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ENVIRONMENT

Subject:

Revised Removal Action Work Plan, Hammonton Smartsville Property, APN 021-150-062, Yuba County, California (DTSC Site Code 104674)

Dear Ms. Songco:

Date:

May 1, 2014

ARCADIS U.S., Inc., (ARCADIS) has prepared this Revised Removal Action Work Plan (RAW) on behalf of the Marysville Joint Unified School District (MJUSD) for the subject property located in Yuba County, California (the Site). This Revised RAW addresses DTSC comments in the DTSC letter dated March 24, 2014.

Contact:

Scott Hackman

Phone:

(916) 786-7369

This RAW presents the methods to be used to remediate organochlorine pesticide- (OCP-), lead-, and arsenic-affected Site soils identified during previous investigations. A project strategy summary table is presented below for reference and explained in more detail in the attached RAW.

Email:

scott.hackman@arcadis-us.com

Our ref:

RV009363.0015

Area of Concern	Chemicals of Concern	Soil Removal Quantity
Former Structure B1	OCPs	Approximately 646 cubic yards of soil will be removed to remediate these areas.
Former Structure B2	OCPs and Lead	
Former Structure B3	OCPs and Lead	
Former Structure B4	OCPs and Lead	
Former Structure B5	OCPs and Lead	Approximately 47 cubic yards of soil will be removed to remediate these areas.
Former Wooden Shed North of B5	OCPs, Lead and Arsenic	

Imagine the result

Area of Concern	Chemicals of Concern	Soil Removal Quantity
Former Structure F1	OCPs and Lead	Approximately 32 cubic yards of soil will be removed to remediate this area.
Former Structure F2	OCPs	Approximately 28 cubic yards of soil will be removed to remediate these areas.
Low-lying areas adjacent to one of the two water supply wells	OCPs	

Notes:

OCPs = Organochlorine Pesticides

CY = cubic yards

If you have any questions concerning this Revised RAW, please feel free to contact me at 916-786-7369.

Sincerely,

ARCADIS U.S., Inc.



Scott Hackman
Project Manager, CPM1

Copies:

Ms. Michal Healy, MJUSD

Mr. Steve Beadle, ARCADIS

Marysville Joint Unified School District

**Revised Removal Action
Work Plan**

Hammonton Smartsville Property
APN 021-150-062
Yuba County, California

May 1, 2014



Scott Hackman
Senior Environmental Scientist



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Senior Geologist



**Revised Removal Action
Work Plan (RAW)**

Hammonton Smartsville Property
APN 021-150-062
Yuba County, California

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Marysville Joint Unified School District

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May 1, 2014

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ACRONYMNS

APN	Assessor's Parcel Number
ARARs	Applicable or relevant and appropriate requirements
Bgs	below ground surface
CalEPA	California Environmental Protection Agency
CDPH	California Department of Public Health
cm ² /day	centimeters squared per day
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGs	Cleanup Goals
CHHSLs	California Human Health Screening Levels
COCs	Chemicals of Concern
COPCs	Chemicals of Potential Concern
CSM	Conceptual Site Model
cy	cubic yards
DTSC	Department of Toxic Substances Control
DRO	Diesel range organics
EE/CA	Engineering Evaluation/Cost Analysis
ESLs	Environmental Screening Levels
EPC	Exposure Point Concentration

Ft	feet
FRAQMD	Feather River Air Quality Management District
GRO	gasoline range organics
HI	Hazard Index
HASP	Health and Safety Plan
H&SC	California Health and Safety Code
kg/m ³	kilograms per cubic meter
MJUSD	Marysville Joint Unified School District
Msl	mean sea level
m ³ /hr	meters cubed per hour
mph	miles per hour
mg/m ³	milligrams per cubic meter
mg/day	milligrams per day
NEPA	National Environmental Policy Act
NFA	No Further Action
OEHHA	Office of Environmental Health Hazard Assessment
ORO	Oil Range Organics
OCPs	organochlorine pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PAM	Personal Air Monitors

PCBs	Polychlorinated biphenyls
PEA	Preliminary Environmental Assessment
PEA WP	Preliminary Environmental Assessment Work Plan
QAPP	Quality Assurance Project Plan
RWQCB	Regional Water Quality Control Board
RA	Removal Action
RACR	Removal Action Completion Report
RAOs	Remedial action objectives
RAW	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
STLC	Soluble Threshold Limit Concentration
SSI	Supplemental Site Investigation
TPH	Total Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentration
USEPA	United States Environmental Protection Agency
UCL	Upper Confidence Limit

1. Introduction

This Removal Action Work Plan (RAW) has been prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Marysville Joint Unified School District (MJUSD) to address soil affected by pesticides and metals at the Hammonton Smartsville Property located on the southwestern corner of the intersection of Dantoni and Hammonton Smartsville Roads in Yuba County, California (the Site; Figure 1). The approximately 50-acre property is located on Yuba County Assessor's Parcel Number (APN) 021-150-062 (Figures 1 and 2). Environmental assessment has previously been conducted on this property by ARCADIS (2012a, 2012b, 2013). For the purposes of this RAW, the Site consists of multiple areas of pesticide- and metals-affected soil, totaling approximately 753 cubic yards (cy) (Figures 4A through 4D).

MJUSD retained ARCADIS to prepare this RAW to document the methods to be used to remediate pesticide- and metals-affected soils identified on the Site during previous investigations. This RAW has been prepared in accordance with applicable and relevant federal, state, and local laws, regulations, and guidelines. The RAW includes a detailed engineering plan for conducting the removal action (RA), a description of the on-site contamination, and the goals to be achieved by the RA, as required by the California Health and Safety Code (H&SC) 25323.1. The RAW is also consistent with the criteria specified in the H&SC section 25356.1(h).

