biased (J+ or J-) flags since it is not possible to assess the direction of the potential bias.
J = J+ plus J-	Adding biased (J+, J-) flags with opposite signs will result in a non-biased flag (J).
UJ = U plus J or J+ or J-	The UJ flag is used when a non-detected (U) flag is added to a biased (J+ or J-) or non-biased flag (J).

Table II lists the reason codes used. Reason codes explain why flags have been applied and identify possible limitations of data use. Reason codes are cumulative except when one of the flags is R then only the reason code associated to the R flag will be used.

Table III presents the overall qualified results after all the flags or validation qualifiers and associated reason codes have been applied.

Once the data are reviewed and qualified according to the BRC SOP-40 and Functional Guidelines, the data set is then evaluated using PARCC criteria. PARCC criteria provide an evaluation of overall data usability. The following is a discussion of PARCC criteria as related to the project DQOs.

Precision is a measure of the agreement or reproducibility of analytical results under a given set of conditions. It is a quantity that cannot be measured directly but is calculated from percent recovery data. Precision is expressed as the relative percent difference (RPD):

$$RPD = (D1-D2)/\{1/2(D1+D2)\} \text{ X } 100$$

where:
D1 = reported concentration for the sample
D2 = reported concentration for the duplicate

Precision is primarily assessed by calculating an RPD from the percent recoveries of the spiked compounds for each sample in the MS/MSD pair. In the absence of an MS/MSD pair, a laboratory duplicate or LCS/LCSD pair can be analyzed as an alternative means of assessing precision. An additional measure of sampling precision was obtained by collecting and analyzing field duplicate samples, which were compared using the RPD result as the evaluation criteria.

MS and MSD samples are field samples spiked by the laboratory with target analytes prior to preparation and analysis. These samples measure the overall efficiency of the analytical method in recovering target analytes from an environmental matrix. A LCS is similar to an MS/MSD sample in that the LCS is spiked with the same target analytes prior to preparation and analysis. However, the LCS is prepared using a controlled interference-free matrix instead of a field sample aliquot. Laboratory reagent water is used to prepare aqueous LCS. The LCS measures laboratory efficiency in recovering target analytes from either an aqueous matrix in the absence of matrix interferences.

One primary sample is analyzed and accompanied by an unspiked laboratory duplicate. The data reviewer compares the reported results of the primary analysis and the laboratory duplicate, then calculates RPDs, which are used to assess laboratory precision.

Laboratory and field sampling precision are evaluated by calculating RPDs for aqueous field sample duplicate pairs. The sampler collects two field samples at the same location and under identically controlled conditions. The laboratory then analyzes the samples under identical conditions.

An RPD outside the numerical QC limit in either MS/MSD samples or LCS/LCSD indicates imprecision. Imprecision is the variance in the consistency with which the laboratory arrives at a particular reported result. Thus, the actual analyte concentration may be higher or lower than the reported result.

Possible causes of poor precision include sample matrix interference, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability. In some duplicate pairs, results maybe reported in either the primary or duplicate samples at levels below the practical quantitation limit (PQL) or non-detected. Since these values are considered to be estimates, RPD exceedances from these duplicate pairs do not suggest a significant impact on the data quality.

Accuracy is a measure of the agreement of an experimental determination and the true value of the parameter being measured. It is used to identify bias in a given measurement system. Recoveries outside acceptable QC limits may be caused by factors such as instrumentation, analyst error, or matrix interference. Accuracy is assessed through the analysis of MS, MSD, LCS, and LCSD. In some cases, samples from multiple SDGs were within one QC batch and therefore are associated with the same laboratory QC samples. Accuracy of inorganic analyses is determined using the percent recoveries of MS and LCS analyses.

Percent recovery (%R) is calculated using the following equation:

$$\%R = (A-B)/C \times 100$$

where:
A = measured concentration in the spiked sample
B = measured concentration of the spike compound in the unspiked sample
C = concentration of the spike

The percent recovery of each analyte spiked in MS/MSD samples and LCS/LCSD is evaluated with the acceptance criteria specified by the previously noted documents. Spike recoveries outside the acceptable QC accuracy limits provide an indication of bias, where the reported data may overestimate or underestimate the actual concentration of compounds detected or quantitation limits reported for environmental samples.

Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a population. It is evaluated by reviewing the QC results of blanks, samples and holding times. Positive detects of compounds in the blank samples identify compounds that may have been introduced into the samples during sample collection, transport, preparation, or analysis. The QA/QC blanks collected and analyzed are method blanks, equipment blanks and field blanks.
A method blank is a laboratory grade water or solid matrix that contains the method reagents and has undergone the same preparation and analysis as the environmental samples. The method blank provides a measure of the combined contamination derived from the laboratory source water, glassware, instruments, reagents, and sample preparation steps. Method blanks are prepared for each sample of a similar matrix extracted by the same method at a similar concentration level.

Trip blanks are used to identify possible volatile organic contamination introduced into the sample during transport. A trip blank is a sample canister pressurized in the laboratory with reagent-grade air. It is transported to the site, stored with the sample containers, and returned unopened to the laboratory for analysis.

Equipment blanks consist of analyte-free air taken through the sample collection equipment. The air is collected in a sample container for laboratory analysis. These blanks are collected after the sampling equipment is decontaminated and measure efficiency of the decontamination procedure.

Contaminants found in both the environmental sample and the blank samples are assumed to be laboratory artifacts if both values are less than the PQL.

Holding times are evaluated to assure that the sample integrity is intact for accurate sample preparation and analysis. Holding times will be specific for each method and matrix analyzed. Holding time exceedance can cause loss of sample constituents due to biodegradation, precipitation, volatization, and chemical degradation. In accordance with EPA guidance (USEPA 2008), sample results for analyses that were performed after the method holding time but less than two times the method holding time were qualified as estimated (J- or UJ) and sample results for analyses that were performed after two times the method holding time were qualified as rejected (R).

Comparability is a qualitative expression of the confidence with which one data set may be compared to another. It provides an assessment of the equivalence of the analytical results to data obtained from other analyses. It is important that data sets be comparable if they are used in conjunction with other data sets. The factors affecting comparability include the following: sample collection and handling techniques, matrix type, and analytical method. If these aspects of sampling and analysis are carried out according to standard analytical procedures, the data are considered comparable. Comparability is also dependent upon other PARCC criteria, because only when precision, accuracy, and representativeness are known can data sets be compared with confidence.

Completeness is defined as the percentage of acceptable sample results compared to the total number of sample results. Completeness is evaluated to determine if an acceptable amount of usable data were obtained so that a valid scientific site assessment can be completed. Completeness equals the total number of sample results for each fraction minus the total number of rejected sample results divided by the total number of sample results multiplied by 100. As specified in the project DQOs, the goal for completeness for target analytes in each analytical fraction is 90 percent.

Percent completeness is calculated using the following equation:

$$\%C = (T - R)/T \times 100$$

where:
%C = percent completeness
T = total number of sample results
R = total number of rejected sample results

Completeness is also determined by comparing the planned number of samples per method and matrix as specified in the QAPP, with the number determined above.

The following sections present a review of QC data for each analytical method.

2.0 VOLATILE ORGANIC COMPOUNDS

A total of 13 air samples were analyzed for VOCs by EPA Method TO-15. All VOC data were assessed to be valid since none of the 845 total results were rejected based on holding time or QC exceedances. This section discusses the QA/QC supporting documentation as defined by the PARCC criteria and evaluated based on the DQOs.

2.1 Precision and Accuracy

2.1.1 Instrument Calibration

Initial and continuing calibration results provide a means of evaluating accuracy within a particular SDG. Percent relative standard deviation (%RSD) and percent difference (%D) are the major parameters used to

measure the effectiveness of instrument calibration. %RSD is an expression of the linearity of instrument response. %D is a comparison of a continuing calibration instrumental response with its initial response. %RSD and %D exceedances suggest routine instrumental anomalies, which typically impact all sample results for the affected compounds.

The %RSDs met the acceptance criteria of 30 percent or the coefficient of determination (r^2) was ≥ 0.990 in the initial calibration.

Thirteen methylene chloride results were qualified as detected estimated (J) or non-detected estimated (UJ). The %Ds in the continuing calibration verifications were outside the acceptance criteria of 30 percent. The details regarding the qualification of results are provided in Attachment A.

2.1.2 Surrogates

All surrogate %Rs met acceptance criteria.

2.1.4 LCS Samples

All LCS %Rs met acceptance criteria.

2.1.5 Internal Standards

All internal standard areas and retention times met acceptance criteria.

2.1.6 Field Duplicate Samples

The field duplicate samples were evaluated for acceptable precision with RPDs or difference in instances the results were less than five times the reporting limit for the compounds. Forty results were qualified as detected estimated (J) or non-detected estimated (UJ) due to RPD or difference outside of the acceptance criteria in field duplicate pair E-SG-6-030813 and E-SG-6-030813-FD. The details regarding the qualification of results are provided in Attachment B.

2.1.7 Analyte Quantitation and Target Identification

Raw data were evaluated for the Stage 4 samples. All analyte quantitation and target identifications were acceptable.

Due to the presence of the leak check compound, helium, in ten samples, 650 results were qualified as detected estimated (J) or non-detected estimated (UJ). The details regarding the qualification of results are provided in Attachment C.

2.2 Representativeness

2.2.1 Sample Preservation and Holding Times

The evaluation of holding times to verify compliance with the method was conducted. All samples met the 30-day analysis holding time criteria.

2.2.2 Blanks

Method blanks, trip blanks, and equipment blanks were analyzed to evaluate representativeness. The concentration for an individual target compound in any of the QA/QC blanks was used for data qualification.

If contaminants were detected in a blank, corrective actions were made for the chemical analytical data during data validation. The corrective action consisted of amending the laboratory reported results based on the following criteria.

Results Below the PQL If a sample result and blank contaminant value were less than the PQL, the sample result was amended as estimated (J) at the concentration reported in the sample results.

Results Above the PQL If a sample result and blank contaminant value were greater than the PQL and less than 10 times the blank contaminant value, the sample result was qualified as detected estimated (J+) at the concentration reported in the sample results.

No Action If blank contaminant values were less than the PQL and associated sample results were greater than the PQL, or if blank contaminant values were greater than the PQL and associated sample results were greater than 10 times the blank contaminant value, the result was not amended.

2.2.2.1 Method Blanks

No data were qualified due to contaminants detected in the method blanks.

2.2.2.2 Trip Blanks

As a result of contamination found in the trip blanks, 13 results were qualified as detected estimated (J). The affected compounds were hexane, t-butyl alcohol, and tetrachloroethylene. The details regarding the qualification of results are provided in Attachment D.

2.2.2.3 Equipment Blanks

As a result of contamination found in the equipment blanks, 14 results in samples E-SG-2-030713 and E-SG-3-030713 were qualified as detected estimated (J). The affected compounds were 2-butanone, 2-hexanone, acetone, carbon tetrachloride, dichlorodifluoromethane, ethyl acetate, hexane, and vinyl acetate. The details regarding the qualification of results are provided in Attachment D.

2.3 Comparability

The laboratory used standard analytical methods for all of the analyses. In all cases, the Sample Quantitation Limits (SQLs) attained were at or below the PQLs. Target compounds detected below the PQLs flagged (J) by the laboratory should be considered estimated. The comparability of the data is regarded as acceptable.

2.4 Completeness

The completeness level attained for VOC field samples was 100 percent. This percentage was calculated as the total number of accepted sample results divided by the total number of sample results multiplied by 100.

3.0 VARIANCES IN ANALYTICAL PERFORMANCE

The laboratory used standard analytical methods for all of the analyses throughout the project. No systematic variances in analytical performance were noted in the laboratory case narratives.

4.0 SUMMARY OF PARCC CRITERIA

The validation reports present the PARCC results for all SDGs. Each PARCC criterion is discussed in detail in the following sections.

4.1 Precision and Accuracy

Precision and accuracy were evaluated using data quality indicators such as calibration, surrogates, LCS, internal standards, and field duplicates. The precision and accuracy of the data set were considered acceptable after integration of result qualification.

All calibration, field duplicate, and analyte quantitation %Ds, RPDs, and difference met acceptance criteria with the exceptions noted in Sections 2.1.1, 2.1.6, and 2.1.7.

4.2 Representativeness

All samples for each method and matrix were evaluated for holding time compliance. All samples were associated with a method blank in each individual SDG. The representativeness of the project data is considered acceptable after integration of result qualification.

4.3 Comparability

Sampling frequency requirements were met in obtaining necessary field blanks and field duplicates. The laboratory used standard analytical methods for the analyses. The analytical results were reported in correct standard units. Sample preservation, and sample integrity criteria were met. All holding times were within QC criteria. The overall comparability is considered acceptable.

4.4 Completeness

Of the 845 total analytes reported, none of the sample results were rejected. The completeness for the soil gas sampling event is as follows:

Parameter	Total Analytes	No. of Rejects	% Completeness
VOCs	845	0	100
Total	**845**	**0**	**100**

The completeness percentage based on rejected data met the 90 percent DQO goal.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The analytical data quality assessment for the soil gas sample laboratory analytical results generated during the Soil Gas Sampling at the Nevada Environmental Response Trust (NERT) site in Henderson, Nevada established that the overall project requirements and completeness levels were met. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the Stage 2B and Stage 4 data validation all other results are considered valid and usable for all purposes.

6.0 REFERENCES

AECOM Incorporated (AECOM) and Northgate Environmental Management, Inc. (Northgate), 2009. Revised Phase B Quality Assurance Project Plan (QAPP), Tronox LLC Facility, Henderson, Nevada. Revised July 20.

Basic Remediation Company (BRC), 2009. Standard Operating Procedures, SOP-40 Data Review/Validation. Revision 4. May 2009.

NDEP, 2009. Data Verification and Validation Requirements - Supplement established for the BMI Plant Sites and Common Areas Projects, Henderson, Nevada. April 13.

USEPA, 2001. Region 9 Superfund Data Evaluation/Validation Guidance, R6QA/006.1, Draft. December 2001.

USEPA, 2008. Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review. June 2008.

TABLE I

Sample Cross Reference

SDG#: 1303287 **VALIDATION SAMPLE TABLE** **LDC#:** 29449A

Parameters/Analytical Method

Client ID #	Lab ID #	Matrix	Date Collected	VOA (TO-15)											
TRIP BLANK	1303287-001	air	03/07/13	X											
E-SG-3-030713-EB	1303287-002	air	03/07/13	X											
E-SG-2-030713	1303287-003	air	03/07/13	X											
E-SG-3-030713	1303287-004	air	03/07/13	X											
E-SG-6-030813	1303287-005	air	03/08/13	X											
E-SG-6-030813-FD	1303287-006	air	03/08/13	X											
E-SG-7-030813	1303287-007	air	03/08/13	X											
E-SG-9-030813	1303287-008	air	03/08/13	X											
E-SG-1-030813	1303287-009	air	03/08/13	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed

SDG#: 1303408 **VALIDATION SAMPLE TABLE** **LDC#:** 29449B

				Parameters/Analytical Method											
Client ID #	**Lab ID #**	**Matrix**	**Date Collected**	**VOA (TO-15)**											
TRIP BLANK	1303408-001	air	03/13/13	X											
E-SG-8-031313**	1303408-002**	air	03/13/13	X											
E-SG-4-031313**	1303408-003**	air	03/13/13	X											
E-SG-5-031313	1303408-004	air	03/13/13	X											

Shaded cells indicate samples underwent Stage 4 validation (all other cells are Stage 2B validation)
X = Validation was performed

TABLE II

Qualification Codes and Definitions

Table II. Qualification Codes and Definitions

Reason Code	Explanation
a	qualified due to low abundance (radiochemical activity)
be	qualified due to equipment blank contamination
bf	qualified due to field blank contamination
bl	qualified due to lab blank contamination
bt	qualified due to trip blank contamination
bp	qualified due to pump blank contamination (wells w/o dedicated pumps, when contamination is detected in the Pump Blk)
br	qualified due to filter blank contamination (aqueous Hexavalent Chromium and Dissolved sample fractions)
c	qualified due to calibration problems
cp	qualified due to insufficient ingrowth (radiochemical only)
dc	duel column confirmation %D exceeded
e	concentration exceeded the calibration range
fd	qualified due to field duplicate imprecision
h	qualified due to holding time exceedance
i	qualified due to internal standard areas
k	qualified as Estimated Maximum Possible Concentrations (dioxins and PCB congeners)
l	qualified due to LCS recoveries
ld	qualified due to lab duplicate imprecision (matrix duplicate, MSD, LCSD)
m	qualified due to matrix spike recoveries
nb	qualified due to negative lab blank contamination (nondetect results only)
o	other
p	qualified as a false positive due to contamination during shipping
pH	sample preservation not within acceptance range
q	qualified due to quantitation problem
s	qualified due to surrogate recoveries
sd	serial dilution did not meet control criteria
sp	detected value reported >SQL <PQL
st	sample receipt temperature exceeded
t	qualified due to elevated helium tracer concentrations
vh	volatile headspace detected in aqueous sample containers submitted for VOC analysis
x	qualified due to low % solids
z	qualified due to ICS results

TABLE III

Overall Qualified Results

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-1-030813	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	56-23-5	Carbon Tetrachloride	0.30	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.54	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.15	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-27-4	Bromodichloromethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	74-83-9	Bromomethane	0.36	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	591-78-6	2-Hexanone	0.54	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	71-43-2	Benzene	1.4		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	67-64-1	Acetone	7.6	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	78-93-3	2-Butanone (MEK)	3.9	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.15	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	0.77	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	75-69-4	Trichlorofluoromethane	1.1	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t
1303287	E-SG-1-030813	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-1-030813	TO-15	91-20-3	Naphthalene	1.2		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	100-42-5	Styrene	0.26	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	75-65-0	t-Butyl alcohol (TBA)	2.0	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	1330-20-7	Xylenes, Total	3.7		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	110-54-3	Hexane	2.3	J	ug/m3	J	bt,t
1303287	E-SG-1-030813	TO-15	108-05-4	Vinyl Acetate	1.8	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	108-88-3	Toluene	15		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	79-01-6	Trichloroethene	0.34	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	108-90-7	Chlorobenzene	0.12	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	127-18-4	Tetrachloroethene	1.2		ug/m3	J	bt,t
1303287	E-SG-1-030813	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	110-82-7	Cyclohexane	4.9	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	75-71-8	Dichlorodifluoromethane	1.5		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	100-41-4	Ethylbenzene	1.3		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	142-82-5	Heptane	2.3	J	ug/m3	J	t
1303287	E-SG-1-030813	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303287	E-SG-1-030813	TO-15	141-78-6	Ethyl acetate	14		ug/m3	J	t
1303287	E-SG-1-030813	TO-15	67-66-3	Chloroform	2.2		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.084	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	87-68-3	Hexachlorobutadiene	2.1	J	ug/m3	J	t
1303287	E-SG-2-030713	TO-15	142-82-5	Heptane	0.077	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	100-41-4	Ethylbenzene	0.66	J	ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-2-030713	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.088	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	141-78-6	Ethyl acetate	2.1		ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.061	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	75-71-8	Dichlorodifluoromethane	2.2		ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	110-82-7	Cyclohexane	73	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	156-59-2	cis-1,2-Dichloroethene	2.3		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	110-54-3	Hexane	3.1	J	ug/m3	J	be,bt,t
1303287	E-SG-2-030713	TO-15	67-66-3	Chloroform	460		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	109-99-9	Tetrahydrofuran	1.3	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	74-87-3	Chloromethane	0.023	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	75-00-3	Chloroethane	100		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	106-46-7	1,4-Dichlorobenzene	10		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	1330-20-7	Xylenes, Total	3.9		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	108-05-4	Vinyl Acetate	5.3	J	ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	75-69-4	Trichlorofluoromethane	1.2	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	79-01-6	Trichloroethene	570		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.25	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.08	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	108-88-3	Toluene	9.3		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	75-09-2	Methylene chloride	19		ug/m3	J	c,t
1303287	E-SG-2-030713	TO-15	127-18-4	Tetrachloroethene	420		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	75-01-4	Vinyl Chloride	4.4		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	75-65-0	t-Butyl alcohol (TBA)	2.9	J	ug/m3	J	t
1303287	E-SG-2-030713	TO-15	100-42-5	Styrene	0.052	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	91-20-3	Naphthalene	1.4		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.1	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	156-60-5	trans-1,2-Dichloroethene	2.1		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	75-34-3	1,1-Dichloroethane	330		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	78-87-5	1,2-Dichloropropane	0.12	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	26		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	95-50-1	1,2-Dichlorobenzene	6.1		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.1	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.16	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-2-030713	TO-15	120-82-1	1,2,4-Trichlorobenzene	79		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.91	J	ug/m3	J	t
1303287	E-SG-2-030713	TO-15	79-00-5	1,1,2-Trichloroethane	8.2		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.075	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	71-55-6	1,1,1-Trichloroethane	0.096	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.16	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	108-90-7	Chlorobenzene	17		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	78-93-3	2-Butanone (MEK)	6.3	J	ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.21	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	71-43-2	Benzene	12		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	56-23-5	Carbon Tetrachloride	0.42		ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	75-35-4	1,1-Dichloroethene	33		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	106-99-0	1,3-Butadiene	0.29	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	74-83-9	Bromomethane	0.21	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	75-25-2	Bromoform	2.3	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	100-44-7	Benzyl chloride	0.071	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	75-15-0	Carbon Disulfide	0.044	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	107-13-1	Acrylonitrile	0.11	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	123-91-1	1,4-Dioxane	0.1	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	67-64-1	Acetone	18	J	ug/m3	J	be,t
1303287	E-SG-2-030713	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	7.2		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	591-78-6	2-Hexanone	0.23	U	ug/m3	UJ	t
1303287	E-SG-2-030713	TO-15	541-73-1	1,3-Dichlorobenzene	38		ug/m3	J	t
1303287	E-SG-2-030713	TO-15	75-27-4	Bromodichloromethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	127-18-4	Tetrachloroethene	1100		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	75-65-0	t-Butyl alcohol (TBA)	3.1	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	100-42-5	Styrene	0.098	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	91-20-3	Naphthalene	1.3		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-09-2	Methylene chloride	14		ug/m3	J	c,t
1303287	E-SG-3-030713	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	110-54-3	Hexane	3.4	J	ug/m3	J	be,bt,t
1303287	E-SG-3-030713	TO-15	108-88-3	Toluene	5.7		ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-3-030713	TO-15	156-60-5	trans-1,2-Dichloroethene	2.2		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	79-01-6	Trichloroethene	170		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-69-4	Trichlorofluoromethane	1.6		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-01-4	Vinyl Chloride	2.3		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	87-68-3	Hexachlorobutadiene	4.0		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	1330-20-7	Xylenes, Total	3.2		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	108-05-4	Vinyl Acetate	6.3	J	ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	2.1		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-27-4	Bromodichloromethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	108-90-7	Chlorobenzene	8.2		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-00-3	Chloroethane	140		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	67-66-3	Chloroform	2900		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	56-23-5	Carbon Tetrachloride	2.0		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	156-59-2	cis-1,2-Dichloroethene	0.32	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	142-82-5	Heptane	2.4	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	110-82-7	Cyclohexane	70	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	75-71-8	Dichlorodifluoromethane	2.6		ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	141-78-6	Ethyl acetate	2.7		ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	100-41-4	Ethylbenzene	0.85	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.68	J	ug/m3	J	t
1303287	E-SG-3-030713	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-3-030713	TO-15	79-00-5	1,1,2-Trichloroethane	21		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-34-3	1,1-Dichloroethane	290		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	120-82-1	1,2,4-Trichlorobenzene	9.9		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	95-50-1	1,2-Dichlorobenzene	2.7		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	33		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	78-93-3	2-Butanone (MEK)	8.6	J	ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	71-43-2	Benzene	10		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	75-35-4	1,1-Dichloroethene	13		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	78-87-5	1,2-Dichloropropane	1.4		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	591-78-6	2-Hexanone	1.2	J	ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	67-64-1	Acetone	25		ug/m3	J	be,t
1303287	E-SG-3-030713	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	106-46-7	1,4-Dichlorobenzene	4.3		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	541-73-1	1,3-Dichlorobenzene	13		ug/m3	J	t
1303287	E-SG-3-030713	TO-15	106-99-0	1,3-Butadiene	0.44	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.15	U	ug/m3	UJ	t
1303287	E-SG-3-030713	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	56-23-5	Carbon Tetrachloride	0.34		ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	78-93-3	2-Butanone (MEK)	5.5	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	591-78-6	2-Hexanone	0.64	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	0.58	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	71-43-2	Benzene	0.26		ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-27-4	Bromodichloromethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-3-030713-EB	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	67-64-1	Acetone	13	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	108-90-7	Chlorobenzene	0.07	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.22	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.09	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.15	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	91-20-3	Naphthalene	0.42	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-65-0	t-Butyl alcohol (TBA)	0.17	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	127-18-4	Tetrachloroethene	0.35		ug/m3	J	bt,t
1303287	E-SG-3-030713-EB	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	108-88-3	Toluene	2.4		ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	79-01-6	Trichloroethene	0.12	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-69-4	Trichlorofluoromethane	1.1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	1330-20-7	Xylenes, Total	2.6	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	67-66-3	Chloroform	0.25		ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-3-030713-EB	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	108-05-4	Vinyl Acetate	4.8	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t
1303287	E-SG-3-030713-EB	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	110-82-7	Cyclohexane	0.32	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	75-71-8	Dichlorodifluoromethane	1.8		ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	141-78-6	Ethyl acetate	5.1		ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	100-41-4	Ethylbenzene	0.27	J	ug/m3	J	t
1303287	E-SG-3-030713-EB	TO-15	110-54-3	Hexane	16	J	ug/m3	J	bt,t
1303287	E-SG-3-030713-EB	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303287	E-SG-3-030713-EB	TO-15	142-82-5	Heptane	0.074	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	74-87-3	Chloromethane	0.027	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	67-66-3	Chloroform	780		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	75-00-3	Chloroethane	0.092	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	108-90-7	Chlorobenzene	2.3		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	71-43-2	Benzene	2.6		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	74-83-9	Bromomethane	0.84	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	75-27-4	Bromodichloromethane	1.7		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	100-44-7	Benzyl chloride	0.43	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	156-59-2	cis-1,2-Dichloroethene	0.89	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	100-41-4	Ethylbenzene	1.5		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	107-13-1	Acrylonitrile	0.12	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	56-23-5	Carbon Tetrachloride	18		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.75		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	110-82-7	Cyclohexane	4.7	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	124-48-1	Dibromochloromethane	1.2	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	75-71-8	Dichlorodifluoromethane	1.5		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.07	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.82	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	76-13-1	Freon 113	1.9	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	142-82-5	Heptane	2.4	J	ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-6-030813	TO-15	87-68-3	Hexachlorobutadiene	1.1	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	67-64-1	Acetone	67		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	75-35-4	1,1-Dichloroethene	0.048	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	141-78-6	Ethyl acetate	3.5		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	95-50-1	1,2-Dichlorobenzene	1.5	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	75-15-0	Carbon Disulfide	0.051	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	110-54-3	Hexane	6100		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	1.1		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	71-55-6	1,1,1-Trichloroethane	1.0	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	1.1		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	79-00-5	1,1,2-Trichloroethane	1.1		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	75-34-3	1,1-Dichloroethane	1.3		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	120-82-1	1,2,4-Trichlorobenzene	1.2	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	1.7		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	95-63-6	1,2,4-Trimethylbenzene	1.5		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	2.8		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.87		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	78-87-5	1,2-Dichloropropane	1.0		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	108-67-8	1,3,5-Trimethylbenzene	1.2		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	106-99-0	1,3-Butadiene	0.34	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	541-73-1	1,3-Dichlorobenzene	0.13	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	106-46-7	1,4-Dichlorobenzene	1.3		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	123-91-1	1,4-Dioxane	0.64	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	78-93-3	2-Butanone (MEK)	9.9	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	591-78-6	2-Hexanone	2.3	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	622-96-8	4-Ethyltoluene	1.2	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	106-93-4	1,2-Dibromoethane (EDB)	1.4		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.68		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	75-09-2	Methylene chloride	2.9		ug/m3	J	c,fd,t
1303287	E-SG-6-030813	TO-15	75-25-2	Bromoform	2.7	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	75-01-4	Vinyl Chloride	0.40		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	108-05-4	Vinyl Acetate	10	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	79-01-6	Trichloroethene	2.2		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	1330-20-7	Xylenes, Total	6.2		ug/m3	J	fd,t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-6-030813	TO-15	156-60-5	trans-1,2-Dichloroethene	0.94	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	108-88-3	Toluene	4.2		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	109-99-9	Tetrahydrofuran	1.4	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	127-18-4	Tetrachloroethene	17		ug/m3	J	t
1303287	E-SG-6-030813	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.78	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	75-65-0	t-Butyl alcohol (TBA)	4.8	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	100-42-5	Styrene	0.74	J	ug/m3	J	t
1303287	E-SG-6-030813	TO-15	91-20-3	Naphthalene	5.2		ug/m3	J	fd,t
1303287	E-SG-6-030813	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.89	U	ug/m3	UJ	t
1303287	E-SG-6-030813	TO-15	75-69-4	Trichlorofluoromethane	3.8		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	142-82-5	Heptane	1.3	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	100-41-4	Ethylbenzene	0.50	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	141-78-6	Ethyl acetate	1.8	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	75-71-8	Dichlorodifluoromethane	2.1		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	110-82-7	Cyclohexane	0.60	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	87-68-3	Hexachlorobutadiene	0.33	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	108-88-3	Toluene	1.9		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	67-66-3	Chloroform	790		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	1330-20-7	Xylenes, Total	2.6	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	108-05-4	Vinyl Acetate	2.3	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	75-69-4	Trichlorofluoromethane	2.0		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	79-01-6	Trichloroethene	0.98	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	127-18-4	Tetrachloroethene	13		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	156-60-5	trans-1,2-Dichloroethene	0.069	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	110-54-3	Hexane	6.5	J	ug/m3	J	bt,fd,t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-6-030813-FD	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	108-90-7	Chlorobenzene	1.3		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	75-65-0	t-Butyl alcohol (TBA)	1.2	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	91-20-3	Naphthalene	1.3		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	75-09-2	Methylene chloride	0.7	U	ug/m3	UJ	c,fd,t
1303287	E-SG-6-030813-FD	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	79-00-5	1,1,2-Trichloroethane	0.19	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	78-87-5	1,2-Dichloropropane	0.12	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.11	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.25	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	56-23-5	Carbon Tetrachloride	15		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.59	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.47	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.30	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	95-50-1	1,2-Dichlorobenzene	1.8		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	fd,t
1303287	E-SG-6-030813-FD	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.41	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	71-55-6	1,1,1-Trichloroethane	0.12	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.14	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	67-64-1	Acetone	9.4	J	ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	74-83-9	Bromomethane	0.33	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	75-27-4	Bromodichloromethane	0.50		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	100-44-7	Benzyl chloride	0.14	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	71-43-2	Benzene	1.5		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	1.5		ug/m3	J	fd,t
1303287	E-SG-6-030813-FD	TO-15	591-78-6	2-Hexanone	1.0	J	ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	E-SG-6-030813-FD	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	106-46-7	1,4-Dichlorobenzene	1.3		ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303287	E-SG-6-030813-FD	TO-15	78-93-3	2-Butanone (MEK)	6.2	J	ug/m3	J	t
1303287	E-SG-6-030813-FD	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	E-SG-7-030813	TO-15	127-18-4	Tetrachloroethene	1.5		ug/m3	J	bt
1303287	E-SG-7-030813	TO-15	110-54-3	Hexane	1.7	J	ug/m3	J	bt
1303287	E-SG-7-030813	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c
1303287	E-SG-9-030813	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c
1303287	E-SG-9-030813	TO-15	110-54-3	Hexane	1.1	J	ug/m3	J	bt
1303287	TRIP BLANK 03/07/2013	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-27-4	Bromodichloromethane	0.1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	1330-20-7	Xylenes, Total	2.6	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	71-43-2	Benzene	0.055	J	ug/m3	J	t
1303287	TRIP BLANK 03/07/2013	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	56-23-5	Carbon Tetrachloride	0.068	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	0.052	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	591-78-6	2-Hexanone	0.22	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	78-93-3	2-Butanone (MEK)	1.5	J	ug/m3	J	t
1303287	TRIP BLANK 03/07/2013	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.15	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	67-64-1	Acetone	0.48	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-65-0	t-Butyl alcohol (TBA)	0.17	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	127-18-4	Tetrachloroethene	1.8		ug/m3	J	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	TRIP BLANK 03/07/2013	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-88-3	Toluene	0.084	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t
1303287	TRIP BLANK 03/07/2013	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	79-01-6	Trichloroethene	0.12	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-69-4	Trichlorofluoromethane	1.1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-05-4	Vinyl Acetate	0.1	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-71-8	Dichlorodifluoromethane	0.096	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	67-66-3	Chloroform	0.072	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	91-20-3	Naphthalene	0.42	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-90-7	Chlorobenzene	0.07	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	141-78-6	Ethyl acetate	0.096	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	100-41-4	Ethylbenzene	0.062	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	142-82-5	Heptane	0.074	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	110-54-3	Hexane	79		ug/m3	J	t
1303287	TRIP BLANK 03/07/2013	TO-15	110-82-7	Cyclohexane	0.18	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.09	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.11	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303287	TRIP BLANK 03/07/2013	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t
1303287	TRIP BLANK 03/07/2013	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-34-3	1,1-Dichloroethane	1.0		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	95-63-6	1,2,4-Trimethylbenzene	3.2		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	127-18-4	Tetrachloroethene	120		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-65-0	t-Butyl alcohol (TBA)	2.8	J	ug/m3	J	bt,t
1303408	E-SG-4-031313	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	91-20-3	Naphthalene	1.8		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	1330-20-7	Xylenes, Total	21		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	108-05-4	Vinyl Acetate	3.5	J	ug/m3	J	t
1303408	E-SG-4-031313	TO-15	75-69-4	Trichlorofluoromethane	48		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	79-01-6	Trichloroethene	3.9		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	108-67-8	1,3,5-Trimethylbenzene	1.1		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.09	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303408	E-SG-4-031313	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	108-90-7	Chlorobenzene	0.07	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	56-23-5	Carbon Tetrachloride	110		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t
1303408	E-SG-4-031313	TO-15	75-27-4	Bromodichloromethane	1.3		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	67-64-1	Acetone	25		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	1.2		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	622-96-8	4-Ethyltoluene	3.1		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	591-78-6	2-Hexanone	0.22	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	78-93-3	2-Butanone (MEK)	4.9	J	ug/m3	J	t
1303408	E-SG-4-031313	TO-15	108-88-3	Toluene	11		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	71-43-2	Benzene	2.4		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	110-54-3	Hexane	1.7	J	ug/m3	J	t
1303408	E-SG-4-031313	TO-15	67-66-3	Chloroform	2800		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	142-82-5	Heptane	1.3	J	ug/m3	J	t
1303408	E-SG-4-031313	TO-15	100-41-4	Ethylbenzene	4.4		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	141-78-6	Ethyl acetate	2.2		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	75-71-8	Dichlorodifluoromethane	2.2		ug/m3	J	t
1303408	E-SG-4-031313	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	110-82-7	Cyclohexane	0.18	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303408	E-SG-4-031313	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303408	E-SG-5-031313	TO-15	142-82-5	Heptane	0.91	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	100-41-4	Ethylbenzene	0.61	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	141-78-6	Ethyl acetate	9.9		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	75-71-8	Dichlorodifluoromethane	2.5		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	110-82-7	Cyclohexane	0.18	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	108-90-7	Chlorobenzene	0.07	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	67-66-3	Chloroform	2100		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	127-18-4	Tetrachloroethene	18		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	108-05-4	Vinyl Acetate	4.5	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-69-4	Trichlorofluoromethane	1.7		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	56-23-5	Carbon Tetrachloride	90		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	79-01-6	Trichloroethene	3.5		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-65-0	t-Butyl alcohol (TBA)	2.8	J	ug/m3	J	bt,t
1303408	E-SG-5-031313	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	91-20-3	Naphthalene	2.4		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t
1303408	E-SG-5-031313	TO-15	110-54-3	Hexane	1.5	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	108-88-3	Toluene	1.3		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303408	E-SG-5-031313	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	95-63-6	1,2,4-Trimethylbenzene	0.62	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.09	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.15	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	1330-20-7	Xylenes, Total	2.9		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	1.0		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	75-27-4	Bromodichloromethane	1.2		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	71-43-2	Benzene	2.0		ug/m3	J	t
1303408	E-SG-5-031313	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	67-64-1	Acetone	16	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	622-96-8	4-Ethyltoluene	1	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	591-78-6	2-Hexanone	0.70	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	78-93-3	2-Butanone (MEK)	6.2	J	ug/m3	J	t
1303408	E-SG-5-031313	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303408	E-SG-5-031313	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	142-82-5	Heptane	0.074	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	67-64-1	Acetone	6.2	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-15-0	Carbon Disulfide	0.042	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	106-46-7	1,4-Dichlorobenzene	0.18	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	123-91-1	1,4-Dioxane	0.096	U	ug/m3	UJ	t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303408	E-SG-8-031313	TO-15	78-93-3	2-Butanone (MEK)	3.2	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	591-78-6	2-Hexanone	0.22	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	106-99-0	1,3-Butadiene	0.28	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	108-10-1	4-Methyl-2-pentanone (MIBK)	1.9		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	108-67-8	1,3,5-Trimethylbenzene	0.67	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	107-13-1	Acrylonitrile	0.1	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	71-43-2	Benzene	1.5		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	100-44-7	Benzyl chloride	0.068	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	75-27-4	Bromodichloromethane	1.3		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-25-2	Bromoform	2.2	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	110-54-3	Hexane	0.95	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	622-96-8	4-Ethyltoluene	1.2		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	95-63-6	1,2,4-Trimethylbenzene	2.5		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	630-20-6	1,1,1,2-Tetrachloroethane	0.15	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	71-55-6	1,1,1-Trichloroethane	0.092	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	79-34-5	1,1,2,2-Tetrachloroethane	0.072	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	79-00-5	1,1,2-Trichloroethane	0.1	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	75-34-3	1,1-Dichloroethane	0.82	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	541-73-1	1,3-Dichlorobenzene	0.1	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	120-82-1	1,2,4-Trichlorobenzene	0.22	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	56-23-5	Carbon Tetrachloride	63		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	96-12-8	1,2-Dibromo-3-chloropropane	0.2	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	106-93-4	1,2-Dibromoethane (EDB)	0.096	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	76-14-2	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	95-50-1	1,2-Dichlorobenzene	0.15	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	107-06-2	1,2-Dichloroethane (1,2-DCA)	0.09	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	78-87-5	1,2-Dichloropropane	0.11	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	75-35-4	1,1-Dichloroethene	0.04	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	108-88-3	Toluene	0.77		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	74-83-9	Bromomethane	0.2	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	91-20-3	Naphthalene	0.89		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	100-42-5	Styrene	0.05	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	75-65-0	t-Butyl alcohol (TBA)	1.7	J	ug/m3	J	bt,t
1303408	E-SG-8-031313	TO-15	994-05-8	tert-Amyl methyl ether (TAME)	0.076	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c,t

Table III. Overall Qualified Results

SDG	Client Sample ID	Method	Client Analyte ID	Analyte	Lab Result	Lab Qualifier	Units	Validation Qualifier	Validation Reason Code
1303408	E-SG-8-031313	TO-15	109-99-9	Tetrahydrofuran	1.2	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	87-68-3	Hexachlorobutadiene	0.14	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	156-60-5	trans-1,2-Dichloroethene	0.064	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	10061-02-6	trans-1,3-Dichloropropene	0.24	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	79-01-6	Trichloroethene	130		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-69-4	Trichlorofluoromethane	1.3		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	108-05-4	Vinyl Acetate	3.0	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-01-4	Vinyl Chloride	0.12	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	127-18-4	Tetrachloroethene	2.5		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	124-48-1	Dibromochloromethane	0.11	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	108-90-7	Chlorobenzene	0.29	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-00-3	Chloroethane	0.076	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	67-66-3	Chloroform	140		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	74-87-3	Chloromethane	0.022	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	156-59-2	cis-1,2-Dichloroethene	0.068	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	1634-04-4	Methyl-t-butyl ether (MTBE)	0.096	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	110-82-7	Cyclohexane	0.18	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	1330-20-7	Xylenes, Total	4.3		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	75-71-8	Dichlorodifluoromethane	2.1		ug/m3	J	t
1303408	E-SG-8-031313	TO-15	108-20-3	Diisopropyl ether (DIPE)	0.058	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	141-78-6	Ethyl acetate	0.75	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	637-92-3	Ethyl tert-butyl ether (ETBE)	0.084	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	100-41-4	Ethylbenzene	0.79	J	ug/m3	J	t
1303408	E-SG-8-031313	TO-15	76-13-1	Freon 113	1.6	U	ug/m3	UJ	t
1303408	E-SG-8-031313	TO-15	10061-01-5	cis-1,3-Dichloropropene	0.08	U	ug/m3	UJ	t
1303408	TRIP BLANK 03/13/2013	TO-15	75-09-2	Methylene chloride	0.078	U	ug/m3	UJ	c

ATTACHMENT A

Qualifications based on Calibration Exceedances

Attachment A. Qualifications based on Calibration Exceedances

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code	DQI Result	DQI Limits
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV
E-SG-3-030713-EB	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV
E-SG-2-030713	1303287	TO-15	Air	Methylene chloride	19	ug/m3		J	c,t	35.616	30%D CCV
E-SG-4-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV
E-SG-3-030713	1303287	TO-15	Air	Methylene chloride	14	ug/m3		J	c,t	35.616	30%D CCV
E-SG-6-030813	1303287	TO-15	Air	Methylene chloride	2.9	ug/m3		J	c,fd,t	35.616	30%D CCV
E-SG-6-030813-FD	1303287	TO-15	Air	Methylene chloride	0.7	ug/m3	U	UJ	c,fd,t	35.616	30%D CCV
E-SG-7-030813	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c	38.086	30%D CCV
E-SG-9-030813	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c	38.086	30%D CCV
E-SG-1-030813	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV
TRIP BLANK 03/13/2013	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c	38.086	30%D CCV
E-SG-8-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV
E-SG-5-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t	38.086	30%D CCV

ATTACHMENT B

Qualifications based on Field Duplicate Exceedances

Attachment B. Qualifications based on Field Duplicate Exceedances

Sample ID	SDG	Method	Matrix	Analyte	Result	RL	Units	Lab Qualifiers	Validation Qualifier	Validation Reason Code	RPD	Limits	Difference	Diff Limit
E-SG-6-030813	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	1.1	0.41	ug/m3		J	fd,t			0.76	0.41
E-SG-6-030813	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	1.1	0.41	ug/m3		J	fd,t			0.96	0.41
E-SG-6-030813	1303287	TO-15	Air	1,1,2-Trichloroethane	1.1	0.34	ug/m3		J	fd,t			0.91	0.34
E-SG-6-030813	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	1.7	0.6	ug/m3		J	fd,t			1.29	0.60
E-SG-6-030813	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	1.4	0.48	ug/m3		J	fd,t			1.00	0.40
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.87	0.24	ug/m3		J	fd,t			0.76	0.24
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichloropropane	1.0	0.29	ug/m3		J	fd,t			0.88	0.29
E-SG-6-030813	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	2.8	1	ug/m3		J	fd,t			1.30	1.0
E-SG-6-030813	1303287	TO-15	Air	Acetone	67	29	ug/m3		J	fd,t			58	29
E-SG-6-030813	1303287	TO-15	Air	Benzene	2.6	0.19	ug/m3		J	fd,t	54	50		
E-SG-6-030813	1303287	TO-15	Air	Bromodichloromethane	1.7	0.43	ug/m3		J	fd,t			1.20	0.43
E-SG-6-030813	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.75	0.29	ug/m3		J	fd,t			0.51	0.29
E-SG-6-030813	1303287	TO-15	Air	Hexane	6100	3600	ug/m3		J	fd,t			6093.50	3600
E-SG-6-030813	1303287	TO-15	Air	Methylene chloride	2.9	0.84	ug/m3		J	c,fd,t			2.20	0.70
E-SG-6-030813	1303287	TO-15	Air	Naphthalene	5.2	0.63	ug/m3		J	fd,t			3.90	0.63
E-SG-6-030813	1303287	TO-15	Air	Toluene	4.2	0.92	ug/m3		J	fd,t			2.30	0.92
E-SG-6-030813	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.68	0.29	ug/m3		J	fd,t			0.44	0.29
E-SG-6-030813	1303287	TO-15	Air	Trichlorofluoromethane	3.8	1.4	ug/m3		J	fd,t			1.80	1.4
E-SG-6-030813	1303287	TO-15	Air	Vinyl Chloride	0.40	0.14	ug/m3		J	fd,t			0.28	0.14
E-SG-6-030813	1303287	TO-15	Air	Xylenes, Total	6.2	3.1	ug/m3		J	fd,t			3.60	3.1
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	0.34	ug/m3	U	UJ	fd,t			0.76	0.41
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.14	0.34	ug/m3	J	J	fd,t			0.96	0.41
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,2-Trichloroethane	0.19	0.28	ug/m3	J	J	fd,t			0.91	0.34
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.41	0.5	ug/m3	J	J	fd,t			1.29	0.60
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	0.4	ug/m3	U	UJ	fd,t			1.00	0.40
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.11	0.2	ug/m3	J	J	fd,t			0.76	0.24
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichloropropane	0.12	0.24	ug/m3	J	J	fd,t			0.88	0.29
E-SG-6-030813-FD	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	1.5	0.84	ug/m3		J	fd,t			1.30	1.0
E-SG-6-030813-FD	1303287	TO-15	Air	Acetone	9.4	24	ug/m3	J	J	fd,t			58	29
E-SG-6-030813-FD	1303287	TO-15	Air	Benzene	1.5	0.16	ug/m3		J	fd,t	54	50		
E-SG-6-030813-FD	1303287	TO-15	Air	Bromodichloromethane	0.50	0.36	ug/m3		J	fd,t			1.20	0.43
E-SG-6-030813-FD	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	0.24	ug/m3	U	UJ	fd,t			0.51	0.29
E-SG-6-030813-FD	1303287	TO-15	Air	Hexane	6.5	72	ug/m3	J	J	bt,fd,t			6093.50	3600
E-SG-6-030813-FD	1303287	TO-15	Air	Methylene chloride	0.7	0.7	ug/m3	U	UJ	c,fd,t			2.20	0.70
E-SG-6-030813-FD	1303287	TO-15	Air	Naphthalene	1.3	0.52	ug/m3		J	fd,t			3.90	0.63