Information on past site uses and existing Site conditions were presented to the California Environmental Protection Agency (CalEPA), Department of Toxic Substances Control (DTSC) in the *Revised Preliminary Environmental Assessment Work Plan* (PEA WP; ARCADIS 2012a). Multiple phases of soil assessment were subsequently conducted during a Preliminary Environmental Assessment (PEA; ARCADIS 2012b) and a Supplemental Site Assessment (SSI; ARCADIS 2013). The PEA and SSI were prepared to satisfy DTSC requirements for the environmental assessment of the Site so that it can be developed for use as MJUSD educational support facilities, a middle school, an alternative education high school, and an adult education center.

A human health risk screening evaluation performed by ARCADIS during the PEA indicated that pesticides and metals were present in shallow site soils at concentrations that presented an unacceptable health risk. Further pesticides and metal in soil delineation was conducted during the SSI. Delineation is now sufficient for remedial planning purposes as confirmed by the DTSC in their SSI approval letter to the MJUSD dated January 8, 2014.

This RAW was prepared using data collected during the environmental assessment, and identifies and evaluates viable remedial alternatives for the affected soil and the elimination of exposure pathways. Previous work has provided sufficient data to support the removal action as proposed by this RAW. As with any real property, if previously unidentified contamination is discovered at the Site, additional soil assessment, investigation, and/or cleanup may be required by the DTSC.

The proposed removal action will be:

- effective in reducing the mobility of the affected soil;
- effective in reducing levels of chemicals at the Site to levels consistent with DTSC requirements;
- cost effective; and,
- effective in reducing environmental liability at the Site.

1.1 Proposed Removal Action

The proposed remedial action is excavation and off-site disposal of affected soil. This RAW presents the proposed technical approach, and includes an Engineering Evaluation/Cost Analysis (EE/CA). The approach is based on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) removal process, and focuses on the physical removal and appropriate disposal of affected soil, and reducing the potential risks to human health to acceptable levels.

1.2 Remedial Action Objectives

Remedial action objectives (RAOs) are developed by evaluating the results of the site characterizations, risk assessment, and applicable or relevant and appropriate requirements (ARARs). RAOs describe the remedial actions needed to protect human health, environmental quality, or both. They are generally narrative statements; however, they can also include specific, quantitative concentrations of chemicals to be achieved by the remedial alternative.

The RAOs for the Site are to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or potential release of a hazardous substance that may result in a threat to the public and/or the environment. The overall remedial action goal for the Site is to obtain an unrestricted future land use designation by limiting human exposure to affected media containing chemicals of concern (COCs) at concentrations presenting unacceptable human health risks and hazards. COCs are compounds that have been identified in site soil at concentrations that present a human health and/or ecological risk. Specific preliminary cleanup goals were identified to provide a health-protective concentration for each COC identified as a risk driver in the PEA. Removal action cleanup goals are presented in this document.

2. Site Description and Background

The Site description and background information has been addressed in several previous documents (ARCADIS 2012a, 2012b, 2013). The information presented in this section has been summarized from these reports.

2.1 Site Location and Description

The Site property, which measures approximately 50 acres in area, is located on the south side of Hammonton Smartsville Road, to the southwest of the intersection with Dantoni Road, in unincorporated Yuba County, California (Figures 1 and 2). The Site's EnviroStor identification number is 60001233; the DTSC site code is 104674-11.

The Site lies within the general area of the unincorporated community of Linda, California. Most neighboring properties are used for residential or agricultural uses, or are undeveloped.

The Site is currently undeveloped (Figures 2 and 3), but was previously developed with several structures. The principal access to the Site is by a gravel paved roadway, which runs southward from Hammonton Smartsville Road into the northeastern part of the Site.

There were historically a number of small structures in the northeastern part of the Site, including a farm residence and other buildings associated with farming and dairy operations (Figures 2 and 3). However, all structures in this area have been demolished; only concrete foundations, some pavement, and a concrete water trough were still evident as of 2013. The remainder of the Site was historically used for farming or grazing, and shows no evidence of other previous development.

In recent visits, the Site has been overgrown with tall grass. Some trees are present in the northeastern part of the Site, near the former building locations.

A buried 12-inch water line crosses the western part of the Site from north to south; it is aligned with Sutter Street, which is located offsite to the south. The buried line is not demarcated or otherwise evident at the Site; it was identified based on information from the Linda County Water District.

ARCADIS understands that the MJUSD plans to develop the Site with educational support facilities, including an adult education center, a middle school, and an alternative education high school. The proposed development will include approximately nine classroom buildings, 11 administration buildings and district offices, and six portable classrooms; 18 additional portable classrooms may also be relocated to the Site. The proposed Site development master plan anticipates a total of up to 1,628 students at the middle

school and the alternative education high school. The proposed development will be served by public utilities for drinking water, irrigation water, and sewage disposal.

2.1.1 Contact Persons, Mailing Addresses, and Telephone Numbers

Contact	Attention	Address	Telephone
MJUSD	Ms. Michal Healy (Director of Facilities)	1919 B Street, Marysville, California 95901	530-749-6151
DTSC	Ms. Mellan Songco (Project Manager)	8800 Cal Center Drive, Sacramento, California 95826	916-255-6527

2.1.2 Assessor's Parcel Numbers and Maps

The Site is located on Yuba County APN 021-150-062, a 50-acre parcel associated with the 2176 Hammonton Smartsville Road address. In previous reports, the Site was associated with APN 021-150-032 and a portion of APN 021-150-060, but the Site was recently re-recorded as a single APN.

2.1.3 Ownership

The Site is currently owned by MJUSD.

2.1.4 Township, Range, Section, and Meridian