Attachment B. Qualifications based on Field Duplicate Exceedances

Sample ID	SDG	Method	Matrix	Analyte	Result	RL	Units	Lab Qualifiers	Validation Qualifier	Validation Reason Code	RPD	Limits	Difference	Diff Limit
E-SG-6-030813-FD	1303287	TO-15	Air	Toluene	1.9	0.76	ug/m3		J	fd,t			2.30	0.92
E-SG-6-030813-FD	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	0.24	ug/m3	U	UJ	fd,t			0.44	0.29
E-SG-6-030813-FD	1303287	TO-15	Air	Trichlorofluoromethane	2.0	1.1	ug/m3		J	fd,t			1.80	1.4
E-SG-6-030813-FD	1303287	TO-15	Air	Vinyl Chloride	0.12	0.12	ug/m3	U	UJ	fd,t			0.28	0.14
E-SG-6-030813-FD	1303287	TO-15	Air	Xylenes, Total	2.6	2.6	ug/m3	U	UJ	fd,t			3.60	3.1

ATTACHMENT C

Qualifications based on Quantitation Issues

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.11	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.09	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.15	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	2-Butanone (MEK)	1.5	ug/m3	J	J	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	2-Hexanone	0.22	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	0.052	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Acetone	0.48	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Benzene	0.055	ug/m3	J	J	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Bromodichloromethane	0.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Carbon Tetrachloride	0.068	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Chlorobenzene	0.07	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Chloroform	0.072	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Cyclohexane	0.18	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Dichlorodifluoromethane	0.096	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Ethyl acetate	0.096	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Ethylbenzene	0.062	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Heptane	0.074	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Hexane	79	ug/m3		J	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Naphthalene	0.42	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	t-Butyl alcohol (TBA)	0.17	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Tetrachloroethene	1.8	ug/m3		J	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Toluene	0.084	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Trichloroethene	0.12	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Trichlorofluoromethane	1.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Vinyl Acetate	0.1	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
TRIP BLANK 03/07/2013	1303287	TO-15	Air	Xylenes, Total	2.6	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-3-030713-EB	1303287	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.22	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.09	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.15	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	2-Butanone (MEK)	5.5	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	2-Hexanone	0.64	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	0.58	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Acetone	13	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Benzene	0.26	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Bromodichloromethane	0.1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Carbon Tetrachloride	0.34	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Chlorobenzene	0.07	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Chloroform	0.25	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Cyclohexane	0.32	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-3-030713-EB	1303287	TO-15	Air	Dichlorodifluoromethane	1.8	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Ethyl acetate	5.1	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Ethylbenzene	0.27	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Heptane	0.074	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Hexane	16	ug/m3	J	J	bt,t
E-SG-3-030713-EB	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
E-SG-3-030713-EB	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Naphthalene	0.42	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	t-Butyl alcohol (TBA)	0.17	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Tetrachloroethene	0.35	ug/m3		J	bt,t
E-SG-3-030713-EB	1303287	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Toluene	2.4	ug/m3		J	t
E-SG-3-030713-EB	1303287	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Trichloroethene	0.12	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Trichlorofluoromethane	1.1	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Vinyl Acetate	4.8	ug/m3	J	J	t
E-SG-3-030713-EB	1303287	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
E-SG-3-030713-EB	1303287	TO-15	Air	Xylenes, Total	2.6	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.16	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,1,1-Trichloroethane	0.096	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.075	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,1,2-Trichloroethane	8.2	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,1-Dichloroethane	330	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,1-Dichloroethene	33	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,2,4-Trichlorobenzene	79	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.91	ug/m3	J	J	t
E-SG-2-030713	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.21	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.1	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-2-030713	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,2-Dichlorobenzene	6.1	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	26	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,2-Dichloropropane	0.12	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.16	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,3-Butadiene	0.29	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	1,3-Dichlorobenzene	38	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,4-Dichlorobenzene	10	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	1,4-Dioxane	0.1	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	2-Butanone (MEK)	6.3	ug/m3	J	J	be,t
E-SG-2-030713	1303287	TO-15	Air	2-Hexanone	0.23	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	7.2	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Acetone	18	ug/m3	J	J	be,t
E-SG-2-030713	1303287	TO-15	Air	Acrylonitrile	0.11	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Benzene	12	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Benzyl chloride	0.071	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Bromodichloromethane	0.1	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Bromoform	2.3	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Bromomethane	0.21	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Carbon Disulfide	0.044	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Carbon Tetrachloride	0.42	ug/m3		J	be,t
E-SG-2-030713	1303287	TO-15	Air	Chlorobenzene	17	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Chloroethane	100	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Chloroform	460	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Chloromethane	0.023	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	cis-1,2-Dichloroethene	2.3	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.084	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Cyclohexane	73	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Dichlorodifluoromethane	2.2	ug/m3		J	be,t
E-SG-2-030713	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.061	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Ethyl acetate	2.1	ug/m3		J	be,t
E-SG-2-030713	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.088	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Ethylbenzene	0.66	ug/m3	J	J	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-2-030713	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Heptane	0.077	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Hexachlorobutadiene	2.1	ug/m3	J	J	t
E-SG-2-030713	1303287	TO-15	Air	Hexane	3.1	ug/m3	J	J	be,bt,t
E-SG-2-030713	1303287	TO-15	Air	Methylene chloride	19	ug/m3		J	c,t
E-SG-2-030713	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.1	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Naphthalene	1.4	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Styrene	0.052	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	t-Butyl alcohol (TBA)	2.9	ug/m3	J	J	t
E-SG-2-030713	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.08	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Tetrachloroethene	420	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Tetrahydrofuran	1.3	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Toluene	9.3	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	trans-1,2-Dichloroethene	2.1	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.25	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Trichloroethene	570	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Trichlorofluoromethane	1.2	ug/m3	U	UJ	t
E-SG-2-030713	1303287	TO-15	Air	Vinyl Acetate	5.3	ug/m3	J	J	be,t
E-SG-2-030713	1303287	TO-15	Air	Vinyl Chloride	4.4	ug/m3		J	t
E-SG-2-030713	1303287	TO-15	Air	Xylenes, Total	3.9	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,1,2-Trichloroethane	21	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,1-Dichloroethane	290	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,1-Dichloroethene	13	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,2,4-Trichlorobenzene	9.9	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.68	ug/m3	J	J	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dichlorobenzene	2.7	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	33	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,2-Dichloropropane	1.4	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.15	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-3-030713	1303287	TO-15	Air	1,3-Butadiene	0.44	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	1,3-Dichlorobenzene	13	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,4-Dichlorobenzene	4.3	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	2-Butanone (MEK)	8.6	ug/m3	J	J	be,t
E-SG-3-030713	1303287	TO-15	Air	2-Hexanone	1.2	ug/m3	J	J	be,t
E-SG-3-030713	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	2.1	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Acetone	25	ug/m3		J	be,t
E-SG-3-030713	1303287	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Benzene	10	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Bromodichloromethane	0.1	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Carbon Tetrachloride	2.0	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Chlorobenzene	8.2	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Chloroethane	140	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Chloroform	2900	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.32	ug/m3	J	J	t
E-SG-3-030713	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Cyclohexane	70	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Dichlorodifluoromethane	2.6	ug/m3		J	be,t
E-SG-3-030713	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	2-Butanone (MEK)	4.9	ug/m3	J	J	t
E-SG-4-031313	1303408	TO-15	Air	2-Hexanone	0.22	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	4-Ethyltoluene	3.1	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	4-Methyl-2-pentanone (MIBK)	1.2	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Acetone	25	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Benzene	2.4	ug/m3		J	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-4-031313	1303408	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Bromodichloromethane	1.3	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Carbon Tetrachloride	110	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Chlorobenzene	0.07	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Chloroform	2800	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Cyclohexane	0.18	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Dichlorodifluoromethane	2.2	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Ethyl acetate	2.2	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Ethylbenzene	4.4	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Heptane	1.3	ug/m3	J	J	t
E-SG-4-031313	1303408	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Hexane	1.7	ug/m3	J	J	t
E-SG-4-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
E-SG-4-031313	1303408	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Naphthalene	1.8	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	2.8	ug/m3	J	J	bt,t
E-SG-4-031313	1303408	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Tetrachloroethene	120	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Ethyl acetate	2.7	ug/m3		J	be,t
E-SG-3-030713	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Ethylbenzene	0.85	ug/m3	J	J	t
E-SG-3-030713	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Heptane	2.4	ug/m3	J	J	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-3-030713	1303287	TO-15	Air	Hexachlorobutadiene	4.0	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Hexane	3.4	ug/m3	J	J	be,bt,t
E-SG-3-030713	1303287	TO-15	Air	Methylene chloride	14	ug/m3		J	c,t
E-SG-3-030713	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Naphthalene	1.3	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Styrene	0.098	ug/m3	J	J	t
E-SG-3-030713	1303287	TO-15	Air	t-Butyl alcohol (TBA)	3.1	ug/m3	J	J	t
E-SG-3-030713	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Tetrachloroethene	1100	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Toluene	5.7	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	trans-1,2-Dichloroethene	2.2	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-3-030713	1303287	TO-15	Air	Trichloroethene	170	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Trichlorofluoromethane	1.6	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Vinyl Acetate	6.3	ug/m3	J	J	be,t
E-SG-3-030713	1303287	TO-15	Air	Vinyl Chloride	2.3	ug/m3		J	t
E-SG-3-030713	1303287	TO-15	Air	Xylenes, Total	3.2	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	1.1	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,1,1-Trichloroethane	1.0	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	1.1	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,1,2-Trichloroethane	1.1	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,1-Dichloroethane	1.3	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	1,1-Dichloroethene	0.048	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	1,2,4-Trichlorobenzene	1.2	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	1,2,4-Trimethylbenzene	1.5	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	1.7	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	1.4	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	1.4	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichlorobenzene	1.5	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.87	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,2-Dichloropropane	1.0	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	1,3,5-Trimethylbenzene	1.2	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	1,3-Butadiene	0.34	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	1,3-Dichlorobenzene	0.13	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-6-030813	1303287	TO-15	Air	1,4-Dichlorobenzene	1.3	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	1,4-Dioxane	0.64	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	2-Butanone (MEK)	9.9	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	2-Hexanone	2.3	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	4-Ethyltoluene	1.2	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	2.8	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Acetone	67	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Acrylonitrile	0.12	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Benzene	2.6	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Benzyl chloride	0.43	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Bromodichloromethane	1.7	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Bromoform	2.7	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Bromomethane	0.84	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Carbon Disulfide	0.051	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Carbon Tetrachloride	18	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Chlorobenzene	2.3	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Chloroethane	0.092	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Chloroform	780	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Chloromethane	0.027	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.89	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.75	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Cyclohexane	4.7	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Dibromochloromethane	1.2	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Dichlorodifluoromethane	1.5	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.07	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Ethyl acetate	3.5	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.82	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Ethylbenzene	1.5	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Freon 113	1.9	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Heptane	2.4	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Hexachlorobutadiene	1.1	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Hexane	6100	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Methylene chloride	2.9	ug/m3		J	c,fd,t
E-SG-6-030813	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.89	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Naphthalene	5.2	ug/m3		J	fd,t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-6-030813	1303287	TO-15	Air	Styrene	0.74	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	t-Butyl alcohol (TBA)	4.8	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.78	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Tetrachloroethene	17	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Tetrahydrofuran	1.4	ug/m3	U	UJ	t
E-SG-6-030813	1303287	TO-15	Air	Toluene	4.2	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	trans-1,2-Dichloroethene	0.94	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.68	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Trichloroethene	2.2	ug/m3		J	t
E-SG-6-030813	1303287	TO-15	Air	Trichlorofluoromethane	3.8	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Vinyl Acetate	10	ug/m3	J	J	t
E-SG-6-030813	1303287	TO-15	Air	Vinyl Chloride	0.40	ug/m3		J	fd,t
E-SG-6-030813	1303287	TO-15	Air	Xylenes, Total	6.2	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,1-Trichloroethane	0.12	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.14	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1,2-Trichloroethane	0.19	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2,4-Trichlorobenzene	0.47	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.59	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.41	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.25	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichlorobenzene	1.8	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.11	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,2-Dichloropropane	0.12	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.30	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,4-Dichlorobenzene	1.3	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	2-Butanone (MEK)	6.2	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	2-Hexanone	1.0	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-6-030813-FD	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	1.5	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Acetone	9.4	ug/m3	J	J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Benzene	1.5	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Benzyl chloride	0.14	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Bromodichloromethane	0.50	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Bromomethane	0.33	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Carbon Tetrachloride	15	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Chlorobenzene	1.3	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Chloroform	790	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Cyclohexane	0.60	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Dichlorodifluoromethane	2.1	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Ethyl acetate	1.8	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Ethylbenzene	0.50	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Heptane	1.3	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Hexachlorobutadiene	0.33	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Hexane	6.5	ug/m3	J	J	bt,fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Methylene chloride	0.7	ug/m3	U	UJ	c,fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Naphthalene	1.3	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	t-Butyl alcohol (TBA)	1.2	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-6-030813-FD	1303287	TO-15	Air	Tetrachloroethene	13	ug/m3		J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-6-030813-FD	1303287	TO-15	Air	Toluene	1.9	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	trans-1,2-Dichloroethene	0.069	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Trichloroethene	0.98	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Trichlorofluoromethane	2.0	ug/m3		J	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Vinyl Acetate	2.3	ug/m3	J	J	t
E-SG-6-030813-FD	1303287	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	fd,t
E-SG-6-030813-FD	1303287	TO-15	Air	Xylenes, Total	2.6	ug/m3	U	UJ	fd,t
E-SG-1-030813	1303287	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2,4-Trimethylbenzene	0.54	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.15	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,3,5-Trimethylbenzene	0.15	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	2-Butanone (MEK)	3.9	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	2-Hexanone	0.54	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	4-Methyl-2-pentanone (MIBK)	0.77	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Acetone	7.6	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Benzene	1.4	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-1-030813	1303287	TO-15	Air	Bromodichloromethane	0.1	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Bromomethane	0.36	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Carbon Tetrachloride	0.30	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Chlorobenzene	0.12	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Chloroform	2.2	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Cyclohexane	4.9	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Dichlorodifluoromethane	1.5	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Ethyl acetate	14	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Ethylbenzene	1.3	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Heptane	2.3	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Hexane	2.3	ug/m3	J	J	bt,t
E-SG-1-030813	1303287	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
E-SG-1-030813	1303287	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Naphthalene	1.2	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	Styrene	0.26	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	t-Butyl alcohol (TBA)	2.0	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Tetrachloroethene	1.2	ug/m3		J	bt,t
E-SG-1-030813	1303287	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Toluene	15	ug/m3		J	t
E-SG-1-030813	1303287	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Trichloroethene	0.34	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Trichlorofluoromethane	1.1	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-1-030813	1303287	TO-15	Air	Vinyl Acetate	1.8	ug/m3	J	J	t
E-SG-1-030813	1303287	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
E-SG-1-030813	1303287	TO-15	Air	Xylenes, Total	3.7	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2,4-Trimethylbenzene	2.5	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.09	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,3,5-Trimethylbenzene	0.67	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	2-Butanone (MEK)	3.2	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	2-Hexanone	0.22	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	4-Ethyltoluene	1.2	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	4-Methyl-2-pentanone (MIBK)	1.9	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Acetone	6.2	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Benzene	1.5	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Bromodichloromethane	1.3	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Carbon Tetrachloride	63	ug/m3		J	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-8-031313	1303408	TO-15	Air	Chlorobenzene	0.29	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Chloroform	140	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Cyclohexane	0.18	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Dichlorodifluoromethane	2.1	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Ethyl acetate	0.75	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Ethylbenzene	0.79	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Heptane	0.074	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Hexane	0.95	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
E-SG-8-031313	1303408	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Naphthalene	0.89	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	1.7	ug/m3	J	J	bt,t
E-SG-8-031313	1303408	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Tetrachloroethene	2.5	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Toluene	0.77	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Trichloroethene	130	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Trichlorofluoromethane	1.3	ug/m3		J	t
E-SG-8-031313	1303408	TO-15	Air	Vinyl Acetate	3.0	ug/m3	J	J	t
E-SG-8-031313	1303408	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
E-SG-8-031313	1303408	TO-15	Air	Xylenes, Total	4.3	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-4-031313	1303408	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,1-Dichloroethane	1.0	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2,4-Trimethylbenzene	3.2	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.09	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,3,5-Trimethylbenzene	1.1	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Toluene	11	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Trichloroethene	3.9	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Trichlorofluoromethane	48	ug/m3		J	t
E-SG-4-031313	1303408	TO-15	Air	Vinyl Acetate	3.5	ug/m3	J	J	t
E-SG-4-031313	1303408	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
E-SG-4-031313	1303408	TO-15	Air	Xylenes, Total	21	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	1,1,1,2-Tetrachloroethane	0.15	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,1,1-Trichloroethane	0.092	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,1,2,2-Tetrachloroethane	0.072	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,1,2-Trichloroethane	0.1	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,1-Dichloroethane	0.82	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,1-Dichloroethene	0.04	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2,4-Trichlorobenzene	0.22	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2,4-Trimethylbenzene	0.62	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	1,2-Dibromo-3-chloropropane	0.2	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2-Dibromoethane (EDB)	0.096	ug/m3	U	UJ	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-5-031313	1303408	TO-15	Air	1,2-Dichloro-1,1,2,2-tetrafluoroethane	0.16	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2-Dichlorobenzene	0.15	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2-Dichloroethane (1,2-DCA)	0.09	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,2-Dichloropropane	0.11	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,3,5-Trimethylbenzene	0.15	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,3-Butadiene	0.28	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,3-Dichlorobenzene	0.1	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,4-Dichlorobenzene	0.18	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	1,4-Dioxane	0.096	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	2-Butanone (MEK)	6.2	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	2-Hexanone	0.70	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	4-Ethyltoluene	1	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	4-Methyl-2-pentanone (MIBK)	1.0	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Acetone	16	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	Acrylonitrile	0.1	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Benzene	2.0	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Benzyl chloride	0.068	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Bromodichloromethane	1.2	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Bromoform	2.2	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Bromomethane	0.2	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Carbon Disulfide	0.042	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Carbon Tetrachloride	90	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Chlorobenzene	0.07	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Chloroethane	0.076	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Chloroform	2100	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Chloromethane	0.022	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	cis-1,2-Dichloroethene	0.068	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	cis-1,3-Dichloropropene	0.08	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Cyclohexane	0.18	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Dibromochloromethane	0.11	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Dichlorodifluoromethane	2.5	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Diisopropyl ether (DIPE)	0.058	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Ethyl acetate	9.9	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Ethyl tert-butyl ether (ETBE)	0.084	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Ethylbenzene	0.61	ug/m3	J	J	t

Attachment C. Qualifications based on Quantitation Issues

Sample ID	SDG	Method	Matrix	Analyte	Result	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code
E-SG-5-031313	1303408	TO-15	Air	Freon 113	1.6	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Heptane	0.91	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	Hexachlorobutadiene	0.14	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Hexane	1.5	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	Methylene chloride	0.078	ug/m3	U	UJ	c,t
E-SG-5-031313	1303408	TO-15	Air	Methyl-t-butyl ether (MTBE)	0.096	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Naphthalene	2.4	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Styrene	0.05	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	2.8	ug/m3	J	J	bt,t
E-SG-5-031313	1303408	TO-15	Air	tert-Amyl methyl ether (TAME)	0.076	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Tetrachloroethene	18	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Tetrahydrofuran	1.2	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Toluene	1.3	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	trans-1,2-Dichloroethene	0.064	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	trans-1,3-Dichloropropene	0.24	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Trichloroethene	3.5	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Trichlorofluoromethane	1.7	ug/m3		J	t
E-SG-5-031313	1303408	TO-15	Air	Vinyl Acetate	4.5	ug/m3	J	J	t
E-SG-5-031313	1303408	TO-15	Air	Vinyl Chloride	0.12	ug/m3	U	UJ	t
E-SG-5-031313	1303408	TO-15	Air	Xylenes, Total	2.9	ug/m3		J	t

ATTACHMENT D

Qualifications based on Blank Contamination

Attachment D. Qualifications based on Blank Contamination

Sample ID	SDG	Method	Matrix	Analyte	Result	Mod Results	Units	Lab Qualifiers	Validation Qualifiers	Validation Reason Code	bl Result	bt Result	be Result
E-SG-3-030713-EB	1303287	TO-15	Air	Hexane	16	16	ug/m3	J	J	bt,t		79	
E-SG-3-030713-EB	1303287	TO-15	Air	Tetrachloroethene	0.35	0.35	ug/m3		J	bt,t		1.8	
E-SG-2-030713	1303287	TO-15	Air	2-Butanone (MEK)	6.3	6.3	ug/m3	J	J	be,t			5.5
E-SG-2-030713	1303287	TO-15	Air	Acetone	18	18	ug/m3	J	J	be,t			13
E-SG-2-030713	1303287	TO-15	Air	Carbon Tetrachloride	0.42	0.42	ug/m3		J	be,t			0.34
E-SG-2-030713	1303287	TO-15	Air	Dichlorodifluoromethane	2.2	2.2	ug/m3		J	be,t			1.8
E-SG-2-030713	1303287	TO-15	Air	Ethyl acetate	2.1	2.1	ug/m3		J	be,t			5.1
E-SG-2-030713	1303287	TO-15	Air	Hexane	3.1	3.1	ug/m3	J	J	be,bt,t		79	16
E-SG-2-030713	1303287	TO-15	Air	Vinyl Acetate	5.3	5.3	ug/m3	J	J	be,t			4.8
E-SG-3-030713	1303287	TO-15	Air	2-Butanone (MEK)	8.6	8.6	ug/m3	J	J	be,t			5.5
E-SG-3-030713	1303287	TO-15	Air	2-Hexanone	1.2	1.2	ug/m3	J	J	be,t			0.64
E-SG-3-030713	1303287	TO-15	Air	Acetone	25	25	ug/m3		J	be,t			13
E-SG-3-030713	1303287	TO-15	Air	Dichlorodifluoromethane	2.6	2.6	ug/m3		J	be,t			1.8
E-SG-4-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	2.8	2.8	ug/m3	J	J	bt,t		3.1	
E-SG-3-030713	1303287	TO-15	Air	Ethyl acetate	2.7	2.7	ug/m3		J	be,t			5.1
E-SG-3-030713	1303287	TO-15	Air	Hexane	3.4	3.4	ug/m3	J	J	be,bt,t		79	16
E-SG-3-030713	1303287	TO-15	Air	Vinyl Acetate	6.3	6.3	ug/m3	J	J	be,t			4.8
E-SG-6-030813-FD	1303287	TO-15	Air	Hexane	6.5	6.5	ug/m3	J	J	bt,fd,t		79	
E-SG-7-030813	1303287	TO-15	Air	Hexane	1.7	1.7	ug/m3	J	J	bt		79	
E-SG-7-030813	1303287	TO-15	Air	Tetrachloroethene	1.5	1.5	ug/m3		J	bt		1.8	
E-SG-9-030813	1303287	TO-15	Air	Hexane	1.1	1.1	ug/m3	J	J	bt		79	
E-SG-1-030813	1303287	TO-15	Air	Hexane	2.3	2.3	ug/m3	J	J	bt,t		79	
E-SG-1-030813	1303287	TO-15	Air	Tetrachloroethene	1.2	1.2	ug/m3		J	bt,t		1.8	
E-SG-8-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	1.7	1.7	ug/m3	J	J	bt,t		3.1	
E-SG-5-031313	1303408	TO-15	Air	t-Butyl alcohol (TBA)	2.8	2.8	ug/m3	J	J	bt,t		3.1	

Prepared for:
Tronox LLC
Henderson, Nevada

Revised
Data Validation Summary Report
Phase B Source Area Investigation Soil Gas Survey – Tronox LLC Facility
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ENSR Corporation
August 2008 – Revised October 2008
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Henderson, Nevada

Revised
Data Validation Summary Report
Phase B Source Area Investigation Soil Gas Survey – Tronox LLC Facility
Henderson, Nevada

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Acronyms and Abbreviations

%D	Percent difference or percent drift
%R	Percent recovery
%RSD	Percent relative standard deviation
ASB	Analytical Services Branch
BHC	Hexchlorocyclohexane
CCV	Continuing calibration verification
CDD	Chlorinated Dibenzo-p-Dioxins
CDF	Chlorinated Dibenzofurans
CLP	Contract Laboratory Program
COC	Chain of custody
DCB	Decachlorobiphenyl
DQI	Data quality indicator
DRO	Diesel range organics
EDD	Electronic data deliverables
EMPC	Estimated Maximum Possible Concentrations
EPA	U.S. Environmental Protection Agency
EPN	O-Ethyl-O-p-nitrophenyl benzene thiophosphonate
GC/MS	Gas Chromatography/Mass Spectrometry
GRO	Gasoline range organics
HT	Holding time
ICAL	Initial calibration
ICP	Inductively Coupled Plasma
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry
ICS	Interference check sample
ID	Identification
IS	Internal standard
LCL	Lower control limit
LCS	Laboratory control sample
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols Manual
MBAS	Methylene-Blue Active Substances MCL Maximum contaminant levels
MDL	Method detection limit

Acronyms and Abbreviations (Cont'd)

Mn	Manganese
MS/MSD	Matrix spike/matrix spike duplicate
ND	Not detected
NDEP	Nevada Department of Environmental Protection
NFG	National Functional Guidelines
NS	Not spiked
ORO	Oil range organics
PAH	Polycyclic aromatic hydrocarbons
prep	Preparation
PRG	Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
QC	Quality control
r2	Correlation coefficient
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
RPD	Relative percent difference
RRF	Relative response factor
SDG	Sample Delivery Group
SRC	Site-Related Chemical
STL	Severn Trent Laboratories
SVOC	Semivolatile organic carbon
TCMX	Tetrachlorometaxylene
TDS	Total dissolved solids
TOC	Total organic carbon
TSS	Total suspended solids
UCL	Upper control limit
VOC	Volatile organic carbon

1.0 Introduction

The purpose of formally validating the Phase B Source Area Investigation Soil Gas Survey laboratory results was to determine the suitability of the data for potential use in the conceptual site model, risk assessment, and other future on-site environmental assessments.

Columbia Analytical Services (hereafter abbreviated as CAS) in Simi Valley, CA was the laboratory contracted by Tronox for the Phase B Source Area Investigation Soil Gas Survey chemical analyses. All VOC analyses utilized EPA Method TO-15. All He tracer gas analyses utilized modified EPA Method 3C.

The validation covered seven SDGs containing a total of 115 soil gas samples. The distribution of samples within SDGs is detailed in Table E-3. The TO-15 analyte list for all samples in this project included 71 VOC compounds as specified in Table 2 of the Phase B Source Area Investigation Soil Gas Survey Workplan (ENSR, March 2008). All field sample analytical results are provided in a separate table titled “Volatile Organic Compounds and Helium Concentrations in Soil Gas”.

Attachment C contains the comments received from the Nevada Division of Environmental Protection (NDEP) dated September 17 and 30, 2008 to the initial DVSR (August 2008) and the Tronox response of September 30, 2008, respectively. This submittal incorporates revisions requested by NDEP to the initial DVSR. The revisions to the initial submittal are highlighted and provided in **Attachment C**

2.0 Data Validation Process

The laboratory results for the Phase B Source Area Investigation Soil Gas Survey were subjected to formal data validation following the guidance on data validation provided by the Nevada Division of Environmental Protection (NDEP) for the BMI Plant Sites (NDEP 2006). The data from the laboratory were submitted as Contract Laboratory Program (CLP)-like data packages in PDF format and EQuIS ® format electronic data deliverables (EDDs). The EDDs were imported into an EQuIS ® database specifically created for this project. ENSR validated the data using the pdf data packages plus EDDs and subsequently entered the validation qualifiers into the database. Results were compared to the goals stated in the Phase B Source Area Investigation Soil Gas Survey Workplan (ENSR, March 2008), hereafter referred to as the “Workplan,” and the Draft Quality Assurance Project Plan (ENSR, April 2008) hereafter referred to as the “QAPP."

A comprehensive (”full”) data validation was performed on one of the seven laboratory Sample Delivery Groups (SDGs), and the remainder underwent a more limited validation as described below. The goal of a minimum of 10% full validation that was established for the project was exceeded in order to comprehensively evaluate a full representative SDG. Limited validation consisted of reviewing the following data elements contained in laboratory summary data forms (and did not generally include raw data review):

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Initial and continuing calibrations
- Laboratory method blanks/canister blanks
- Surrogate recoveries
- Internal standard performance
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results

- Laboratory duplicate results
- Field duplicate results
- Quantitation limits and sample results
- Helium tracer gas concentrations

Full validation consisted of reviewing to the level of raw data all of the elements covered in the limited validation plus the following elements where applicable as defined by the analytical method:

- Mass spectrometer tuning
- Gas Chromatography/Mass Spectrometry (GC/MS) performance checks
- Compound identification
- Peak integration and mass spectral matches
- Calculation and transcription verifications

Analytical data were evaluated with reference to the National Functional Guidelines (NFG; EPA 1999) as well as the Region 9 Superfund Data Evaluation/Validation Guidance (EPA 2001), the above-mentioned NDEP Guidance on Data Validation (NDEP 2006), the EPA reference method, the quality control (QC) criteria specified in the QAPP (ENSR, April 2008), and the Workplan (ENSR, March 2008). The Regional and National Functional Guidelines were modified to accommodate the non-CLP methodologies.

Helium tracer gas data was utilized to determine whether significant leaks of surface air contaminated or diluted the soil gas during collection. This data was used for screening purposes and was not provided by the laboratory in a format that permitted validation of the He data itself, however the He results were used to qualify the TO-15 data if the % average leak of helium into the soil gas exceeded 1% of the concentration introduced inside the shroud at the surface.This rule was based on a conservative interpretation of the Interstate Technology Regulatory Council (ITRC) document "Vapor Intrusion Pathway: A Practical Guideline" (ITRC, Jan 2007), and the New York State Department of Health document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, Oct 2006)

In general, the validation qualifiers and definitions employed were based on those used by the U.S. Environmental Protection Agency (EPA) in the documents mentioned above. Validation qualifiers and definitions are listed in **Table E-1**. A reason code was assigned to all the applications of validation qualifiers for this project. The reason codes and their explanations are listed in **Table E-2**. These codes were entered in the project database for each application of a validation qualifier that changed a laboratory qualifier or modified a result value to indicate the primary reason(s) for data qualification. Where multiple reason codes were assigned to a single result then professional judgment was used to determine the most appropriate overall qualifier and bias sign, if any. Conversions of the laboratory reported "ND" for not detected to the "U" flag in the database and the laboratory-applied "J" qualifier to indicate results less than the reporting limit but greater than the method detection limit (MDL) are generally not discussed in this report. These laboratory qualifiers were standardized and migrated to the validation qualifier field so that the "J" qualifier, unless applied by a validator for other reasons discussed below and documented with a reason code, always indicates a result is estimated because it is less than the reporting limit but greater than the MDL.

Data validation was organized by laboratory report SDG. For each separate SDG a data validation memorandum was written by a validator and reviewed by a peer at ENSR's Westford, MA office. These memoranda are included as Word and Excel documents and sorted by ENSR Identification (ID), which is correlated with the laboratory SDGs, field sample IDs, and collection dates as listed in **Table E-3**. **Table E-3** is

provided as an Excel spreadsheet that can be resorted to assist the data user in locating validation information for any particular sample or SDG. Note validation information about the helium tracer results is provided in this revised DVSR and associated tables in response to NDEP comments but is not included in the original data validation memoranda.

3.0 Data Validation Results

The data validation qualifiers and reason codes were used to indicate all the data in the database where results were qualified as a result of validation. This information was sorted by the QC review elements listed below:

- Holding times and sample preservation
- Initial and continuing calibrations
- Mass spectrometer tuning
- Laboratory blanks/equipment blanks/field blanks
- Surrogate recoveries
- LCS/LCSD results
- Internal standard performance
- Laboratory duplicate results
- Field duplicate results
- Quantitation limits and sample results
- GC/MS performance checks
- Peak integration and mass spectral matches
- Calculation and transcription verifications
- Helium tracer gas concentrations

Tables E-4 through **E-7** and **E-9** list all the results qualified based on QC problems identified with regard to blank contamination, calibrations, field duplicates, quantitation problems, and helium tracer results, respectively. Reason codes for each qualifier assignment have been provided in each table. Where available, a numerical data quality indicator (DQI) result value, and acceptance criteria for that DQI value have been added to the tables in columns to the right of the reason codes per NDEP's request. No QC problems were identified that resulted in qualification of results based on holding times, mass spectrometer tuning, surrogate recoveries, LCS recoveries, internal standard performance, laboratory duplicate results, GC/MS performance checks, compound identification, or peak integration. Results for a single sample were rejected based on data validation due to the helium tracer concentrations. This location (SG42B) was successfully resampled and provided data without detectable He. **Table E-8** was provided as part of the response to NDEP comments and details the calculated helium percent leak for soil gas samples in which the helium tracer was detected. The data validation summary results table contents are sorted by sample ID and SDG to assist the data user in locating the associated data validation memoranda. The data validation memoranda discuss the application of qualifiers in more detail. **Table E-4** through **Table E-7,** plus **Table E-9** are provided on CD as Excel spreadsheets that can be resorted to assist the data user in locating validation information for any particular sample, SDG, method, or analyte. The results in each table will be summarized separately in sections below.

3.1 Instrument Calibration

Table E-5 lists the sample results that were qualified based on exceeded calibration criteria. The nature of the numerical DQI result value is defined by the DQI limit criteria; for instance, percent relative standard deviation (%RSD) criteria are from method initial calibration (ICAL) requirements. The one positive and nine nondetect results for 1,2-dichlorobenzene were qualified as estimated (J and UJ, respectively) due to the associated initial calibration's %RSD for this compound, which slightly exceeded the method defined criteria.

3.2 Blank Contamination

In general, laboratory and field blanks were free of contamination at significant levels. **Table E-4** lists the sample results that were qualified based on contamination in laboratory method blanks. Target compounds were not detected in the canister blanks. The blank result value associated with each qualified sample result is given in the column to the right of the reason codes.

A total of 115 sample results were negated (U) based on the presence of low levels of the common laboratory contaminants methylene chloride, acetone, and 2-butanone, as well as trace levels of benzene, carbon disulfide, ethanol, isopropylbenzene, naphthalene, and vinyl acetate in the method blanks. The majority of these negations were based on the presence of acetone. Table E-4 provides the dilution factors and sample quantitation limits (SQL) to assist the reader in understanding the blank actions. Action limits (AL) were established at 10x the method blank concentration for common lab contaminants and 5x for all other target analytes. If the sample result was < the SQL and < the AL, the result was reported as not detected (U) at the SQL. If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration. If the sample result was > AL, the result was not qualified.

3.3 Field Duplicates

The results of all soil gas field duplicate pairs collected were evaluated during validation. RPDs were compared to the objectives established in the QAPP of 50% RPD for soil gas. **Table E-6** lists the results qualified during validation based on field duplicate precision nonconformances.

A total of 84 associated field sample result values in nine sample/field duplicate pairs were qualified as estimated (J) based on field duplicate result RPDs that exceeded the QAPP criteria. Twenty two different analytes and from two to ten records per analyte were qualified.

3.4 Quantitation

Table E-7 lists the results that were qualified during validation based on quantitation issues. All 25 of the qualified results were based on the laboratory qualifier M indicating a possible high bias due to matrix interferences in the GC/MS data. No other quantitation problems were discovered during data validation.

3.5 Helium tracer results

Table E-9 lists the results that were qualified based on the helium tracer concentrations detected in the soil gas samples. The DQI result is the He concentration in ppmV in the sample. The DQI limit is a calculated 1% of the He concentration in the surface shroud. Table E-8 and the associated Tronox response to comments provide additional details. If the He concentration was between 1% and 10% of the shroud average then the TO-15 VOC analyte results were qualified as estimated based on the possible contamination and dilution by surface air. If the He concentration exceeded 10% of the shroud average then the results were rejected. Four sample datasets were qualified as estimated and one was rejected based on these criteria. All but one of these soil gas samples were recollected later and He was not detected in these resample datasets (indicated by an R in the sample ID), therefore only TO-15 data from a single location (SG17B) was potentially impacted by

surface air contamination/dilution. A comparison of the original and resampled results (e.g. SG53B-05, its duplicate SG53B-05D, the resampled SG53BR-05, and its duplicate SG53BR-05D) indicates the TO-15 analyte results are very consistent regardless of the He tracer results. This confirms the assumptions used for data qualification based on He tracer results were conservative and the data quality is not significantly impacted when He results are less than 10% of the surface shroud levels.

4.0 Evaluation of Data Quality Indicators

Data validation information was used to evaluate the DQIs of precision, accuracy, representativeness, comparability, completeness, and sensitivity for results in the Henderson Phase B Source Area Soil Gas Investigation dataset. Each of these DQI parameters is discussed in the sections below.

4.1 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. Field precision was assessed through the collection and measurement of field duplicates and expressed as the RPD of the sample and field duplicate pair results. The field duplicate RPD results that caused the application of validation qualifiers are discussed in Section 3.3 of this report and listed in **Table E-6**. In general the field duplicate precision was acceptable for all analytes. A limited analyte data set was qualified as estimated but usable and represents only 1% of the total field sample results dataset.

Laboratory precision was assessed through the RPD results for matrix duplicates. The laboratory duplicate precision was acceptable and no results were qualified during validation.

4.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value. Laboratory accuracy was assessed during the validation using the recoveries of positive control samples (i.e., LCS and surrogate spikes). All positive control sample recoveries were acceptable and no results were qualified based on LCS or surrogate recoveries.

Accuracy is also indirectly addressed via the negative control samples for field activities, as well as laboratory negative control samples such as method blanks and calibration blanks. Based on blank results validation, 115 results were qualified as described in Section 3.2, which represents only 1.4% of the total data points collected. No data were rejected based on blank results.

Bias as a component of accuracy is also evaluated with the validation of HT, calibration, internal standard performance, and quantitation results. Collectively these evaluations resulted in the qualification of only 0.4% of the total data points. No data were rejected based on these aspects of bias.

Evaluation of the remaining QC elements that contribute to accuracy, such as mass spectrometer tuning, compound or element identification, peak integration and mass spectral matches, and calculation/transcription verifications, did not result in the qualification or rejection of any data points during validation.

4.3 Representativeness

Representativeness is the measure of the degree to which data suitably represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Aspects of representativeness addressed during validation include the review of sample collection information in the COC documentation, conformity of laboratory analyses to Workplan intentions, adherence of the

documented laboratory procedures to method requirements, and completeness of the laboratory data packages. Most of the issues identified during this evaluation did not result in the qualification of laboratory data but did involve resubmittals of data from the laboratories to correct problems that were discovered during the validation process. All of these issues were resolved. Other aspects of data representativeness, such as adherence to recommended HTs, instrument calibration requirements, as well as field and laboratory precision assessments, are discussed above in this report. The possible entrainment of contaminants and dilution by surface air also could impact the representativness of the soil gas and this is discussed above in this revised DVSR report as well as the Tronox response to NDEP comments on the original DVSR for the soil gas dataset. Very low levels of the helium tracer and consistency between the original and recollected sample results for VOC analytes both indicate the sampling was representative of the subterranean soil gas.

4.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that were or should have been collected. Valid data are defined as all the data points judged to be usable (i.e., not rejected, as a result of the validation process).

Field completeness is defined as the percentage of samples actually collected versus those intended to be collected per the Workplan. The goal stated in the QAPP for this project was greater than 90% field completeness. A comparison of the Workplan sample tables with the database sample IDs indicates that actual field completeness was 100%, exceeding the goal established for the project. This field completeness calculation is based on the total sample locations scheduled in the Workplan compared to the COC requests sent to the laboratories. All COC requests were faithfully executed by the laboratories with the minor exceptions detailed in the data validation memoranda.

Laboratory completeness is defined as percentage of valid data points versus the total expected from the laboratory analyses. The objective stated in the QAPP for this project was greater than 95% laboratory completeness. Actual laboratory completeness was 100% on the basis of sample analysis (i.e., all requested analyses were performed and reported by the laboratories), and 99% completeness based on valid data.

4.5 Comparability

Comparability is a qualitative expression of the measure of confidence that two or more data sets may contribute to a common analysis. Because this project was an initial site investigation for all of the TO-15 parameters, involving new soil gas sampling locations, there was no well characterized historical data set for comparisons. Comparability of data within the investigation was maximized by using standard methods for sampling and analysis, reporting data, and data validation. A single laboratory performed all the analyses to eliminate interlaboratory variability.

4.6 Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest and particularly the capability of measuring a constituent at low levels. For the EPA methods employed in this project, sensitivity is measured by the MDL and reporting limit (RL). Both nominal MDLs and RLs were provided by the laboratories in the laboratory data packages and were verified during validation. Reporting limits in general were adjusted for sample quantitation limits based on the low point of calibration and corrected for sample-specific factors such as exact aliquot size, canister pressure, dilutions, etc. The laboratories were instructed to report estimated (J flagged) results if concentrations above the MDL but below the RL were detected.

To determine if the adjusted reporting limits for all project analytes were low enough to meet the project sensitivity requirements, a comparison of the project regulatory comparison levels, based on 1/10 of the EPA Region 9 Preliminary Remediation Goals (PRGs) for ambient air, adjusted for vapor intrusion dilution, was made with the nominal laboratory RLs. Risk assessment will be based on the EPA Region VI MSSL values per

NDEP request. In general the methods selected were sufficiently sensitive to meet the risk-based comparison level goals in soil gas samples and support potential vapor intrusion evaluation. The RLs and MDLs provided by the laboratories for this analyte set are typical of the TO-15 method employed and significantly lower detection limits are not routinely achievable using certified methods.

5.0 Conclusions

One hundred percent of the laboratory data for the Phase B Source Area Soil Gas Investigation were validated using standardized guidelines and procedures recommended by EPA and NDEP. Ninety four percent of the results for this project were accepted as reported by the laboratory without additional qualification based on validation actions and should be considered valid for all decision-making purposes.

A subset of the laboratory results was qualified during validation, and those results are summarized in **Tables E-4 to E-7**. The qualified data are grouped in these tables based on the reason for qualification (see **Table E-2**) and the qualifier symbols or flags applied (see **Table E-1**). Six percent of the results of the total analytical dataset for this project were qualified as estimated due to minor QC problems with precision, accuracy, and representativeness. Based on guidance in the EPA data usability document (EPA 1992), estimated data are considered usable with the appropriate interpretation (e.g., consideration of the potential bias). All results for a single sample were rejected during data validation based on helium tracer concentrations exceeding 10% of the surface shroud value This sample was successfully recollected and reanalyzed.

All the qualified results were evaluated with respect to the data quality indicators and compared to the QAPP and Workplan goals. Details of this evaluation are discussed in Section 4 of this report. Based on the results of data validation, the overall goals for data quality were achieved for this project.

6.0 References

EPA. 1992. Guidance for Data Usability in Risk Assessment. Part A.

EPA. 1999. USEPA “Contract Laboratory Program National Functional Guidelines for Organic Data Review.”

EPA. 2001. USEPA “Draft Region 9 Superfund Data Evaluation/Validation Guidance.”

ENSR. March 2008. Phase B Source Area Investigation Soil Gas Survey Workplan, Tronox LLC Facility, Henderson, Nevada.

ENSR. April 2008. Quality Assurance Project Plan, Tronox LLC Facility Henderson, Nevada.

ITRC, January 2007. Interstate Technology Regulatory Council “Technical and Regulatory Guidance - Vapor Intrusion Pathway: A Practical Guideline”.

NDEP. 2006. NDEP “Guidance on Data Validation, BMI Pant Sites and Common Areas Projects, Henderson, Nevada.”

NYSDOH, October 2006. New York State Department of Health “Final: Guidance for Evaluating Soil Vapor Intrusion in the State of New York”

Tables

Table E-1
Data Validation Qualifiers
Phase B Source Area Soil Gas Investigation,
Tronox Facility
Henderson, Nevada

Validation Qualifier	Definition
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J+	The result is an estimated quantity and the result may be biased high.
J-	The result is an estimated quantity and the result may be biased low.
UJ	The analyte was not detected above the sample reporting limit and the reporting limit is approximate.
U	The analyte was analyzed for, but was not detected above the sample reporting limit
R	The result is rejected and unusable due to serious data deficiencies. The presence or absence of the analyte cannot be verified.

Code	Explanation
a	qualified due to low abundance (radiochemical activity)
b	qualified due to blank contamination
be	qualified due to equipment blank contamination
bf	qualified due to field blank contamination
bl	qualified due to lab blank contamination
c	qualified due to calibration problems
cp	qualified due to insufficient ingrowth (radiochemical only)
fd	qualified due to field duplicate imprecision
h	qualified due to holding time exceedance
i	qualified due to internal standard areas
k	qualified as Estimated Maximum Possible Concentrations (dioxins only)
l	qualified due to LCS recoveries
ld	qualified due to lab duplicate imprecision (matrix duplicate, MSD, LCSD)
m	qualified due to matrix spike recoveries
nb	qualified due to negative lab blank contamination (nondetect results only)
p	qualified as a false positive due to contamination during shipping
q	qualified due to quantitation problem
s	qualified due to surrogate recoveries
t	qualified due to elevated helium tracer concentrations
x	qualified due to low % solids
y	qualified due to serial dilution results
z	qualified due to ICS results

Table E-3
Sample IDs , SDGs, Lab IDs, and ENSR memo IDs
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Lab ID	ENSR memo ID	Collection Date
SG83B-05-1	P0801342	P0801342-001	TH532	2008-5-7 2:33 PM
SG83B-05-1	P0801342	P0801342-001	TH532	2008-5-7 2:33 PM
SG83B-05-3	P0801342	P0801342-002	TH532	2008-5-7 3:41 PM
SG83B-05-3	P0801342	P0801342-002	TH532	2008-5-7 3:41 PM
SG83B-05-7	P0801342	P0801342-003	TH532	2008-5-7 4:39 PM
SG83B-05-7	P0801342	P0801342-003	TH532	2008-5-7 4:39 PM
SG38B-20	P0801385	P0801385-005	TH533	2008-5-10 9:53 AM
SG40B-05	P0801385	P0801385-006	TH533	2008-5-10 10:51 AM
SG40B-05	P0801385	P0801385-006	TH533	2008-5-10 10:51 AM
SG40B-05D	P0801385	P0801385-007	TH533	2008-5-10 11:18 AM
SG40B-05D	P0801385	P0801385-007	TH533	2008-5-10 11:18 AM
SG41B-20	P0801385	P0801385-002	TH533	2008-5-9 6:30 PM
SG41B-20	P0801385	P0801385-002	TH533	2008-5-9 6:30 PM
SG41B-20D	P0801385	P0801385-003	TH533	2008-5-9 7:12 PM
SG41B-20D	P0801385	P0801385-003	TH533	2008-5-9 7:12 PM
SG43B-05	P0801385	P0801385-004	TH533	2008-5-10 8:20 AM
SG64B-05	P0801385	P0801385-001	TH533	2008-5-9 5:11 PM
SG35B-05	P0801442	P0801442-014	TH534	2008-5-15 1:32 PM
SG36B-20	P0801442	P0801442-004	TH534	2008-5-14 4:25 PM
SG36B-20	P0801442	P0801442-004	TH534	2008-5-14 4:25 PM
SG37B-20	P0801442	P0801442-003	TH534	2008-5-14 5:00 PM
SG39B-05	P0801442	P0801442-002	TH534	2008-5-14 3:20 PM
SG44B-05	P0801442	P0801442-005	TH534	2008-5-14 12:30 PM
SG65B-05	P0801442	P0801442-010	TH534	2008-5-15 8:44 AM
SG65B-05D	P0801442	P0801442-011	TH534	2008-5-15 9:10 AM
SG70B-05	P0801442	P0801442-008	TH534	2008-5-15 9:22 AM
SG70B-05	P0801442	P0801442-008	TH534	2008-5-15 9:22 AM
SG71B-05	P0801442	P0801442-009	TH534	2008-5-15 10:30 AM
SG71B-05	P0801442	P0801442-009	TH534	2008-5-15 10:30 AM
SG72B-05	P0801442	P0801442-007	TH534	2008-5-14 2:02 PM
SG72B-05	P0801442	P0801442-007	TH534	2008-5-14 2:02 PM
SG73B-05	P0801442	P0801442-001	TH534	2008-5-14 2:57 PM
SG75B-05	P0801442	P0801442-018	TH534	2008-5-15 4:29 PM
SG75B-05	P0801442	P0801442-018	TH534	2008-5-15 4:29 PM
SG84B-05	P0801442	P0801442-012	TH534	2008-5-15 10:47 AM
SG84B-05	P0801442	P0801442-012	TH534	2008-5-15 10:47 AM
SG85B-05	P0801442	P0801442-013	TH534	2008-5-15 1:30 PM
SG88B-05	P0801442	P0801442-006	TH534	2008-5-14 1:43 PM
SG89B-05	P0801442	P0801442-017	TH534	2008-5-15 3:52 PM
SG89B-05	P0801442	P0801442-017	TH534	2008-5-15 3:52 PM
SG94B-05	P0801442	P0801442-015	TH534	2008-5-15 2:34 PM
SG95B-05	P0801442	P0801442-016	TH534	2008-5-15 3:09 PM
SG95B-05	P0801442	P0801442-016	TH534	2008-5-15 3:09 PM

Table E-3
Sample IDs , SDGs, Lab IDs, and ENSR memo IDs
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Lab ID	ENSR memo ID	Collection Date
SG07B-05	P0801483	P0801483-027	TH536	2008-5-17 4:20 PM
SG07B-05	P0801483	P0801483-027	TH536	2008-5-17 4:20 PM
SG07B-05D	P0801483	P0801483-028	TH536	2008-5-17 5:05 PM
SG07B-05D	P0801483	P0801483-028	TH536	2008-5-17 5:05 PM
SG08B-05	P0801483	P0801483-023	TH536	2008-5-18 8:44 AM
SG08B-05	P0801483	P0801483-023	TH536	2008-5-18 8:44 AM
SG09B-05	P0801483	P0801483-024	TH536	2008-5-18 7:40 AM
SG09B-05	P0801483	P0801483-024	TH536	2008-5-18 7:40 AM
SG10B-05	P0801483	P0801483-026	TH536	2008-5-18 8:05 AM
SG10B-05	P0801483	P0801483-026	TH536	2008-5-18 8:05 AM
SG11B-05	P0801483	P0801483-025	TH536	2008-5-18 6:55 AM
SG11B-05	P0801483	P0801483-025	TH536	2008-5-18 6:55 AM
SG12B-05	P0801483	P0801483-022	TH536	2008-5-18 6:45 AM
SG12B-05	P0801483	P0801483-022	TH536	2008-5-18 6:45 AM
SG16B-05	P0801483	P0801483-021	TH536	2008-5-18 9:47 AM
SG17B-05	P0801483	P0801483-029	TH536	2008-5-18 10:28 AM
SG18B-05	P0801483	P0801483-030	TH536	2008-5-18 10:55 AM
SG18B-05	P0801483	P0801483-030	TH536	2008-5-18 10:55 AM
SG22B-05	P0801483	P0801483-009	TH536	2008-5-16 12:25 PM
SG22B-05	P0801483	P0801483-009	TH536	2008-5-16 12:25 PM
SG26B-05	P0801483	P0801483-006	TH536	2008-5-16 11:25 AM
SG26B-05	P0801483	P0801483-006	TH536	2008-5-16 11:25 AM
SG26B-05D	P0801483	P0801483-007	TH536	2008-5-16 12:00 PM
SG26B-05D	P0801483	P0801483-007	TH536	2008-5-16 12:00 PM
SG27B-05	P0801483	P0801483-018	TH536	2008-5-16 2:42 PM
SG27B-05	P0801483	P0801483-018	TH536	2008-5-16 2:42 PM
SG28B-05	P0801483	P0801483-011	TH536	2008-5-16 1:53 PM
SG28B-05	P0801483	P0801483-011	TH536	2008-5-16 1:53 PM
SG28B-05D	P0801483	P0801483-008	TH536	2008-5-16 2:16 PM
SG28B-05D	P0801483	P0801483-008	TH536	2008-5-16 2:16 PM
SG32B-05	P0801483	P0801483-019	TH536	2008-5-17 12:00 PM
SG32B-05	P0801483	P0801483-019	TH536	2008-5-17 12:00 PM
SG33B-05	P0801483	P0801483-013	TH536	2008-5-17 3:38 PM
SG61B-05	P0801483	P0801483-015	TH536	2008-5-17 1:38 PM
SG61B-05	P0801483	P0801483-015	TH536	2008-5-17 1:38 PM
SG62B-05	P0801483	P0801483-012	TH536	2008-5-17 2:47 PM
SG62B-05	P0801483	P0801483-012	TH536	2008-5-17 2:47 PM
SG63B-05	P0801483	P0801483-020	TH536	2008-5-17 12:39 PM
SG63B-05	P0801483	P0801483-020	TH536	2008-5-17 12:39 PM
SG76B-05	P0801483	P0801483-001	TH536	2008-5-15 6:00 PM
SG76B-05	P0801483	P0801483-001	TH536	2008-5-15 6:00 PM
SG78B-05	P0801483	P0801483-002	TH536	2008-5-15 5:10 PM
SG78B-05	P0801483	P0801483-002	TH536	2008-5-15 5:10 PM

Table E-3
Sample IDs , SDGs, Lab IDs, and ENSR memo IDs
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Lab ID	ENSR memo ID	Collection Date
SG78B-05	P0801483	P0801483-002	TH536	2008-5-15 5:10 PM
SG79B-05	P0801483	P0801483-004	TH536	2008-5-16 9:44 AM
SG80B-05	P0801483	P0801483-005	TH536	2008-5-16 11:00 AM
SG80B-05	P0801483	P0801483-005	TH536	2008-5-16 11:00 AM
SG81B-05	P0801483	P0801483-003	TH536	2008-5-16 10:24 AM
SG81B-05	P0801483	P0801483-003	TH536	2008-5-16 10:24 AM
SG82B-05	P0801483	P0801483-014	TH536	2008-5-16 9:15 AM
SG82B-05	P0801483	P0801483-014	TH536	2008-5-16 9:15 AM
SG83B-05	P0801483	P0801483-017	TH536	2008-5-17 1:00 PM
SG83B-05	P0801483	P0801483-017	TH536	2008-5-17 1:00 PM
SG83B-05D	P0801483	P0801483-016	TH536	2008-5-17 1:32 PM
SG83B-05D	P0801483	P0801483-016	TH536	2008-5-17 1:32 PM
SG86B-05	P0801483	P0801483-010	TH536	2008-5-16 1:33 PM
SG86B-05	P0801483	P0801483-010	TH536	2008-5-16 1:33 PM
SG06B-05	P0801507	P0801507-015	TH537	2008-5-20 2:53 PM
SG13B-05	P0801507	P0801507-012	TH537	2008-5-20 12:00 PM
SG13B-05	P0801507	P0801507-012	TH537	2008-5-20 12:00 PM
SG14B-05	P0801507	P0801507-014	TH537	2008-5-20 1:50 PM
SG14B-05	P0801507	P0801507-014	TH537	2008-5-20 1:50 PM
SG15B-05	P0801507	P0801507-013	TH537	2008-5-20 1:00 PM
SG15B-05	P0801507	P0801507-013	TH537	2008-5-20 1:00 PM
SG29B-05	P0801507	P0801507-003	TH537	2008-5-19 11:43 AM
SG29B-05	P0801507	P0801507-003	TH537	2008-5-19 11:43 AM
SG30B-05	P0801507	P0801507-002	TH537	2008-5-19 10:35 AM
SG30B-05	P0801507	P0801507-002	TH537	2008-5-19 10:35 AM
SG31B-05	P0801507	P0801507-005	TH537	2008-5-19 2:43 PM
SG31B-05	P0801507	P0801507-005	TH537	2008-5-19 2:43 PM
SG55B-05	P0801507	P0801507-010	TH537	2008-5-20 2:39 PM
SG55B-05	P0801507	P0801507-010	TH537	2008-5-20 2:39 PM
SG56B-05	P0801507	P0801507-008	TH537	2008-5-20 12:48 PM
SG56B-05	P0801507	P0801507-008	TH537	2008-5-20 12:48 PM
SG56B-05D	P0801507	P0801507-009	TH537	2008-5-20 1:31 PM
SG56B-05D	P0801507	P0801507-009	TH537	2008-5-20 1:31 PM
SG57B-05	P0801507	P0801507-011	TH537	2008-5-20 3:58 PM
SG57B-05	P0801507	P0801507-011	TH537	2008-5-20 3:58 PM
SG58B-05	P0801507	P0801507-007	TH537	2008-5-20 11:06 AM
SG58B-05	P0801507	P0801507-007	TH537	2008-5-20 11:06 AM
SG59B-05	P0801507	P0801507-004	TH537	2008-5-19 1:20 PM
SG59B-05	P0801507	P0801507-004	TH537	2008-5-19 1:20 PM
SG60B-05	P0801507	P0801507-006	TH537	2008-5-20 9:24 AM
SG60B-05	P0801507	P0801507-006	TH537	2008-5-20 9:24 AM
SG77B-05	P0801507	P0801507-001	TH537	2008-5-19 9:01 AM
SG77B-05	P0801507	P0801507-001	TH537	2008-5-19 9:01 AM

Table E-3
Sample IDs , SDGs, Lab IDs, and ENSR memo IDs
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Lab ID	ENSR memo ID	Collection Date
SG42B-05	P0801548	P0801548-008	TH538	2008-5-21 7:15 AM
SG45B-05	P0801548	P0801548-017	TH538	2008-5-22 1:28 PM
SG46B-05	P0801548	P0801548-003	TH538	2008-5-21 9:05 AM
SG46B-05	P0801548	P0801548-003	TH538	2008-5-21 9:05 AM
SG47B-05	P0801548	P0801548-011	TH538	2008-5-21 10:45 AM
SG47B-05	P0801548	P0801548-011	TH538	2008-5-21 10:45 AM
SG48B-05	P0801548	P0801548-010	TH538	2008-5-21 9:30 AM
SG49B-05	P0801548	P0801548-014	TH538	2008-5-22 9:36 AM
SG50B-05	P0801548	P0801548-016	TH538	2008-5-22 12:18 PM
SG51B-05	P0801548	P0801548-006	TH538	2008-5-21 1:33 PM
SG51B-05	P0801548	P0801548-006	TH538	2008-5-21 1:33 PM
SG51B-05D	P0801548	P0801548-007	TH538	2008-5-21 2:15 PM
SG51B-05D	P0801548	P0801548-007	TH538	2008-5-21 2:15 PM
SG53B-05	P0801548	P0801548-012	TH538	2008-5-21 1:28 PM
SG53B-05	P0801548	P0801548-012	TH538	2008-5-21 1:28 PM
SG53B-05D	P0801548	P0801548-013	TH538	2008-5-21 1:57 PM
SG53B-05D	P0801548	P0801548-013	TH538	2008-5-21 1:57 PM
SG54B-05	P0801548	P0801548-018	TH538	2008-5-22 1:19 PM
SG54B-05	P0801548	P0801548-018	TH538	2008-5-22 1:19 PM
SG66B-05	P0801548	P0801548-015	TH538	2008-5-22 9:47 AM
SG66B-05	P0801548	P0801548-015	TH538	2008-5-22 9:47 AM
SG67B-05	P0801548	P0801548-005	TH538	2008-5-21 11:07 AM
SG67B-05	P0801548	P0801548-005	TH538	2008-5-21 11:07 AM
SG68B-05	P0801548	P0801548-004	TH538	2008-5-21 10:08 AM
SG69B-05	P0801548	P0801548-009	TH538	2008-5-21 8:19 AM
SG69B-05	P0801548	P0801548-009	TH538	2008-5-21 8:19 AM
SG87B-05	P0801548	P0801548-019	TH538	2008-5-22 12:27 PM
SG91B-05	P0801548	P0801548-001	TH538	2008-5-21 7:00 AM
SG91B-05	P0801548	P0801548-001	TH538	2008-5-21 7:00 AM
SG93B-05	P0801548	P0801548-002	TH538	2008-5-21 7:54 AM
SG93B-05	P0801548	P0801548-002	TH538	2008-5-21 7:54 AM
SG01B-05	P0801656	P0801656-014	TH539	2008-5-29 12:27 PM
SG02B-05	P0801656	P0801656-015	TH539	2008-5-29 1:33 PM
SG03B-05	P0801656	P0801656-013	TH539	2008-5-29 11:12 AM
SG04B-05	P0801656	P0801656-018	TH539	2008-5-29 11:41 AM
SG05B-05	P0801656	P0801656-019	TH539	2008-5-29 1:05 PM
SG19B-05	P0801656	P0801656-008	TH539	2008-5-28 2:42 PM
SG20B-05	P0801656	P0801656-009	TH539	2008-5-28 4:15 PM
SG20B-05	P0801656	P0801656-009	TH539	2008-5-28 4:15 PM
SG21B-05	P0801656	P0801656-005	TH539	2008-5-28 10:08 AM
SG23B-05	P0801656	P0801656-001	TH539	2008-5-28 2:48 PM
SG23B-05	P0801656	P0801656-001	TH539	2008-5-28 2:48 PM
SG24B-05	P0801656	P0801656-006	TH539	2008-5-28 11:26 AM

Table E-3
Sample IDs , SDGs, Lab IDs, and ENSR memo IDs
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Lab ID	ENSR memo ID	Collection Date
SG24B-05	P0801656	P0801656-006	TH539	2008-5-28 11:26 AM
SG25B-05	P0801656	P0801656-002	TH539	2008-5-28 3:52 PM
SG34B-05	P0801656	P0801656-003	TH539	2008-5-28 5:14 PM
SG34B-05	P0801656	P0801656-003	TH539	2008-5-28 5:14 PM
SG42BR-05	P0801656	P0801656-011	TH539	2008-5-29 8:09 AM
SG52B-05	P0801656	P0801656-010	TH539	2008-5-28 5:25 PM
SG52B-05	P0801656	P0801656-010	TH539	2008-5-28 5:25 PM
SG53BR-05	P0801656	P0801656-022	TH539	2008-5-29 6:20 PM
SG53BR-05	P0801656	P0801656-022	TH539	2008-5-29 6:20 PM
SG53BR-05D	P0801656	P0801656-023	TH539	2008-5-29 6:20 PM
SG53BR-05D	P0801656	P0801656-023	TH539	2008-5-29 6:20 PM
SG60BR-05	P0801656	P0801656-017	TH539	2008-5-29 8:40 AM
SG60BR-05	P0801656	P0801656-017	TH539	2008-5-29 8:40 AM
SG65BR-05	P0801656	P0801656-020	TH539	2008-5-29 4:09 PM
SG65BR-05D	P0801656	P0801656-021	TH539	2008-5-29 4:09 PM
SG74B-05	P0801656	P0801656-004	TH539	2008-5-28 6:16 PM
SG90B-05	P0801656	P0801656-007	TH539	2008-5-28 12:32 PM
SG90B-05	P0801656	P0801656-007	TH539	2008-5-28 12:32 PM
SG92B-05	P0801656	P0801656-016	TH539	2008-5-29 10:02 AM
SG92B-05	P0801656	P0801656-016	TH539	2008-5-29 10:02 AM
SG94BR-05	P0801656	P0801656-012	TH539	2008-5-29 9:20 AM

Table E-4
Qualifications Based on Blank Contamination
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	Batch ID	MB_Result	Dilution Factor	QL
SG06B-05	P0801507	TO-15	GS	Methylene chloride	0.77	U	ug/m3	b	MS16052708	0.076	1.54	0.77
SG07B-05	P0801483	TO-15	GS	Vinylacetate	8.5	U	ug/m3	b	MS13052708	0.40	1.69	8.5
SG07B-05	P0801483	TO-15	GS	Ethanol	8.5	U	ug/m3	b	MS13052708	1.0	1.69	8.5
SG07B-05	P0801483	TO-15	GS	Acetone	11	U	ug/m3	b	MS13052708	1.8	1.69	8.5
SG07B-05	P0801483	TO-15	GS	2-Butanone	4.5	U	ug/m3	b	MS13052708	0.35	1.69	0.85
SG08B-05	P0801483	TO-15	GS	Vinylacetate	7.5	U	ug/m3	b	MS13052708	0.40	1.49	7.5
SG08B-05	P0801483	TO-15	GS	Acetone	12	U	ug/m3	b	MS13052708	1.8	1.49	7.5
SG10B-05	P0801483	TO-15	GS	Vinylacetate	7.8	U	ug/m3	b	MS13052708	0.40	1.55	7.8
SG10B-05	P0801483	TO-15	GS	Acetone	24	U	ug/m3	b	MS13052708	1.8	1.55	7.8
SG11B-05	P0801483	TO-15	GS	Carbon disulfide	1.4	U	ug/m3	b	MS13052708	0.29	1.47	0.74
SG12B-05	P0801483	TO-15	GS	Vinylacetate	7.7	U	ug/m3	b	MS13052708	0.40	1.54	7.7
SG12B-05	P0801483	TO-15	GS	Carbon disulfide	1.1	U	ug/m3	b	MS13052708	0.29	1.54	0.77
SG12B-05	P0801483	TO-15	GS	Acetone	15	U	ug/m3	b	MS13052708	1.8	1.54	7.7
SG13B-05	P0801507	TO-15	GS	Vinylacetate	32	U	ug/m3	b	MS16052708	0.26	6.44	32
SG13B-05	P0801507	TO-15	GS	Acetone	47	U	ug/m3	b	MS16052708	1.0	6.44	32
SG13B-05	P0801507	TO-15	GS	Methylene chloride	3.2	U	ug/m3	b	MS16052708	0.076	6.44	3.2
SG14B-05	P0801507	TO-15	GS	Methylene chloride	0.97	U	ug/m3	b	MS16052708	0.076	1.63	0.82
SG15B-05	P0801507	TO-15	GS	Methylene chloride	1.6	U	ug/m3	b	MS16052708	0.076	3.26	1.6
SG16B-05	P0801483	TO-15	GS	Vinylacetate	7.9	U	ug/m3	b	MS13052708	0.40	1.57	7.9
SG16B-05	P0801483	TO-15	GS	Ethanol	7.9	U	ug/m3	b	MS13052708	1.0	1.57	7.9
SG16B-05	P0801483	TO-15	GS	Acetone	11	U	ug/m3	b	MS13052708	1.8	1.57	7.9
SG16B-05	P0801483	TO-15	GS	Carbon disulfide	0.90	U	ug/m3	b	MS13052708	0.29	1.57	0.79
SG16B-05	P0801483	TO-15	GS	2-Butanone	4.4	U	ug/m3	b	MS13052708	0.35	1.57	0.79
SG19B-05	P0801656	TO-15	GS	Methylene chloride	1.7	U	ug/m3	b	MS13060708	0.18	1.69	0.85
SG21B-05	P0801656	TO-15	GS	Methylene chloride	0.84	U	ug/m3	b	MS13060708	0.18	1.67	0.84
SG25B-05	P0801656	TO-15	GS	Methylene chloride	0.85	U	ug/m3	b	MS13060708	0.18	1.7	0.85
SG26B-05	P0801483	TO-15	GS	Ethanol	130	U	ug/m3	b	MS13052308	0.12	25.73	130
SG26B-05	P0801483	TO-15	GS	Acetone	130	U	ug/m3	b	MS13052308	0.36	25.73	130
SG26B-05D	P0801483	TO-15	GS	Acetone	49	U	ug/m3	b	MS13052608	0.33	9.7	49
SG27B-05	P0801483	TO-15	GS	Vinylacetate	17	U	ug/m3	b	MS13052708	0.40	3.32	17
SG27B-05	P0801483	TO-15	GS	Ethanol	17	U	ug/m3	b	MS13052708	1.0	3.32	17
SG27B-05	P0801483	TO-15	GS	Carbon disulfide	1.7	U	ug/m3	b	MS13052708	0.29	3.32	1.7

Table E-4
Qualifications Based on Blank Contamination
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	Batch ID	MB_Result	Dilution Factor	QL
SG27B-05	P0801483	TO-15	GS	Acetone	17	U	ug/m3	b	MS13052708	1.8	3.32	17
SG27B-05	P0801483	TO-15	GS	2-Butanone	5.0	U	ug/m3	b	MS13052708	0.35	3.32	1.7
SG28B-05	P0801483	TO-15	GS	Acetone	160	U	ug/m3	b	MS13052608	0.33	31.8	160
SG28B-05D	P0801483	TO-15	GS	Acetone	53	U	ug/m3	b	MS13052608	0.33	10.6	53
SG29B-05	P0801507	TO-15	GS	Acetone	830	U	ug/m3	b	MS16052808	0.35	165	830
SG29B-05	P0801507	TO-15	GS	Methylene chloride	83	U	ug/m3	b	MS16052808	0.064	165	83
SG30B-05	P0801507	TO-15	GS	Benzene	15	U	ug/m3	b	MS16052708	0.059	62.4	6.2
SG30B-05	P0801507	TO-15	GS	Acetone	310	U	ug/m3	b	MS16052708	1.0	62.4	310
SG30B-05	P0801507	TO-15	GS	2-Butanone	31	U	ug/m3	b	MS16052708	0.072	62.4	31
SG31B-05	P0801507	TO-15	GS	Acetone	79	U	ug/m3	b	MS16052808	0.35	15.8	79
SG31B-05	P0801507	TO-15	GS	Methylene chloride	7.9	U	ug/m3	b	MS16052808	0.064	15.8	7.9
SG32B-05	P0801483	TO-15	GS	Acetone	160	U	ug/m3	b	MS13052808	0.35	652	3300
SG35B-05	P0801442	TO-15	GS	Acetone	200	U	ug/m3	b	MS13052408	0.19	40	200
SG36B-20	P0801442	TO-15	GS	Acetone	160	U	ug/m3	b	MS13052408	0.19	31.2	160
SG51B-05	P0801548	TO-15	GS	Acetone	400	U	ug/m3	b	MS13060208	0.66	61.2	7.7
SG53B-05	P0801548	TO-15	GS	Acetone	17	U	ug/m3	b	MS13060208	0.66	3.3	17
SG53B-05D	P0801548	TO-15	GS	Acetone	14	U	ug/m3	b	MS13060208	0.66	2.78	14
SG54B-05	P0801548	TO-15	GS	Ethanol	360	U	ug/m3	b	MS13060208	0.093	71.2	360
SG54B-05	P0801548	TO-15	GS	Acetone	360	U	ug/m3	b	MS13060208	0.66	71.2	360
SG55B-05	P0801507	TO-15	GS	Benzene	9.9	U	ug/m3	b	MS16052708	0.059	68	6.8
SG55B-05	P0801507	TO-15	GS	Acetone	340	U	ug/m3	b	MS16052708	1.0	68	340
SG55B-05	P0801507	TO-15	GS	Methylene chloride	34	U	ug/m3	b	MS16052708	0.076	68	34
SG55B-05	P0801507	TO-15	GS	2-Butanone	34	U	ug/m3	b	MS16052708	0.072	68	34
SG56B-05	P0801507	TO-15	GS	Benzene	6.3	U	ug/m3	b	MS16052708	0.059	33.4	3.3
SG56B-05	P0801507	TO-15	GS	Acetone	170	U	ug/m3	b	MS16052708	1.0	33.4	170
SG56B-05	P0801507	TO-15	GS	Methylene chloride	17	U	ug/m3	b	MS16052708	0.076	33.4	17
SG56B-05	P0801507	TO-15	GS	2-Butanone	17	U	ug/m3	b	MS16052708	0.072	33.4	17
SG56B-05D	P0801507	TO-15	GS	Acetone	56	U	ug/m3	b	MS16052808	0.35	11.13	56
SG56B-05D	P0801507	TO-15	GS	Methylene chloride	5.6	U	ug/m3	b	MS16052808	0.064	11.13	5.6
SG57B-05	P0801507	TO-15	GS	Benzene	9.4	U	ug/m3	b	MS16052708	0.059	80.5	8.1
SG57B-05	P0801507	TO-15	GS	Acetone	400	U	ug/m3	b	MS16052708	1.0	80.5	400
SG57B-05	P0801507	TO-15	GS	Methylene chloride	40	U	ug/m3	b	MS16052708	0.076	80.5	40

Table E-4
Qualifications Based on Blank Contamination
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	Batch ID	MB_Result	Dilution Factor	QL
SG58B-05	P0801507	TO-15	GS	Acetone	570	U	ug/m3	b	MS16052908	0.55	113.33	570
SG58B-05	P0801507	TO-15	GS	Methylene chloride	57	U	ug/m3	b	MS16052908	0.055	113.33	57
SG59B-05	P0801507	TO-15	GS	Benzene	8.7	U	ug/m3	b	MS16052708	0.059	86.5	8.7
SG59B-05	P0801507	TO-15	GS	Acetone	430	U	ug/m3	b	MS16052708	1.0	86.5	430
SG59B-05	P0801507	TO-15	GS	Methylene chloride	43	U	ug/m3	b	MS16052708	0.076	86.5	43
SG60B-05	P0801507	TO-15	GS	Acetone	1700	U	ug/m3	b	MS16052808	0.35	330	1700
SG60B-05	P0801507	TO-15	GS	Methylene chloride	170	U	ug/m3	b	MS16052808	0.064	330	170
SG60BR-05	P0801656	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13060508	0.19	312	1600
SG61B-05	P0801483	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13052608	0.33	326	1600
SG62B-05	P0801483	TO-15	GS	Acetone	390	U	ug/m3	b	MS13052608	0.33	77	390
SG63B-05	P0801483	TO-15	GS	Ethanol	8.0	U	ug/m3	b	MS13052708	1.0	1.6	8.0
SG63B-05	P0801483	TO-15	GS	Carbon disulfide	0.80	U	ug/m3	b	MS13052708	0.29	1.6	0.80
SG63B-05	P0801483	TO-15	GS	Acetone	10	U	ug/m3	b	MS13052708	1.8	1.6	8.0
SG63B-05	P0801483	TO-15	GS	2-Butanone	3.1	U	ug/m3	b	MS13052708	0.35	1.6	0.80
SG69B-05	P0801548	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13053008	0.16	326	1600
SG70B-05	P0801442	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13052408	0.19	320	1600
SG71B-05	P0801442	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13052408	0.19	322	1600
SG75B-05	P0801442	TO-15	GS	Acetone	110	U	ug/m3	b	MS13052408	0.19	21.87	110
SG76B-05	P0801483	TO-15	GS	Acetone	79	U	ug/m3	b	MS13052308	0.36	15.7	79
SG76B-05	P0801483	TO-15	GS	Naphthalene	1.5	U	ug/m3	b	MS13052308	0.082	15.7	3.1
SG77B-05	P0801507	TO-15	GS	Ethanol	780	U	ug/m3	b	MS16052708	0.082	156	780
SG77B-05	P0801507	TO-15	GS	Acetone	780	U	ug/m3	b	MS16052708	1.0	156	780
SG77B-05	P0801507	TO-15	GS	Methylene chloride	78	U	ug/m3	b	MS16052708	0.076	156	78
SG77B-05	P0801507	TO-15	GS	2-Butanone	78	U	ug/m3	b	MS16052708	0.072	156	78
SG78B-05	P0801483	TO-15	GS	Ethanol	170	U	ug/m3	b	MS13052308	0.12	33	170
SG78B-05	P0801483	TO-15	GS	Acetone	170	U	ug/m3	b	MS13060408	0.13	33	170
SG78B-05	P0801483	TO-15	GS	Acetone	170	U	ug/m3	b	MS13052308	0.36	33	170
SG80B-05	P0801483	TO-15	GS	Ethanol	110	U	ug/m3	b	MS13052308	0.12	21.07	110
SG80B-05	P0801483	TO-15	GS	Acetone	110	U	ug/m3	b	MS13052308	0.36	21.07	110
SG80B-05	P0801483	TO-15	GS	Naphthalene	2.4	U	ug/m3	b	MS13052308	0.082	21.07	4.2
SG81B-05	P0801483	TO-15	GS	Ethanol	76	U	ug/m3	b	MS13052308	0.12	15.2	76
SG81B-05	P0801483	TO-15	GS	Acetone	76	U	ug/m3	b	MS13052308	0.36	15.2	76

Table E-4
Qualifications Based on Blank Contamination
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	Batch ID	MB_Result	Dilution Factor	QL
SG82B-05	P0801483	TO-15	GS	Vinylacetate	56	U	ug/m3	b	MS13052708	0.40	11.13	56
SG82B-05	P0801483	TO-15	GS	Ethanol	56	U	ug/m3	b	MS13052708	1.0	11.13	56
SG82B-05	P0801483	TO-15	GS	Acetone	56	U	ug/m3	b	MS13052708	1.8	11.13	56
SG82B-05	P0801483	TO-15	GS	2-Butanone	7.4	U	ug/m3	b	MS13052708	0.35	11.13	5.6
SG83B-05	P0801483	TO-15	GS	Acetone	49	U	ug/m3	b	MS13052808	0.35	181	910
SG83B-05	P0801483	TO-15	GS	2-Butanone	91	U	ug/m3	b	MS13052808	0.074	181	91
SG83B-05-1	P0801342	TO-15	GS	Acetone	820	U	ug/m3	b	MS13050808	0.42	164	820
SG83B-05-1	P0801342	TO-15	GS	Isopropylbenzene	82	U	ug/m3	b	MS13050808	0.060	164	82
SG83B-05-1	P0801342	TO-15	GS	Naphthalene	33	U	ug/m3	b	MS13050808	0.10	164	33
SG83B-05-3	P0801342	TO-15	GS	Acetone	840	U	ug/m3	b	MS13050808	0.42	167	840
SG83B-05-7	P0801342	TO-15	GS	Acetone	870	U	ug/m3	b	MS13050808	0.42	173	870
SG83B-05D	P0801483	TO-15	GS	Ethanol	920	U	ug/m3	b	MS13052708	1.0	184	920
SG83B-05D	P0801483	TO-15	GS	Carbon disulfide	92	U	ug/m3	b	MS13052708	0.29	184	92
SG83B-05D	P0801483	TO-15	GS	Acetone	920	U	ug/m3	b	MS13052708	1.8	184	920
SG84B-05	P0801442	TO-15	GS	Acetone	38	U	ug/m3	b	MS13052408	0.19	7.65	38
SG86B-05	P0801483	TO-15	GS	Acetone	110	U	ug/m3	b	MS13052608	0.33	22.27	110
SG89B-05	P0801442	TO-15	GS	Acetone	1600	U	ug/m3	b	MS13052408	0.19	316	1600
SG94B-05	P0801442	TO-15	GS	Acetone	19	U	ug/m3	b	MS13052408	0.19	3.72	19
SG95B-05	P0801442	TO-15	GS	Acetone	20	U	ug/m3	b	MS13052408	0.19	3.9	20

Note:
Reason codes are defined in Table E-2
Data qualifiers are defined in Table E-1

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit
SG38B-20	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.16	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG40B-05	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.16	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG40B-05D	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.16	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG41B-20	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.11	J	ug/m3	c	ICAL %RSD	30.54%	<30%
SG41B-20D	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.16	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG43B-05	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.19	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG64B-05	P0801385	TO-15	GS	1,2-Dichlorobenzene	0.20	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG83B-05-1	P0801342	TO-15	GS	1,2-Dichlorobenzene	16	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG83B-05-3	P0801342	TO-15	GS	1,2-Dichlorobenzene	17	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%
SG83B-05-7	P0801342	TO-15	GS	1,2-Dichlorobenzene	17	UJ	ug/m3	c	ICAL %RSD	30.54%	<30%

Note:
Reason codes are defined in Table E-2
Data qualifiers are defined in Table E-1

Table E-6
Qualifications Based on Field Duplicate Precision
Phase B Source Area Soil Gas Investigation
Tronox Facility,
Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	RPD	RPD Limit
SG07B-05	P0801483	TO-15	GS	Ethylbenzene	0.21	J	ug/m3	fd	158	50%
SG07B-05D	P0801483	TO-15	GS	Ethylbenzene	1.8	J	ug/m3	fd	158	50%
SG51B-05	P0801548	TO-15	GS	Ethylbenzene	3.8	J	ug/m3	fd	133	50%
SG51B-05D	P0801548	TO-15	GS	Ethylbenzene	0.77	J	ug/m3	fd	133	50%
SG07B-05	P0801483	TO-15	GS	N-Propylbenzene	0.16	J	ug/m3	fd	138	50%
SG07B-05D	P0801483	TO-15	GS	N-Propylbenzene	0.87	J	ug/m3	fd	138	50%
SG26B-05	P0801483	TO-15	GS	1,4-Dichlorobenzene	4.9	J	ug/m3	fd	111	50%
SG26B-05D	P0801483	TO-15	GS	1,4-Dichlorobenzene	17	J	ug/m3	fd	111	50%
SG40B-05	P0801385	TO-15	GS	1,4-Dichlorobenzene	81	J	ug/m3	fd	84	50%
SG40B-05D	P0801385	TO-15	GS	1,4-Dichlorobenzene	33	J	ug/m3	fd	84	50%
SG51B-05	P0801548	TO-15	GS	1,4-Dichlorobenzene	5.0	J	ug/m3	fd	NC	50%
SG51B-05D	P0801548	TO-15	GS	1,4-Dichlorobenzene	0.62	UJ	ug/m3	fd	NC	50%
SG53B-05	P0801548	TO-15	GS	1,4-Dichlorobenzene	11	J	ug/m3	fd	84	50%
SG53B-05D	P0801548	TO-15	GS	1,4-Dichlorobenzene	4.5	J	ug/m3	fd	84	50%
SG65B-05	P0801442	TO-15	GS	1,4-Dichlorobenzene	78	J	ug/m3	fd	71	50%
SG65B-05D	P0801442	TO-15	GS	1,4-Dichlorobenzene	37	J	ug/m3	fd	71	50%
SG40B-05	P0801385	TO-15	GS	Allyl chloride	5.5	J	ug/m3	fd	NC	50%
SG40B-05D	P0801385	TO-15	GS	Allyl chloride	0.16	UJ	ug/m3	fd	NC	50%
SG07B-05	P0801483	TO-15	GS	1,3,5-Trimethylbenzene	0.24	J	ug/m3	fd	157	50%
SG07B-05D	P0801483	TO-15	GS	1,3,5-Trimethylbenzene	2.0	J	ug/m3	fd	157	50%
SG51B-05	P0801548	TO-15	GS	1,3,5-Trimethylbenzene	5.3	J	ug/m3	fd	NC	50%
SG51B-05D	P0801548	TO-15	GS	1,3,5-Trimethylbenzene	3.1	UJ	ug/m3	fd	NC	50%
SG53BR-05	P0801656	TO-15	GS	1,3,5-Trimethylbenzene	0.40	J	ug/m3	fd	102	50%
SG53BR-05D	P0801656	TO-15	GS	1,3,5-Trimethylbenzene	0.13	J	ug/m3	fd	102	50%
SG51B-05	P0801548	TO-15	GS	Toluene	50	J	ug/m3	fd	63	50%
SG51B-05D	P0801548	TO-15	GS	Toluene	26	J	ug/m3	fd	63	50%
SG65B-05	P0801442	TO-15	GS	Toluene	9.5	J	ug/m3	fd	59	50%
SG65B-05D	P0801442	TO-15	GS	Toluene	5.2	J	ug/m3	fd	59	50%
SG51B-05	P0801548	TO-15	GS	Chlorobenzene	32	J	ug/m3	fd	119	50%
SG51B-05D	P0801548	TO-15	GS	Chlorobenzene	8.1	J	ug/m3	fd	119	50%
SG07B-05	P0801483	TO-15	GS	n-Octane	0.36	J	ug/m3	fd	113	50%

Table E-6
Qualifications Based on Field Duplicate Precision
Phase B Source Area Soil Gas Investigation
Tronox Facility,
Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	RPD	RPD Limit
SG07B-05D	P0801483	TO-15	GS	n-Octane	1.3	J	ug/m3	fd	113	50%
SG41B-20	P0801385	TO-15	GS	n-Octane	53	J	ug/m3	fd	55	50%
SG41B-20D	P0801385	TO-15	GS	n-Octane	30	J	ug/m3	fd	55	50%
SG51B-05	P0801548	TO-15	GS	n-Octane	17	J	ug/m3	fd	118	50%
SG51B-05D	P0801548	TO-15	GS	n-Octane	4.4	J	ug/m3	fd	118	50%
SG07B-05	P0801483	TO-15	GS	n-Heptane	0.11	J	ug/m3	fd	160	50%
SG07B-05D	P0801483	TO-15	GS	n-Heptane	1.0	J	ug/m3	fd	160	50%
SG41B-20	P0801385	TO-15	GS	n-Heptane	19	J	ug/m3	fd	62	50%
SG41B-20D	P0801385	TO-15	GS	n-Heptane	10	J	ug/m3	fd	62	50%
SG07B-05	P0801483	TO-15	GS	2-Hexanone	0.32	J	ug/m3	fd	137	50%
SG07B-05D	P0801483	TO-15	GS	2-Hexanone	1.7	J	ug/m3	fd	137	50%
SG07B-05	P0801483	TO-15	GS	4-Ethyltoluene	0.23	J	ug/m3	fd	125	50%
SG07B-05D	P0801483	TO-15	GS	4-Ethyltoluene	1.0	J	ug/m3	fd	125	50%
SG65B-05	P0801442	TO-15	GS	Ethanol	53	J	ug/m3	fd	126	50%
SG65B-05D	P0801442	TO-15	GS	Ethanol	12	J	ug/m3	fd	126	50%
SG51B-05	P0801548	TO-15	GS	Chloromethane	6.5	J	ug/m3	fd	122	50%
SG51B-05D	P0801548	TO-15	GS	Chloromethane	27	J	ug/m3	fd	122	50%
SG53B-05	P0801548	TO-15	GS	Carbon disulfide	1.1	J	ug/m3	fd	177	50%
SG53B-05D	P0801548	TO-15	GS	Carbon disulfide	18	J	ug/m3	fd	177	50%
SG53BR-05	P0801656	TO-15	GS	Carbon disulfide	3.4	J	ug/m3	fd	163	50%
SG53BR-05D	P0801656	TO-15	GS	Carbon disulfide	33	J	ug/m3	fd	163	50%
SG65B-05	P0801442	TO-15	GS	Carbon disulfide	9.0	J	ug/m3	fd	81	50%
SG65B-05D	P0801442	TO-15	GS	Carbon disulfide	3.8	J	ug/m3	fd	81	50%
SG65BR-05	P0801656	TO-15	GS	Carbon disulfide	5.5	J	ug/m3	fd	153	50%
SG65BR-05D	P0801656	TO-15	GS	Carbon disulfide	0.73	J	ug/m3	fd	153	50%
SG40B-05	P0801385	TO-15	GS	1,2-Dichloropropane	1.3	J	ug/m3	fd	131	50%
SG40B-05D	P0801385	TO-15	GS	1,2-Dichloropropane	0.27	J	ug/m3	fd	131	50%
SG51B-05	P0801548	TO-15	GS	Hexachlorobutadiene	2.9	J	ug/m3	fd	NC	50%
SG51B-05D	P0801548	TO-15	GS	Hexachlorobutadiene	0.62	UJ	ug/m3	fd	NC	50%
SG65B-05	P0801442	TO-15	GS	Naphthalene	0.21	J	ug/m3	fd	172	50%
SG65B-05D	P0801442	TO-15	GS	Naphthalene	2.8	J	ug/m3	fd	172	50%

Table E-6
Qualifications Based on Field Duplicate Precision
Phase B Source Area Soil Gas Investigation
Tronox Facility,
Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	RPD	RPD Limit
SG07B-05	P0801483	TO-15	GS	o-Xylene	0.47	J	ug/m3	fd	153	50%
SG07B-05D	P0801483	TO-15	GS	o-Xylene	3.5	J	ug/m3	fd	153	50%
SG51B-05	P0801548	TO-15	GS	o-Xylene	9.7	J	ug/m3	fd	177	50%
SG51B-05D	P0801548	TO-15	GS	o-Xylene	0.58	J	ug/m3	fd	177	50%
SG07B-05	P0801483	TO-15	GS	1,2-Dichlorobenzene	0.17	UJ	ug/m3	fd	NC	50%
SG07B-05D	P0801483	TO-15	GS	1,2-Dichlorobenzene	3.7	J	ug/m3	fd	NC	50%
SG51B-05	P0801548	TO-15	GS	1,2-Dichlorobenzene	0.94	J	ug/m3	fd	NC	50%
SG51B-05D	P0801548	TO-15	GS	1,2-Dichlorobenzene	0.62	UJ	ug/m3	fd	NC	50%
SG65B-05	P0801442	TO-15	GS	1,2-Dichlorobenzene	0.38	J	ug/m3	fd	104	50%
SG65B-05D	P0801442	TO-15	GS	1,2-Dichlorobenzene	0.12	J	ug/m3	fd	104	50%
SG07B-05	P0801483	TO-15	GS	1,2,4-Trimethylbenzene	0.80	J	ug/m3	fd	120	50%
SG07B-05D	P0801483	TO-15	GS	1,2,4-Trimethylbenzene	3.2	J	ug/m3	fd	120	50%
SG51B-05	P0801548	TO-15	GS	1,2,4-Trimethylbenzene	4.0	J	ug/m3	fd	NC	50%
SG51B-05D	P0801548	TO-15	GS	1,2,4-Trimethylbenzene	3.1	UJ	ug/m3	fd	NC	50%
SG65B-05	P0801442	TO-15	GS	4-Isopropyltoluene	1.2	J	ug/m3	fd	108	50%
SG65B-05D	P0801442	TO-15	GS	4-Isopropyltoluene	0.36	J	ug/m3	fd	108	50%
SG65BR-05	P0801656	TO-15	GS	4-Isopropyltoluene	0.83	J	ug/m3	fd	146	50%
SG65BR-05D	P0801656	TO-15	GS	4-Isopropyltoluene	0.13	J	ug/m3	fd	146	50%
SG07B-05	P0801483	TO-15	GS	m,p-Xylene	0.96	J	ug/m3	fd	152	50%
SG07B-05D	P0801483	TO-15	GS	m,p-Xylene	7.1	J	ug/m3	fd	152	50%
SG51B-05	P0801548	TO-15	GS	m,p-Xylene	27	J	ug/m3	fd	167	50%
SG51B-05D	P0801548	TO-15	GS	m,p-Xylene	2.4	J	ug/m3	fd	167	50%

Note:
Reason codes are defined in Table E-2
Data qualifiers are defined in Table E-1

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason
SG43B-05	P0801385	TO-15	GS	Acetone	34	J+	ug/m3	q
SG85B-05	P0801442	TO-15	GS	Bromodichloromethane	0.96	J+	ug/m3	q
SG07B-05	P0801483	TO-15	GS	N-Butylbenzene	0.39	J+	ug/m3	q
SG07B-05D	P0801483	TO-15	GS	N-Butylbenzene	0.50	J+	ug/m3	q
SG09B-05	P0801483	TO-15	GS	N-Butylbenzene	0.77	J+	ug/m3	q
SG18B-05	P0801483	TO-15	GS	N-Butylbenzene	2.4	J+	ug/m3	q
SG63B-05	P0801483	TO-15	GS	N-Butylbenzene	0.42	J+	ug/m3	q
SG79B-05	P0801483	TO-15	GS	N-Butylbenzene	0.97	J+	ug/m3	q
SG14B-05	P0801507	TO-15	GS	N-Butylbenzene	0.71	J+	ug/m3	q
SG15B-05	P0801507	TO-15	GS	N-Butylbenzene	1.1	J+	ug/m3	q
SG42B-05	P0801548	TO-15	GS	Acetone	38	J+	ug/m3	q
SG47B-05	P0801548	TO-15	GS	Acetone	29	J+	ug/m3	q
SG49B-05	P0801548	TO-15	GS	Acetone	16	J+	ug/m3	q
SG51B-05	P0801548	TO-15	GS	2-Hexanone	2.0	J+	ug/m3	q
SG93B-05	P0801548	TO-15	GS	Acetone	16	J+	ug/m3	q
SG01B-05	P0801656	TO-15	GS	Acetone	33	J+	ug/m3	q
SG04B-05	P0801656	TO-15	GS	Acetone	12	J+	ug/m3	q
SG21B-05	P0801656	TO-15	GS	Acetone	16	J+	ug/m3	q
SG24B-05	P0801656	TO-15	GS	Acetone	18	J+	ug/m3	q
SG25B-05	P0801656	TO-15	GS	Acetone	23	J+	ug/m3	q
SG42BR-05	P0801656	TO-15	GS	Acetone	15	J+	ug/m3	q
SG53BR-05	P0801656	TO-15	GS	Acetone	15	J+	ug/m3	q
SG65BR-05	P0801656	TO-15	GS	Acetone	22	J+	ug/m3	q
SG92B-05	P0801656	TO-15	GS	Acetone	10	J+	ug/m3	q
SG94BR-05	P0801656	TO-15	GS	Acetone	41	J+	ug/m3	q

Note:
Reason codes are defined in Table E-2
Data qualifiers are defined in Table E-1

Table E-8
Calculated Helium Percent Leak for Phase B Soil Gas Samples
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson, Nevada

Soil Gas Sample ID[1]	Soil Gas Probe Resampled Because of Elevated Helium (yes/no)	Re-sampled Soil Gas Sample ID	Helium Concentration Reported in the Soil Gas Sample (ppmV)[2]	Starting helium concentration (%)	Helium concentration (%) inside the shroud measured every five minutes								Average helium concentration inside the shroud		% Average Leak[4]
					5 (min)	10 (min)	15 (min)	20 (min)	25 (min)	30 (min)	35 (min)	40 (min)	%	Converted ppmV[3]	
SG42B-05	Yes. 5/29/08	SG42BR-05	14,000	8.6	7.1	5.0	12.2	10.9	10.2				9.1	90,800	15.4
SG53B-05	Yes. 5/29/08	SG53BR-05	5,000	11.5	8.1	5.2	15.6	9.4	8.9	8.4			9.3	92,667	5.4
SG64B-05	No	--	60	27.7	38.6	55.3	51.9	48.8	45.4				48.0	480,000	0.0
SG29B-05	No	--	120	7.9	9.4	8.7	7.3	6.7	6.3				7.7	76,800	0.2
SG60B-05	Yes. 5/29/08	SG60BR-05	1,100	7.2	9.0	6.9	5.0	7.2	5.9	12.9	6.3		7.6	76,000	1.4
SG76B-05	No	--	44	9.5	13.7	5.4	16.7	15.5	8.1	9.2	5.1	6.3	10.0	100,000	0.0
SG86B-05	No	--	83	14.6	10.5	7.2	5.2	7.6	5.2	6.9	5.5		6.9	68,714	0.1
SG32B-05	No	--	110	10.9	9.8	6.5	5.4	8.3	7.9	7.2	5.2	6.8	7.1	71,375	0.2
SG17B-05[5]	No	see note 5	2,100	11.3	10.1	8.9	8.3	7.6	6.5	5.4			7.8	78,000	2.7
SG18B-05	No	--	190	8.5	8.5	8.3	6.3	15.4	10.6	7.3	5.1	5.7	8.4	84,000	0.2
SG23B-05	No	--	45	15.5	13.8	10.7	8.6	6.0	5.5	8.1	6.1		8.4	84,000	0.1
SG73B-05	No	--	160	12.0	9.4	8.5	7.2	6.4	5.5	10.5	8.9		8.1	80,571	0.2
SG36B-20	No	--	110	16.6	6.7	6.1	5.3	27.5	17.1				12.5	125,400	0.1
SG94B-05	Yes. 5/29/08	SG94BR-05	1,700	6.6	5.4	6.8	5.1	9.6	5.6				6.5	65,000	2.6

Notes

1 **The list of samples identifies the 14 soil gas samples (of the more than 100 samples collected) that contained detectable concentrations of helium.**
2 **All soil gas samples were tested for helium by the laboratory. Only those samples where helium was detected are shown**
3 **Conversion factor: 1% v/v = 10,000 ppm**
4 **% Average leak = 100 x (He concentration (ppmV) in soil gas sample) / (average He concentration (%) x 10,000 ppmV)**
5 **The soil gas probe (SG17B-05) could not be resampled because the labortory data was reported after sampling equipment had been removed from the site.**
-- **Not applicable.**

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG17B-05	P0801483	TO-15	GS	1,1,1-Trichloroethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,1,2,2-Tetrachloroethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,1,2-Trichloroethane	1.2	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,1,2-Trichlorotrifluoroethane	0.46	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,1-Dichloroethane	2.6	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,1-Dichloroethene	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2,4-Trichlorobenzene	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2,4-Trimethylbenzene	0.35	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2-Dibromo-3-chloropropane	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2-Dichlorobenzene	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2-Dichloroethane	2.3	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2-Dichloropropane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,2-Dichlorotetrafluoroethane	0.098	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,3,5-Trimethylbenzene	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,3-Dichlorobenzene	0.14	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,4-Dichlorobenzene	0.52	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	1,4-Dioxane	0.51	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	2-Butanone	5.5	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	2-Hexanone	0.83	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	2-Methoxy-2-methyl-butane	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	4-Ethyltoluene	0.11	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	4-Isopropyltoluene	0.19	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	4-Methyl-2-pentanone	0.37	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Acetone	19	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Acrylonitrile	0.15	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Allyl chloride	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	alpha-Methylstyrene	0.19	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Benzene	1.6	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Benzyl Chloride	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Bromodichloromethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Bromoform	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Bromomethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Carbon disulfide	13	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Carbon tetrachloride	0.28	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Chlorobenzene	0.11	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Chloroethane	3.8	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Chloroform	180	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Chloromethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	cis-1,2-Dichloroethene	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	cis-1,3-Dichloropropene	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Dibromochloromethane	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG17B-05	P0801483	TO-15	GS	Dichlorodifluoromethane	2.3	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Ethanol	7.3	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Ethyl t-butyl ether	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Ethylbenzene	0.16	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Ethylene dibromide	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Hexachlorobutadiene	0.26	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	isopropyl ether	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Isopropylbenzene	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	m,p-Xylene	0.69	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Methyl methacrylate	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Methyl tert butyl ether	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Methylene chloride	1.8	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	N-Butylbenzene	0.22	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	n-Heptane	0.51	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	n-Octane	0.36	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	N-Propylbenzene	0.088	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Naphthalene	0.92	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	o-Xylene	0.27	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	sec-Butylbenzene	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Styrene	0.46	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	t-Butyl alcohol	0.62	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	tert-Butylbenzene	0.33	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Tetrachloroethene	7.5	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Toluene	2.2	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	trans-1,2-Dichloroethylene	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	trans-1,3-Dichloropropene	0.82	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Trichloroethene	0.30	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Trichlorofluoromethane	1.0	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Vinylacetate	5.1	J	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG17B-05	P0801483	TO-15	GS	Vinylchloride	0.16	UJ	ug/m3	t	He tracer	2100 ppmV	780 ppmV
SG42B-05	P0801548	TO-15	GS	1,1,1-Trichloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,1,2,2-Tetrachloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,1,2-Trichloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,1,2-Trichlorotrifluoroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,1-Dichloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,1-Dichloroethene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2,4-Trichlorobenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2,4-Trimethylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2-Dibromo-3-chloropropane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2-Dichlorobenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2-Dichloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG42B-05	P0801548	TO-15	GS	1,2-Dichloropropane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,2-Dichlorotetrafluoroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,3,5-Trimethylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,3-Dichlorobenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,4-Dichlorobenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	1,4-Dioxane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	2-Butanone		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	2-Hexanone		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	2-Methoxy-2-methyl-butane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	4-Ethyltoluene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	4-Isopropyltoluene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	4-Methyl-2-pentanone		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Acetone		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Acrylonitrile		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Allyl chloride		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	alpha-Methylstyrene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Benzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Benzyl Chloride		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Bromodichloromethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Bromoform		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Bromomethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Carbon disulfide		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Carbon tetrachloride		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Chlorobenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Chloroethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Chloroform		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Chloromethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	cis-1,2-Dichloroethene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	cis-1,3-Dichloropropene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Dibromochloromethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Dichlorodifluoromethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Ethanol		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Ethyl t-butyl ether		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Ethylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Ethylene dibromide		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Hexachlorobutadiene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	isopropyl ether		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Isopropylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	m,p-Xylene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Methyl methacrylate		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Methyl tert butyl ether		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG42B-05	P0801548	TO-15	GS	Methylene chloride		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	N-Butylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	n-Heptane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	n-Octane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	N-Propylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Naphthalene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	o-Xylene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	sec-Butylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Styrene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	t-Butyl alcohol		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	tert-Butylbenzene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Tetrachloroethene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Toluene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	trans-1,2-Dichloroethylene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	trans-1,3-Dichloropropene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Trichloroethene		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Trichlorofluoromethane		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Vinylacetate		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG42B-05	P0801548	TO-15	GS	Vinylchloride		R	ug/m3	t	He tracer	14000 ppmV	908 ppmV
SG53B-05	P0801548	TO-15	GS	1,1,1-Trichloroethane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,1,2,2-Tetrachloroethane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,1,2-Trichloroethane	5.4	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,1,2-Trichlorotrifluoroethane	0.48	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,1-Dichloroethane	130	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,1-Dichloroethene	3.5	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2,4-Trichlorobenzene	1.9	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2,4-Trimethylbenzene	2.2	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2-Dibromo-3-chloropropane	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2-Dichlorobenzene	0.33	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2-Dichloroethane	13	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2-Dichloropropane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,2-Dichlorotetrafluoroethane	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,3,5-Trimethylbenzene	0.93	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,3-Dichlorobenzene	0.25	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,4-Dichlorobenzene	11	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	1,4-Dioxane	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	2-Butanone	4.2	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	2-Hexanone	0.77	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	2-Methoxy-2-methyl-butane	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	4-Ethyltoluene	0.88	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	4-Isopropyltoluene	0.47	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG53B-05	P0801548	TO-15	GS	4-Methyl-2-pentanone	0.85	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Acetone	17	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Acrylonitrile	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Allyl chloride	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	alpha-Methylstyrene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Benzene	5.0	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Benzyl Chloride	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Bromodichloromethane	0.24	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Bromoform	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Bromomethane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Carbon disulfide	1.1	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Carbon tetrachloride	0.46	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Chlorobenzene	1.5	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Chloroethane	100	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Chloroform	1400	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Chloromethane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	cis-1,2-Dichloroethene	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	cis-1,3-Dichloropropene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Dibromochloromethane	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Dichlorodifluoromethane	2.0	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Ethanol	2.4	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Ethyl t-butyl ether	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Ethylbenzene	2.4	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Ethylene dibromide	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Hexachlorobutadiene	4.8	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	isopropyl ether	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Isopropylbenzene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	m,p-Xylene	11	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Methyl methacrylate	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Methyl tert butyl ether	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Methylene chloride	12	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	N-Butylbenzene	1.7	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	n-Heptane	0.52	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	n-Octane	0.71	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	N-Propylbenzene	0.56	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Naphthalene	6.9	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	o-Xylene	3.5	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	sec-Butylbenzene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Styrene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	t-Butyl alcohol	0.77	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	tert-Butylbenzene	0.66	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG53B-05	P0801548	TO-15	GS	Tetrachloroethene	65	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Toluene	8.4	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	trans-1,2-Dichloroethylene	0.33	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	trans-1,3-Dichloropropene	1.7	UJ	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Trichloroethene	1.1	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Trichlorofluoromethane	1.0	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Vinylacetate	4.9	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG53B-05	P0801548	TO-15	GS	Vinylchloride	0.52	J	ug/m3	t	He tracer	5000 ppmV	930 ppmV
SG60B-05	P0801507	TO-15	GS	1,1,1-Trichloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,1,2,2-Tetrachloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,1,2-Trichloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,1,2-Trichlorotrifluoroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,1-Dichloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,1-Dichloroethene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2,4-Trichlorobenzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2,4-Trimethylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2-Dibromo-3-chloropropane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2-Dichlorobenzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2-Dichloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2-Dichloropropane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,2-Dichlorotetrafluoroethane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,3,5-Trimethylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,3-Dichlorobenzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,4-Dichlorobenzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	1,4-Dioxane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	2-Butanone	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	2-Hexanone	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	2-Methoxy-2-methyl-butane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	4-Ethyltoluene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	4-Isopropyltoluene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	4-Methyl-2-pentanone	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Acetone	1700	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Acrylonitrile	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Allyl chloride	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	alpha-Methylstyrene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Benzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Benzyl Chloride	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Bromodichloromethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Bromoform	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Bromomethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Carbon disulfide	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG60B-05	P0801507	TO-15	GS	Carbon tetrachloride	52	J	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Chlorobenzene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Chloroethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Chloroform	100000	J	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Chloromethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	cis-1,2-Dichloroethene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	cis-1,3-Dichloropropene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Dibromochloromethane	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Dichlorodifluoromethane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Ethanol	1700	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Ethyl t-butyl ether	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Ethylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Ethylene dibromide	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Hexachlorobutadiene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	isopropyl ether	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Isopropylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	m,p-Xylene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Methyl methacrylate	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Methyl tert butyl ether	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Methylene chloride	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	N-Butylbenzene	66	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	n-Heptane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	n-Octane	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	N-Propylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Naphthalene	66	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	o-Xylene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	sec-Butylbenzene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Styrene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	t-Butyl alcohol	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	tert-Butylbenzene	66	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Tetrachloroethene	140	J	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Toluene	22	J	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	trans-1,2-Dichloroethylene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	trans-1,3-Dichloropropene	170	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Trichloroethene	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Trichlorofluoromethane	190	J	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Vinylacetate	1700	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG60B-05	P0801507	TO-15	GS	Vinylchloride	33	UJ	ug/m3	t	He tracer	1100 ppmV	760 ppmV
SG94B-05	P0801442	TO-15	GS	1,1,1-Trichloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,1,2,2-Tetrachloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,1,2-Trichloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG94B-05	P0801442	TO-15	GS	1,1,2-Trichlorotrifluoroethane	0.51	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,1-Dichloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,1-Dichloroethene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2,4-Trichlorobenzene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2,4-Trimethylbenzene	0.35	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2-Dibromo-3-chloropropane	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2-Dichlorobenzene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2-Dichloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2-Dichloropropane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,2-Dichlorotetrafluoroethane	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,3,5-Trimethylbenzene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,3-Dichlorobenzene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,4-Dichlorobenzene	2.7	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	1,4-Dioxane	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	2-Butanone	6.8	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	2-Hexanone	0.55	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	2-Methoxy-2-methyl-butane	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	4-Ethyltoluene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	4-Isopropyltoluene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	4-Methyl-2-pentanone	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Acetone	19	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Acrylonitrile	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Allyl chloride	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	alpha-Methylstyrene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Benzene	3.6	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Benzyl Chloride	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Bromodichloromethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Bromoform	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Bromomethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Carbon disulfide	3.2	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Carbon tetrachloride	0.40	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Chlorobenzene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Chloroethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Chloroform	1.5	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Chloromethane	0.26	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	cis-1,2-Dichloroethene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	cis-1,3-Dichloropropene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Dibromochloromethane	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Dichlorodifluoromethane	2.0	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Ethanol	6.9	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Ethyl t-butyl ether	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV

Table E-9
Qualifications Based on Helium Tracer Concentrations
Phase B Source Area Soil Gas Investigation
Tronox Facility - Henderson, Nevada

Sample ID	SDG	Method	Matrix	Analyte	Result	Qualifiers	Units	Reason	DQI	DQI Result	DQI Limit (1%*)
SG94B-05	P0801442	TO-15	GS	Ethylbenzene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Ethylene dibromide	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Hexachlorobutadiene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	isopropyl ether	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Isopropylbenzene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	m,p-Xylene	0.51	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Methyl methacrylate	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Methyl tert butyl ether	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Methylene chloride	0.34	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	N-Butylbenzene	0.74	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	n-Heptane	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	n-Octane	0.31	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	N-Propylbenzene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Naphthalene	2.6	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	o-Xylene	0.23	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	sec-Butylbenzene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Styrene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	t-Butyl alcohol	0.67	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	tert-Butylbenzene	0.74	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Tetrachloroethene	3.9	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Toluene	1.7	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	trans-1,2-Dichloroethylene	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	trans-1,3-Dichloropropene	1.9	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Trichloroethene	0.40	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Trichlorofluoromethane	1.1	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Vinylacetate	1.5	J	ug/m3	t	He tracer	1700 ppmV	650 ppmV
SG94B-05	P0801442	TO-15	GS	Vinylchloride	0.37	UJ	ug/m3	t	He tracer	1700 ppmV	650 ppmV

Note:
Reason codes are defined in Table E-2
Data qualifiers are defined in Table E-1
* The DQI Limit is based on 1% of the concentration of helium within the surface shroud.

Attachment A

Laboratory Analytical Reports and Access® Data Files (on Report CD)

Attachment B

Data Review Memos

ENSR
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T 978.589.3000 F 978.589.3100 www.ensr.aecom.com

Memorandum

Date: August 6, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801342

Distribution: R. Kennedy/Westford

04020-023-432
TH532to15wwb

SUMMARY

Limited validation was performed on the data for three soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 7, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801342.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs
SG83B-05-1
SG83B-05-3
SG83B-05-7

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REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial calibrations associated with the sample analyses with the following exception. Actions were applied as indicated below.

Compound	%RSD	Action (Detects/Nondetects)
1,2-Dichlorobenzene	30.54	Estimate (J)/ Estimate (UJ)
Associated samples: All samples		

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The continuing calibration met the percent difference acceptance criteria.

Method Blanks/Canister Blanks

Several target compounds were detected in the laboratory method blank associated with all sample analyses. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action levels (ALs) were established for acetone at 10x the concentration detected in the laboratory method blank, and at 5x the concentration detected in the method blank for the remaining compounds. The following table summarizes the level of blank contamination detected in the blanks; the action levels; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Method Blank			
Compound	**Concentration ($\mu g/m^3$)**	**AL ($\mu g/m^3$)**	**Associated Samples**
Acetone	0.42	4.2	All samples
Isopropylbenzene	0.06	0.3	
Naphthalene	0.1	0.5	

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.
- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all associated sample analyses.

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Field Duplicate Results

No field duplicates were collected with this sample set. No data validation action is required.

Laboratory Duplicate Results

Laboratory duplicate analysis was performed on sample SG83B-05-07. The RPDs for all target compounds met the QC acceptance criteria.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, all samples required additional dilution due to target compound concentrations that exceeded the calibration range. The overall dilution factors for these samples are tabulated below.

Sample ID	Total Dilution Factor
SG83B-05-1	164, 1640
SG83B-05-3	167, 1670
SG83B-05-7	173, 1730

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for these additional dilutions.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH532

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG83B-05-1	1,2-Dichlorobenzene		16	ug/m3	U	UJ	c
SG83B-05-1	Acetone		820	ug/m3	J, B	U	b
SG83B-05-1	Isopropylbenzene		82	ug/m3	J, B	U	b
SG83B-05-1	Naphthalene		33	ug/m3	J, B	U	b
SG83B-05-3	1,2-Dichlorobenzene		17	ug/m3	U	UJ	c
SG83B-05-3	Acetone		840	ug/m3	J, B	U	b
SG83B-05-7	1,2-Dichlorobenzene		17	ug/m3	U	UJ	c
SG83B-05-7	Acetone		870	ug/m3	J, B	U	b

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801385

Distribution: R. Kennedy/Westford

04020-023-432
TH533to15wwb

SUMMARY

Limited validation was performed on the data for seven soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 9 and 10, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801385.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs
SG38B-20
SG40B-05
SG40B-05D (field duplicate of SG40B-05)
SG41B-20
SG41B-20D (field duplicate of SG41B-20)
SG43B-05
SG64B-05

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REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial calibrations associated with the sample analyses with the following exception. Actions were applied as indicated below.

Compound	%RSD	Action (Detects/Nondetects)
1,2-Dichlorobenzene	30.54	Estimate (J)/Estimate (UJ)
Associated samples: All samples		

The continuing calibration met the percent difference acceptance criteria.

Method Blanks/Canister Blanks

Target compounds were not detected in the laboratory method blanks or canister blanks.

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The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all sample analyses.

Field Duplicate Results

Samples SG40B-05/SG40B-05D and SG41B-20/SG41B-20D were submitted as the field duplicate pairs with this sample set. The following tables list the relative percent differences (RPDs) of the detected analytes for each field duplicate pair.

SG40B-05			
Compound	**Original Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**RPD**
Ethylbenzene	2.6	2.8	7
Styrene	0.15 J	0.21 J	33
N-Propylbenzene	0.48 J	0.59 J	21
N-Butylbenzene	0.53	0.28 J	62
1,4-Dichlorobenzene	81	33	84
Allyl chloride	5.5	0.16 U	NC
1,2-Dichloroethane	0.16 U	0.08 J	NC
Vinyl acetate	2.9	1.8	47
4-Methyl-2-pentanone	1.3	1.3	0
1,3,5-Trimethylbenzene	0.66 J	0.67 J	2
Toluene	7	6.9	1
Chlorobenzene	0.44	0.44	0
n-Octane	1.1	1	10
Tetrachloroethene	40	38	5
n-Heptane	0.58 J	0.61 J	5
1,3-Dichlorobenzene	0.16 U	0.12 J	NC
Carbon tetrachloride	26	26	0
2-Hexanone	1.6	1.5	6
4-Ethyltoluene	0.7 J	0.76 J	8
Ethanol	2.5	5.3	72
Acetone	19	13	38
Benzene	4.2	3.1	30
1,1,1-Trichloroethane	2.6	2.6	0
Bromomethane	0.093 J	0.08 J	15
Chloroethane	0.54	0.59	9

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	SG40B-05		
Compound	**Original Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**RPD**
Methylene chloride	0.96	1	4
Carbon disulfide	0.92	1	8
Bromodichloromethane	6.3	6.1	3
1,1-Dichloroethane	0.56	0.58	4
1,1-Dichloroethene	0.48	0.48	0
t-Butyl alcohol	0.5 J	0.29 J	53
Trichlorofluoromethane	1.5	1.5	0
Dichlorodifluoromethane	2.3	2.2	4
1,1,2-Trichlorotrifluoroethane	0.51	0.61	18
1,2-Dichlorotetrafluoroethane	0.099 J	0.12 J	19
1,2-Dichloropropane	1.3	0.27	131
2-Butanone	5.8	4.9	17
Trichloroethene	3.3	3.3	0
Hexachlorobutadiene	3.6	3.7	3
Naphthalene	3.2	2.6	21
o-Xylene	3.6	3.7	3
1,2,4-Trimethylbenzene	1.8	1.8	0
Isopropylbenzene	0.14 J	0.14 J	0
4-Isopropyltoluene	0.37 J	0.35 J	6
m,p-Xylene	12	12	0
Chloroform	5000	5000	0

The RPDs for allyl chloride, 1,2-dichloroethane, and 1,3-dichlorobenzene were not calculable (NC) due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for 1,2-dichloroethane and 1,3-dichlorobenzene since the detected result was less than five times the reporting limit in each case. The detected and non-detected results for allyl chloride in samples SG40B-05 and SG40B-05D were qualified as estimated (J and UJ, respectively) since the detected concentration was greater than five times the reporting limit.

Results for 1,4-dichlorobenzene and 1,2-dichloropropane in samples SG40B-05 and SG40B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are greater than five times the reporting limit. All other RPDs met the acceptance criteria.

	SG41B-20		
Compound	**Original Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**RPD**
Ethylbenzene	90	87	3
Styrene	1.7	1.9	11
N-Propylbenzene	8.8	9.7	10
N-Butylbenzene	2.7	3	11
1,4-Dichlorobenzene	31	35	12
1,2-Dichloroethane	0.1 J	0.14 J	33
Acrylonitrile	0.25 J	0.31 J	21

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	SG41B-20		
Compound	**Original Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**RPD**
Vinyl acetate	2.3	2.8	20
4-Methyl-2-pentanone	12	14	15
1,3,5-Trimethylbenzene	16	19	17
n-Octane	53	30	55
1,4-Dioxane	0.83 U	0.14 J	NC
Dibromochloromethane	0.17 U	0.12 J	NC
Tetrachloroethene	15	13	14
sec-Butylbenzene	0.91	0.93	2
n-Heptane	19	10	62
cis-1,2-Dichloroethene	0.15 J	0.093 J	47
Methyl tert butyl ether	0.27	0.3	11
Carbon tetrachloride	2.3	2	14
2-Hexanone	0.83 U	3.9	NC
4-Ethyltoluene	14	17	19
Ethanol	5	7.6	41
Acetone	25	26	4
Chloroform	140	110	24
Benzene	35	24	37
Bromomethane	0.1 J	0.16 U	NC
Chloroethane	0.094 J	0.16 U	NC
Methylene chloride	1	1.2	18
Carbon disulfide	13	15	14
Bromodichloromethane	3.4	2.8	19
1,1-Dichloroethane	0.71	0.56	24
1,1-Dichloroethene	6.7	5.4	21
t-Butyl alcohol	0.68 J	0.67 J	1
Trichlorofluoromethane	5.9	5.4	9
Dichlorodifluoromethane	2.3	2.2	4
1,1,2-Trichlorotrifluoroethane	0.57	0.53	7
1,2-Dichlorotetrafluoroethane	0.097 J	0.089 J	9
1,2-Dichloropropane	0.25	0.23	8
2-Butanone	26	28	7
Trichloroethene	4.4	3.6	20
Methyl methacrylate	0.18 J	0.36 J	67
Naphthalene	5.9	7	17
o-Xylene	110	120	9
1,2-Dichlorobenzene	0.11 J	0.16 U	NC
1,2,4-Trimethylbenzene	31	39	23
Isopropylbenzene	3.8	3.7	3
alpha-methyl styrene	0.63 J	0.53 J	17
4-Isopropyltoluene	5.7	6.9	19
Toluene	240	230	4
m,p-Xylene	420	350	18

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The RPDs for 1,4-dioxane, dibromochloromethane, 2-hexanone, bromomethane, chloroethane, and 1,2-dichlorobenzene were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected results were less than five times the reporting limit.

Results for n-octane and n-heptane in samples SG41B-20 and SG41B-20D were qualified as estimated (J) since the RPDs exceeded the acceptance criterion of 50% when both results are greater than five times the reporting limit. All other RPDs met the acceptance criteria.

Laboratory Duplicate Results

Laboratory duplicate analysis was performed on sample SG43B-05. The RPDs for all target compounds met the QC acceptance criteria.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

Several samples required additional dilution due to target compound concentrations that exceeded the calibration range. The overall dilution factors for these samples are tabulated below.

Sample ID	Total Dilution Factor
SG40B-05	64
SG40B-05D	62.8
SG41B-20	16.5
SG41B-20D	16.1

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for these additional dilutions.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH533

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG38B-20	1,2-Dichlorobenzene		0.16	ug/m3	U	UJ	c
SG40B-05	1,2-Dichlorobenzene		0.16	ug/m3	U	UJ	c
SG40B-05	1,2-Dichloropropane	1.3	0.16	ug/m3		J	fd
SG40B-05	1,4-Dichlorobenzene	81	0.16	ug/m3		J	fd
SG40B-05	Allyl chloride	5.5	0.16	ug/m3		J	fd
SG40B-05D	1,2-Dichlorobenzene		0.16	ug/m3	U	UJ	c
SG40B-05D	1,2-Dichloropropane	0.27	0.16	ug/m3		J	fd
SG40B-05D	1,4-Dichlorobenzene	33	0.16	ug/m3		J	fd
SG40B-05D	Allyl chloride		0.16	ug/m3	U	UJ	fd
SG41B-20	1,2-Dichlorobenzene	0.11	0.17	ug/m3	J	J	c
SG41B-20	n-Heptane	19	0.83	ug/m3		J	fd
SG41B-20	n-Octane	53	0.83	ug/m3		J	fd
SG41B-20D	1,2-Dichlorobenzene		0.16	ug/m3	U	UJ	c
SG41B-20D	n-Heptane	10	0.81	ug/m3		J	fd
SG41B-20D	n-Octane	30	0.81	ug/m3		J	fd
SG43B-05	1,2-Dichlorobenzene		0.19	ug/m3	U	UJ	c
SG43B-05	Acetone	34	9.7	ug/m3	B, M	J+	q
SG64B-05	1,2-Dichlorobenzene		0.20	ug/m3	U	UJ	c

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801442

Distribution: R. Kennedy/Westford

04020-023-432
TH534to15wwb

SUMMARY

Limited validation was performed on the data for 18 soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 14 and 15, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801442.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs
SG35B-05
SG36B-20
SG37B-20
SG39B-05
SG44B-05
SG65B-05

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Sample IDs
SG65B-05D (field duplicate of SG65B-05)
SG70B-05
SG71B-05
SG72B-05
SG73B-05
SG75B-05
SG84B-05
SG85B-05
SG88B-05
SG89B-05
SG94B-05
SG95B-05

REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

The laboratory incorrectly reported the 4-ethyltoluene result for sample SG95B-05 with a "JB" qualifier indicating associated blank contamination. However, 4-ethyltoluene was not found in any of the blanks. The "B" qualifier was removed during validation.

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Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial and continuing calibrations associated with the sample analyses.

Method Blanks/Canister Blanks

Acetone was detected in the laboratory method blank associated with all sample analyses. The presence of blank contamination indicates that false positives may exist for this compound in the associated samples. An action levels (AL) was established for acetone at 10x the concentration detected in the laboratory method blank. The following table summarizes the level of blank contamination detected in the blank; the action level; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Method Blank			
Compound	**Concentration ($\mu g/m^3$)**	**AL ($\mu g/m^3$)**	**Associated Samples**
Acetone	0.19	1.9	All samples

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.
- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

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LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all associated sample analyses.

Field Duplicate Results

Samples SG65B-05/SG65B-05D were submitted as the field duplicate pair with this sample set. The following table lists the relative percent differences (RPDs) of the detected compounds.

SG65B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
Ethylbenzene	1	0.63 J	45
Styrene	0.78	0.73 U	NC
N-Propylbenzene	0.44 J	0.25 J	55
N-Butylbenzene	0.39	0.29 U	NC
1,4-Dichlorobenzene	78	37	71
Acrylonitrile	0.11 J	0.73 U	NC
Vinyl acetate	7.4 U	2.7 J	NC
4-Methyl-2-pentanone	0.42 J	0.27 J	43
1,3,5-Trimethylbenzene	0.68 J	0.27 J	86
Toluene	9.5	5.2	59
Chlorobenzene	0.093 J	0.15 U	NC
n-Octane	0.36 J	0.16 J	77
1,2,4-Trichlorobenzene	0.15 U	0.24	NC
1,4-Dioxane	0.74 U	0.3 J	NC
Dibromochloromethane	0.26	0.31	18
Tetrachloroethene	2.9	2	37
n-Heptane	0.24 J	0.17 J	34
Methyl tert butyl ether	0.15 U	0.099 J	NC
Carbon tetrachloride	0.44	0.5	13
2-Hexanone	0.44 J	0.34 J	26
4-Ethyltoluene	0.64 J	0.43 J	39
Ethanol	53	12	126
Acetone	27	14	63
Chloroform	6.3	7.5	17
Benzene	2.1	1.8	15
1,1,1-Trichloroethane	0.11 J	0.15 U	NC
Chloromethane	0.11 J	0.15 U	NC
Chloroethane	0.3	0.17	55
Methylene chloride	0.29 J	0.26 J	11
Carbon disulfide	9	3.8	81
Bromoform	0.14 J	0.18 J	25
Bromodichloromethane	0.48	0.55	14
1,1-Dichloroethene	0.087 J	0.074 J	16
t-Butyl alcohol	0.54 J	0.47 J	14
Trichlorofluoromethane	1.2	1.2	0

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SG65B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
Dichlorodifluoromethane	2	2.1	5
1,1,2-Trichlorotrifluoroethane	0.52	0.51	2
1,2-Dichlorotetrafluoroethane	0.1 J	0.11 J	10
2-Butanone	4.6	3.8	19
Trichloroethene	0.38	0.32	17
Naphthalene	0.21 J	2.8	172
o-Xylene	2.6	1.4	60
1,2-Dichlorobenzene	0.38	0.12 J	104
1,2,4-Trimethylbenzene	1.8	1.1	48
Isopropylbenzene	0.15 J	0.73 U	NC
alpha-Methyl styrene	0.11 J	0.11 J	0
4-Isopropyltoluene	1.2	0.36 J	108
m,p-Xylene	5	2.6	63

The RPDs for styrene, n-butylbenzene, acrylonitrile, vinyl acetate, chlorobenzene, 1,2,4-trichlorobenzene, 1,4-dioxane, methyl tert butyl ether, 1,1,1-trichloroethane, chloromethane, and Isopropylbenzene were not calculable (NC) due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

Results for 1,4-dichlorobenzene, toluene, ethanol, carbon disulfide, naphthalene, 1,2-dichlorobenzene, and 4-isopropyl toluene in samples SG65B-05 and SG65B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are greater than five times the reporting limit. All other RPDs met the acceptance criteria.

Laboratory Duplicate Results

Laboratory duplicate analysis was performed on sample SG35B-05. The RPDs for all target compounds met the QC acceptance criteria.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, all samples required additional dilution due to target compound concentrations that exceeded the calibration range. All dilution factors associated with reported results are tabulated below.

Sample ID	Dilution Factor
SG35B-05	40
SG36B-20	31
SG36B-20	312
SG37B-20	3.2
SG39B-05	3.3

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Sample ID	Dilution Factor
SG44B-05	1.6
SG65B-05	1.5
SG65B-05D	1.5
SG70B-05	320
SG70B-05	1333
SG71B-05	322
SG71B-05	1610
SG72B-05	1.6
SG72B-05	6.3
SG73B-05	3.2
SG75B-05	22
SG75B-05	109
SG84B-05	7.7
SG84B-05	38
SG85B-05	1.6
SG88B-05	1.7
SG89B-05	316
SG89B-05	1580
SG94B-05	3.7
SG95B-05	3.9
SG95B-05	16

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for the additional analytical dilutions.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH534

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG35B-05	Acetone		200	ug/m3	J, B	U	b
SG36B-20	Acetone		160	ug/m3	J, B	U	b
SG65B-05	1,2-Dichlorobenzene	0.38	0.15	ug/m3		J	fd
SG65B-05	1,4-Dichlorobenzene	78	0.15	ug/m3		J	fd
SG65B-05	4-Isopropyltoluene	1.2	0.74	ug/m3		J	fd
SG65B-05	Carbon disulfide	9.0	0.74	ug/m3		J	fd
SG65B-05	Ethanol	53	7.4	ug/m3		J	fd
SG65B-05	Naphthalene	0.21	0.29	ug/m3	J	J	fd
SG65B-05	Toluene	9.5	0.74	ug/m3		J	fd
SG65B-05D	1,2-Dichlorobenzene	0.12	0.15	ug/m3	J	J	fd
SG65B-05D	1,4-Dichlorobenzene	37	0.15	ug/m3		J	fd
SG65B-05D	4-Isopropyltoluene	0.36	0.73	ug/m3	J	J	fd
SG65B-05D	Carbon disulfide	3.8	0.73	ug/m3		J	fd
SG65B-05D	Ethanol	12	7.3	ug/m3		J	fd
SG65B-05D	Naphthalene	2.8	0.29	ug/m3		J	fd
SG65B-05D	Toluene	5.2	0.73	ug/m3		J	fd
SG70B-05	Acetone		1600	ug/m3	J, B	U	b
SG71B-05	Acetone		1600	ug/m3	J, B	U	b
SG75B-05	Acetone		110	ug/m3	J, B	U	b
SG84B-05	Acetone		38	ug/m3	J, B	U	b
SG85B-05	Bromodichloromethane	0.96	0.16	ug/m3	M	J+	q
SG89B-05	Acetone		1600	ug/m3	J, B	U	b
SG94B-05	Acetone		19	ug/m3	J, B	U	b
SG95B-05	Acetone		20	ug/m3	J, B	U	b

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801483

Distribution: R. Kennedy/Westford

04020-023-432
TH536to15wwb

SUMMARY

Limited validation was performed on the data for 30 soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 15, 16, 17, and 18, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801483.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs	Sample IDs
SG07B-05	SG28B-05D (field duplicate of SG28B-05)
SG07B-05D (field duplicate of SG07B-05)	SG32B-05
SG08B-05	SG33B-05
SG09B-05	SG61B-05
SG10B-05	SG62B-05

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Sample IDs	Sample IDs
SG11B-05	SG63B-05
SG12B-05	SG76B-05
SG16B-05	SG78B-05
SG17B-05	SG79B-05
SG18B-05	SG80B-05
SG22B-05	SG81B-05
SG26B-05	SG82B-05
SG26B-05D (field duplicate of SG26B-05)	SG83B-05
SG27B-05	SG83B-05D (field duplicate of SG83B-05)
SG28B-05	SG86B-05

REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC.

The laboratory noted that the canister ID for sample SG16B-05 was listed on the COC as SC00539, but the laboratory received canister SC00529, and that the canister ID for sample SG12B-05 was listed on the COC as SC00846, but the laboratory received canister SC00890. No action was taken other than this notation.

The laboratory reported two sets of results for sample SG78B-05. This situation will be described in detail in the laboratory duplicate section below.

No other discrepancies were noted.

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Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial and continuing calibrations associated with the sample analyses.

Method Blanks/Canister Blanks

Selected target compounds were detected in several laboratory method blanks associated with the sample analyses. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action levels (AL) was established at 10x the concentration detected in the laboratory method blank for the common laboratory contaminants acetone and 2-butanone, and at 5x the concentration detected in the method blank for the remaining compounds. The following table summarizes the level of blank contamination detected in the blanks; the action levels; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Blank ID	Analysis Date	Compound	Conc. ($\mu g/m^3$)	AL ($\mu g/m^3$)	Associated Samples
MS13052308MB	5/23/2008	Acetone	0.36	3.6	SG26B-05, SG76B-05,
		Ethanol	0.12	0.6	SG78B-05, SG79B-05,
		Naphthalene	0.082	0.41	SG80B-05, SG81B-05
MS13052708MB	5/27/2008	2-Butanone	0.35	3.5	SG07B-05, SG08B-05,
		Acetone	1.8	18	SG09B-05, SG10B-05,
		Carbon disulfide	0.29	1.45	SG11B-05, SG12B-05,
		Chloroform	0.095	0.475	SG16B-05, SG22B-05,
		Ethanol	1.0	5	SG27B-05, SG61B-05,
		Vinylacetate	0.40	2	SG62B-05, SG63B-05, SG82B-05, SG83B-05D
MS13052808MB	5/28/2008	2-Butanone	0.074	0.74	SG07B-05, SG07B-05D,
		Acetone	0.35	3.5	SG08B-05, SG09B-05, SG10B-05, SG11B-05, SG12B-05, SG17B-05, SG18B-05, SG27B-05, SG32B-05, SG33B-05, SG63B-05, SG83B-05
MS13052908MB	5/29/2008	Acetone	0.54	5.4	SG18B-05, SG28B-05
MS13060408MB	6/4/2008	Acetone	0.13	1.3	SG20B-05, SG23B-05, SG24B-05, SG34B-05, SG74B-05, SG78B-05, SG90B-05

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.

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- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all sample analyses.

Field Duplicate Results

Samples SG07B-05/SG07B-05D, SG26B-05/SG26B-05D, SG28B-05/SG28B-05D, and SG83B-05/SG83B-05D were submitted as the field duplicate pairs with this sample set. The following tables list the relative percent differences (RPDs) of the detected compounds.

SG07B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
Ethylbenzene	0.21 J	1.8	158
Styrene	0.17 J	0.13 J	27
N-Propylbenzene	0.16 J	0.87	138
N-Butylbenzene	0.39	0.5	25
1,4-Dichlorobenzene	1.1	0.75	38
Acrylonitrile	0.85 U	0.14 J	NC
Vinyl acetate	8.5 U	6.6 J	NC
4-Methyl-2-pentanone	0.15 J	0.38 J	87
1,3,5-Trimethylbenzene	0.24 J	2	157
Toluene	1	0.99	1
Chlorobenzene	0.18	0.24	29
n-Octane	0.36 J	1.3	113
1,4-Dioxane	0.34 J	0.79 J	80
Dibromochloromethane	0.23	0.19	19
Tetrachloroethene	5.4	5.4	0
sec-Butylbenzene	0.85 U	0.23 J	NC
n-Heptane	0.11 J	1	160
Methyl tert butyl ether	13	13	0

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SG07B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
1,3-Dichlorobenzene	0.37	0.24	43
Carbon tetrachloride	19	19	0
2-Hexanone	0.32 J	1.7	137
4-Ethyltoluene	0.23 J	1	125
Ethanol	8.5 U	4.9 J	NC
Acetone	11 U	18	NC
Benzene	3.3	2.8	16
1,1,1-Trichloroethane	0.11 J	0.11 J	0
Bromomethane	0.091 J	0.088 J	3
Chloromethane	0.11 J	0.17 U	NC
Chloroethane	1.3	1.3	0
Methylene chloride	2.5	2.4	4
Carbon disulfide	2.9 B	4.7	47
Bromodichloromethane	1.2	1.4	15
1,1-Dichloroethene	0.24	0.23	4
t-Butyl alcohol	0.37 J	0.45 J	20
Trichlorofluoromethane	1.4	1.4	0
Dichlorodifluoromethane	2.1	2	5
1,1,2-Trichlorotrifluoroethane	0.54	0.54	0
2-Butanone	4.5 U	5.4	NC
Trichloroethene	1.8	2.1	15
Naphthalene	0.95	0.87	9
o-Xylene	0.47 J	3.5	153
1,2-Dichlorobenzene	0.17 U	3.7	NC
1,2,4-Trimethylbenzene	0.8 J	3.2	120
Isopropylbenzene	0.85 U	0.41 J	NC
4-Isopropyltoluene	0.2 J	0.56 J	95
m,p-Xylene	0.96	7.1	152
Chloroform	430	420	2

The RPDs for acrylonitrile, sec-butyl benzene, ethanol, acetone, chloromethane, 1,2-dichlorobenzene, vinyl acetate, 2-butanone, and isopropylbenzene were not calculable (NC) due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for acrylonitrile, sec-butyl benzene, ethanol, acetone, chloromethane, vinyl acetate, 2-butanone, and isopropylbenzene since the detected result was less than five times the reporting limit in each case. Positive and non-detect results for 1,2-dichlorobenzene were qualified as estimated (J and UJ, respectively) in samples SG07B-05 and SG07B-05D since the detected concentration was greater than five times the reporting limit.

Results for ethyl benzene, n-propyl benzene, 1,3,5-trimethylbenzene, n-octane, n-heptane, 2-hexanone, 4-ethyltoluene, o-xylene, m,p-xylene, and 1,2,4-trimethylbenzene in samples SG07B-05 and SG07B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of

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50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

SG26B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
1,4-Dichlorobenzene	4.9	17	111
Vinyl acetate	130 U	2.2 J	NC
Toluene	6.4 J	10	44
Chlorobenzene	2.7	2.6	4
Tetrachloroethene	13	13	0
1,3-Dichlorobenzene	2.6 U	1	NC
Carbon tetrachloride	17	16	6
Ethanol	130 U	3.5 J	NC
Benzene	3.8	2.6	38
Methylene chloride	1.8 J	0.98 J	59
Bromodichloromethane	2.6 U	1.1	NC
1,1-Dichloroethene	3.9	3.1	23
Trichlorofluoromethane	2.6 U	1.1	NC
Dichlorodifluoromethane	2.3 J	2.1 J	9
2-Butanone	4.5 J	3.7 J	20
Trichloroethene	77	76	1
Hexachlorobutadiene	79	69	14
o-Xylene	13 U	1.1 J	NC
1,2-Dichlorobenzene	2.6 U	1.1	NC
m,p-Xylene	13 U	1.6 J	NC
Chloroform	4600	4500	2

The RPDs for vinyl acetate 1,3-dichlorobenzene, ethanol, bromodichloromethane, trichlorofluoromethane, o-xylene, 1,2-dichlorobenzene, and m,p-xylene were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

Results for 1,4-dichlorobenzene in samples SG26B-05 and SG26B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

SG28B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
1,4-Dichlorobenzene	11	3.7	99
Vinylacetate	160 U	4.3 J	NC
Toluene	2.1 J	1.9 J	10
Chlorobenzene	3.2 U	1.3	NC

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SG28B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
Tetrachloroethene	42	41	2
Carbon tetrachloride	24	25	4
Ethanol	5.6 J	3.2 J	55
Benzene	3.7	3.1	18
Methylene chloride	16 U	0.87 J	NC
Carbon disulfide	16 U	2.9 J	NC
Bromodichloromethane	3.2 U	1.5	NC
1,1-Dichloroethane	3.2 U	0.84 J	NC
1,1-Dichloroethene	28	26	7
Trichlorofluoromethane	3.2 U	1.2	NC
Dichlorodifluoromethane	2.1 J	2.1 J	0
2-Butanone	4.4 J	4.3 J	2
Trichloroethene	560	580	4
Naphthalene	2.4 J	1.1 J	74
o-Xylene	16 U	0.92 J	NC
Chloroform	7800	5900	28

The RPDs for vinyl acetate, chlorobenzene, methylene chloride, carbon disulfide, bromodichloromethane, 1,1-dichloroethane, trichlorofluoromethane, and o-xylene were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

All calculated RPDs met the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit.

SG83B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD**
1,4-Dichlorobenzene	12 J	18 U	NC
Chlorobenzene	340	330	3
Tetrachloroethene	130	120	8
Carbon tetrachloride	9700	9800	1
Ethanol	32 J	920 U	NC
Benzene	80	79	1
Methylene chloride	10 J	9.6 J	4
Carbon disulfide	37 J	92 U	NC
1,1-Dichloroethane	9.4 J	18 U	NC
Trichlorofluoromethane	1300	1400	7
2-Butanone	16 J	92 U	NC
Trichloroethene	13 J	12 J	8
Naphthalene	20 J	37 U	NC
Chloroform	46000	52000 B	12

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The RPDs for 1,4-dichlorobenzene, ethanol, carbon disulfide, 1,1-dichloroethane, 2-butanone, and naphthalene were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

All calculated RPDs met the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit.

Laboratory Duplicate Results

Laboratory duplicate analyses were performed on samples SG27B-05 and SG78B-05. Precision was deemed acceptable for all compounds in the analysis of sample SG27B-05.

The laboratory initially performed the duplicate analysis of sample SG78B-05 on 5/23/2008. The RPDs for selected compounds exceeded the acceptance criteria so the laboratory reanalyzed the duplicate pair on 6/4/2008. All acceptance criteria were met upon reanalysis. The laboratory reported both sets of results. The validator used professional judgment to report the second set of results. No validation action was required. Note that chloroform is reported from a diluted analysis performed on 5/26/2008.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, all samples required additional dilution due to target compound concentrations that exceeded the calibration range. All dilution factors associated with reported results are tabulated below.

Sample ID	Dilution Factors
SG07B-05	1.69, 8.45
SG08B-05	1.49, 14.9
SG09B-05	1.65, 16.5
SG10B-05	1.55, 7.75
SG11B-05	1.47, 14.7
SG12B-05	1.54, 7.7
SG16B-05	1.57
SG17B-05	1.63
SG18B-05	1.58, 31.6
SG22B-05	3.16, 63.2
SG26B-05	25.73, 77.2
SG26B-05D	9.7, 77.6
SG27B-05	3.32, 16.6
SG28B-05	31.8, 79.5
SG28B-05D	10.6, 63.6
SG32B-05	652, 3260
SG33B-05	2.22
SG61B-05	326, 1630

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Sample ID	Dilution Factors
SG62B-05	77, 308
SG63B-05	1.6, 8
SG76B-05	15.7, 157
SG78B-05	33, 82.5
SG79B-05	1.53
SG80B-05	21.07, 63.2
SG81B-05	15.2, 30.4
SG82B-05	11.13, 66.8
SG83B-05	181, 1810
SG83B-05D	184, 920
SG86B-05	22.27, 66.8

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for the additional analytical dilutions.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH536

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG07B-05	1,2,4-Trimethylbenzen	0.80	0.85	ug/m3	J	J	fd
SG07B-05	1,2-Dichlorobenzene		0.17	ug/m3	U	UJ	fd
SG07B-05	1,3,5-Trimethylbenzen	0.24	0.85	ug/m3	J	J	fd
SG07B-05	2-Butanone		4.5	ug/m3	B	U	b
SG07B-05	2-Hexanone	0.32	0.85	ug/m3	J	J	fd
SG07B-05	4-Ethyltoluene	0.23	0.85	ug/m3	J	J	fd
SG07B-05	Acetone		11	ug/m3	B	U	b
SG07B-05	Ethanol		8.5	ug/m3	J, B	U	b
SG07B-05	Ethylbenzene	0.21	0.85	ug/m3	J	J	fd
SG07B-05	m,p-Xylene	0.96	0.85	ug/m3		J	fd
SG07B-05	n-Heptane	0.11	0.85	ug/m3	J	J	fd
SG07B-05	n-Octane	0.36	0.85	ug/m3	J	J	fd
SG07B-05	N-Propylbenzene	0.16	0.85	ug/m3	J	J	fd
SG07B-05	o-Xylene	0.47	0.85	ug/m3	J	J	fd
SG07B-05	Vinylacetate		8.5	ug/m3	J, B	U	b
SG07B-05	N-Butylbenzene	0.39	0.34	ug/m3	M	J+	q
SG07B-05D	1,2,4-Trimethylbenzen	3.2	0.85	ug/m3		J	fd
SG07B-05D	1,2-Dichlorobenzene	3.7	0.17	ug/m3		J	fd
SG07B-05D	1,3,5-Trimethylbenzen	2.0	0.85	ug/m3		J	fd
SG07B-05D	2-Hexanone	1.7	0.85	ug/m3		J	fd
SG07B-05D	4-Ethyltoluene	1.0	0.85	ug/m3		J	fd
SG07B-05D	Ethylbenzene	1.8	0.85	ug/m3		J	fd
SG07B-05D	m,p-Xylene	7.1	0.85	ug/m3		J	fd
SG07B-05D	n-Heptane	1.0	0.85	ug/m3		J	fd
SG07B-05D	n-Octane	1.3	0.85	ug/m3		J	fd
SG07B-05D	N-Propylbenzene	0.87	0.85	ug/m3		J	fd
SG07B-05D	o-Xylene	3.5	0.85	ug/m3		J	fd
SG07B-05D	N-Butylbenzene	0.50	0.34	ug/m3	M	J+	q
SG08B-05	Acetone		12	ug/m3	B	U	b
SG08B-05	Vinylacetate		7.5	ug/m3	J, B	U	b
SG09B-05	N-Butylbenzene	0.77	0.33	ug/m3	M	J+	q
SG10B-05	Acetone		24	ug/m3	B	U	b
SG10B-05	Vinylacetate		7.8	ug/m3	J, B	U	b
SG11B-05	Carbon disulfide		1.4	ug/m3	B	U	b
SG12B-05	Acetone		15	ug/m3	B	U	b
SG12B-05	Carbon disulfide		1.1	ug/m3	B	U	b
SG12B-05	Vinylacetate		7.7	ug/m3	J, B	U	b
SG16B-05	2-Butanone		4.4	ug/m3	B	U	b
SG16B-05	Acetone		11	ug/m3	B	U	b
SG16B-05	Carbon disulfide		0.90	ug/m3	B	U	b
SG16B-05	Ethanol		7.9	ug/m3	J, B	U	b
SG16B-05	Vinylacetate		7.9	ug/m3	J, B	U	b
SG18B-05	N-Butylbenzene	2.4	0.32	ug/m3	M	J+	q
SG26B-05	1,4-Dichlorobenzene	4.9	2.6	ug/m3		J	fd
SG26B-05	Acetone		130	ug/m3	J, B	U	b
SG26B-05	Ethanol		130	ug/m3	J, B	U	b
SG26B-05D	1,4-Dichlorobenzene	17	0.97	ug/m3		J	fd
SG26B-05D	Acetone		49	ug/m3	J, B	U	b
SG27B-05	2-Butanone		5.0	ug/m3	B	U	b
SG27B-05	Acetone		17	ug/m3	J, B	U	b

Summary of Qualified Data
ENSR Data Validation Memo TH536

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG27B-05	Carbon disulfide		1.7	ug/m3	J, B	U	b
SG27B-05	Ethanol		17	ug/m3	J, B	U	b
SG27B-05	Vinylacetate		17	ug/m3	J, B	U	b
SG28B-05	Acetone		160	ug/m3	J, B	U	b
SG28B-05D	Acetone		53	ug/m3	J, B	U	b
SG32B-05	Acetone		3300	ug/m3	J, B	U	b
SG61B-05	Acetone		1600	ug/m3	J, B	U	b
SG62B-05	Acetone		390	ug/m3	J, B	U	b
SG63B-05	2-Butanone		3.1	ug/m3	B	U	b
SG63B-05	Acetone		10	ug/m3	B	U	b
SG63B-05	Carbon disulfide		0.80	ug/m3	J, B	U	b
SG63B-05	Ethanol		8.0	ug/m3	J, B	U	b
SG63B-05	N-Butylbenzene	0.42	0.32	ug/m3	M	J+	q
SG76B-05	Acetone		79	ug/m3	J, B	U	b
SG76B-05	Naphthalene		3.1	ug/m3	J, B	U	b
SG78B-05	Acetone		170	ug/m3	J, B	U	b
SG79B-05	N-Butylbenzene	0.97	0.31	ug/m3	M	J+	q
SG80B-05	Acetone		110	ug/m3	J, B	U	b
SG80B-05	Ethanol		110	ug/m3	J, B	U	b
SG80B-05	Naphthalene		4.2	ug/m3	J, B	U	b
SG81B-05	Acetone		76	ug/m3	J, B	U	b
SG81B-05	Ethanol		76	ug/m3	J, B	U	b
SG82B-05	2-Butanone		7.4	ug/m3	B	U	b
SG82B-05	Acetone		56	ug/m3	J, B	U	b
SG82B-05	Ethanol		56	ug/m3	J, B	U	b
SG82B-05	Vinylacetate		56	ug/m3	J, B	U	b
SG83B-05	2-Butanone		91	ug/m3	J	U	b
SG83B-05	Acetone		910	ug/m3	J, B	U	b
SG83B-05D	Acetone		920	ug/m3	J, B	U	b
SG83B-05D	Carbon disulfide		92	ug/m3	J, B	U	b
SG83B-05D	Ethanol		920	ug/m3	J, B	U	b
SG86B-05	Acetone		110	ug/m3	J, B	U	b

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801507

Distribution: R. Kennedy/Westford

04020-023-432
TH537to15wwb

SUMMARY

Full validation was performed on the data for 15 soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 19 and 20, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801507.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs	Sample IDs
SG06B-05	SG56B-05
SG13B-05	SG56B-05D (field duplicate of SG56B-05)
SG14B-05	SG57B-05
SG15B-05	SG58B-05
SG29B-05	SG59B-05
SG30B-05	SG60B-05
SG31B-05	SG77B-05

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Sample IDs	Sample IDs
SG55B-05	

REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- GC/MS Tuning
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Target compound identification
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Instrument Tuning

All bromofluorobenzene instrument tune checks met the acceptance criteria. The samples were analyzed within 24 hours of a tune check.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial and continuing calibrations associated with the sample analyses.

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Method Blanks/Canister Blanks

Selected target compounds were detected in several laboratory method blanks associated with the sample analyses. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action levels (ALs) were established at 10x the concentration detected in the laboratory method blank for the common laboratory contaminants acetone and 2-butanone, and at 5x the concentration detected in the method blank for the remaining compounds. The following table summarizes the level of blank contamination detected in the blanks; the ALs; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Blank ID	Analysis Date	Compound	Conc. ($\mu g/m^3$)	AL ($\mu g/m^3$)	Associated Samples
MS16052708MB	5/27/2008	2-Butanone	0.072	0.72	SG06B-05, SG13B-05, SG14B-05, SG15B-05, SG30B-05, SG31B-05, SG55B-05, SG56B-05, SG56B-05D, SG57B-05, SG59B-05, SG77B-05
		Acetone	1.0	10	
		Benzene	0.059	0.295	
		Ethanol	0.082	0.41	
		Methylene chloride	0.076	0.76	
		Vinyl acetate	0.26	1.3	
MS16052808MB	5/28/2008	Acetone	0.35	3.5	SG29B-05, SG30B-05, SG31B-05, SG55B-05, SG56B-05D, SG57B-05, SG59B-05, SG60B-05
		Chloroform	0.090	0.45	
		Methylene chloride	0.064	0.64	
MS16052908MB	5/29/2008	Acetone	0.55	5.5	SG29B-05, SG58B-05
		Chloroform	0.087	0.435	
		Ethanol	0.062	0.31	
		Methylene chloride	0.055	0.55	

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.
- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

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LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all sample analyses.

Field Duplicate Results

Samples SG56B-05/SG56B-05D were submitted as the field duplicate pair with this sample set. The following tables list the relative percent differences (RPDs) of the detected analytes for the field duplicate pair.

SG56B-05			
Compound	**Original Result ($\mu g/m^3$)**	**Duplicate Result ($\mu g/m^3$)**	**RPD**
Chloroform	7500	7700	2.6
Ethylbenzene	8.9 J	11	21
N-Propylbenzene	17 U	1.2 J	NC
1,4-Dichlorobenzene	3.3 U	0.97 J	NC
1,2-Dichloroethane	3.3 U	1 J	NC
4-Methyl-2-pentanone	17 U	1.9 J	NC
1,3,5-Trimethylbenzene	3.6 J	4.7 J	27
Toluene	32	35	9.0
Chlorobenzene	3.3 U	0.81 J	NC
n-Octane	26	27	3.8
Tetrachloroethene	31	30	3.3
n-Heptane	17 U	1.1 J	NC
1,3-Dichlorobenzene	4.3	4.3	0
Carbon tetrachloride	210	220	4.7
2-Hexanone	17 U	1 J	NC
4-Ethyltoluene	17 U	2.4 J	NC
Ethanol	170 U	1.4 J	NC
Benzene	6.3 U	4.8	NC
Carbon disulfide	17 U	3.5 J	NC
Bromodichloromethane	3.3 U	2.1	44
1,1-Dichloroethane	7.2	7.5	4.1
1,1-Dichloroethene	3.3 U	0.87 J	NC
Trichlorofluoromethane	56	57	1.8
Dichlorodifluoromethane	17 U	2.2 J	NC
2-Butanone	7.4 J	4.5 J	49
Trichloroethene	3.3 U	0.98 J	NC
Naphthalene	6.7 U	1.2 J	NC
o-Xylene	17 J	20	16
1,2,4-Trimethylbenzene	5.2 J	8	42
m,p-Xylene	47	56	17

The RPDs for n-propylbenzene, 1,4-dichlorobenzene, 1,2-dichloroethane, 4-methyl-2-pentanone, chlorobenzene, n-heptane, 2-hexanone, 4-ethyltoluene, ethanol, benzene, carbon disulfide, bromodichloromethane, 1,1-dichloroethene, dichlorodifluoromethane, trichloroethene, and naphthalene were NC due to a non-detect result in either the original or the duplicate. Precision was

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deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

All calculated RPDs met the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit.

Laboratory Duplicate Results

Laboratory duplicate analysis was performed on sample SG56B-05. The RPDs for all target compounds met the QC acceptance criteria.

Target Compound Identification

Target compound identification was spot checked. Target compounds were within appropriate retention time windows, and spectral identification was acceptable.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, most samples required additional dilution due to target compound concentrations that exceeded the calibration range. All dilution factors associated with reported results are tabulated below.

Sample ID	Dilution Factors
SG06B-05	1.54
SG13B-05	6.44, 32.2
SG14B-05	1.63, 16.3
SG15B-05	3.26, 32.6
SG29B-05	165, 1650
SG30B-05	62.4, 780
SG31B-05	15.8, 79
SG55B-05	68, 340
SG56B-05	33.4, 83.5
SG56B-05D	11.1, 83.5
SG57B-05	80.5, 805
SG58B-05	113, 850
SG59B-05	86.5, 865
SG60B-05	330, 1650
SG77B-05	156, 780

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for the additional analytical dilutions.

Note that the actual concentrations of the calibrations vary slightly from the nominal concentrations. For example, the actual concentration of compounds in the 0.1 ng standard may range from 0.091 to 0.131, meaning that for those compounds with a nominal reporting limit of 0.10 µg/m3, the true value of the

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associated reporting limit may be slightly higher. In all cases, the reporting limit is within 30% of the lowest calibration standard. No validation action was taken other than this notation.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH537

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG06B-05	Methylene chloride		0.77	ug/m3	J, B	U	b
SG13B-05	Acetone		47	ug/m3	B	U	b
SG13B-05	Methylene chloride		3.2	ug/m3	J, B	U	b
SG13B-05	Vinylacetate		32	ug/m3	J, B	U	b
SG14B-05	Methylene chloride		0.97	ug/m3	B	U	b
SG14B-05	N-Butylbenzene	0.71	0.33	ug/m3	M	J+	q
SG15B-05	Methylene chloride		1.6	ug/m3	J, B	U	b
SG15B-05	N-Butylbenzene	1.1	0.65	ug/m3	M	J+	q
SG29B-05	Acetone		830	ug/m3	J, B	U	b
SG29B-05	Methylene chloride		83	ug/m3	J, B	U	b
SG30B-05	2-Butanone		31	ug/m3	J, B	U	b
SG30B-05	Acetone		310	ug/m3	J, B	U	b
SG30B-05	Benzene		15	ug/m3	B	U	b
SG31B-05	Acetone		79	ug/m3	J, B	U	b
SG31B-05	Methylene chloride		7.9	ug/m3	J, B	U	b
SG55B-05	2-Butanone		34	ug/m3	J, B	U	b
SG55B-05	Acetone		340	ug/m3	J, B	U	b
SG55B-05	Benzene		9.9	ug/m3	B	U	b
SG55B-05	Methylene chloride		34	ug/m3	J, B	U	b
SG56B-05	2-Butanone		17	ug/m3	J, B	U	b
SG56B-05	Acetone		170	ug/m3	J, B	U	b
SG56B-05	Benzene		6.3	ug/m3	B	U	b
SG56B-05	Methylene chloride		17	ug/m3	J, B	U	b
SG56B-05D	Acetone		56	ug/m3	J, B	U	b
SG56B-05D	Methylene chloride		5.6	ug/m3	J, B	U	b
SG57B-05	Acetone		400	ug/m3	J, B	U	b
SG57B-05	Benzene		9.4	ug/m3	B	U	b
SG57B-05	Methylene chloride		40	ug/m3	J, B	U	b
SG58B-05	Acetone		570	ug/m3	J, B	U	b
SG58B-05	Methylene chloride		57	ug/m3	J, B	U	b
SG59B-05	Acetone		430	ug/m3	J, B	U	b
SG59B-05	Benzene		8.7	ug/m3	B	U	b
SG59B-05	Methylene chloride		43	ug/m3	J, B	U	b
SG60B-05	Acetone		1700	ug/m3	J, B	U	b
SG60B-05	Methylene chloride		170	ug/m3	J, B	U	b
SG77B-05	2-Butanone		78	ug/m3	J, B	U	b
SG77B-05	Acetone		780	ug/m3	J, B	U	b
SG77B-05	Ethanol		780	ug/m3	J, B	U	b
SG77B-05	Methylene chloride		78	ug/m3	J, B	U	b

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801548

Distribution: R. Kennedy/Westford

04020-023-432
TH538to15wwb

SUMMARY

Limited validation was performed on the data for 19 soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 21 and 22, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801548.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs	Sample IDs
SG42B-05	SG51B-05D (field duplicate of SG51B-05)
SG45B-05	SG53B-05
SG46B-05	SG53B-05D (field duplicate of SG53B-05)
SG47B-05	SG54B-05
SG48B-05	SG66B-05
SG49B-05	SG67B-05

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Sample IDs	Sample IDs
SG91B-05	SG68B-05
SG93B-05	SG69B-05
SG50B-05	SG87B-05
SG51B-05	

REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial and continuing calibrations associated with the sample analyses.

Method Blanks/Canister Blanks

Selected target compounds were detected in several laboratory method blanks associated with the sample analyses. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action levels (ALs) were established at 10x the concentration detected in the laboratory method blank for the common laboratory contaminants

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acetone and 2-butanone, and at 5x the concentration detected in the method blank for the remaining compounds. The following table summarizes the level of blank contamination detected in the blanks; the ALs; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Blank ID	Analysis Date	Compound	Conc. ($\mu g/m^3$)	AL ($\mu g/m^3$)	Associated Samples
MS13053008MB	5/30/2008	Acetone	0.16	1.6	SG42B-05 SG46B-05 SG47B-05 SG48B-05 SG51B-05 SG51B-05D SG67B-05 SG68B-05 SG69B-05 SG91B-05 SG93B-05
MS13060208MB	6/2/2008	2-Butanone	0.12	1.2	SG51B-05 SG51B-05D SG53B-05 SG53B-05D SG54B-05 SG66B-05
		Acetone	0.66	6.6	
		Ethanol	0.093	0.465	
		Naphthalene	0.12	0.6	
		Vinylacetate	0.22	1.1	
MS13060308MB	6/3/2008	Acetone	0.16	1.6	SG45B-05 SG49B-05 SG50B-05 SG87B-05

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.
- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

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LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all sample analyses.

Field Duplicate Results

Samples SG51B-05/SG51B-05D and SG53B-05/SG53B-05D were submitted as the field duplicate pairs with this sample set. The following tables list the relative percent differences (RPDs) of the detected compounds.

SG51B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
Ethylbenzene	3.8	0.77 J	133
Styrene	0.19 J	3.1 U	NC
N-Propylbenzene	0.79	3.1 U	NC
N-Butylbenzene	0.59	1.2 U	NC
1,4-Dichlorobenzene	5	0.62 U	NC
Allyl chloride	0.31	0.62 U	NC
1,2-Dichloroethane	7.3	7.3	0
Acrylonitrile	0.11 J	3.1 U	NC
4-Methyl-2-pentanone	3.1	1.8 J	53
1,3,5-Trimethylbenzene	5.3	3.1 U	NC
Toluene	50	26	63
Chlorobenzene	32	8.1	119
n-Octane	17	4.4	118
1,2,4-Trichlorobenzene	0.37	0.62 U	NC
1,4-Dioxane	0.77 U	0.92 J	18
Dibromochloromethane	4.1	3.4	19
Tetrachloroethene	490	440	11
sec-Butylbenzene	0.23 J	3.1 U	NC
n-Heptane	19	15	24
cis-1,2-Dichloroethene	0.23	0.62 U	NC
trans-1,2-Dichloroethylene	0.13 J	0.62 U	NC
1,3-Dichlorobenzene	0.43	0.62 U	NC
Carbon tetrachloride	79	78	1.3
2-Hexanone	2 M	3.1 U	NC
4-Ethyltoluene	0.83	3.1 U	NC
Ethanol	11	14 J	24
Acetone	400 U	330	NC
Benzene	160	150	6.4
1,1,1-Trichloroethane	0.41	0.45 J	9.3
Bromomethane	0.24	0.61 J	87
Chloromethane	6.5	27	122
Chloroethane	75	76	1.3

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SG51B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
Vinyl chloride	1.9	2	5.1
Methylene chloride	90	90	0
Carbon disulfide	5.6	6.5	15
Bromoform	4.6	2.6 J	56
Bromodichloromethane	7.3	7.2	1.4
1,1-Dichloroethane	84	84	0
1,1-Dichloroethene	3.2	3	6.4
t-Butyl alcohol	3.7	5.5	39
Trichlorofluoromethane	2.1	2.1	0
Dichlorodifluoromethane	2	2.1 J	4.9
1,1,2-Trichlorotrifluoroethane	0.5	0.47 J	6.2
1,2-Dichlorotetrafluoroethane	0.081 J	3.1 U	NC
1,2-Dichloropropane	2.6	2.4	8.0
2-Butanone	25	33	28
1,1,2-Trichloroethane	0.13 J	0.62 U	NC
Trichloroethene	35	33	5.9
Hexachlorobutadiene	2.9	0.62 U	NC
Naphthalene	1.1	1.2 U	NC
o-Xylene	9.7	0.58 J	177
1,2-Dichlorobenzene	0.94	0.62 U	NC
1,2,4-Trimethylbenzene	4	3.1 U	NC
Isopropylbenzene	1.2	3.1 U	NC
alpha-Methyl styrene	0.16 J	3.1 U	NC
4-Isopropyltoluene	1.1	3.1 U	NC
m,p-Xylene	27	2.4 J	167
Chloroform	3100	3100	0

The RPDs for styrene, n-propylbenzene, n-butylbenzene, 1,4-dichlorobenzene, allyl chloride, acrylonitrile, 1,3,5-trimethylbenzene, 1,2,4-trichlorobenzene, sec-butylbenzene, cis-1,2-dichloroethene, trans-1,2-dichloroethylene, 1,3-dichlorobenzene, 2-hexanone, 4-ethyltoluene, 1,2-dichlorotetrafluoroethane, 1,1,2-trichloroethane, hexachlorobutadiene, naphthalene, 1,2-dichlorobenzene, 1,2,4-trimethylbenzene, isopropylbenzene, alpha-methyl styrene, acetone, and 4-isopropyltoluene were not calculable (NC) due to a non-detect result in either the original or the duplicate. Positive and non-detected results for 1,4-dichlorobenzene, 1,3,5-trimethylbenzene, hexachlorobutadiene, 1,2-dichlorobenzene, and 1,2,4-trimethylbenzene were qualified as estimated (J and UJ, respectively) in samples SG51B-05 and SG51B-05D since the detected result was greater than five times the reporting limit. Precision was deemed acceptable for the remaining compounds since the detected result was less than five times the reporting limit in each case.

Results for ethyl benzene, toluene, chlorobenzene, n-octane, chloromethane, o-xylene, and m,p-xylenes in samples SG51B-05 and SG51B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting

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limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

SG53B-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
Ethylbenzene	2.4	3.3	32
Styrene	1.7 U	0.28 J	NC
N-Propylbenzene	0.56 J	0.84 J	40
N-Butyibenzene	1.7	1	52
1,4-Dichlorobenzene	11	4.5	84
1,2-Dichloroethane	13	13	0
Vinyl acetate	4.9 J	4.3 J	13
4-Methyl-2-pentanone	0.85 J	1.4	49
1,3,5-Trimethylbenzene	0.93 J	1.5	47
Toluene	8.4	8.4	0
Chlorobenzene	1.5	1.5	0
n-Octane	0.71 J	0.63 J	12
1,2,4-Trichlorobenzene	1.9	2	5.1
1,4-Dioxane	1.7 U	0.39 J	NC
Tetrachloroethene	65	66	1.5
n-Heptane	0.52 J	0.44 J	17
1,3-Dichlorobenzene	0.25 J	0.24 J	4.1
Carbon tetrachloride	0.46	0.44	4.4
2-Hexanone	0.77 J	0.61 J	23
4-Ethyltoluene	0.88 J	1.5	52
Ethanol	2.4 J	2.5 J	4.1
Benzene	5	3.4	38
Chloroethane	100	100	0
Vinyl chloride	0.52	0.5	3.9
Methylene chloride	12	12	0
Carbon disulfide	1.1 J	18	177
Bromodichloromethane	0.24 J	0.27 J	12
1,1-Dichloroethane	130	130	0
1,1-Dichloroethene	3.5	3.6	2.8
t-Butyl alcohol	0.77 J	1.4	58
Trichlorofluoromethane	1	1.1	9.5
Dichlorodifluoromethane	2	1.9	5.1
1,1,2-Trichlorotrifluoroethane	0.48	0.49	2.1
1,2-Dichloropropane	0.33 U	0.17 J	NC
2-Butanone	4.2	4.9	15
1,1,2-Trichloroethane	5.4	5.6	3.6
Trichloroethene	1.1	0.69	46
Hexachlorobutadiene	4.8	5.6	15

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Naphthalene	6.9	7.2	4.3
o-Xylene	3.5	5.2	39
1,2-Dichlorobenzene	0.33	0.3	9.5
1,2,4-Trimethylbenzene	2.2	4.5	69
Isopropylbenzene	1.7 U	0.21 J	NC
4-Isopropyltoluene	0.47 J	1.2 J	87
m,p-Xylene	11	16	37
Chloroform	1400	1300	7.4

The RPDs for styrene, 1,4-dioxane, 1,2-dichloropropane, and isopropylbenzene were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

Results for 1,4-dichlorobenzene and carbon disulfide in samples SG53B-05 and SG53B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

Laboratory Duplicate Results

Laboratory duplicate analyses were performed on sample SG68B-05. Precision was deemed acceptable for all compounds.

Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, several samples required additional dilution due to target compound concentrations that exceeded the calibration range. All dilution factors associated with reported results are tabulated below.

Sample ID	Dilution Factors
SG42B-05	3.88
SG45B-05	1.49
SG46B-05	1.58, 15.8
SG47B-05	1.66, 33.2
SG48B-05	1.58
SG49B-05	1.63
SG87B-05	2.17
SG91B-05	3.2, 64
SG93B-05	3.28, 32.8
SG50B-05	1.78
SG51B-05	1.53, 61.2
SG51B-05D	6.2, 62
SG53B-05	3.3, 55
SG53B-05D	2.78, 55.6
SG54B-05	71.2, 890
SG66B-05	3.06, 61.2

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Sample ID	Dilution Factors
SG67B-05	1.67, 16.7
SG68B-05	1.54
SG69B-05	326, 3260

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for the additional analytical dilutions.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH538

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG51B-05	1,2,4-Trimethylbenzene	4.0	0.77	ug/m3		J	fd
SG51B-05	1,2-Dichlorobenzene	0.94	0.15	ug/m3		J	fd
SG51B-05	1,3,5-Trimethylbenzene	5.3	0.77	ug/m3		J	fd
SG51B-05	1,4-Dichlorobenzene	5.0	0.15	ug/m3		J	fd
SG51B-05	Acetone		400	ug/m3	B	U	b
SG51B-05	Chlorobenzene	32	0.15	ug/m3		J	fd
SG51B-05	Chloromethane	6.5	0.15	ug/m3		J	fd
SG51B-05	Ethylbenzene	3.8	0.77	ug/m3		J	fd
SG51B-05	Hexachlorobutadiene	2.9	0.15	ug/m3		J	fd
SG51B-05	m,p-Xylene	27	0.77	ug/m3		J	fd
SG51B-05	n-Octane	17	0.77	ug/m3		J	fd
SG51B-05	o-Xylene	9.7	0.77	ug/m3		J	fd
SG51B-05	Toluene	50	0.77	ug/m3		J	fd
SG51B-05D	1,2,4-Trimethylbenzene		3.1	ug/m3	U	UJ	fd
SG51B-05D	1,2-Dichlorobenzene		0.62	ug/m3	U	UJ	fd
SG51B-05D	1,3,5-Trimethylbenzene		3.1	ug/m3	U	UJ	fd
SG51B-05D	1,4-Dichlorobenzene		0.62	ug/m3	U	UJ	fd
SG51B-05D	Chlorobenzene	8.1	0.62	ug/m3		J	fd
SG51B-05D	Chloromethane	27	0.62	ug/m3		J	fd
SG51B-05D	Ethylbenzene	0.77	3.1	ug/m3	J	J	fd
SG51B-05D	Hexachlorobutadiene		0.62	ug/m3	U	UJ	fd
SG51B-05D	m,p-Xylene	2.4	3.1	ug/m3	J	J	fd
SG51B-05D	n-Octane	4.4	3.1	ug/m3		J	fd
SG51B-05D	o-Xylene	0.58	3.1	ug/m3	J	J	fd
SG51B-05D	Toluene	26	3.1	ug/m3		J	fd
SG53B-05	1,4-Dichlorobenzene	11	0.33	ug/m3		J	fd
SG53B-05	Acetone		17	ug/m3	J, B, M	U	b
SG53B-05	Carbon disulfide	1.1	1.7	ug/m3	J	J	fd
SG53B-05D	1,4-Dichlorobenzene	4.5	0.28	ug/m3		J	fd
SG53B-05D	Acetone		14	ug/m3	J, B, M	U	b
SG53B-05D	Carbon disulfide	18	1.4	ug/m3		J	fd
SG54B-05	Acetone		360	ug/m3	J, B	U	b
SG54B-05	Ethanol		360	ug/m3	J, B	U	b
SG69B-05	Acetone		1600	ug/m3	J, B	U	b
SG42B-05	Acetone	38	19	ug/m3	B, M	J+	q
SG47B-05	Acetone	29	8.3	ug/m3	B, M	J+	q
SG49B-05	Acetone	16	8.2	ug/m3	B, M	J+	q
SG93B-05	Acetone	16	16	ug/m3	J, B, M	J+	q
SG51B-05	2-Hexanone	2.0	0.77	ug/m3	M	J+	q

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

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Memorandum

Date: August 12, 2008

To: Mike Flack/Camarillo

From: Waverly Braunstein/Westford

Subject: Data Validation, TO-15 Analysis
Henderson Source Area Phase B Investigation
Tronox LLC Henderson, Nevada
CAS SDG P0801656

Distribution: R. Kennedy/Westford

04020-023-432
TH539to15wwb

SUMMARY

Limited validation was performed on the data for 23 soil gas samples analyzed for volatile organic compounds (VOCs) using EPA method TO-15. The samples were collected in Summa® canisters at Henderson, NV on May 28 and 29, 2008 and submitted to Columbia Analytical Services (CAS), Simi Valley, CA. The data were processed and reported under CAS project number P0801656.

The analytical data were evaluated with reference to EPA Method TO-15, the Region 9 Superfund Data Evaluation/Validation Guidance, NDEP Guidance on Data Validation (5/06), and the quality control (QC) criteria specified in the Quality Assurance Project Plan (QAPP). Validation actions were derived from the USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (10/99). Modification of the Functional Guidelines was performed to accommodate the non-CLP methodology.

In general, the data are valid as reported and may be used for decision making purposes. No data were rejected. Selected data points were qualified during validation due to nonconformances to the quality control (QC) acceptance criteria (see discussion below).

SAMPLES

Sample IDs	Sample IDs
SG01B-05	SG42BR-05
SG02B-05	SG52B-05
SG03B-05	SG53BR-05
SG04B-05	SG53BR-05D (field duplicate of SG53BR-05)
SG05B-05	SG60BR-05
SG19B-05	SG65BR-05
SG20B-05	SG65BR-05D (field duplicate of SG65BR-05)

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Sample IDs	Sample IDs
SG21B-05	SG74B-05
SG23B-05	SG90B-05
SG24B-05	SG92B-05
SG25B-05	SG94BR-05
SG34B-05	

REVIEW ELEMENTS

Sample data were reviewed for the following elements:

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Data package completeness
- Holding times
- Initial and continuing calibrations
- Method blanks/canister blanks
- Surrogate spike recoveries
- Internal standard results
- Laboratory control sample (LCS) results
- Field duplicate results
- Laboratory duplicate results
- Quantitation limits and sample results

DISCUSSION

Agreement of Analyses Conducted with COC Requests

Sample reports were checked to verify that the results corresponded to analytical requests as designated on the COC. No discrepancies were noted.

Data Package Completeness

The data package was complete as received.

Holding Times

The samples were analyzed within the method specified holding time.

Initial and Continuing Calibrations

The percent relative standard deviations (%RSDs), and the response factors (RFs) of all target compounds were within the QC acceptance criteria for the initial and continuing calibrations associated with the sample analyses.

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Method Blanks/Canister Blanks

Acetone and methylene were detected in several laboratory method blanks associated with the sample analyses. The presence of blank contamination indicates that false positives may exist for these compounds in the associated samples. Action levels (ALs) were established at 10x the concentration detected in the laboratory method blank for the common laboratory contaminants acetone and methylene chloride. The following table summarizes the level of blank contamination detected in the blanks; the action levels; and the associated samples. Blank results and ALs are adjusted by dilution factors before comparison to sample results and quantitation limits.

Blank ID	Analysis Date	Compound	Conc. ($\mu g/m^3$)	AL ($\mu g/m^3$)	Associated Samples
MS13060408MB	6/4/2008	Acetone	0.13	1.3	SG20B-05, SG23B-05, SG24B-05, SG34B-05, SG74B-05, SG90B-05
MS13060508MB	6/5/2008	Acetone	0.19	1.9	SG01B-05, SG03B-05, SG42BR-05, SG52B-05, SG60BR-05, SG94BR-05
MS13060608MB	6/6/2008	Acetone	0.41	4.1	SG02B-05, SG04B-05, SG05B-05, SG53BR-05, SG53BR-05D, SG65BR-05, SG65BR-05D, SG92B-05
MS13060708MB	6/7/2008	Acetone	0.42	4.2	SG19B-05, SG20B-05, SG21B-05, SG23B-05, SG24B-05, SG25B-05, SG34B-05, SG53BR-05, SG53BR-05D, SG90B-05
		Methylene chloride	0.18	1.8	

Sample results were qualified as follows:

- If the sample result was < the sample quantitation limit (SQL) and < the AL, the result was reported as not detected (U) at the SQL.
- If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration.
- If the sample result was > AL, the result was not qualified.

Target compounds were not detected in the canister blanks.

The samples were collected in canisters verified as clean by the laboratory through routine checks of ten percent of the canisters cleaned. Canister blank certificates are not provided for these samples.

Surrogate Spike Recoveries

Surrogate percent recoveries (%Rs) met the QC acceptance criteria for all samples in this data set.

Internal Standard Results

All internal standard recoveries met the QC acceptance criteria.

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LCS Results

The LCS %Rs met the QC acceptance limits of 70-130% for all sample analyses.

Field Duplicate Results

Samples SG53BR-05/SG53BR-05D and SG65B-05/SG65B-05D were submitted as the field duplicate pairs with this sample set. The following tables list the relative percent differences (RPDs) of the detected compounds.

SG53BR-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
1,1,2-Trichloroethane	5.2	5.2	0
1,1,2-Trichlorotrifluoroethane	0.47	0.47	0
1,1-Dichloroethane	120	120	0
1,1-Dichloroethene	3.4	3.4	0
1,2,4-Trichlorobenzene	3.1	3.2	3.2
1,2,4-Trimethylbenzene	1.6	0.79	68
1,2-Dichlorobenzene	0.28	0.27	3.6
1,2-Dichloroethane	13	13	0
1,2-Dichloropropane	0.21	0.18	15
1,2-Dichlorotetrafluoroethane	0.078 J	0.081 J	3.8
1,3,5-Trimethylbenzene	0.40 J	0.13 J	102
1,3-Dichlorobenzene	0.23	0.24	4.3
1,4-Dichlorobenzene	9.1	10	9.4
1,4-Dioxane	1.3	1.2	8.0
2-Butanone	5.8	7.6	27
2-Hexanone	0.41 J	0.49 J	18
4-Ethyltoluene	0.49 J	0.33 J	39
4-Isopropyltoluene	0.29 J	0.21 J	32
4-Methyl-2-pentanone	0.26 J	0.28 J	7.4
Acetone	15 J+	15	0
Benzene	2.6	2.5	3.9
Bromodichloromethane	0.21	0.20	4.9
Bromomethane	0.081 J	0.11 J	30
Carbon disulfide	3.4	33	163
Carbon tetrachloride	0.45	0.45	0
Chlorobenzene	1.1	1.1	0
Chloroethane	96	96	0
Chloroform	1500	1200	22
Chloromethane	0.12 J	0.15 U	NC
Dichlorodifluoromethane	2.0	1.9	5.1
Ethanol	5.3 J	5.2 J	1.9
Ethylbenzene	0.78	0.54 J	36
Hexachlorobutadiene	6.4	6.7	4.6
Isopropylbenzene	0.11 J	0.77 U	NC

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SG53BR-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
m,p-Xylene	3.1	2.3	30
Methyl tert butyl ether	U	0.10 J	NC
Methylene chloride	11	12	8.7
N-Butylbenzene	0.55	0.41	29
n-Heptane	0.49 J	0.23 J	72
n-Octane	0.60 J	0.30 J	67
N-Propylbenzene	0.38 J	0.29 J	27
Naphthalene	2.5	2.4	4.1
o-Xylene	1.2	0.90	29
sec-Butylbenzene	0.098 J	0.77 U	NC
Styrene	0.20 J	0.77 U	NC
t-Butyl alcohol	0.27 J	0.28 J	3.6
Tetrachloroethene	59	59	0
Toluene	3.0	3.1	3.3
Trichloroethene	0.38	0.36	5.4
Trichlorofluoromethane	1.0	1.0	0
Vinyl acetate	5.1 J	7.5 J	38
Vinyl chloride	0.35	0.35	0

The RPDs for chloromethane, isopropylbenzene, methyl tert butyl ether, sec-butylbenzene, and styrene were not calculable (NC) due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

Results for 1,3,5-trimethylbenzene and carbon disulfide in samples SG53BR-05 and SG53BR-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

SG65BR-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
1,1,2-Trichlorotrifluoroethane	0.51	0.46	10%
1,2,4-Trichlorobenzene	0.29	0.34	16%
1,2,4-Trimethylbenzene	0.13 J	0.21 J	47%
1,2-Dichlorotetrafluoroethane	0.82 U	0.084 J	NC
1,4-Dichlorobenzene	17	19	11%
1,4-Dioxane	0.17 J	0.21 J	21%
2-Butanone	4.8	4.8	0
2-Hexanone	0.35 J	0.37 J	5.6%
4-Ethyltoluene	0.82 U	0.097 J	NC
4-Isopropyltoluene	0.83	0.13 J	146%

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SG65BR-05			
Compound	**Original Result (ug/m3)**	**Duplicate Result (ug/m3)**	**RPD (%)**
4-Methyl-2-pentanone	0.53 J	0.52 J	1.9%
Acetone	22 J+	29	27%
Benzene	1.2	1.1	8.7%
Bromodichloromethane	0.58	0.59	1.7%
Bromoform	0.17 J	0.17 J	0
Bromomethane	0.16 U	0.14 J	NC
Carbon disulfide	5.5	0.73 J	153%
Carbon tetrachloride	0.50	0.53	5.8%
Chloroethane	0.25	0.16 J	44%
Chloroform	7.8	7.7	1.3%
Dibromochloromethane	0.27	0.30	11%
Dichlorodifluoromethane	1.9	2.0	5.1%
Ethanol	8.9	8.9	0
Hexachlorobutadiene	0.28	0.30	6.9%
m,p-Xylene	0.25 J	0.30 J	18%
Methyl tert butyl ether	0.16 J	0.16 U	NC
Methylene chloride	0.23 J	0.18 J	24%
N-Butylbenzene	0.18 J	0.19 J	5.4%
Naphthalene	0.56	0.63	12%
o-Xylene	0.16 J	0.19 J	17%
t-Butyl alcohol	0.20 J	0.20 J	0
Tetrachloroethene	1.6	1.8	12%
Toluene	0.92	1.6	54%
Trichloroethene	0.33	0.32	3.1%
Trichlorofluoromethane	1.2	1.1	8.7%
Vinylacetate	2.0 J	3.8 J	62%

The RPDs for 1,2-dichlorotetrafluoroethane, 4-ethyltoluene, bromomethane, and methyl tert butyl ether were NC due to a non-detect result in either the original or the duplicate. Precision was deemed acceptable for each of these compounds since the detected result was less than five times the reporting limit in each case.

Results for 4-isopropyltoluene and carbon disulfide in samples SG65B-05 and SG65B-05D were qualified as estimated (J) since the RPDs exceeded the acceptance criteria of 50% when both results are greater than five times the reporting limit or 100% when results are less than five times the reporting limit. All other RPDs met the acceptance criteria.

Laboratory Duplicate Results

Laboratory duplicate analyses were performed on sample SG68B-05. Precision was deemed acceptable for all compounds.

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Quantitation Limits and Sample Results

All samples were analyzed at minor dilutions due to the requirement to pressurize the canisters prior to analysis. Sample results and sample quantitation limits were adjusted accordingly.

In addition, several samples required additional dilution due to target compound concentrations that exceeded the calibration range. All dilution factors associated with reported results are tabulated below.

Sample ID	Dilution Factors
SG01B-05	1.7
SG02B-05	1.7
SG03B-05	1.61
SG04B-05	1.53
SG05B-05	1.63
SG19B-05	1.69
SG20B-05	3.04, 50.67
SG21B-05	1.67
SG23B-05	3.14, 52.33
SG24B-05	3.3, 55
SG25B-05	1.7
SG34B-05	2.96, 49.3
SG42BR-05	1.5
SG52B-05	3.08, 308
SG53BR-05	1.53, 51
SG53BR-05D	1.53, 51
SG60BR-05	312, 3120
SG65BR-05	1.64
SG65BR-05D	1.64
SG74B-05	3.38
SG90B-05	3.26, 65.2
SG92B-05	1.64, 32.8
SG94BR-05	1.67

The laboratory combined the results from multiple runs to ensure that all results were within the calibration range, and non-detect results were reported at the lowest possible reporting limit. The laboratory did not adjust the reporting limits for the additional analytical dilutions.

The laboratory appended an "M" qualifier to selected results to indicate possible matrix interference due to elution of non-target compounds, leading to a potential high bias in the results. Associated results less than the reporting limit were already flagged with a "J" to indicate an estimated result; in these cases, the "M" qualifier was removed and the "J" qualifier was retained. If the associated result was greater than the reporting limit, the "M" qualifier was replaced with "J+" during validation to indicate an estimated value with possible high bias.

Attachments

Summary of qualified data

Summary of Qualified Data
ENSR Data Validation Memo TH539

Sample ID	Compound	Result	Reporting Limit	Units	Lab Qual	Validation Qual	Reason Code
SG01B-05	Acetone	33	8.5	ug/m3	B, M	J+	q
SG04B-05	Acetone	12	7.7	ug/m3	B, M	J+	q
SG19B-05	Methylene chloride		1.7	ug/m3	B	U	b
SG21B-05	Methylene chloride		0.84	ug/m3	J, B	U	b
SG21B-05	Acetone	16	8.4	ug/m3	B, M	J+	q
SG24B-05	Acetone	18	17	ug/m3	B, M	J+	q
SG25B-05	Methylene chloride		0.85	ug/m3	J, B	U	b
SG25B-05	Acetone	23	8.5	ug/m3	B, M	J+	q
SG42BR-05	Acetone	15	7.5	ug/m3	B, M	J+	q
SG53BR-05	1,3,5-Trimethylbenzene	0.40	0.77	ug/m3	J	J	fd
SG53BR-05	Carbon disulfide	3.4	0.77	ug/m3		J	fd
SG53BR-05	Acetone	15	7.7	ug/m3	B, M	J+	q
SG53BR-05D	1,3,5-Trimethylbenzene	0.13	0.77	ug/m3	J	J	fd
SG53BR-05D	Carbon disulfide	33	0.77	ug/m3		J	fd
SG60BR-05	Acetone		1600	ug/m3	J, B	U	b
SG65BR-05	4-Isopropyltoluene	0.83	0.82	ug/m3		J	fd
SG65BR-05	Carbon disulfide	5.5	0.82	ug/m3		J	fd
SG65BR-05	Acetone	22	8.2	ug/m3	B, M	J+	q
SG65BR-05D	4-Isopropyltoluene	0.13	0.82	ug/m3	J	J	fd
SG65BR-05D	Carbon disulfide	0.73	0.82	ug/m3	J	J	fd
SG92B-05	Acetone	10	8.2	ug/m3	B, M	J+	q
SG94BR-05	Acetone	41	8.4	ug/m3	B, M	J+	q

Note:
Validation qualifiers are defined in Table E-1
Reason codes are defined in Table E-2

Attachment C

Red Line Strike Out/Track Changes

Prepared for:
Tronox LLC
Henderson, Nevada

Revised
Data Validation Summary Report Phase B Source Area Investigation Soil Gas Survey – Tronox LLC Facility Henderson, Nevada

ENSR Corporation
August 2008 – Revised October 2008
Document No.: 04020-023-4311

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Prepared for:
Tronox LLC
Henderson, Nevada

Revised
Data Validation Summary Report
Phase B Source Area Investigation Soil Gas Survey – Tronox LLC Facility
Henderson, Nevada

Prepared By Robert Kennedy
Senior Project Chemist
ENSR Corporation

Reviewed By Marie Wojtas

ENSR Corporation
August 2008 – Revised October 2008
Document No.: 04020-023-4311

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Contents

Acronyms and Abbreviations

%D	Percent difference or percent drift
%R	Percent recovery
%RSD	Percent relative standard deviation
ASB	Analytical Services Branch
BHC	Hexchlorocyclohexane
CCV	Continuing calibration verification
CDD	Chlorinated Dibenzo-p-Dioxins
CDF	Chlorinated Dibenzofurans
CLP	Contract Laboratory Program
COC	Chain of custody
DCB	Decachlorobiphenyl
DQI	Data quality indicator
DRO	Diesel range organics
EDD	Electronic data deliverables
EMPC	Estimated Maximum Possible Concentrations
EPA	U.S. Environmental Protection Agency
EPN	O-Ethyl-O-p-nitrophenyl benzene thiophosphonate
GC/MS	Gas Chromatography/Mass Spectrometry
GRO	Gasoline range organics
HT	Holding time
ICAL	Initial calibration
ICP	Inductively Coupled Plasma
ICP/MS	Inductively Coupled Plasma/Mass Spectrometry
ICS	Interference check sample
ID	Identification
IS	Internal standard
LCL	Lower control limit
LCS	Laboratory control sample
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MARLAP	Multi-Agency Radiological Laboratory Analytical Protocols Manual
MBAS	Methylene-Blue Active Substances MCL Maximum contaminant levels
MDL	Method detection limit

Acronyms and Abbreviations (Cont'd)

Mn	Manganese
MS/MSD	Matrix spike/matrix spike duplicate
ND	Not detected
NDEP	Nevada Department of Environmental Protection
NFG	National Functional Guidelines
NS	Not spiked
ORO	Oil range organics
PAH	Polycyclic aromatic hydrocarbons
prep	Preparation
PRG	Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
QC	Quality control
r2	Correlation coefficient
RCRA	Resource Conservation and Recovery Act
RL	Reporting limit
RPD	Relative percent difference
RRF	Relative response factor
SDG	Sample Delivery Group
SRC	Site-Related Chemical
STL	Severn Trent Laboratories
SVOC	Semivolatile organic carbon
TCMX	Tetrachlorometaxylene
TDS	Total dissolved solids
TOC	Total organic carbon
TSS	Total suspended solids
UCL	Upper control limit
VOC	Volatile organic carbon

1.0 Introduction

The purpose of formally validating the Phase B Source Area Investigation Soil Gas Survey laboratory results was to determine the suitability of the data for potential use in the conceptual site model, risk assessment, and other future on-site environmental assessments.

Columbia Analytical Services (hereafter abbreviated as CAS) in Simi Valley, CA was the laboratory contracted by Tronox for the Phase B Source Area Investigation Soil Gas Survey chemical analyses. All VOC analyses utilized EPA Method TO-15. All He tracer gas analyses utilized modified EPA Method 3C.

The validation covered seven SDGs containing a total of 115 soil gas samples. The distribution of samples within SDGs is detailed in Table E-3. The TO-15 analyte list for all samples in this project included 71 VOC compounds as specified in Table 2 of the Phase B Source Area Investigation Soil Gas Survey Workplan (ENSR, March 2008). All field sample analytical results are provided in a separate table titled "Volatile Organic Compounds and Helium Concentrations in Soil Gas".

Attachment C contains the comments received from the Nevada Division of Environmental Protection (NDEP) dated September 17 and 30, 2008 to the initial DVSR (August 2008) and the Tronox response of September 30, 2008, respectively. This submittal incorporates revisions requested by NDEP to the initial DVSR. The revisions to the initial submittal are highlighted and provided in **Attachment C**

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2.0 Data Validation Process

The laboratory results for the Phase B Source Area Investigation Soil Gas Survey were subjected to formal data validation following the guidance on data validation provided by the Nevada Division of Environmental Protection (NDEP) for the BMI Plant Sites (NDEP 2006). The data from the laboratory were submitted as Contract Laboratory Program (CLP)-like data packages in PDF format and EQuIS ® format electronic data deliverables (EDDs). The EDDs were imported into an EQuIS ® database specifically created for this project. ENSR validated the data using the ~~hard copy and~~ pdf data packages plus EDDs and subsequently entered the validation qualifiers into the database. Results were compared to the goals stated in the Phase B Source Area Investigation Soil Gas Survey Workplan (ENSR, March 2008), hereafter referred to as the "Workplan," and the Draft Quality Assurance Project Plan (ENSR, April 2008) hereafter referred to as the "QAPP."

A comprehensive ("full") data validation was performed on one of the seven laboratory Sample Delivery Groups (SDGs), and the remainder underwent a more limited validation as described below. The goal of a minimum of 10% full validation that was established for the project was exceeded in order to comprehensively evaluate a full representative SDG. Limited validation consisted of reviewing the following data elements contained in laboratory summary data forms (and did not generally include raw data review):

- Agreement of analyses conducted with chain-of-custody (COC) requests
- Holding times and sample preservation
- Initial and continuing calibrations
- Laboratory method blanks/canister blanks

- Surrogate recoveries
- Internal standard performance
- Laboratory control sample/laboratory control sample duplicate (LCS/LCSD) results
- Laboratory duplicate results
- Field duplicate results
- Quantitation limits and sample results
- Helium tracer gas concentrations

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Full validation consisted of reviewing to the level of raw data all of the elements covered in the limited validation plus the following elements where applicable as defined by the analytical method:

- Mass spectrometer tuning
- Gas Chromatography/Mass Spectrometry (GC/MS) performance checks
- Compound identification
- Peak integration and mass spectral matches
- Calculation and transcription verifications

Analytical data were evaluated with reference to the National Functional Guidelines (NFG; EPA 1999) as well as the Region 9 Superfund Data Evaluation/Validation Guidance (EPA 2001), the above-mentioned NDEP Guidance on Data Validation (NDEP 2006), the EPA reference method, the quality control (QC) criteria specified in the QAPP (ENSR, April 2008), and the Workplan (ENSR, March 2008). The Regional and National Functional Guidelines were modified to accommodate the non-CLP methodologies.

Helium tracer gas data was utilized to determine whether significant leaks of surface air contaminated or diluted the soil gas during collection. This data was used for screening purposes and was not provided by the laboratory in a format that permitted validation of the He data itself, however the He results were used to qualify the TO-15 data if the % average leak of helium into the soil gas exceeded 1% of the concentration introduced inside the shroud at the surface. This rule was based on a conservative interpretation of the Interstate Technology Regulatory Council (ITRC) document "Vapor Intrusion Pathway: A Practical Guideline" (ITRC, Jan 2007), and the New York State Department of Health document "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, Oct 2006)

In general, the validation qualifiers and definitions employed were based on those used by the U.S. Environmental Protection Agency (EPA) in the documents mentioned above. Validation qualifiers and definitions are listed in **Table E-1**. A reason code was assigned to all the applications of validation qualifiers for this project. The reason codes and their explanations are listed in **Table E-2**. These codes were entered in the project database for each application of a validation qualifier that changed a laboratory qualifier or modified a result value to indicate the primary reason(s) for data qualification. Where multiple reason codes were assigned to a single result then professional judgment was used to determine the most appropriate overall qualifier and bias sign, if any. Conversions of the laboratory reported "ND" for not detected to the "U" flag in the database and the laboratory-applied "J" qualifier to indicate results less than the reporting limit but greater than the method detection limit (MDL) are generally not discussed in this report. These laboratory qualifiers were standardized and migrated to the validation qualifier field so that the "J" qualifier, unless applied by a validator for other reasons discussed below and documented with a reason code, always indicates a result is estimated because it is less than the reporting limit but greater than the MDL.

Data validation was organized by laboratory report SDG. For each separate SDG a data validation memorandum was written by a validator and reviewed by a peer at ENSR's Westford, MA office. These memoranda are included as Word and Excel documents and sorted by ENSR Identification (ID), which is correlated with the laboratory SDGs, field sample IDs, and collection dates as listed in **Table E-3**. **Table E-3** is provided as an Excel spreadsheet that can be resorted to assist the data user in locating validation information for any particular sample or SDG. Note validation information about the helium tracer results is provided in this revised DVSR and associated tables in response to NDEP comments but is not included in the original data validation memoranda.

3.0 Data Validation Results

The data validation qualifiers and reason codes were used to indicate all the data in the database where results were qualified as a result of validation. This information was sorted by the QC review elements listed below:

- Holding times and sample preservation
- Initial and continuing calibrations
- Mass spectrometer tuning
- Laboratory blanks/equipment blanks/field blanks
- Surrogate recoveries
- LCS/LCSD results
- Internal standard performance
- Laboratory duplicate results
- Field duplicate results
- Quantitation limits and sample results
- GC/MS performance checks
- Peak integration and mass spectral matches
- Calculation and transcription verifications
- Helium tracer gas concentrations

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Tables E-4 through **E-7** and **E-9** list all the results qualified based on QC problems identified with regard to blank contamination, calibrations, field duplicates, and quantitation problems, and helium tracer results, respectively. Reason codes for each qualifier assignment have been provided in each table. Where available, a numerical data quality indicator (DQI) result value, and acceptance criteria for that DQI value have been added to the tables in columns to the right of the reason codes per NDEP's request. No QC problems were identified that resulted in qualification of results based on holding times, mass spectrometer tuning, surrogate recoveries, LCS recoveries, internal standard performance, laboratory duplicate results, GC/MS performance checks, compound identification, or peak integration. No results wereResults for a single sample were rejected based on data validation due to the helium tracer concentrations. This location (SG42B) was successfully resampled and provided data without detectable He. **Table E-8** was provided as part of the response to NDEP comments and details the calculated helium percent leak for soil gas samples in which the helium tracer was detected. The data validation summary results table contents are sorted by sample ID and SDG to assist

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the data user in locating the associated data validation memoranda. The data validation memoranda discuss the application of qualifiers in more detail. **Table E-4** through **Table E-7**, plus **Table E-9** are provided on CD as Excel spreadsheets that can be resorted to assist the data user in locating validation information for any particular sample, SDG, method, or analyte. The results in each table will be summarized separately in sections below.

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3.1 Instrument Calibration

Table E-5 lists the sample results that were qualified based on exceeded calibration criteria. The nature of the numerical DQI result value is defined by the DQI limit criteria; for instance, percent relative standard deviation (%RSD) criteria are from method initial calibration (ICAL) requirements. The one positive and nine nondetect results for 1,2-dichlorobenzene were qualified as estimated (J and UJ, respectively) due to the associated initial calibration's %RSD for this compound, which slightly exceeded the method defined criteria.

3.2 Blank Contamination

In general, laboratory and field blanks were free of contamination at significant levels. **Table E-4** lists the sample results that were qualified based on contamination in laboratory method blanks. Target compounds were not detected in the canister blanks. The blank result value associated with each qualified sample result is given in the column to the right of the reason codes.

A total of 115 sample results were negated (U) based on the presence of low levels of the common laboratory contaminants methylene chloride, acetone, and 2-butanone, as well as trace levels of benzene, carbon disulfide, ethanol, isopropylbenzene, naphthalene, and vinyl acetate in the method blanks. The majority of these negations were based on the presence of acetone. Table E-4 provides the dilution factors and sample quantitation limits (SQL) to assist the reader in understanding the blank actions. Action limits (AL) were established at 10x the method blank concentration for common lab contaminants and 5x for all other target analytes. If the sample result was < the SQL and < the AL, the result was reported as not detected (U) at the SQL. If the sample result was > SQL but < AL, the result was reported as not detected (U) at the reported concentration. If the sample result was > AL, the result was not qualified.

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3.3 Field Duplicates

The results of all soil gas field duplicate pairs collected were evaluated during validation. RPDs were compared to the objectives established in the QAPP of 50% RPD for soil gas. **Table E-6** lists the results qualified during validation based on field duplicate precision nonconformances.

A total of 84 associated field sample result values in nine sample/field duplicate pairs were qualified as estimated (J) based on field duplicate result RPDs that exceeded the QAPP criteria. Twenty two different analytes and from two to ten records per analyte were qualified.

3.4 Quantitation

Table E-7 lists the results that were qualified during validation based on quantitation issues. All 25 of the qualified results were based on the laboratory qualifier M indicating a possible high bias due to matrix interferences in the GC/MS data. No other quantitation problems were discovered during data validation.

3.5 Helium tracer results

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Table E-9 lists the results that were qualified based on the helium tracer concentrations detected in the soil gas samples. The DQI result is the He concentration in ppmV in the sample. The DQI limit is a calculated 1% of the He concentration in the surface shroud. Table E-8 and the associated Tronox response to comments

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provide additional details. If the He concentration was between 1% and 10% of the shroud average then the TO-15 VOC analyte results were qualified as estimated based on the possible contamination and dilution by surface air. If the He concentration exceeded 10% of the shroud average then the results were rejected. Four sample datasets were qualified as estimated and one was rejected based on these criteria. All but one of these soil gas samples were recollected later and He was not detected in these resample datasets (indicated by an R in the sample ID), therefore only TO-15 data from a single location (SG17B) was potentially impacted by surface air contamination/dilution. A comparison of the original and resampled results (e.g. SG53B-05, its duplicate SG53B-05D, the resampled SG53BR-05, and its duplicate SG53BR-05D) indicates the TO-15 analyte results are very consistent regardless of the He tracer results. This confirms the assumptions used for data qualification based on He tracer results were conservative and the data quality is not significantly impacted when He results are less than 10% of the surface shroud levels.

4.0 Evaluation of Data Quality Indicators

Data validation information was used to evaluate the DQIs of precision, accuracy, representativeness, comparability, completeness, and sensitivity for results in the Henderson Phase B Source Area Soil Gas Investigation dataset. Each of these DQI parameters is discussed in the sections below.

4.1 Precision

Precision is the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions. Field precision was assessed through the collection and measurement of field duplicates and expressed as the RPD of the sample and field duplicate pair results. The field duplicate RPD results that caused the application of validation qualifiers are discussed in Section 3.3 of this report and listed in **Table E-6**. In general the field duplicate precision was acceptable for all analytes. A limited analyte data set was qualified as estimated but usable and represents only 1% of the total field sample results dataset.

Laboratory precision was assessed through the RPD results for matrix duplicates. The laboratory duplicate precision was acceptable and no results were qualified during validation.

4.2 Accuracy

Accuracy is the degree of agreement between an observed value and an accepted reference or true value. Laboratory accuracy was assessed during the validation using the recoveries of positive control samples (i.e., LCS and surrogate spikes). All positive control sample recoveries were acceptable and no results were qualified based on LCS or surrogate recoveries.

Accuracy is also indirectly addressed via the negative control samples for field activities, as well as laboratory negative control samples such as method blanks and calibration blanks. Based on blank results validation, 115 results were qualified as described in Section 3.2, which represents only 1.4% of the total data points collected. No data were rejected based on blank results.

Bias as a component of accuracy is also evaluated with the validation of HT, calibration, internal standard performance, and quantitation results. Collectively these evaluations resulted in the qualification of only 0.4% of the total data points. No data were rejected based on these aspects of bias.

Evaluation of the remaining QC elements that contribute to accuracy, such as mass spectrometer tuning, compound or element identification, peak integration and mass spectral matches, and calculation/transcription verifications, did not result in the qualification or rejection of any data points during validation.

4.3 Representativeness

Representativeness is the measure of the degree to which data suitably represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Aspects of representativeness addressed during validation include the review of sample collection information in the COC documentation, conformity of laboratory analyses to Workplan intentions, adherence of the documented laboratory procedures to method requirements, and completeness of the laboratory data packages. Most of the issues identified during this evaluation did not result in the qualification of laboratory data but did involve resubmittals of data from the laboratories to correct problems that were discovered during the validation process. All of these issues were resolved. Other aspects of data representativeness, such as adherence to recommended HTs, instrument calibration requirements, as well as field and laboratory precision assessments, are discussed above in this report. The possible entrainment of contaminants and dilution by surface air also could impact the representativness of the soil gas and this is discussed above in this revised DVSR report as well as the Tronox response to NDEP comments on the original DVSR for the soil gas dataset. Very low levels of the helium tracer and consistency between the original and recollected sample results for VOC analytes both indicate the sampling was representative of the subterranean soil gas.

4.4 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that were or should have been collected. Valid data are defined as all the data points judged to be usable (i.e., not rejected, as a result of the validation process).

Field completeness is defined as the percentage of samples actually collected versus those intended to be collected per the Workplan. The goal stated in the QAPP for this project was greater than 90% field completeness. A comparison of the Workplan sample tables with the database sample IDs indicates that actual field completeness was 100%, exceeding the goal established for the project. This field completeness calculation is based on the total sample locations scheduled in the Workplan compared to the COC requests sent to the laboratories. All COC requests were faithfully executed by the laboratories with the minor exceptions detailed in the data validation memoranda.

Laboratory completeness is defined as percentage of valid data points versus the total expected from the laboratory analyses. The objective stated in the QAPP for this project was greater than 95% laboratory completeness. Actual laboratory completeness was 100% on the basis of sample analysis (i.e., all requested analyses were performed and reported by the laboratories), and ~~100~~99% completeness based on valid data.

4.5 Comparability

Comparability is a qualitative expression of the measure of confidence that two or more data sets may contribute to a common analysis. Because this project was an initial site investigation for all of the TO-15 parameters, involving new soil gas sampling locations, there was no well characterized historical data set for comparisons. Comparability of data within the investigation was maximized by using standard methods for sampling and analysis, reporting data, and data validation. A single laboratory performed all the analyses to eliminate interlaboratory variability.

4.6 Sensitivity

Sensitivity is the capability of a method or instrument to discriminate between measurement responses representing different levels of the variable of interest and particularly the capability of measuring a constituent at low levels. For the EPA methods employed in this project, sensitivity is measured by the MDL and reporting

limit (RL). Both nominal MDLs and RLs were provided by the laboratories in the laboratory data packages and were verified during validation. Reporting limits in general were adjusted for sample quantitation limits based on the low point of calibration and corrected for sample-specific factors such as exact aliquot size, canister pressure, dilutions, etc. The laboratories were instructed to report estimated (J flagged) results if concentrations above the MDL but below the RL were detected.

To determine if the adjusted reporting limits for all project analytes were low enough to meet the project sensitivity requirements, a comparison of the project regulatory comparison levels, based on 1/10 of the EPA Region 9 Preliminary Remediation Goals (PRGs) for ambient air, adjusted for vapor intrusion dilution, was made with the nominal laboratory RLs. Risk assessment will be based on the EPA Region VI MSSL values per NDEP request. In general the methods selected were sufficiently sensitive to meet the risk-based comparison level goals in soil gas samples and support potential vapor intrusion evaluation. The RLs and MDLs provided by the laboratories for this analyte set are typical of the TO-15 method employed and significantly lower detection limits are not routinely achievable using certified methods.

5.0 Conclusions

One hundred percent of the laboratory data for the Phase B Source Area Soil Gas Investigation were validated using standardized guidelines and procedures recommended by EPA and NDEP. Ninety ~~seven~~ four percent of the results for this project were accepted as reported by the laboratory without additional qualification based on validation actions and should be considered valid for all decision-making purposes.

A subset of the laboratory results was qualified during validation, and those results are summarized in **Tables E-4 to E-7**. The qualified data are grouped in these tables based on the reason for qualification (see **Table E-2**) and the qualifier symbols or flags applied (see **Table E-1**). ~~Three~~ Six percent of the results of the total analytical dataset for this project were qualified as estimated due to minor QC problems with precision, accuracy, and representativeness. Based on guidance in the EPA data usability document (EPA 1992), estimated data are considered usable with the appropriate interpretation (e.g., consideration of the potential bias). ~~No~~ All r~~r~~esults for a single sample were rejected during data validation based on helium tracer concentrations exceeding 10% of the surface shroud value~~.~~ This sample was successfully recollected and reanalyzed.

All the qualified results were evaluated with respect to the data quality indicators and compared to the QAPP and Workplan goals. Details of this evaluation are discussed in Section 4 of this report. Based on the results of data validation, the overall goals for data quality were achieved for this project.

6.0 References

EPA. 1992. Guidance for Data Usability in Risk Assessment. Part A.

EPA. 1999. USEPA "Contract Laboratory Program National Functional Guidelines for Organic Data Review."

EPA. 2001. USEPA "Draft Region 9 Superfund Data Evaluation/Validation Guidance."

ENSR. March 2008. Phase B Source Area Investigation Soil Gas Survey Workplan, Tronox LLC Facility, Henderson, Nevada.

ENSR. April 2008. Quality Assurance Project Plan, Tronox LLC Facility Henderson, Nevada.

ITRC, January 2007. Interstate Technology Regulatory Council "Technical and Regulatory Guidance - Vapor Intrusion Pathway: A Practical Guideline".

NDEP. 2006. NDEP "Guidance on Data Validation, BMI Pant Sites and Common Areas Projects, Henderson, Nevada."

NYSDOH, October 2006. New York State Department of Health "Final: Guidance for Evaluating Soil Vapor Intrusion in the State of New York"

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September 18, 2008

Susan Crowley
Tronox LLC
PO Box 55
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**
NDEP Facility ID #H-000539
Nevada Division of Environmental Protection (NDEP) Revised Response to:
Data Validation Summary Report (DVSR), *Phase B Source Area Investigation Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada*
Dated August 25, 2008

Dear Ms. Crowley,

Please accept this revised response letter that replaces NDEP's September 17, 2008 letter regarding the above-identified DVSR.

The NDEP has received and reviewed TRX's above-identified DVSR and provides comments in Attachment A. TRX should provide an annotated response-to-comments letter **by September 30, 2008** addressing these comments.

Please contact the undersigned with any questions at sharbour@ndep.nv.gov or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.
Staff Engineer III
Bureau of Corrective Actions
Special Projects Branch
NDEP-Las Vegas Office

SH:bar:sh

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Attachment A

1. **Helium Analysis**: Review of the laboratory reports from Columbia Analytical Services shows that helium analysis, using a modified method 3C, was performed on the Summa canister samples. It is unclear why helium analysis was required and why the soil gas samples would be exposed to helium. The DVSR should provide details on why helium analysis was performed along with a discussion of what impact helium detection in a sample has on the TO-15 results. For example, does helium indicate a soil gas sample was influenced from a purge gas? If helium detection in a sample does impact the VOC results the DVSR should also provide a validation of the helium analysis along with a discussion of the impact of helium results on the VOC data. Please respond **by September 30, 2008** with the rationale for the helium analysis and the potential effects the presence of helium would have on the analytical results.
2. **Recommendation for Future Reports**: It would benefit the readability of the report if future reports included the following information in the Introduction section of the DVSR:
   a. The number of SDGs included in this DVSR
   b. The SDG IDs
   c. The total number of samples taken
   d. The number of samples taken within each SDG
   e. An analyte list for each SDG.

TRONOX

Susan Crowley
Staff Environmental Specialist

(702) 651-2234
Fax (405) 302-4607
susan.crowley@tronox.com

September 30, 2008

Shannon Harbour, P.E.
Staff Engineer III
Bureau of Corrective Actions
Special Projects Branch
NDEP-Las Vegas Office

Subject: **Response to NDEP September 18, 2008 Comments**
Data Validation Summary Report (DVSR), Phase B Source Area Investigation
Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada
Dated August 25, 2008

Dear Ms. Harbour:

On September 18, 2008, the Nevada Division of Environmental Protection (NDEP) provided comments to the Tronox LLC (Tronox) Data Validation Summary Report dated August 25, 2008, which was prepared for the Phase B Soil Gas Survey conducted at the Tronox facility in Henderson, Nevada. This letter transmits the Tronox response to those comments.

If you have any comments or questions concerning this correspondence please contact me at (702) 651-2234.

Sincerely

Susan M. Crowley
Staff Environmental Specialist

Overnight Mail
Attachment: As stated
cc: See attached Distribution List

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			& Hard Data		
Bailey	Keith	Environ Answers	X	X	
Krish	Ed	ENSR	X	X	
Bilodeau	Sally	ENSR	X	X	
Flack	Mike	ENSR	X	X	
Ho	Brian	ENSR	X	X	
Kennedy	Robert	ENSR	X	X	
Bradley	Lisa	ENSR	X	X	
Lambeth	Jeff	Veolia			
Guerriero	Joe	AIG		X	
Giroux	Barry	GEI		X	
Stowers	Kirk	Broadbent			
Sahu	Rahnijit	BMI		X	
Crouse	George	Syngenta		X	
Erickson	Lee	Stauffer		X	
Kelly	Joe	Montrose			
Sundberg	Paul	Montrose		X	
Gibson	Jeff	AmPac			
Richards	Curt	Olin		X	
Bellotti	Michael	Olin		X	
Wilkinson	Craig	Timet		X	
Mack	Joel	Montrose Counsel			

Tronox Response to Comments

September 18, 2008 NDEP Letter Regarding
Data Validation Summary Report (DVSR),
Phase B Source Area Investigation Soil Gas Survey,
Tronox LLC Facility, Henderson, Nevada
(August 2008)

NDEP comment

1 **Helium Analysis**: Review of the laboratory reports from Columbia Analytical Services shows that helium analysis, using a modified method 3C, was performed on the Summa canister samples. It is unclear why helium analysis was required and why the soil gas samples would be exposed to helium. The DVSR should provide details on why helium analysis was performed along with a discussion of what impact helium detection in a sample has on the TO-15 results. For example, does helium indicate a soil gas sample was influenced from a purge gas? If helium detection in a sample does impact the VOC results the DVSR should also provide a validation of the helium analysis along with a discussion of the impact of helium results on the VOC data.

Tronox Response

Helium was used at each sample location as a tracer gas or leak-check compound during collection of soil gas samples. Ambient air has the potential to leak into the sampling system during sampling. This has the potential to dilute samples and produce results that underestimate actual site conditions or contaminate the sample with compounds present in the ambient air. Leakage can potentially occur at sample system connections, at surface bentonite seals (e.g., around rods and tubing), or at the top of the temporary soil gas probes.

The Interstate Technology Regulatory Council (ITRC) lists helium as an acceptable tracer compound for soil gas surveys. The laboratory (Columbia Analytical Services, Inc.), indicates that the presence of helium in a sample will not interfere with the TO-15 analysis and that the required reporting limits can still be achieved.

For the Phase B soil gas survey, the above-ground portion of the sample system (i.e., summa canisters, flow-controller, vacuum gauge, valves and tubing connections) was placed under a shroud (plastic box). Helium gas (provided by a compressed gas vendor) filled the shroud, creating an atmosphere surrounding the sampling system with between 5% to 55% helium. A hand-held helium meter was used to monitor the atmosphere within the shroud to ensure that the helium concentration was maintained as each sample was collected (see the attached **photos numbered 1 through 6**).

The laboratory was instructed to analyze each soil gas sample for helium as well as volatile organic compounds (VOCs). If helium was detected in a summa canister then the percent leak rate of helium was calculated for each sample (please see attached **Table E-8**). The ITRC, in their January 2007 document: "*Vapor Intrusion Pathway: A Practical Guideline*," indicate that: "A small amount of tracer in a sample does not necessarily indicate an unreliable sample. Some agencies, such as the New York Department of Environmental Conservation, allow tracer concentrations up to 10% of the starting concentration before considering the soil gas sample compromised. For gaseous tracer compounds, the starting concentration is the measured concentration under the shroud."

The percent leak for each soil gas sample where helium was detected is shown in the attached **Table E-8**. The percent leak was estimated as a ratio of the sample concentration to the average helium concentration measured in the shroud during sampling.

The helium concentration in the shroud was recorded at 5-minute intervals during sample collection. Of the fourteen soil gas samples with reported helium, the leak rate was estimated to be less than 1% in nine of the samples. The leak rate was estimated to be between 1% and 3% in three of the fourteen samples and greater than 3% in two of the fourteen samples. In four of the five samples where helium was reported above 1,000 parts per million by volume (ppmv) the soil gas probe was re-sampled **(Table E-8)**. In the cases, where the soil gas probe was re-sampled, helium was not reported in the re-sample. Soil gas sample (SG17B-05) could not be re-sampled because the laboratory data was reported after the field team and sampling equipment had left the site.

For purposes of data validation protocols, where soil gas samples were found with He, at less than a 1% leakage rate, the VOC data were considered to be usable data and were not qualified. Those samples with a helium leakage rate between 1% and 10% were considered usable but were qualified as estimates (added "J" flag). Where the leakage rate exceeded 10% the associated VOC data are not considered usable and will be rejected in the revised dataset.

Tronox is currently updating the DVSR, results table and databases to reflect the changes following the protocols as described above. Finalization of this revision will require concurrence from NDEP on the approach toward data validation protocols using the helium leak rate. Helium data were provided on a results only basis by the laboratory because it was considered only a screening tool, therefore validation of the helium data will not be provided.

NDEP Comment

2 **Recommendation for Future Reports**: It would benefit the readability of the report if future reports included the following information in the Introduction section of the DVSR:
   a. The number of SDGs included in this DVSR
   b. The SDG IDs
   c. The total number of samples taken
   d. The number of samples taken within each SDG
   e. An analyte list for each SDG.

Tronox Response

This information is provided in other sections of the DVSR and associated tables. A brief summary of this information and/or references to the appropriate tables containing the information will be included in the Introduction section of future DVSRs.

Table E-8
Calculated Helium Percent Leak for Phase B Soil Gas Samples
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson, Nevada

Soil Gas Sample ID[1]	Soil Gas Probe Resampled Because of Elevated Helium (yes/no)	Re-sampled Soil Gas Sample ID	Helium Concentration Reported in the Soil Gas Sample (ppmV)[2]	Starting helium concentration (%)	Helium concentration (%) inside the shroud measured every five minutes								Average helium concentration inside the shroud		% Average Leak[4]
					5 (min)	10 (min)	15 (min)	20 (min)	25 (min)	30 (min)	35 (min)	40 (min)	%	Converted ppmV[3]	
SG42B-05	Yes. 5/29/08	SG42BR-05	14,000	8.6	7.1	5.0	12.2	10.9	10.2				9.1	90,800	15.4
SG53B-05	Yes. 5/29/08	SG53BR-05	5,000	11.5	8.1	5.2	15.6	9.4	8.9	8.4			9.3	92,667	5.4
SG64B-05	No	--	60	27.7	38.6	55.3	51.9	48.8	45.4				48.0	480,000	0.0
SG29B-05	No	--	120	7.9	9.4	8.7	7.3	6.7	6.3				7.7	76,800	0.2
SG60B-05	Yes. 5/29/08	SG60BR-05	1,100	7.2	9.0	6.9	5.0	7.2	5.9	12.9	6.3		7.6	76,000	1.4
SG76B-05	No	--	44	9.5	13.7	5.4	16.7	15.5	8.1	9.2	5.1	6.3	10.0	100,000	0.0
SG86B-05	No	--	83	14.6	10.5	7.2	5.2	7.6	5.2	6.9	5.5		6.9	68,714	0.1
SG32B-05	No	--	110	10.9	9.8	6.5	5.4	8.3	7.9	7.2	5.2	6.8	7.1	71,375	0.2
SG17B-05[5]	No	see note 5	2,100	11.3	10.1	8.9	8.3	7.6	6.5	5.4			7.8	78,000	2.7
SG18B-05	No	--	190	8.5	8.5	8.3	6.3	15.4	10.6	7.3	5.1	5.7	8.4	84,000	0.2
SG23B-05	No	--	45	15.5	13.8	10.7	8.6	6.0	5.5	8.1	6.1		8.4	84,000	0.1
SG73B-05	No	--	160	12.0	9.4	8.5	7.2	6.4	5.5	10.5	8.9		8.1	80,571	0.2
SG36B-20	No	--	110	16.6	6.7	6.1	5.3	27.5	17.1				12.5	125,400	0.1
SG94B-05	Yes. 5/29/08	SG94BR-05	1,700	6.6	5.4	6.8	5.1	9.6	5.6				6.5	65,000	2.6

Notes

1 The list of samples identifies the 14 soil gas samples (of the more than 100 samples collected) that contained detectable concentrations of helium.
2 All soil gas samples were tested for helium by the laboratory. Only those samples where helium was detected are shown
3 Conversion factor: 1% v/v = 10,000 ppm
4 % Average leak = 100 x (He concentration (ppmV) in soil gas sample) / (average He concentration (%) x 10,000 ppmV)
5 The soil gas probe (SG17B-05) could not be resampled because the labortory data was reported after sampling equipment had been removed from the site.
-- Not applicable.

ENSR

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tronox LLC	Henderson, Nevada	04020-023-430

Photo No.	Date:
1	May-08

Activity:
Soil gas sampling

Description:
Preparation of sample point. The ground surface around the sample tubing is sealed with hydrated granular bentonite and covered with aluminum foil.

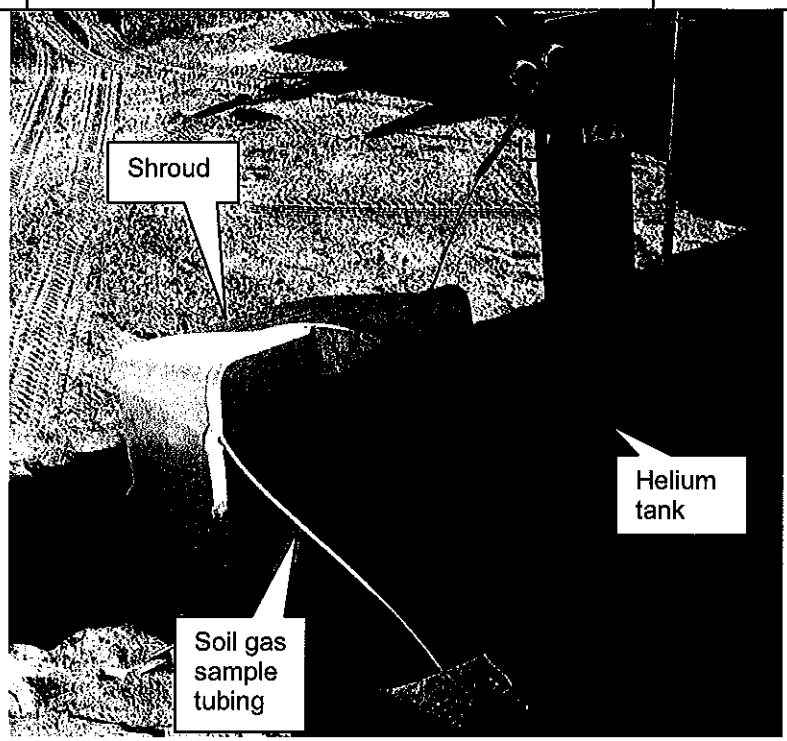
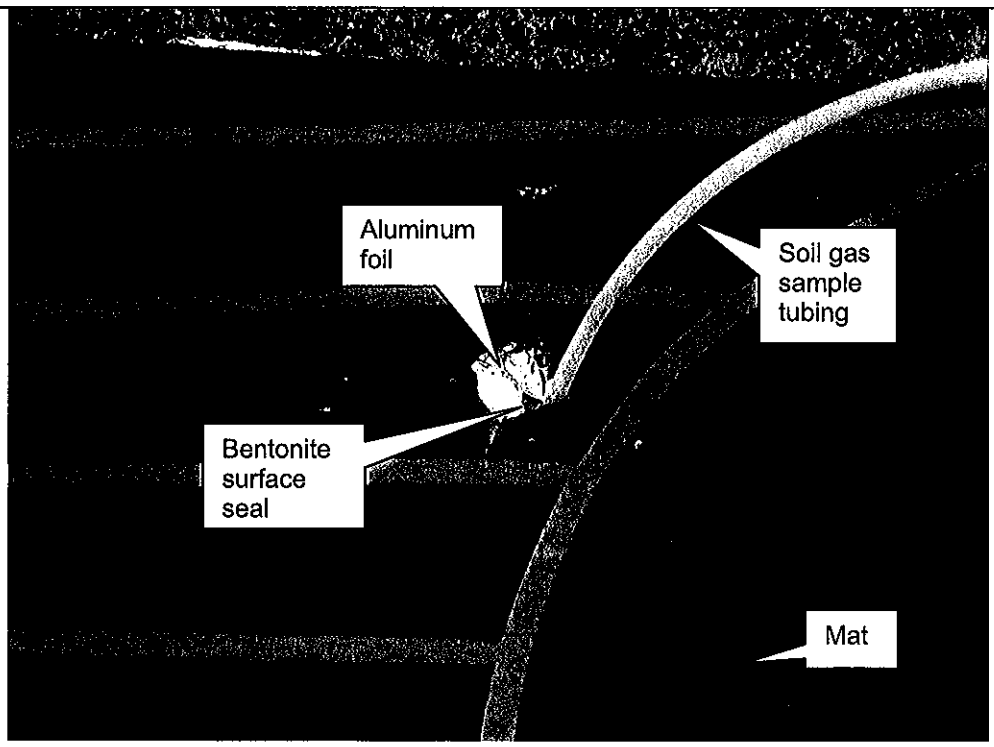


Photo No.	Date:
2	May-08

Activity:
Soil gas sampling

Description:
Preparation of sample point. Mat acts as seal for the shroud.



ENSR

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tronox LLC	Henderson, Nevada	04020-023-430

Photo No.	Date:
3	May-08

Activity:
Soil gas sampling

Description:
Setup of purge and sample canisters. Soil gas-sampling tubing is connected to intake valve. A flow control device (i.e., critical orifice) maintains purge and sample rate at 200 cc per minute. Vacuum gauge allows field personnel to monitor the vacuum within the sampling system.

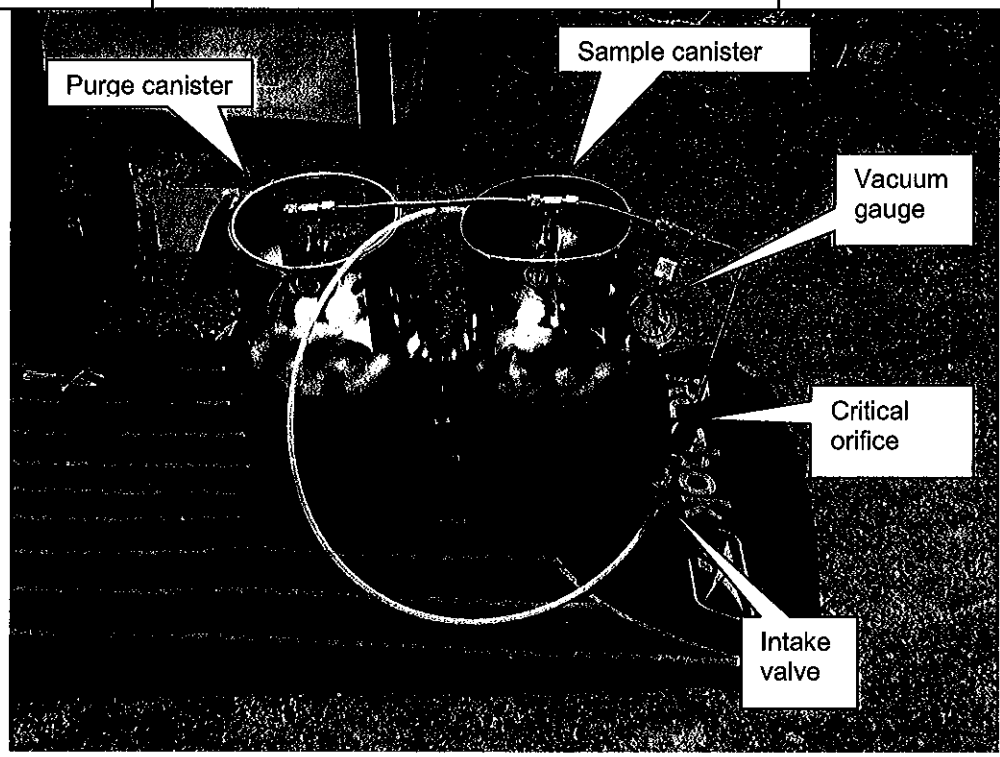
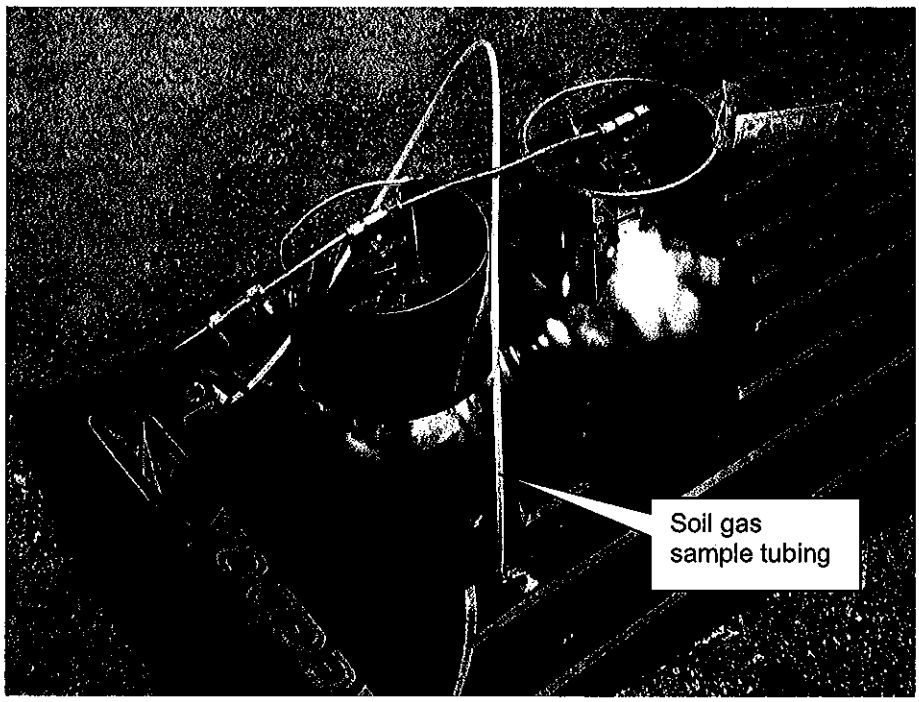


Photo No.	Date:
4	May-08

Activity:
Soil gas sampling

Description:
Setup of purge and sample canisters. Soil gas probe is set at 5 feet below ground surface. Soil gas flows from soil through tubing, to the intake valve, critical orifice, vacuum gauge, and into Summa canister.



ENSR

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Tronox LLC	Henderson, Nevada	04020-023-430

Photo No.	Date:
5	May-08

Activity:
Soil gas sampling

Description:
Sampling system in place and operational. Shroud is placed over the Summa canisters, gauge, valves, and tubing connections. Helium flows into the shroud creating a helium-enriched atmosphere.

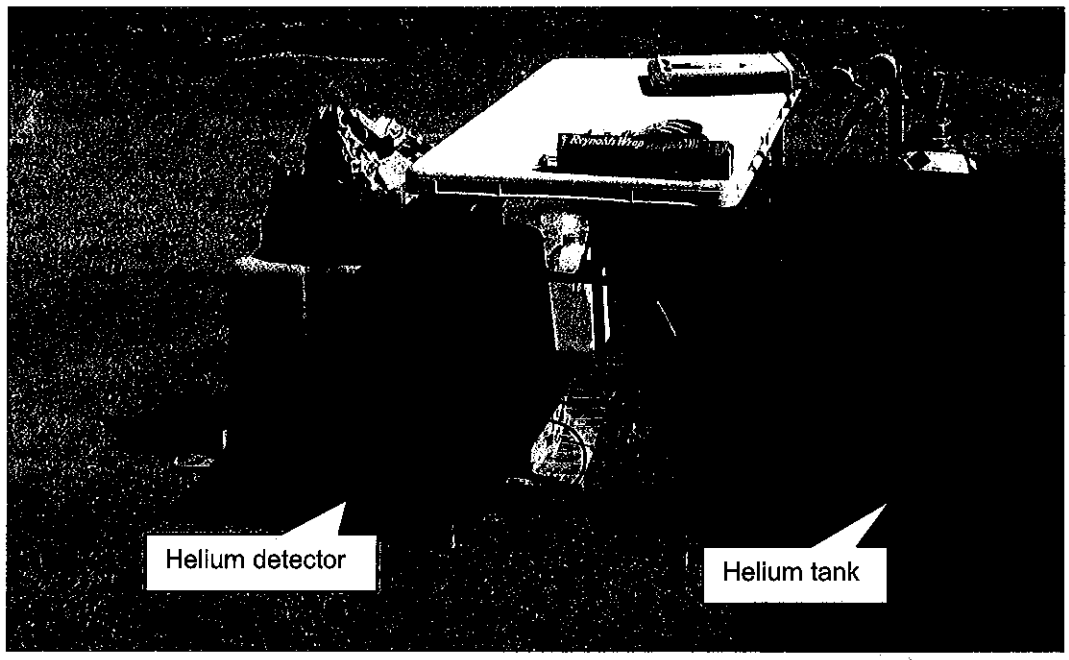
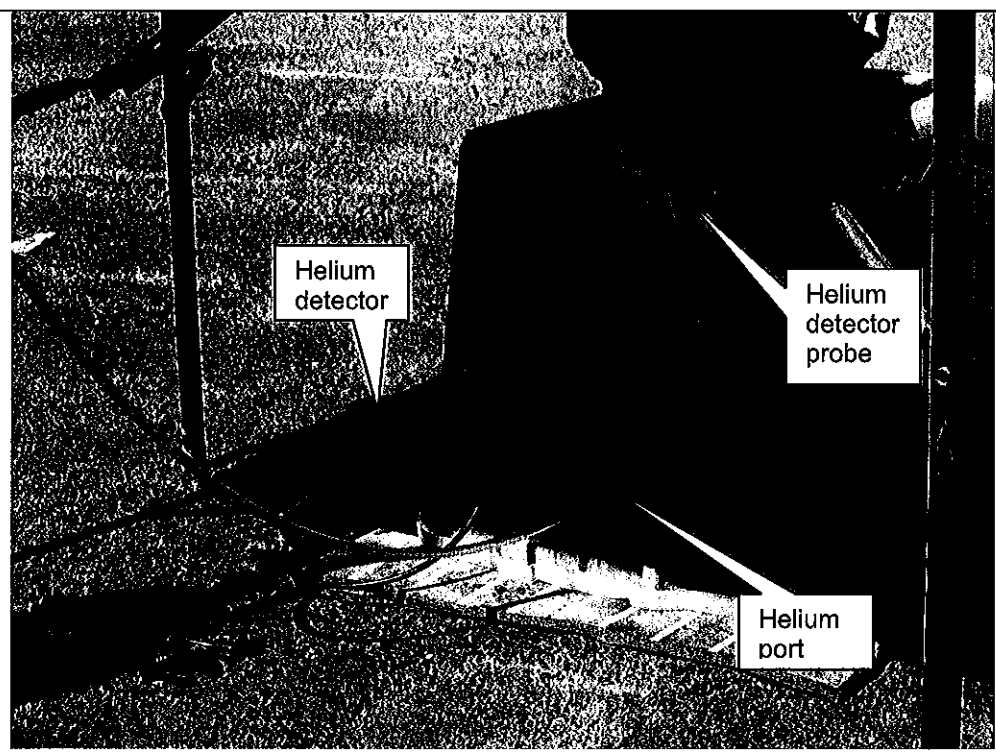


Photo No.	Date:
6	May-08

Activity:
Soil gas sampling

Description:
Sampling system in place and operational. Helium concentration inside the shroud is monitored with a handheld helium detector while the soil gas sample is being collected.



September 30, 2008

Susan Crowley
Tronox LLC
PO Box 55
Henderson, Nevada 89009

Re: **Tronox LLC (TRX)**
NDEP Facility ID #H-000539
Nevada Division of Environmental Protection (NDEP) Response to:
Response to NDEP September 18, 2008 Comments, Data Validation Summary Report (DVSR), Phase B Source Area Investigation, Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada, Dated August 25, 2008
Dated September 29, 2008

Dear Ms. Crowley,

The NDEP has received and reviewed TRX's above-identified Response-to-Comments (RTC) letter and provides additional comments in Attachment A. TRX should provide an annotated response-to-comments letter and revised DVSR **by October 14, 2008** addressing these comments. If TRX would find it helpful, a brief conference call with NDEP could be held to discuss these issues. Please contact the undersigned with any questions at sharbour@ndep.nv.gov or (702) 486-2850 extension 240.

Sincerely,

Shannon Harbour, P.E.
Staff Engineer III
Bureau of Corrective Actions
Special Projects Branch
NDEP-Las Vegas Office

SH:bar:sh

CC: Jim Najima, NDEP, BCA, Carson City
Brian Rakvica, NDEP, BCA, Las Vegas
Keith Bailey, Environmental Answers LLC, 3229 Persimmon Creek Drive, Edmond, OK 73013
Sally Bilodeau, ENSR, 1220 Avenida Acaso, Camarillo, CA 93012-8727
Barry Conaty, Holland & Hart LLP, 975 F Street, N.W. Suite 900, Washington, D.C. 20004
Brenda Pohlmann, City of Henderson, PO Box 95050, Henderson, NV 89009
Mitch Kaplan, U.S. Environmental Protection Agency, Region 9, mail code: WST-5, 75 Hawthorne Street, San Francisco, CA 94105-3901
Ebrahim Juma, DAQEM, PO Box 551741, Las Vegas, NV, 89155-1741
Ranajit Sahu, BRC, 311 North Story Place, Alhambra, CA 91801
Rick Kellogg, BRC, 875 West Warm Springs, Henderson, NV 89011
Mark Paris, Landwell, 875 West Warm Springs, Henderson, NV 89011
Craig Wilkinson, TIMET, PO Box 2128, Henderson, Nevada, 89009-7003
Kirk Stowers, Broadbent & Associates, 8 West Pacific Avenue, Henderson, Nevada 89015
George Crouse, Syngenta Crop Protection, Inc., 410 Swing Road, Greensboro, NC 27409
Nick Pogoncheff, PES Environmental, 1682 Novato Blvd., Suite100, Novato, CA 94947
Lee Erickson, Stauffer Management Company, P.O. Box 18890, Golden, CO 80402
Michael Bellotti, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312
Curt Richards, Olin Corporation, 3855 North Ocoee Street, Suite 200, Cleveland, TN 37312
Paul Sundberg, Montrose Chemical Corporation, 3846 Estate Drive, Stockton, California 95209
Joe Kelly, Montrose Chemical Corporation of CA, 600 Ericksen Avenue NE, Suite 380, Bainbridge Island, WA 98110
Dave Gratson, Neptune and Company, 1505 15th Street, Suite B, Los Alamos, NM 87544

Attachment A

1. RTC 1, NDEP has the following comments:
   a. The NDEP finds TRX's description and method acceptable.
   b. TRX should document the calibration and other QA/QC checks used during the helium analysis method and keep them for the record to document that helium results are based on quality procedures.
   c. TRX should also cite the ITRC source that discusses using helium tracer and the New York State Department of Environmental Conservation document that allows tracer concentrations up to 10% before the sample is considered compromised.
   d. TRX should note that all the sampling parameters and QC checks (e.g. dead volume) performed during the field work should be documented. This documentation does not have to be included in the DVSR but should be available if questions on the sampling arise.

Appendix D

Electronic Data Deliverable (EDD)

(Database files provided electronically or on CD separately)

Appendix E

Laboratory Reports March 2013

(Provided electronically or on CD separately)

Appendix F
Soil Boring Logs

Geraghty & Miller, Inc.

WELL LOG

Well No.: H-23

Project: Stauffer Chemical Company

Date Completed: 1/31/80

Location: Henderson, Nevada

Description	Depth Below Land Surface (feet)
Sand, silty to clayey, grayish-brown very fine to very coarse (poorly sorted), and gravel, pebbles, cobbles and boulders, rounded to subangular; also with layers of caliche and caliche-cemented sand and gravel Notes: layers of cemented sand and gravel 27'-29', 31'-34', 40'-41'; organic odor in mud at 37'	0 - 42½
Clay, silty, to silt, clayey, light brown with traces of sand and gravel in matrix; also, with occasional thin layers of sand, reworked caliche, and caliche (Muddy Creek Formation) Notes: thin layers of white silt and clay (reworked caliche) at 54'-55', 87', 96'.	42½ - 101

LITHOLOGY LOG

FOR HENDERSON

WELL NO. H-28

Description	Depth Below Land Surface (feet)
Sand, silty to clayey, grayish-brown very fine to very coarse (poorly sorted), and gravel, pebbles, cobbles and boulders, rounded to subangular; also with layers of caliche and caliche-cemented sand and gravel	0 - 44½
Clay, silty, to silt, clayey, light brown with traces of sand and gravel in matrix; also, with occasional thin layers of sand, reworked caliche, and caliche (Muddy Creek Formation)	44½ - 51

Data from Geraghty and Miller, Inc., October, 1980.

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION HENDERSON NV	BORING NUMBER M106

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
	0-4 Gravel, sdy, lt brn (5YR5/4), interbeds of sdy gravel and gravelly sd		GP							
4	Sd 40-60%, vf-vcg, A-SR, Gravel 40-60, pea size to 1/2", volc, com caliche rinds on clasts. Sl. calcareous		SW							
9	4-9 SAND, gravelly, H brn, com calichification vf-vc, A-SR, w/ 10-20% volc pea gravel.									
	9-20' SAND, gravelly & silty, lt brn. 10-20% silt in matrix, sd, vf-vc, A-SR, 25-35% pea gravel, volc, up to 2". Mod-com caliche rinds		GM							DAMP @ 15'
15										
20										
	20-28 SILT, lt brn (5YR5/4) w/ minor lt gry oran (10YR 8/4). Non-calcareous. Tr. vf-fg sd. 5-10% clay in matrix		ML							
25										
28										
	28-30 SILT, calcareous, lt brn. com. v. thin parallel calcareous laminae		ML							
30										
	30-38 SILT, sdy and SAND, silty, interbedded, lt brn. SLT : SD = 70:30. vfg, A-SA sd, 20%, in SILT 30-40% SILT in sd		ML/SM							WET @ 30'
35										
38										
	38-42 SAND, silty, lt brn, vfg w/ 30-40% silt		SM							

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL · AUGER · ROCK CORE · THIN-WALLED TUBE · CONTINUOUS SAMPLER · NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY · SILT · SAND · GRAVEL · SILTY CLAY · CLAYEY SILT · DEBRIS FILL · HIGHLY ORGANIC (PEAT) · SANDY CLAY · CLAYEY SAND

DATE DRILLED	PAGE
2-2-01	1 of 2

DRILLING METHOD: PERCUSSION
DRILLED BY: LAYNE
LOGGED BY: ED KRISH
EXISTING GRADE ELEVATION (FT. AMSL):
LOCATION OR GRID COORDINATES:

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION Henderson NV	BORING NUMBER M-106

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
42	sl. calcareous		SM							
	42-52 SILT, lt brn. w/ 10.% clay and 10% vfg sd		ML							
45										
	42-47 mod calcareous lt. gry oran (10YR 8/4)									
50							X	50 – 51.5	100 %	
	52-55 SILT, sdy, lt brn, 20-30% vfg sd.		ML							
55										
	55-64' SAND, silty. lt brn and paleoran (10YR 7/2) where calcareous. vfg, A-SA w/ 30-40% silt & 5-10% clay		SM							
60										
	58-62 calcareous									
64										
	64-75 SILT, sdy, lt brn, sl. calcareous. 20-25% vfg sd, 10% clay		ML							
70							X	70 – 71.5	100%	
75										
	75-78 SILT, sdy, 20% vfg, mottled lt. paleoran (10YR 8/2) & yell gry (5Y 8/1) com. calc. nodules, tr. gyp. 10-15% clay in matrix		ML							
78										TD @ 78'

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL | AUGER | ROCK CORE | THIN-WALLED TUBE | CONTINUOUS SAMPLER | NO RECOVERY

- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY | DEBRIS FILL | SILT | HIGHLY ORGANIC (PEAT) | SAND | SANDY CLAY | GRAVEL | CLAYEY SAND | SILTY CLAY | _____ | CLAYEY SILT | _____

DATE DRILLED	PAGE
2-2-01	2 of 2

DRILLING METHOD: Percussion

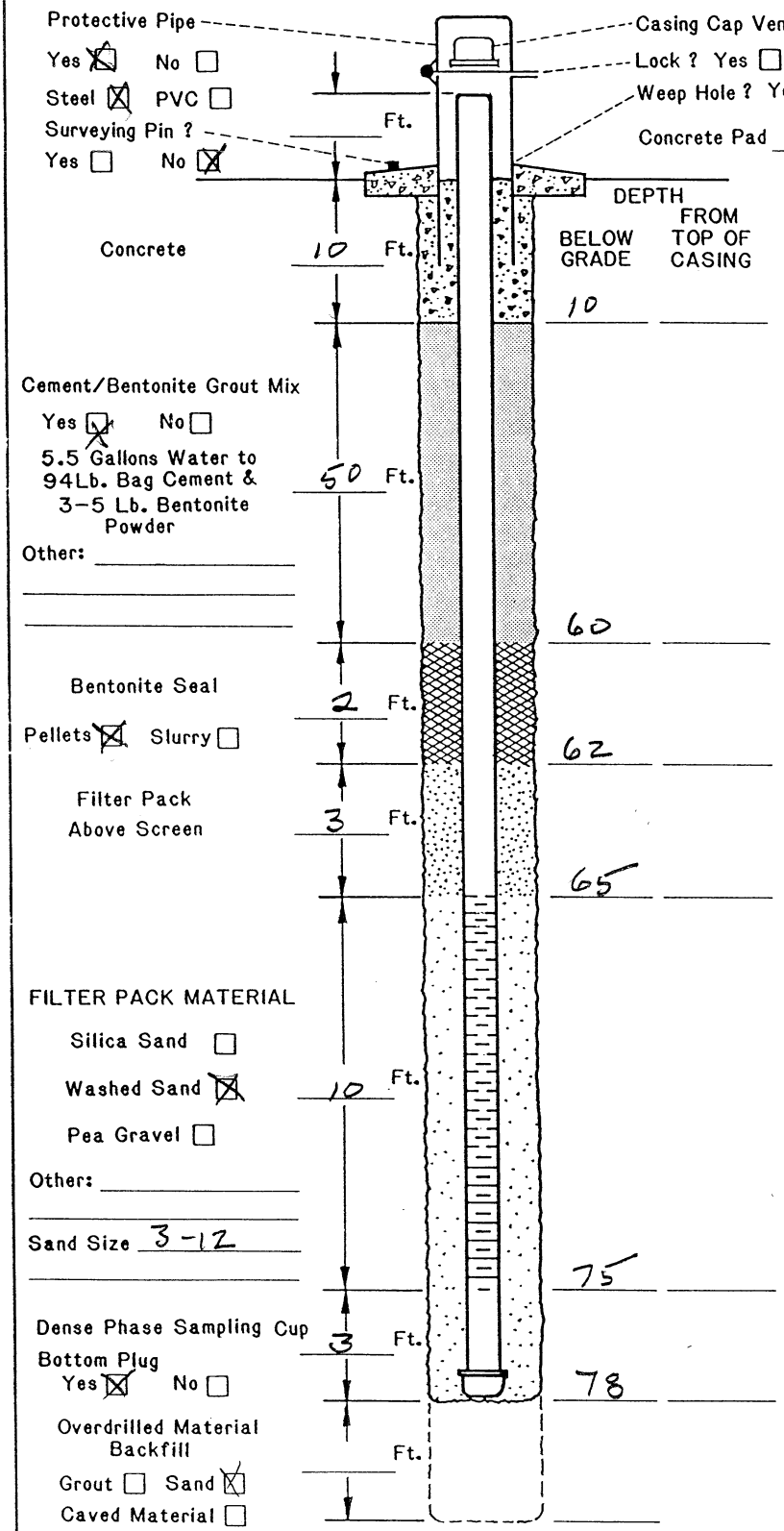
DRILLED BY: LAYNE

LOGGED BY: Ed Krish

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

KERR-McGEE CORPORATION
HYDROLOGY DEPARTMENT
MONITORING WELL INSTALLATION DIAGRAM



DRILLING INFORMATION:

1. Borehole Diameter= 9 Inches.
2. Were Drilling Additives Used ? Yes ☐ No ☒
   Revert ☐ Bentonite ☐ Water ☐
   Solid Auger ☐ Hollow Stem Auger ☐
3. Was Outer Steel Casing Used ? Yes ☐ No ☒
   Depth= _____ to _____ Feet.
4. Borehole Diameter for Outer Casing _____ Inches.

WELL CONSTRUCTION INFORMATION:

1. Type of Casing: PVC ☒ Galvanized ☐ Teflon ☐
   Stainless ☐ Other _____
2. Type of Casing Joints: Screw-Couple ☒ Glue-Couple ☐ Other _____
3. Type of Well Screen: PVC ☒ Galvanized ☐
   Stainless ☐ Teflon ☐ Other _____
4. Diameter of Casing and Well Screen:
   Casing 2 Inches, Screen 2 Inches.
5. Slot Size of Screen: 0.020
6. Type of Screen Perforation: Factory Slotted ☒
   Hacksaw ☐ Drilled ☐ Other _____
7. Installed Protector Pipe w/Lock: Yes ☒ No ☐

WELL DEVELOPMENT INFORMATION:

1. How was Well Developed ? Bailing ☐ Pumping ☒
   Air Surging (Air or Nitrogen) ☐ Other _____
2. Time Spent on Well Development ?
   _____/_____ Minutes/Hours
3. Approximate Water Volume Removed ? _____ Gallons
4. Water Clarity Before Development ? Clear ☐
   Turbid ☐ Opaque ☐
5. Water Clarity After Development ? Clear ☐
   Turbid ☐ Opaque ☐
6. Did Water have Oder ? Yes ☐ No ☐
   If Yes, Describe _____
7. Did Water have any Color ? Yes ☐ No ☐
   If Yes , Describe _____

WATER LEVEL INFORMATION:

Water Level Summary (From Top of Casing)

During Drilling 20 Ft. Date 2-2-01

Before Development _____ Ft. Date _____

After Development _____ Ft. Date _____

Driller/Firm LAYNE Drill Rig Type AP-1000 Date Installed 2-2-01

Drill Crew PERRY Well No. M-106 Kerr-McGee Hydrologist Ed Krish

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION HENDERSON, NV	BORING NUMBER M107

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
	TD 57' M107 is 10' S of M106. SEE M106 lith log for description									

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED: 2-2-01 | PAGE: 1 of 1

DRILLING METHOD: PERCUSSION

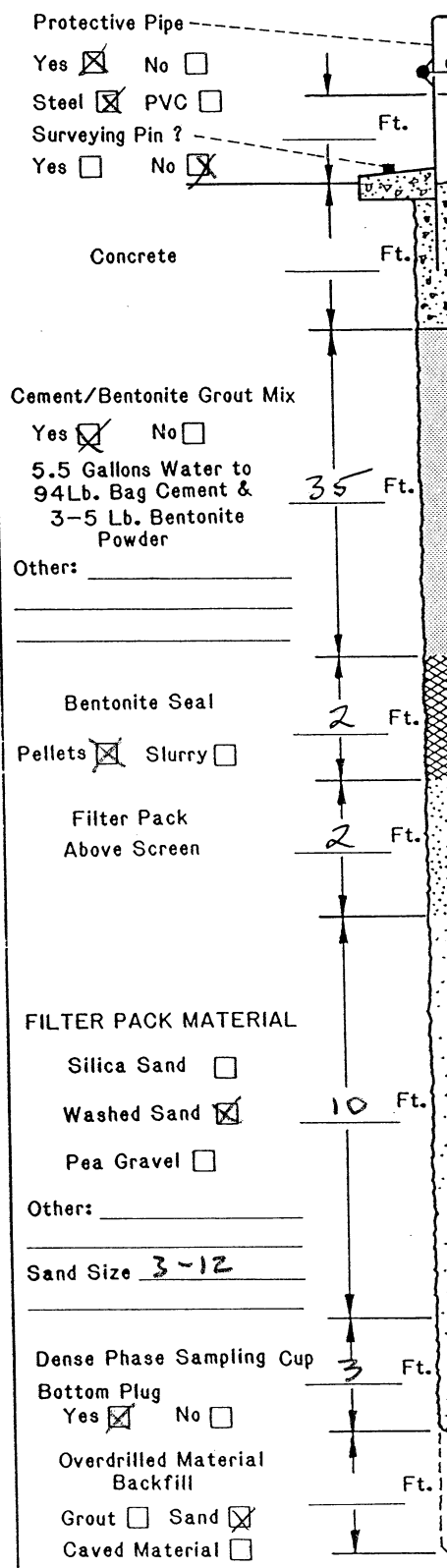
DRILLED BY: LAYNE

LOGGED BY: Ed Krish

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

KERR-McGEE CORPORATION
HYDROLOGY DEPARTMENT
MONITORING WELL INSTALLATION DIAGRAM



DRILLING INFORMATION:

1. Borehole Diameter= 9 Inches.
2. Were Drilling Additives Used ? Yes ☐ No ☒
   Revert ☐ Bentonite ☐ Water ☐
   Solid Auger ☐ Hollow Stem Auger ☐
3. Was Outer Steel Casing Used ? Yes ☐ No ☒
   Depth= _____ to _____ Feet.
4. Borehole Diameter for Outer Casing _____ Inches.

WELL CONSTRUCTION INFORMATION:

1. Type of Casing: PVC ☒ Galvanized ☐ Teflon ☐
   Stainless ☐ Other _____
2. Type of Casing Joints: Screw-Couple ☒ Glue-Couple ☐ Other _____
3. Type of Well Screen: PVC ☒ Galvanized ☐
   Stainless ☐ Teflon ☐ Other _____
4. Diameter of Casing and Well Screen:
   Casing 2 Inches, Screen 2 Inches.
5. Slot Size of Screen: 0.020
6. Type of Screen Perforation: Factory Slotted ☒
   Hacksaw ☐ Drilled ☐ Other _____
7. Installed Protector Pipe w/Lock: Yes ☒ No ☐

WELL DEVELOPMENT INFORMATION:

1. How was Well Developed ? Bailing ☐ Pumping ☒
   Air Surging (Air or Nitrogen) ☐ Other _____
2. Time Spent on Well Development ?
   _____ / _____ Minutes/Hours
3. Approximate Water Volume Removed ? _____ Gallons
4. Water Clarity Before Development ? Clear ☐
   Turbid ☐ Opaque ☐
5. Water Clarity After Development ? Clear ☐
   Turbid ☐ Opaque ☐
6. Did Water have Odor ? Yes ☐ No ☐
   If Yes, Describe _____
7. Did Water have any Color ? Yes ☐ No ☐
   If Yes , Describe _____

WATER LEVEL INFORMATION:

Water Level Summary (From Top of Casing)

During Drilling 20 Ft. Date 2-2-01

Before Development 19.47 Ft. Date 2-3-01

After Development _____ Ft. Date _____

Driller/Firm LAYNE Drill Rig Type AP-1000 Date Installed 2-2-01

Drill Crew Perry Well No. M-107 Kerr-McGee Hydrologist Ed Krish

ENSR	*Client:* Tronox LLC		**Boring No. M-117**
1220 Avenida Acaso Camarillo, California 93012 (805) 388-3775	*Project Number:* 04020-023-151		
	Site Location: Henderson, NV		
	Coordinates: 26715198.289 N , 828917.057 E NAD83	*Elevation:* 1877.98 ft, msl	*Sheet:* 1 of 2
	Drilling Method: Sonic - Continuous Core		*Monitoring Well Installed:* Yes
	Sample Type(s): Split Spoon/Core	*Boring Diameter:* 7-inch	*Screened Interval:* 130-150 feet
Weather: Cold, cloudy, 30s to 40s	*Logged By:* Ed Krish	*Date/Time Started:* 3/11/06 7:30 a.m.	*Depth of Boring:* 157 feet
Drilling Contractor: Prosonic	*Ground Elevation:*	*Date/Time Finished:* 3/11/06	*Water Level:* 79.4 feet

Depth (ft)	Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (feet)	Headspace (ppm)	U.S.C.S	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Depth (Ft.)
	M-117-0.5			10		SM (GM)	**ALLUVIUM:** SILTY/GRAVELY SAND, with silty gravel lenses present, pale yellow brown (10YR 6/4), 10-20% silt with trace clay, 60 to 80% sand (very fine- to very coarse-grained, angular to subrounded), 10 to 30% gravel to 2" maximum, (commonly 1/8" to 3/4", subangular to angular, volcanic to basaltic, well graded), dry, no unusual odor or staining.	
	M-117-5				0.0			
10	M-117-10			10	0.0			
20	M-117-20			10	0.0			
	M-117-20D							
30	M-117-30			10	0.0		From 27 to 40 ft: brown (5YR 5/4).	
40	M-117-40			10	0.0			40 ft
						GM	**ALLUVIUM:** SANDY SILTY GRAVEL, brown (5YR 5/4), 25% silt with trace clay, 35% sand (very fine- to very coarse-grained, angular to subrounded), 40% gravel to 2 1/2" maximum (commonly 1/8" to 1", angular to subangular), dry, no unusual odor or staining. From 46 to 47 ft: caliche zone at contact with Muddy Creek Fm - First coarse-grained facies at 47'.	47 ft
50	M-117-50			10	0.0	SM (GM)	**MUDDY CREEK FORMATION - FIRST COARSE-GRAINED FACIES:** SILTY SAND and GRAVELLY SAND, with silty gravel lenses present, brown (5YR 5/4 & 5/6), 20 to 45% silt with trace clay, 50 to 70% sand (very fine- to very coarse-grained, angular to subrounded), 0 to 20% gravel to 1" maximum (commonly 1/8" to 3/4", angular to subangular), dry, no unusual odors or staining.	
60	M-117-60			20	0.0			
70	M-117-70				0.0		Damp at 70' From 72 to 74 ft: caliche zone, nodular.	
80	M-117-80			17	0.0		From 79 to 85 ft: common caliche nodules to 1/2". Wet at 80'	▼
	M-117-80D							
90							From 85 to 100 ft: Sp. (?) caliche nodules to 1/2".	
100				20				

Notes:

Checked by SWB Date: 8/10/06

ENSR	Client: Tronox LLC			Boring No. M-118
1220 Avenida Acaso Camarillo, California 93012 (805) 388-3775	Project Number: 04020-023-151			
	Site Location: Henderson, NV			
	Coordinates: 26715068.012 N , 828036.397 E ; NAD 83	Elevation: 1874.53 feet		Sheet: 1 of 2
	Drilling Method: Sonic - Continuous Core			Monitoring Well Installed: Yes
	Sample Type(s): Split Spoon/Core	Boring Diameter: 7-inch		Screened Interval: 138-158 feet
Weather: Sunny, windy, 50s F	Logged By: Ed Krish	Date/Time Started: 3/8/06	11:45 am	Depth of Boring: 163 feet
Drilling Contractor: Prosonic	Ground Elevation:	Date/Time Finished: 3/8/06	5:05 pm	Water Level:

Depth (ft)	Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (feet)	Headspace (ppm)	U.S.C.S	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Depth (Ft.)
	M-118-0.5			10		SM (GM)	**ALLUVIUM:** SILTY SAND and GRAVELY SAND, with silty gravel lenses present, brown (5YR 5/5), 15 to 20% silt, 65 to 70% sand (very fine- to very-coarse-grained, angular to subangular), 10 to 20% volcanic gravel to 4" maximum (commonly granule to pea gravel, 18" to 1/4", angular to subangular), dry, no unusual odor or staining.	
	M-118-5				2.4			
10	M-118-10			10	12.8			
	M-118-20			10	5.1			
20	M-118-20D							
30	M-118-30			10	2.9			
40	M-118-40			10	4.7		From 40 to 51 ft: very pale orange (10YR 8/2) with common caliche nodules and soft cement in sand matrix, nodules to 2 1/2".	
50	M-118-50			10			From 51 to 52 ft: Silty Sand, very fine- to fine-grained, common caliche nodules, possibly reworked Muddy Creek Fm.	52 ft
						SM (GM)	**MUDDY CREEK FM - FIRST COARSE-GRAINED FACIES:** SILTY SAND and SILTY/GRAVELY SAND, with silty gravel lenses present, brown (5YR 5/5), 10 to 35% silt, 60 to 80% sand (very fine- to very coarse-grained, angular to subrounded), 0 to 15% granules and pea gravel (1/8" to 3/8", angular to subangular), interbedded, dry, no unusual odors or staining.	
60	M-118-60			7	0.4		From 52 to 62 ft: Local zones with caliche nodules (1/8" to 1" diameter).	
70				13			Damp at 75'	
80	M-118-80			7			From 77 to 80 ft: Local zones with caliche nodules (1/8" to 1" diameter). Wet from 80'	
90				13			From 83 to 87 ft: Local zones with caliche nodules (1/8" to 1" diameter).	
100				13	3.4		From 92 to 102 ft: Local zones with caliche nodules (1/8" to 1" diameter).	

Notes:

Checked by SWB Date: 8/10/06

ENSR	*Client:* Tronox LLC		**Boring No. M-120**
	Project Number: 04020-023-151		
	Site Location: Henderson, NV		
1220 Avenida Acaso Camarillo, California 93012 (805) 388-3775	*Coordinates:* 26715162.900 N, 828387.792 E, NAD 83 *Elevation:* 1875.81 ft, msl		*Sheet:* 1 of 2
	Drilling Method: Sonic - Continuous Core		*Monitoring Well Installed:* Yes
	Sample Type(s): Split Spoon/Core *Boring Diameter:* 7-inch		*Screened Interval:* 80-100 feet
Weather: Windy, 40s to 58s F	*Logged By:* Ed Krish *Date/Time Started:* 3/8/06 9:00 am		*Depth of Boring:* 107 feet
Drilling Contractor: Prosonic	*Ground Elevation:* *Date/Time Finished:* 3/8/06		*Water Level:* 79.47

Depth (ft)	Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (feet)	Headspace (ppm)	U.S.C.S	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Depth (Ft.)
	M-120-0.5			7		SW/SP	**ALLUVIUM:** SAND, brown (5YR 5/4), 20% silt and clay, 60% sand (very fine- to fine-grained with common medium- to very coarse-grained sand, angular to subangular), 20% granules and gravel (fine-grained to 1/2", angular to subangular), gravelly, dry, no unusual odors or staining.	
	M-120-5			3	0.0			
10	M-120-10			12	1.0			
20	M-120-20			10	1.8			21 ft
						GM	**ALLUVIUM:** SANDY GRAVEL, brown (5YR 5/4), 20% silt and clay, 30% sand (very fine- to very coarse-grained, angular to subangular), 50% gravel to 3 1/2" (mostly 1/8" to 1 1/2", angular to subangular, basaltic), dry.	26 ft
				3		SM	**ALLUVIUM:** SILTY SAND, brown (5YR 5/4), 25 to 35% silt, 75% sand (very fine- to fine-grained with minor medium to coarse-grained sand, angular to subangular), 0 to 5% granules and gravel (fine gravel to 1/4"), dry, no unusual odors or staining.	
30	M-120-30			11	0.8		From 31 to 41 ft: moderate calcite cement.	
40	M-120-40 M-120-40D			12	2.2		From 48 to 49 ft: caliche zone with nodules to 3 1/2".	
							Contact with Muddy Creek Fm at 49 ft	49 ft
50	M-120-50			12	1.6	SC/SM (GM)	**MUDDY CREEK FM - FIRST COARSE-GRAINED FACIES:** SAND, with silty gravel lenses present, silty gravel lenses present and varying amounts of silt, clay and/or gravel, brown (5YR 5/4), 0 to 20% clay, 10 to 50% silt, 50 to 70% sand (very fine- to fine-grained, with medium- to very coarse-grained sand, angular to subangular), 0 to 15% gravel (granules to fine gravel to 1", angular to subangular), dry.	
60	M-120-60			7	0.8		From 49 to 57 ft: sand, silty or clayey. From 57 to 83 ft: sand, gravelly ± silt.	
70				15				
80	M-120-80			7	1.8		Damp at 80'	▼
							From 83 to 102 ft: sand, silty.	
90				15			Wet at 85'	
100				8				

Notes:

Checked by SWB Date: 8/10/06

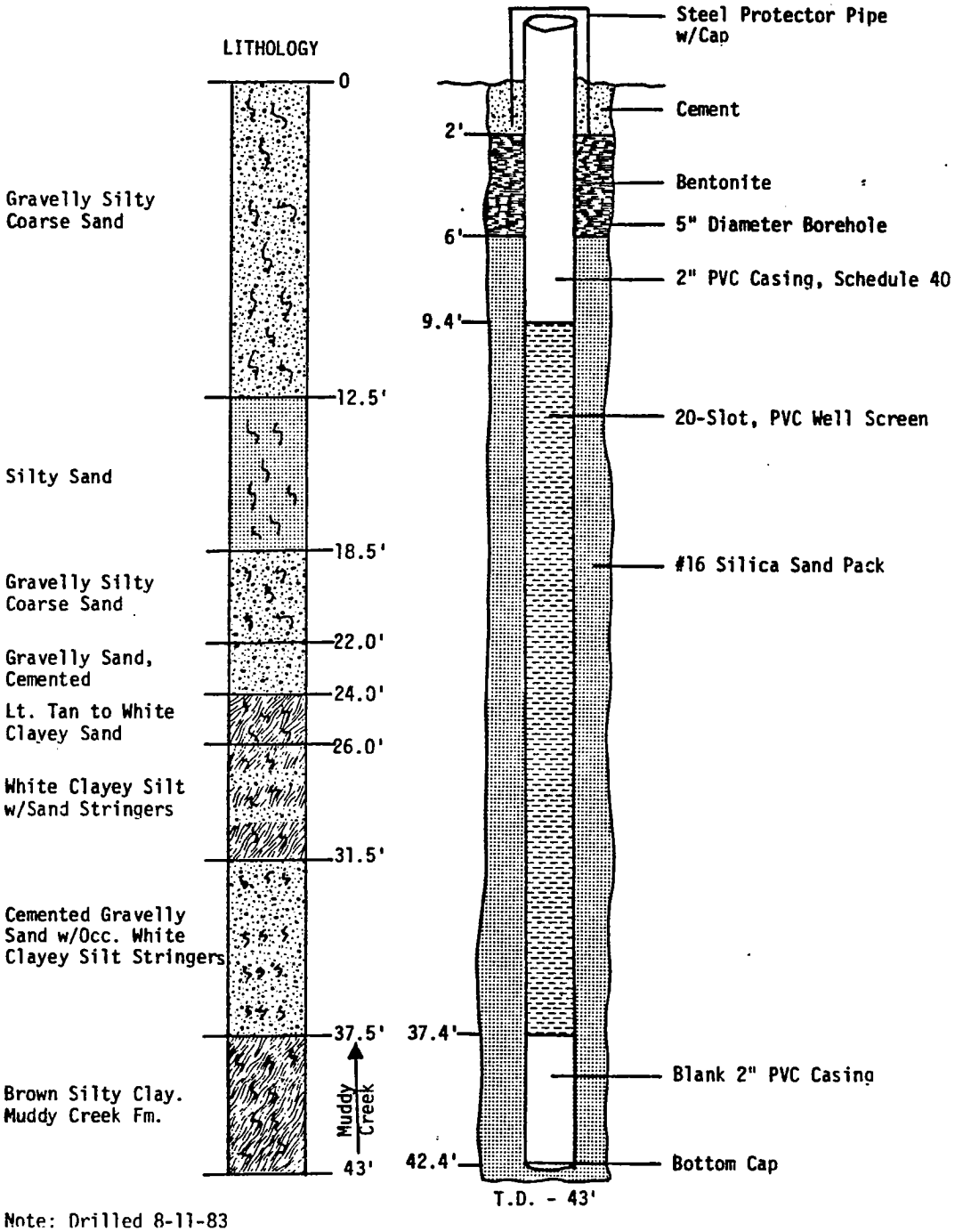
ENSR	*Client:* Tronox LLC		**Boring No. M-121**
	Project Number: 04020-023-151		
	Site Location: Henderson, NV		
1220 Avenida Acaso Camarillo, California 93012 (805) 388-3775	*Coordinates:* 26715001.237 N, 827694.571 E, NAD 83 *Elevation:* 1872.90 ft, msl		*Sheet: 1 of 2*
	Drilling Method: Sonic		*Monitoring Well Installed:* Yes
	Sample Type(s): Split Spoon/Core *Boring Diameter:* 7-inch		*Screened Interval:* 77-97 feet
Weather: Windy, cold, 30s F	*Logged By:* Ed Krish *Date/Time Started:* 3/10/06 7:30 am		*Depth of Boring:* 107 feet
Drilling Contractor: Prosonic	*Ground Elevation:* *Date/Time Finished:* 3/10/06 1:00 pm		*Water Level:* 76.1

Depth (ft)	Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (feet)	Headspace (ppm)	U.S.C.S	MATERIAL IDENTIFICATION, color, description of fine grained material (silt and clay) description of coarse grained material (sand and gravel), structural or mineralogical features, density or stiffness, moisture content, odors or staining.	Depth (Ft.)
	M-121-0.5			10		SM/GM	**ALLUVIUM:** SILTY/GRAVELLY SAND, brown (5YR 5/4), 15% silt with trace clay, 60% sand (very fine- to fine-grained, angular to subangular), 25% volcanic gravel (commonly 1/8" to 3/4", angular to subangular), dry, no unusual odors or staining.	
	M-121-5				0.0			
	M-121-5D							
10	M-121-10			10	0.0			
20	M-121-20			10	17.2			
30	M-121-30			10	2.0			
40	M-121-40			6	0.8		From 44 to 45ft: Silty Sand, 75% sand (very fine-grained sand with medium- to coarse-grained sand, angular to subangular), caliche zone with nodules to 4 1/2".	45 ft
				4				
50	M-121-50			10	3.3	SM (GM)	**MUDDY CREEK FM - FIRST COARSE-GRAINED FACIES:** SILTY SAND and GRAVELLY SAND, with silty gravel lenses present, brown (5YR 5/5), locally very silty to 40% silt with trace clay, gravely zones with 5 to 15% gravel (granules and fine gravel to 1", commonly 1/8" to 1/4", angular to subangular), no unusual odors or staining. From 45 to 52 ft: with 5% granules to 1/4".	
60	M-121-60			10	89.6		From 63 to 67 ft: with 10% granules to 1/4".	
70				13	104.0		From 71 to 72 ft: with 5% granules to 1/8". Damp at 71'	
80	M-121-80			17	0.0		From 77 to 79 ft: with 5% granules to 1/8". From 80 to 82 ft: with 15% granules, fine gravel to 1". From 82 to 89 ft: with 5% granules to 1/8". Wet at 80'	
90							From 89 to 92 ft: with 10% granules to 1/4".	
100				10			From 97 to 102 ft: with 5% granules to 1/8".	

Notes:

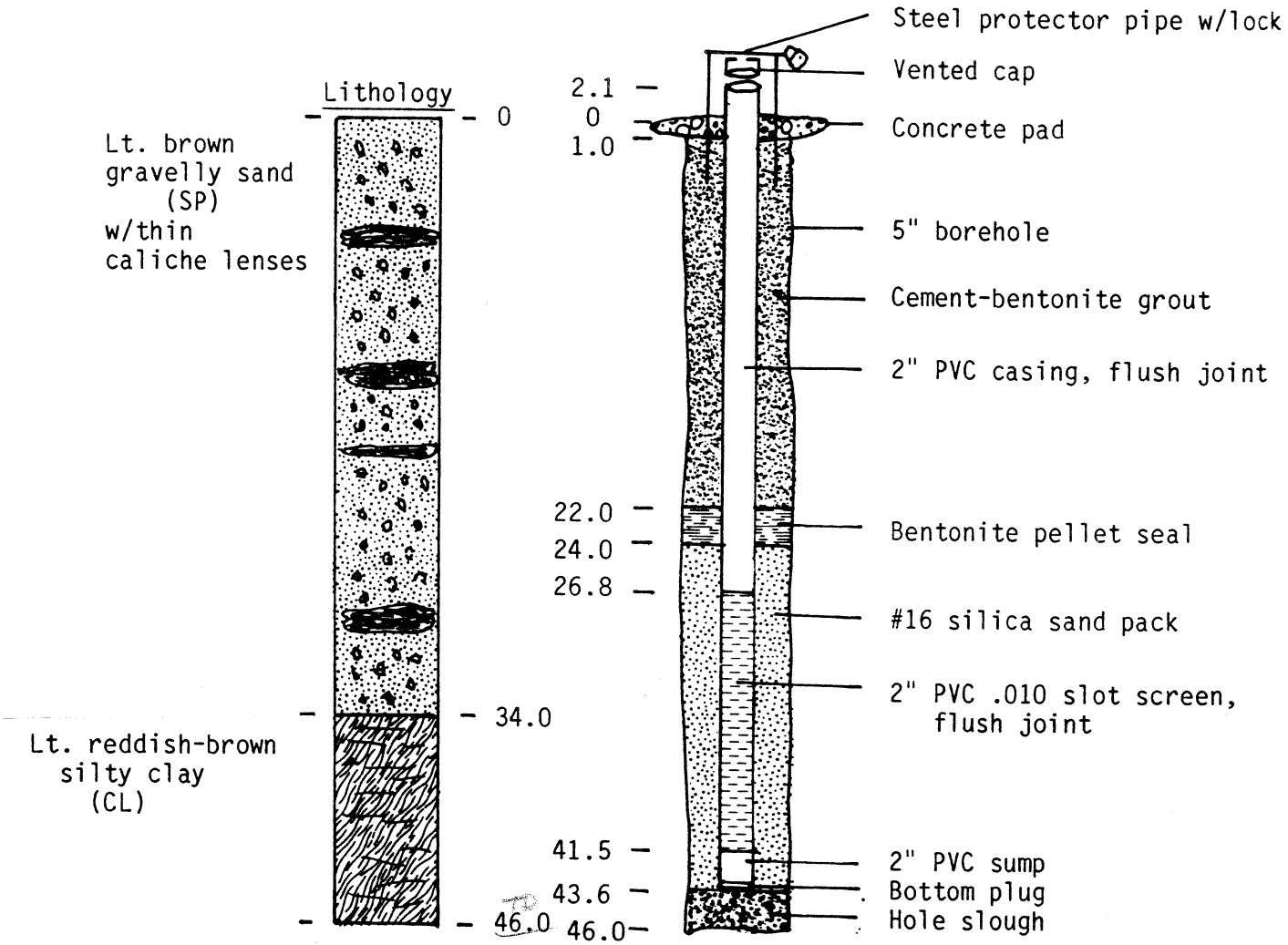
Checked by SWB Date: 8/10/06

WELL CONSTRUCTION DIAGRAM
MONITOR WELL M-23
HENDERSON FACILITY



Note: Drilled 8-11-83

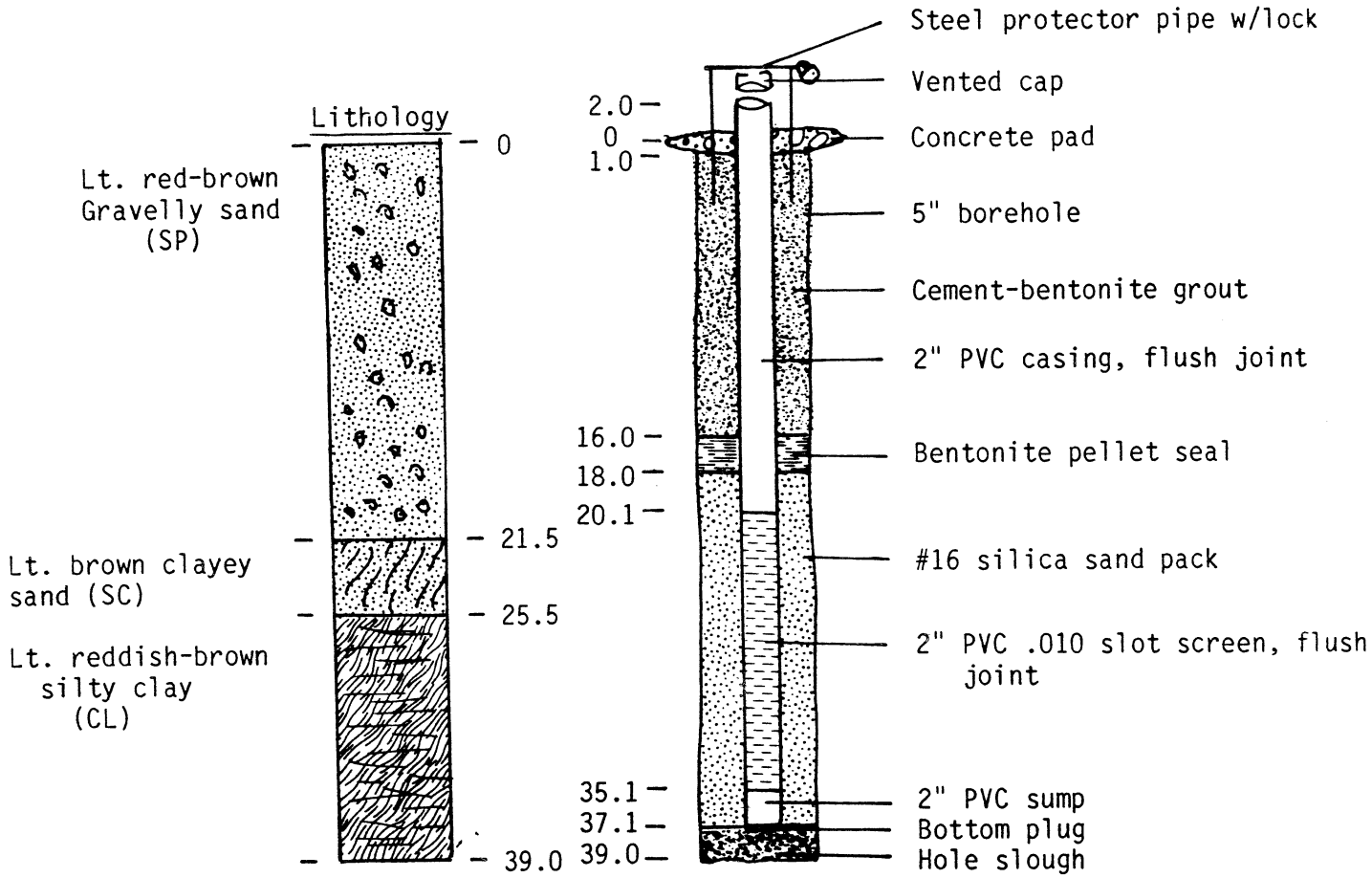
WELL CONSTRUCTION DIAGRAM
WELL M-6A
HENDERSON, NV



Date Drilled: 12-18-86
Drilled By: Mooney Drilling
Drilling Method: Rotary Wash
Logged By: W. M. Goodman, KM

WELL CONSTRUCTION DIAGRAM
WELL M-7A
HENDERSON, NV

P-A



Date Drilled: 12-18-86
Drilled By: Mooney Drilling
Drilling Method: Rotory Wash, Bentonite
Logged By: W. M. Goodman, KM

SOIL BORING LOG KM—5655-A

KERR-McGEE CORPORATION Hydrology Dept. Engineering Services	KM SUBSIDIARY CHEMICAL	LOCATION HENDERSON, NV.	BORING NUMBER M-92

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE NO	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SILTY SAND, LT-MEDIUM BROWN, WELL GRADED, DRY TO SLIGHTLY MOIST		SM							
5	CALICHE-CEMENTED GRAVEL ZONE @ 4-6'									
10	SILTY SAND; FINE- COARSED GRAINED, CALICHE CEMENTED GRAVELLY ZONE @ 9-14'									EARTHY OR MUSTY ODOR NOTED DURING DRILLING
15	SILTY SAND AS ABOVE, BECOMING MODERATELY MOIST @ 18'		SM							
20	SILTY CLAY, LT. BROWN, SLI. TO MODERATELY MOIST, STIFF, OCC. FINE TO MED SAND GRAINS		CL							
25										
30										
35	SILTY CLAY AS ABOVE; SATURATED, MOD. PLASTIC									
40										

EXPLANATION

- Water Table (24 Hour)
- Water Table (Time of Boring)
- PID — Photoionization Detection (ppm)
- NO. — Identifies Sample by Number
- TYPE — Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH — Depth Top and Bottom of Sample
- REC. — Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC PEAT
- SANDY CLAY
- CLAYEY SAND
- CALICHE

DATE DRILLED	5/4-5/93
PAGE	1 of 2
DRILLING METHOD	HOLLOW STEM AUGER
DRILLED BY	WESTERN TECH.
LOGGED BY	— REED
EXISTING GRADE ELEVATION FT AMSL	~1800'
LOCATION OR GRID COORDINATES	

SOIL BORING LOG KM—5655-A

KERR-McGEE CORPORATION Hydrology Dept. Engineering Services	KM SUBSIDIARY CHEMICAL	LOCATION HENDERSON, NV.	BORING NUMBER M-93

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
1	GRAVEL FILL									
	SILTY SAND, LT TO MED. BROWN, DRY, AND GRAVEL 1-6'		SM		0					
5	SILTY SAND AS ABOVE, GRAVEL AND COBBLES COMMON FROM 6-10'				0					NO HYDROCARBON ODOR
					0					
					0					
10	SILTY SAND AS ABOVE, BECOMING SLI. MOIST; CALICHE-CEMENTED GRAVELLY ZONE FROM 14-15'				0					
					0					
15		XX	SM		0					
		XX			0					
20					0					
					0					
23.5					0					
25	SILTY CLAY, LT. BROWN, SLI. MOIST, STIFF, SAND GRAINS COMMON		CL		0					
					0					
30					0					
	SILTY CLAY SATURATED @ 33'	▽			0					NO HYDROCARBON ODOR
33					0					
35					0					
					0					
40					0					

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL · AUGER · ROCK CORE · THIN-WALLED TUBE · CONTINUOUS SAMPLER · NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY · SILT · SAND · GRAVEL · SILTY CLAY · CLAYEY SILT · DEBRIS FILL · HIGHLY ORGANIC (PEAT) · SANDY CLAY · CLAYEY SAND · CALICHE

DATE DRILLED	PAGE
5/5/93	1 of 2

DRILLING METHOD: HOLLOW STEM AUGER
DRILLED BY: WESTERN TECH.
LOGGED BY: T. REED
EXISTING GRADE ELEVATION FT. AMSL: ~1798'
LOCATION OR GRID COORDINATES:

P-A 6/03

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION HENDERSON, NV	BORING NUMBER PC 102

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
	0-8 GRAVEL, gry brn, sl. sdy (10-15) m-vc & sl slty (10%). Grav. up to 4", ave 1/2"		GP							start 11AM, finish 11:30 am wet @ 0' WTR @ 2'
8	8-14 slty SAND & slty sdy GRAVEL, interbedded		SM/GM							dry 8-9' wet @ 9'
	8-9 brn, slty (40%) vf-f sd									
	9-11 brn slty sdy gravel, 30% silt, 20% f-c sd, 50% pea gravel to 1"									
14	11-14 brn, slty vf-f sd		ML/SM							
19	14-19 sdy SILT and slty SAND, interbedded, brn to ltgrnish brn. vf-f sd		GW							
22	19-22 sdy GRAVEL, gry brn, 30-40% vf-vc, A-SR sd in gran./pea gravel, SR-R, to 1/2" (vol/c)		SM							
24	22-24 slty SAND, brn 30% silt in vf-fg sd		GM/SM							
28	24-28 slty sdy GRAVEL, dec silt from 30% @ 24 to 15% @ 28'. brn, f-mw/cg SR sd in pea grav/gran to 1/2-3/4"		GW							
	28-36 sdy GRAVEL, gry brn & whtish. Contains abu lg. gravels. 20-30% f-vc; SR sd in gran/pea gravel ave 1" w/ up to 6" locally		GM/SM							
36			GW							
39										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED	PAGE
8-17-00	1 of 2

DRILLING METHOD: PERCUSSION

DRILLED BY: LAYNE

LOGGED BY: ED KRISH

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION Henderson, NV	BORING NUMBER PC 36

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SAND, gravelly, f-m w/c-vc									
	0-12.5' mod yell brn (10YR5/4) f-m sd (w/ minor c-vc) and minor gravel (10-20% of 1/4"-1 1/4"). Dry. Contains 10-15% silt. Minor caliche cement		SW/GW							
5										
10	@12.5 damp									
12.5										
	SAND, silty & gravelly, f-m w/c-vc		GM							wet @ 15' ▽
15	12.5-15' 15-20% 1/4"-1/2" grav and 25-30% silt.									
	SAND, silty, mod yell brn, SA-SR, 30% silt, no gravel f-m w/c grained		SM							
20										
25										Water sample taken when hole 30' deep
27										
	SAND, mod yell brn, vf-f w/m, compact, w/ 20% silt		SP/SM				X	29-30	100	
30.5										
	SAND, silty, gravelly, f-m w/c-vc and 10-15% 1/4" gravel. 25-30% silt. Minor caliche cement		SM							
35										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL · AUGER · ROCK CORE · THIN-WALLED TUBE · CONTINUOUS SAMPLER · NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY · SILT · SAND · GRAVEL · SILTY CLAY · CLAYEY SILT · DEBRIS FILL · HIGHLY ORGANIC (PEAT) · SANDY CLAY · CLAYEY SAND

DATE DRILLED	PAGE
4-27-98	1 of 2

DRILLING METHOD: Auger
DRILLED BY: Weber
LOGGED BY: E.J. Krish
EXISTING GRADE ELEVATION (FT. AMSL):
LOCATION OR GRID COORDINATES:

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCLLC	LOCATION HENDERSON, NV.	BORING NUMBER PC-37

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
5	SAND / SILTY SAND; OCC. GRAVEL; LT. TAN-BROWN; WELL-GRADED; GRAVEL ZONE @ 3-4'		SM							
10	SAND AS ABOVE; GRAVEL ZONE @ 12-13'									
15	▽									
20	SAND AS ABOVE; GRAY-BROWN; GRAVEL ZONE @ 22'									
25										
27	SANDY SILT; OCC. GRAVEL; LT. GRAY-BROWN; SATURATED		ML							
30										
35										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL; AUGER; ROCK CORE; THIN-WALLED TUBE; CONTINUOUS SAMPLER; NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY; SILT; SAND; GRAVEL; SILTY CLAY; CLAYEY SILT; DEBRIS FILL; HIGHLY ORGANIC (PEAT); SANDY CLAY; CLAYEY SAND; _____; _____

DATE DRILLED	PAGE
4/27/98	1 of 2

DRILLING METHOD: HSA

DRILLED BY: WEBER DRLG.

LOGGED BY: T. REED

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION Henderson, NV	BORING NUMBER PC38

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SAND, gravelly, lt brn 0-40', f-m w/ c-vc sd and 30-35% 1/4-3/4" grav. (Minor 3/4"-2" grav), Slight silty 5-10%. Minor caliche cement throughout		SW							
5										
10										
15										
20	20'-40' 20% silt, lt brn sd and grav as above									
25										
30										DAMP @ 33' ▽
35										MOIST-WET @ 40'

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND

DATE DRILLED	PAGE
4-27-98	1 of 2
DRILLING METHOD: AUGER	
DRILLED BY: WEBER	
LOGGED BY: E J Krish	
EXISTING GRADE ELEVATION (FT AMSL)	
LOCATION OR GRID COORDINATES	

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMLLC	LOCATION HENDERSON, NV	BORING NUMBER PC-39

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SAND / SILTY SAND; LT. TAN-BROWN; OCC. GRAVEL; SLI. MOIST; WELL-GRADED									
5										
			SM							
10	SAND AS ABOVE; GRAVEL ZONE @ 10'									
15										
17	▽									
20										
25										
			SM							
30										
	GRAVEL ZONE @ 33-35'									
35										
40										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED	4/27/98
PAGE	1 of 2
DRILLING METHOD	HSA
DRILLED BY	WEBER DRLG.
LOGGED BY	T. REED
EXISTING GRADE ELEVATION (FT. AMSL)	
LOCATION OR GRID COORDINATES	

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION HENDERSON, NV	BORING NUMBER PC 40

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SAND, gravelly, mod yell brn (10YR 5/4). Contains 20-30% 1/4"-3/4" gravel. Slightly silty (5%).									
5	0'-10' w/ minor cobbles - 3/4"-3"									
10	minor caliche cement throughout									
	0'-43' sand is f-m w/ minor c-vc									
15			SW							@ 18' damp
20										
25										
30									▽	@ 30' moist-wet
	32'-35' cobbles w/ caliche cement									
35										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED	PAGE
4-27/28-98	1 of 2
DRILLING METHOD: AUGER	
DRILLED BY: WEBER	
LOGGED BY: E. J. Krish	
EXISTING GRADE ELEVATION (FT. AMSL)	
LOCATION OR GRID COORDINATES	

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION HENDERSON, NV	BORING NUMBER PC 42

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SAND, gravelly, lt brn (5YR 6/4), poorly sorted, SA-SR, f-vc w/ 20-30% 1/4"-3/4" gravel. Weak caliche cement throughout									
5										
10	0'-41' sparse silt (5-10%)									
15										
20			SW							
25										
30	31'-41' Calichefied sand and gravel, slow drilling, poor returns									31'-41' hard drilling - sample off auger flites
35										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- ☐ _____
- ☐ _____

DATE DRILLED	4-28/29-98
PAGE	1 of 2
DRILLING METHOD	AUGER
DRILLED BY	WEBER
LOGGED BY	E.J Krish
EXISTING GRADE ELEVATION (FT. AMSL)	
LOCATION OR GRID COORDINATES	

SOIL BORING LOG KM—5655-A

KERR-McGEE CORPORATION Hydrology Dept. Engineering Services	KM SUBSIDIARY Chemical	LOCATION Henderson, NV	BORING NUMBER PC-71

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
5	Tan to reddish brown silty sand with variable small to medium gravel in thin layers. Alluvial Deposits		GM							
10										
15										
20	Chiefly sand and Gravel		SP					17.5-18	0.5	1055
	Hard red clay		CL							
	reddish-brown silty clay							20-21	1'	1045
25			CL					24.5-26	1.5	1055
								27-28	1'	1110
30	Reddish-brown clay, blocky, dry-to-moist Creek TD 33 Ft		CL					30-31	1'	1130
35										

EXPLANATION

- Water Table (24 Hour)
- Water Table (Time of Boring)
- PID — Photoionization Detection (ppm)
- NO. — Identifies Sample by Number
- TYPE — Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH — Depth Top and Bottom of Sample
- REC. — Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND

DATE DRILLED: 11-30-98 | PAGE: 1 of 1

DRILLING METHOD: Hollow Stem Auger

DRILLED BY: Compliance Drilling

LOGGED BY: Steve Lower

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-A

KERR-McGEE CORPORATION Hydrology Dept. Engineering Services	KM SUBSIDIARY Chemical	LOCATION Henderson, NV	BORING NUMBER PC-72

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
5	Tan to reddish brown silty sand with variable small to medium gravel Alluvial Sequence		GM							
10										
15										
20										
25							X	25-25	0.5	1515
30	Sequence of caliche and gray coarse sand		SP							
35	Reddish-brown clay, firm, blocky - muddy Creek		CL				X	35-35	0.5	1600
							X	35-36	1'	0750
							X	37-38	1'	0810
40	TD 38 ft									

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED	PAGE
12-1-98	1 of 1

DRILLING METHOD: Hollow Stem Auger

DRILLED BY: Compliance Drilling

LOGGED BY: Steve Lower

EXISTING GRADE ELEVATION (FT AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM—5655-A

KERR-McGEE CORPORATION Hydrology Dept. Engineering Services	KM SUBSIDIARY Chemical	LOCATION Henderson, NV	BORING NUMBER PC-73

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER FOOT	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0–30	Tan to reddish brown silty sand with variable small to medium gravel in thin layers		GM							
30–40	Gray silty sand with small gravel		GM							

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED: 12-1-98

PAGE: 1 of 2

DRILLING METHOD: Hollow Stem Auger

DRILLED BY: Cascade Drilling

LOGGED BY: Dave Lowry

EXISTING GRADE ELEVATION (FT. AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION HENDERSON, NV	BORING NUMBER TR11

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	0-4 GRAVEL, sdy, mod yell brn (10YR 5/4), sd vf-vc, gravel up to 1" diam. A-SR, com caliche cement		GW							
5	4-8 sand, vf-vc, A-SA		SW							
	7-8 hard caliche									
10	8-28 SAND, gravelly, gry oran (10YR 7/4) to mod yell brn (10YR 5/4). vf-vc, A-SA, gravel to to 1" diam Com. caliche cement		SP							
15										
20										
25	24-28 lg cobbles w/ com caliche, hard		GP							
30	28-32 SAND, w/ minor caliche and granules vf-vc		SW							
35	32-50 GRAVEL, hard, cemented, fractured. Com caliche cement. Minor sd interbeds and in matrix Gry oran and dusky yell brn		GW							

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL · AUGER · ROCK CORE · THIN-WALLED TUBE · CONTINUOUS SAMPLER · NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY · SILT · SAND · GRAVEL · SILTY CLAY · CLAYEY SILT · DEBRIS FILL · HIGHLY ORGANIC (PEAT) · SANDY CLAY · CLAYEY SAND

DATE DRILLED	PAGE
10-10-99	1 of 7

DRILLING METHOD: ARCH
DRILLED BY: BEYLIK
LOGGED BY: Ed Krish
EXISTING GRADE ELEVATION (FT AMSL)
LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMC LLC	LOCATION HENDERSON	BORING NUMBER TR-12

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
5	0-5 GRAVEL w/silty sd in matrix. Com caliche coatings. Sized up to 2', volcanics		GM							
10	5-10 SAND, silty w/ mod cobble-size volc gravel, Com caliche coatings. Sd vf-vc, A-SR		SW							
15	10-19 Gravel, boulders, w/com. caliche coatings. Mod vf-vc silty sand matrix dk yell brn (10YR 2/2) and gry oran (10YR 7/4)		GW							
19										
21	19-21 SAND, silty w/mod pea gravel, volc.		SW							
27	21-27 Gravel, boulders w/mod silty sd matrix. dk yell brn + gry oran. Sd vf-vc. Mod cemented Com caliche coatings		GW							
30	27-36 GRAVEL, up to boulder size w/ minor vf-vc sd matrix. HARD well cemented w/ caliche		GP							
36										
38	36-38 SAND, HARD, well cemented (caliche), vf-vc		SP							
39	38-39 SAND + GRAVEL, as above, uncemented		GW SP							

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND

DATE DRILLED	PAGE
10-16-99	1 of 8

DRILLING METHOD: ARCH

DRILLED BY: BEYLIK

LOGGED BY: Ed Krish

EXISTING GRADE ELEVATION (FT AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCLLC	LOCATION HENDERSON	BORING NUMBER TR-5

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	SANDY GRAVEL w/ SILT; SLI. MOIST; GRAYISH-ORANGE PINK 5YR 7/2		GW							
5	SAND (VF-MED.) WITH SILT AND GRAVEL; SLI. MOIST; 5YR 7/2		SW							
10	SANDY GRAVEL, SLI. MOIST; SOME SILT; GRAYISH-ORANGE PINK 5YR 7/2		GW							
15										
20	SAND; VF-F GRAINED; MED-COARSE SAND CLASTS COMMON; SLI.-MOD. MOIST; LT. BROWN 5YR 6/4		SW							
25	GRAVELLY SAND; VF-COARSE; MOD. MOIST; LT. BROWN; 5YR 6/4		SW							
30										
35										Qal
37	37-62 SILT w/thin sdy lenses, mod yell brn (10YR5/4) calcareous		ML							MC fg
40										

EXPLANATION

- Water Table (24 Hour)
- Water Table (Time of Boring)
- PID — Photoionization Detection (ppm)
- NO. — Identifies Sample by Number
- TYPE — Sample Collection Method

SPLIT-BARREL; AUGER; ROCK CORE; THIN-WALLED TUBE; CONTINUOUS SAMPLER; NO RECOVERY

DEPTH — Depth Top and Bottom of Sample
REC. — Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY; SILT; SAND; GRAVEL; SILTY CLAY; CLAYEY SILT; DEBRIS FILL; HIGHLY ORGANIC (PEAT); SANDY CLAY; CLAYEY SAND; _____; _____

DATE DRILLED	PAGE
9/16-9/22/99	1 of 7

DRILLING METHOD: ARCH

DRILLED BY: BEYLIK

LOGGED BY: T. REED

EXISTING GRADE ELEVATION (FT AMSL):

LOCATION OR GRID COORDINATES:

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION HENDERSON	BORING NUMBER TR 6

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
	TD 80' 15' North of TR 5 see TR 5 lith log for lithology									

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method

SPLIT-BARREL · AUGER · ROCK CORE · THIN-WALLED TUBE · CONTINUOUS SAMPLER · NO RECOVERY

DEPTH Depth Top and Bottom of Sample
REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

CLAY · SILT · SAND · GRAVEL · SILTY CLAY · CLAYEY SILT · DEBRIS FILL · HIGHLY ORGANIC (PEAT) · SANDY CLAY · CLAYEY SAND · _____ · _____

DATE DRILLED	PAGE
9-24-99	1 of 1

DRILLING METHOD: ARCH
DRILLED BY: BEYLIK
LOGGED BY: E. KRISH
EXISTING GRADE ELEVATION (FT AMSL):
LOCATION OR GRID COORDINATES:

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION HENDERSON	BORING NUMBER TR7

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
0	0-12 GRAVEL, sdy, gry oran (10YR 7/4) and mod yell brn (10YR 5/4). 60-70% gravel up to 1" diam in sd (f-vc) matrix. Mod. calcite cement. Mod calichification		GW							
12	12-20 SAND, gravelly, as above w/ 30-40% 1" diam volc gravel		SW							
20	20-26 SAND, silty gry oran (10YR 7/4) vf-vc w/ 20% silt in matrix		SM							
26	26-43 SAND, gry orange (10YR 7/4) vf-m w/ minor vc, A-SA, calcareous w/ sp-sd-size caliche nodules		SW							damp @ 28'
35										

EXPLANATION

- ▼ Water Table (24 Hour)
- ▽ Water Table (Time of Boring)
- PID Photoionization Detection (ppm)
- NO. Identifies Sample by Number
- TYPE Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH Depth Top and Bottom of Sample
- REC. Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND
- _____
- _____

DATE DRILLED: 9/25-9/26/99 | PAGE: 1 of 8

DRILLING METHOD: ARCH

DRILLED BY: BEYLIK

LOGGED BY: E KRISH

EXISTING GRADE ELEVATION (FT AMSL)

LOCATION OR GRID COORDINATES

SOIL BORING LOG KM-5655-B

KERR-McGEE CORPORATION Hydrology Dept. - S&EA Division	KM SUBSIDIARY KMCC	LOCATION HENDERSON	BORING NUMBER TR8

DEPTH IN FEET	LITHOLOGIC DESCRIPTION	GRAPHIC LOG	UNIFIED SOIL FIELD CLASS.	BLOWS PER 6"	PID (ppm)	SOIL SAMPLE NO.	SOIL SAMPLE TYPE	SOIL SAMPLE DEPTH	SOIL SAMPLE REC.	REMARKS OR FIELD OBSERVATIONS
	HOLE LOCATED 12 ft South of TR7 - see TR7 for Lithology TD 98' NOTE: IN TR8 first MC, gravel started @ 62' and ended at 93 ft.									

EXPLANATION

- Water Table (24 Hour)
- Water Table (Time of Boring)
- PID — Photoionization Detection (ppm)
- NO. — Identifies Sample by Number
- TYPE — Sample Collection Method
- SPLIT-BARREL
- AUGER
- ROCK CORE
- THIN-WALLED TUBE
- CONTINUOUS SAMPLER
- NO RECOVERY
- DEPTH — Depth Top and Bottom of Sample
- REC. — Actual Length of Recovered Sample in Feet

GRAPHIC LOG LEGEND

- CLAY
- SILT
- SAND
- GRAVEL
- SILTY CLAY
- CLAYEY SILT
- DEBRIS FILL
- HIGHLY ORGANIC (PEAT)
- SANDY CLAY
- CLAYEY SAND

DATE DRILLED	9/30/99
PAGE	1 of 1
DRILLING METHOD	ARCH
DRILLED BY	BEYLIK
LOGGED BY	E. KRISH
EXISTING GRADE ELEVATION (FT AMSL)	
LOCATION OR GRID COORDINATES	

Appendix G

Analytical Data

(Provided electronically or on CD separately)

Appendix H

Johnson and Ettinger Spreadsheets

(Provided electronically or on CD separately)

Appendix I

Shallow Groundwater Evaluation

Contents

I Shallow Groundwater Evaluation

Potential exposure to groundwater via inhalation of volatile organic compounds (VOCs) was evaluated for future on-site indoor commercial/industrial workers and outdoor commercial/industrial workers using the same exposure assumptions, fate and transport modeling, method for estimation of exposure concentrations (ECs), toxicity assessment, and risk characterization as presented in the main report. As presented in the following sections, the groundwater evaluation is conducted using a conservative, screening-level approach in which the cancer risks and noncancer hazard indices (HIs) associated with the inhalation of VOCs are estimated based on the maximum concentration of each chemical of potential concern (COPC) for each Study Area parcel.

The following sections present the selection of COPCs, exposure assessment, toxicity assessment, and risk characterization.

I.1 Selection of Chemicals of Potential Concern

COPCs in groundwater were selected according to the following criteria. The primary contributors to the total cancer risk for indoor and outdoor commercial/industrial workers from soil gas and detected in more than one soil gas sample (carbon tetrachloride, chloroform, 1,2-dichloroethane, and trichloroethene [TCE]) were used as the initial COPCs. In addition, chemicals identified by the former Montrose Chemical Corporation of California and by Stauffer Management Company LLC/Syngenta Crop Protection, Inc. facilities and current Olin facility (located to the west of the Site) as the most prevalent VOCs that are consistently detected in the shallow and middle zones at elevated concentrations (Hargis & Associates [H+A] 2012) were also identified as COPCs. These chemicals include: benzene, chlorobenzene, chloroform, 1,2-dichlorobenzene, and 1,4-dichlorobenzene. As shown in Figure I-1 and Figures 6 through 10 of Appendix A of the main report, the shallow groundwater contaminant plumes have migrated onto the Site and Study Area from the Olin facility. Using these selection criteria, the following eight VOCs were identified as COPCs (Table 10 of the main report).

- Benzene
- Carbon tetrachloride
- Chlorobenzene
- Chloroform
- 1,2-Dichlorobenzene
- 1,4-Dichlorobenzene
- 1,2-Dichloroethane
- TCE

I.2 Exposure Assessment

For this Health Risk Assessment (HRA), the potentially exposed populations and exposure pathways associated with inhalation of VOCs in indoor air (the vapor intrusion pathway) and

inhalation of VOCs released to outdoor air for the Study Area are shown in the conceptual site model (CSM) presented in Figure 8. Inhalation of vapors released from groundwater to indoor air for long-term indoor commercial/industrial workers and to ambient air for long-term outdoor commercial/industrial workers are the only pathways evaluated for exposure from inhalation of VOCs in groundwater. Other potential receptors include on-site short-term construction workers, off-site indoor commercial/industrial workers, off-site residents, visitors, and trespassers. In accordance with the Health Risk Assessment Work Plan prepared by Northgate Environmental Management, Inc. (Northgate 2010) and approved by Nevada Division of Environmental Protection (NDEP) on March 16, 2010 and the 2013 HRA Work Plan (ENVIRON 2013), off-site receptors, visitors, and trespassers receptors were not quantitatively evaluated in the HRA and are discussed in Section 6.6 of the main report.

Exposure parameters common to all inhalation pathways are the exposure time, exposure frequency, exposure duration, and averaging time. The values used for these parameters are presented in Table 11 of the main report.

ENVIRON searched NDEP's regional database for results for chemicals identified as COPCs (as discussed in Section 5.2) in shallow groundwater wells sampled within or on the border of the Study Area. These wells evaluated in the HRA are listed in Table 2 and shown on Figure 7 of the main report.

As previously stated, groundwater ECs were based on the most recent maximum detected concentration for each individual parcel for all eight groundwater COPCs. Wells located within the Study Area or on or near the border of the Study Area (i.e., within 45 feet [ft] of the Study Area boundary) were included in the data set evaluated in the HRA. As shown in Table 2 and in Figure 7, 23 groundwater sample locations (located within or near the Study Area) were used for conducting the HRA while all 57 groundwater sample locations shown on Figure 6 (some of which extend well beyond the boundaries of the Study Area) were used for spatial and other related analyses. A complete set of groundwater data evaluated in the HRA and used for the co-located soil gas and groundwater samples evaluation presented in Section 4.2.2 of the main report is provided in Appendix G-2.

Similar to chemicals detected in soil gas, chemicals detected in groundwater can potentially migrate through the unsaturated zone to ambient or indoor air. This migration is quantified for the purposes of this assessment through an intermedia transfer factor. When the transfer factor is multiplied by the source concentration of a chemical in groundwater (in micrograms per liter [µg/L]), the product is the predicted steady-state concentration in indoor or ambient air (in micrograms per cubic meter [$\mu g/m^3$]). As described in the main report, intermedia transfer factors were estimated using the screening-level model described by Johnson and Ettinger (1991). For exposure of current/future on-site workers, intermedia transfer factors for groundwater to indoor or ambient air were derived using transport of VOCs released from groundwater at 25-40 ft below ground surface (bgs) into a commercial slab-on-grade building and ambient air. The transfer factors are shown in Table I-1.

The Johnson and Ettinger spreadsheets for one representative example of the indoor air modeling are included in Appendix H of the main report. The Study Area and parcel-specific input parameters used in the Johnson and Ettinger model are listed in Table 12 of the main

report. The physical/chemical properties used in the Johnson and Ettinger model for all COPCs are presented in Table 13 of the main report. Unless otherwise noted, all properties were from US Environmental Protection Agency (USEPA 2004). Additionally, the model parameters used in the Johnson and Ettinger model are discussed in detail in the main report.

Using the groundwater concentrations as model input, indoor and ambient air concentrations were modeled using the Johnson and Ettinger model and a basic diffusion model, respectively. The ECs for noncarcinogens and carcinogens were estimated using the equation presented in Section 5.2.3.2 of the main report. The ECs for groundwater are shown in Table I-1.

I.3 Toxicity Assessment

The cancer and noncancer toxicity values were identified using the same sources as provided in the main report. The toxicity values used in the groundwater evaluation are also listed in Table 16 of the main report.

I.4 Risk Characterization

Carcinogenic risks and noncancer hazards were estimated using the equations provided in Sections 5.4.1 and 5.4.2 of the main report. The estimated excess cancer risks and noncancer hazards associated with exposure of an indoor and an outdoor commercial/industrial worker to COPCs in groundwater through inhalation of vapors in indoor and outdoor air are summarized in Table I-1. As shown, the total excess cancer risk estimates due to exposure to COPCs in groundwater range from 1.4×10^{-8} (Parcel H) to 2.3×10^{-4} (Parcel C) for an indoor commercial/industrial worker and range from 2.3×10^{-10} (Parcel H) to 3.9×10^{-6} (Parcel C) for an outdoor commercial/industrial worker. The total estimated noncancer hazard due to exposure to COPCs in groundwater range from less than 0.001 (Parcels G and H) to 3.5 (Parcel C) for an indoor commercial/industrial worker and range from less than 0.001 (Parcels D, F, G, and H) to 0.058 (Parcel C) for an outdoor commercial/industrial worker.

As requested by NDEP (2013), cancer risks estimated using chloroform concentrations in groundwater and the associated soil gas samples were compared and presented in Table I-2. Only co-located samples were used for this comparison; however, as discussed in Section 4.2.2 of the main report, data were not collected in the same time period for all co-located samples. Due to the temporal variation in sampling, direct comparisons cannot be drawn although results were compared as followed: 2008 soil gas results were compared to 2008 groundwater results when available; in the absence of 2008 groundwater samples, 2006, 2009, and 2010 data were used instead. The 2013 soil gas samples were compared to the most recent co-located groundwater sample data available.

As shown in Table I-2, two groundwater samples and two soil gas samples in Parcel C exceed the target cancer risk; in the two co-located pairs, predicted soil gas cancer risk is approximately 1.5 to 2.5-fold lower. Four of the remaining five soil gas samples collected within or nearby Parcel C with cancer risks below the target cancer risk have higher predicted cancer risk levels than their co-located groundwater samples.

Among Parcel D samples, soil gas samples located to the north and west of the parcel (both within and nearby) have higher cancer risks than their co-located groundwater samples while

those to the east of the parcel (within and nearby) are lower. One groundwater sample outside the eastern border of the parcel slightly exceeds the target cancer risk.

In Parcel F, two groundwater samples and one co-located soil gas sample on the eastern border and nearby the northern border exceed the target cancer risk. Each groundwater sample has higher cancer risks than their co-located soil gas samples. Cancer risk at the soil gas sample located on the south-eastern border of the parcel is higher than its co-located groundwater sample while cancer risk at the soil gas and groundwater co-located samples near the eastern border is approximately the same.

The soil gas cancer risk is higher than groundwater for the single co-located sample pair in In Parcel G. Neither the soil gas nor the groundwater samples exceed the target cancer risk.

In Parcel H, soil gas cancer risk is higher than the co-located groundwater sample risk for the co-located sample pair to the north of the parcel. Groundwater cancer risks are higher for the two co-located sample pairs within the Parcel H border. None of the soil gas or groundwater samples exceed the target cancer risk.

I.5 Summary and Conclusions

The objective of evaluating the inhalation of VOCs pathway using groundwater data was to compare the cancer risks and noncancer hazards estimated from soil gas data to those estimated from groundwater data. The cancer risks and noncancer hazards estimated using the chloroform groundwater data were approximately 1.5- to 77-fold higher than those estimated using the soil gas concentrations at the six co-located groundwater and soil gas sample location pairs where the groundwater risk exceeded 1×10^{-6} (Table I-2). It is expected that the soil gas sampling will provide a more accurate risk characterization because the samples are collected closer to the receptor. In general, the closer the sampled medium is to the receptor, the more relevant the data are for estimating exposure and greater its weight of evidence (California Environmental Protection Agency [Cal/EPA] 2011). Partitioning assumptions in modeling soil gas concentrations from groundwater data increase the uncertainty in the modeling (Wong-Yim et al. 2007). Additionally, certain chemicals (i.e. benzene) are expected to have significant bioattenuation throughout the vadose zone and risks estimated using the groundwater data can be substantially overestimated (USEPA 2012). Therefore risks estimated using the soil gas data presented in the main report are used as the primary line of evidence for the inhalation of VOCs in indoor air and inhalation of VOCs released to outdoor air pathways.

I.6 References

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Tables

TABLE I-1. Parcel-Specific Cancer Risks and Noncancer Hazards Estimated Using Groundwater Results
Nevada Environmental Response Trust Site, Henderson, Nevada

Chemical	Parcel	Maximum Concentration (µg/L)[a]	Sample Date	Location	Indoor Air				Outdoor Air			
					Indoor Air Transfer Factor (α), unitless (µg/m^3 per µg/L)	Indoor Air Concentration (µg/m^3)	Cancer Risk	Noncancer Hazard	Outdoor Air Transfer Factor (α), unitless (µg/m^3 per µg/L)	Outdoor Air Concentration (µg/m^3)	Cancer Risk	Noncancer Hazard
Benzene	C	80,000	10/20/2011	AA-BW-04A	4.4E-03	3.5E+02	2.2E-04	2.7E+00	8.2E-05	6.5E+00	3.7E-06	4.5E-02
Carbon Tetrachloride	C	< 19	10/20/2011	AA-BW-04A	2.1E-02	ND	--	--	3.8E-04	ND	--	--
Chlorobenzene	C	73,000	10/20/2011	AA-BW-04A	2.4E-03	1.7E+02	--	7.9E-01	4.4E-05	3.2E+00	--	1.3E-02
Chloroform	C	810	11/30/2006	M-98	3.6E-03	2.9E+00	5.4E-06	6.8E-03	6.7E-05	5.4E-02	9.1E-08	1.1E-04
1,2-Dichlorobenzene	C	1,900	10/20/2011	AA-BW-04A	1.1E-03	2.2E+00	--	2.5E-03	2.1E-05	4.0E-02	--	4.1E-05
1,4-Dichlorobenzene	C	3,300	10/20/2011	AA-BW-04A	1.4E-03	4.7E+00	4.2E-06	1.3E-03	2.6E-05	8.7E-02	7.0E-08	2.2E-05
1,2-Dichloroethane	C	< 13	10/20/2011	AA-BW-04A	1.4E-03	ND	--	--	2.6E-05	ND	--	--
Trichloroethene	C	< 16	10/20/2011	AA-BW-04A	7.0E-03	ND	--	--	1.3E-04	ND	--	--
Cumulative Risk/Hazard from Groundwater Across Parcel C							**2.3E-04**	**3.5E+00**			**3.9E-06**	**5.8E-02**
Benzene	D	11	4/22/2011	MC-09R	4.0E-03	4.5E-02	2.8E-08	3.4E-04	7.5E-05	8.3E-04	4.7E-10	5.7E-06
Carbon Tetrachloride	D	< 2.5	4/22/2010	MC-113, MC-114	1.9E-02	ND	--	--	3.5E-04	ND	--	--
Chlorobenzene	D	3.3	4/22/2011	MC-09R	2.2E-03	7.1E-03	--	3.3E-05	4.0E-05	1.3E-04	--	5.4E-07
Chloroform	D	130	6/25/2008	M-23	3.3E-03	4.3E-01	8.0E-07	9.9E-04	6.1E-05	7.9E-03	1.3E-08	1.7E-05
1,2-Dichlorobenzene	D	5.7	4/21/2010	MC-50	1.0E-03	5.9E-03	--	6.8E-06	1.9E-05	1.1E-04	--	1.1E-07
1,4-Dichlorobenzene	D	8.8	4/21/2010	MC-50	1.3E-03	1.1E-02	1.0E-08	3.3E-06	2.4E-05	2.1E-04	1.7E-10	5.4E-08
1,2-Dichloroethane	D	1.2	4/22/2010	MC-114	1.3E-03	1.6E-03	1.4E-09	4.5E-07	2.4E-05	2.9E-05	2.3E-11	7.4E-09
Trichloroethene	D	2.1	4/22/2010	MC-114	6.5E-03	1.4E-02	4.5E-09	1.6E-03	1.2E-04	2.5E-04	7.5E-11	2.6E-05
Cumulative Risk/Hazard from Groundwater Across Parcel D							**8.4E-07**	**2.9E-03**			**1.4E-08**	**4.9E-05**
Benzene	F	< 2.5	7/27/2010	TR-6	3.7E-03	ND	--	--	6.9E-05	ND	--	--
Carbon Tetrachloride	F	38	7/27/2010	TR-6	1.8E-02	6.7E-01	3.3E-07	1.5E-03	3.2E-04	1.2E-02	5.4E-09	2.5E-05
Chlorobenzene	F	1.6	7/27/2010	TR-6	2.0E-03	3.2E-03	--	1.5E-05	3.7E-05	5.9E-05	--	2.4E-07
Chloroform	F	2,000	7/27/2010	TR-6	3.0E-03	6.1E+00	1.1E-05	1.4E-02	5.6E-05	1.1E-01	1.9E-07	2.4E-04
1,2-Dichlorobenzene	F	22	7/27/2010	TR-6	9.5E-04	2.1E-02	--	2.4E-05	1.8E-05	3.9E-04	--	4.0E-07
1,4-Dichlorobenzene	F	44	7/27/2010	TR-6	1.2E-03	5.3E-02	4.7E-08	1.5E-05	2.2E-05	9.7E-04	7.8E-10	2.5E-07
1,2-Dichloroethane	F	< 2.5	7/27/2010	TR-6	1.2E-03	ND	--	--	2.2E-05	ND	--	--
Trichloroethene	F	< 2.5	7/27/2010	TR-6	6.0E-03	ND	--	--	1.1E-04	ND	--	--
Cumulative Risk/Hazard from Groundwater Across Parcel F							**1.2E-05**	**1.6E-02**			**2.0E-07**	**2.6E-04**
Benzene	G	< 0.09	7/14/2009	TR-8	3.5E-03	ND	--	--	6.4E-05	ND	--	--
Carbon Tetrachloride	G	0.37	7/14/2009	TR-8	1.6E-02	6.1E-03	3.0E-09	1.4E-05	3.0E-04	1.1E-04	4.9E-11	2.3E-07
Chlorobenzene	G	< 0.13	7/14/2009	TR-8	1.8E-03	ND	--	--	3.4E-05	ND	--	--
Chloroform	G	9.8	7/14/2009	TR-8	2.8E-03	2.8E-02	5.2E-08	6.4E-05	5.2E-05	5.1E-04	8.6E-10	1.1E-06
1,2-Dichlorobenzene	G	< 0.2	7/14/2009	TR-8	8.8E-04	ND	--	--	1.6E-05	ND	--	--
1,4-Dichlorobenzene	G	< 0.17	7/14/2009	TR-8	1.1E-03	ND	--	--	2.0E-05	ND	--	--
1,2-Dichloroethane	G	< 0.07	7/14/2009	TR-8	1.1E-03	ND	--	--	2.0E-05	ND	--	--
Trichloroethene	G	0.5	7/14/2009	TR-8	5.6E-03	2.8E-03	9.3E-10	3.2E-04	1.0E-04	5.1E-05	1.5E-11	5.3E-06
Cumulative Risk/Hazard from Groundwater Across Parcel G							**5.6E-08**	**4.0E-04**			**9.3E-10**	**6.6E-06**
Benzene	H	< 2.5	7/27/2010	M-120	3.5E-03	ND	--	--	6.4E-05	ND	--	--
Carbon Tetrachloride	H	< 2.5	7/27/2010	M-120	1.6E-02	ND	--	--	3.0E-04	ND	--	--
Chlorobenzene	H	< 2.5	7/27/2010	M-120	1.8E-03	ND	--	--	3.4E-05	ND	--	--
Chloroform	H	2.6	7/10/2009 - 7/14//2009	M-121, TR-10	2.8E-03	7.3E-03	1.4E-08	1.7E-05	5.2E-05	1.4E-04	2.3E-10	2.8E-07
1,2-Dichlorobenzene	H	< 2.5	7/27/2010	M-120	8.8E-04	ND	--	--	1.6E-05	ND	--	--
1,4-Dichlorobenzene	H	< 2.5	7/27/2010	M-120	1.1E-03	ND	--	--	2.0E-05	ND	--	--
1,2-Dichloroethane	H	< 2.5	7/27/2010	M-120	1.1E-03	ND	--	--	2.0E-05	ND	--	--
Trichloroethene	H	< 2.5	7/27/2010	M-120	5.6E-03	ND	--	--	1.0E-04	ND	--	--
Cumulative Risk/Hazard from Groundwater Across Parcel H							**1.4E-08**	**1.7E-05**			**2.3E-10**	**2.8E-07**

Notes:
-- = Not applicable
ND = Nondetects

µg/m^3 = microgram per cubic meter
µg/L = microgram per liter

[a] The maximum nondetected values are represented by one half of the sample quantitation limit.

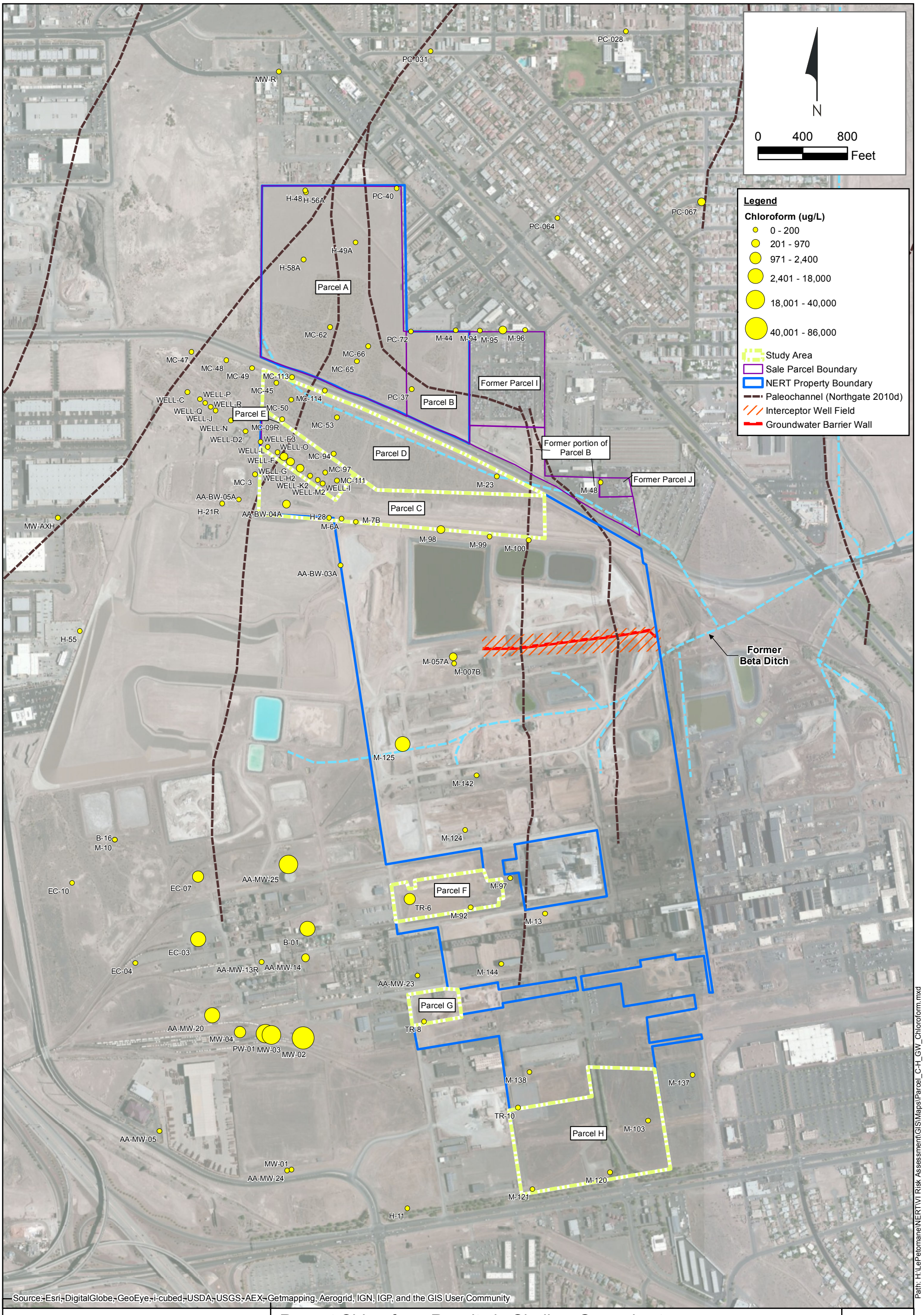
TABLE I-2. Comparison of Cancer Risks and Noncancer Hazards Estimated Using Soil Gas and Groundwater Results from Co-located Samples
Nevada Environmental Response Trust Site, Henderson, Nevada

Sample Location Relative to Parcels C through H	Groundwater					Soil Gas					Ratio of Cancer Risk[c]	Ratio of Hazard Quotient[d]	Soil Gas Samples and Groundwater Samples Collected >3 Years Apart
	Well Id[a,b]	Sample Date	Maximum Concentration (µg/L)	Cancer Risk	Hazard Quotient	Soil Gas Boring[b]	Sample Date	Maximum Concentration (µg/m^3)	Cancer Risk	Hazard Quotient			
Parcel C	AA-BW-04A	10/20/2011	330	2.2E-06	2.8E-03	E-SG-3	3/7/2013	2,900	1.6E-06	1.9E-03	**1.4**	**1.4**	no
Parcel C	M-7B	6/26/2008	2.1	1.4E-08	1.8E-05	SG19	5/28/2008	70	3.8E-08	4.7E-05	0.37	0.37	no
Parcel C	M-99	5/6/2010	150	1.0E-06	1.3E-03	SG24	5/28/2008	1,300	7.0E-07	8.7E-04	**1.4**	**1.4**	no
Parcel C	M-98	11/30/2006	810	5.4E-06	6.8E-03	SG90	5/28/2008	3,900	2.1E-06	2.6E-03	**2.6**	**2.6**	no
Parcel C	M-100	12/4/2006	38	2.6E-07	3.2E-04	SG91	5/21/2008	490	2.6E-07	3.3E-04	0.97	0.97	no
Parcel C	MC-3	5/27/2009	16	1.1E-07	1.3E-04	E-SG-2	3/7/2013	460	2.5E-07	3.1E-04	0.43	0.43	yes
Parcels C and D (nearby)[e]	MC-97	6/25/2008	3.8	2.6E-08	3.2E-05	SG17	5/18/2008	180	9.7E-08	1.2E-04	0.26	0.26	no
Parcel D	M-23	6/25/2008	130	8.0E-07	9.9E-04	E-SG-9	3/8/2013	98	5.3E-08	6.5E-05	**15**	**15**	yes
Parcel D	MC-45	6/25/2008	3	1.8E-08	2.3E-05	SG16	5/18/2008	84	4.5E-08	5.6E-05	0.41	0.41	no
Parcel D (nearby)	MC-62	6/23/2008	2.3	1.4E-08	1.8E-05	SG05	5/29/2008	62	3.3E-08	4.1E-05	0.43	0.43	no
Parcel D (nearby)	PC-37	6/20/2008	2	1.2E-08	1.5E-05	SG06	5/20/2008	34	1.8E-08	2.3E-05	0.67	0.67	no
Parcel D (nearby)	M-48	7/9/2008	180	1.1E-06	1.4E-03	SG14	5/20/2008	1,000	5.4E-07	6.7E-04	**2.1**	**2.1**	no
Parcel F	TR-6	7/27/2010	2,000	1.1E-05	1.4E-02	E-SG-4	3/13/2013	2,800	1.5E-06	1.9E-03	**7.6**	**7.6**	no
Parcel F	TR-6	7/27/2010	2,000	1.1E-05	1.4E-02	E-SG-6	3/8/2013	780	4.2E-07	5.2E-04	**27**	**27**	no
Parcel F	M-92	7/15/2009	30	1.7E-07	2.1E-04	SG34	5/28/2008	640	3.4E-07	4.3E-04	0.50	0.50	no
Parcel F (nearby)	M-13	6/25/2009	36	2.0E-07	2.5E-04	SG39	5/14/2008	370	2.0E-07	2.5E-04	1.0	1.0	no
Parcel F (nearby)	M-124	7/11/2008	240	1.4E-06	1.7E-03	SG33	5/17/2008	33	1.8E-08	2.2E-05	**77**	**77**	no
Parcel G	TR-8	7/14/2009	9.8	5.2E-08	6.4E-05	E-SG-8	3/13/2013	140	7.5E-08	9.3E-05	0.69	0.69	yes
Parcel H	M-103	7/8/2009	0.54	2.9E-09	3.5E-06	SG50	5/22/2008	0.83	4.5E-10	5.5E-07	**6.4**	**6.4**	no
Parcel H	M-121	7/10/2009	2.6	1.4E-08	1.7E-05	SG49	5/22/2008	1.3	7.0E-10	8.7E-07	**20**	**20**	no
Parcel H	TR-10	7/14/2009	2.6	1.4E-08	1.7E-05	SG47	5/21/2008	33	1.8E-08	2.2E-05	0.77	0.77	no

Notes:
µg/L= micrograms per liter
µg/m^3 = micrograms per cubic meter

[a] Only groundwater wells with detected concentrations are shown.
[b] Sample results highlighted gray indicate that the cancer risk exceeds 1×10^{-6}.
[c] This value represents the ratio of cancer risk calculated from groundwater to cancer risk calculated from soil gas. Bolded values indicate the cancer risk predicted from groundwater is greater than from soil gas
[d] This value represents the ratio of the hazard quotient calculated from groundwater to the hazard quotient calculated from soil gas. Bolded values indicate the hazard quotient predicted from groundwater i greater than from soil gas.
[e] RBCs for Parcel C were used for well MC-97 and soil gas boring SG17.

Figure



ENVIRON

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Recent Chloroform Results in Shallow Groundwater

Nevada Environmental Response Trust Site, Henderson, Nevada

Figure **I-1**

Drafter: RS | Date: 6/28/2013 | Contract Number: 21-32100GA G01 | Approved by: | Revised: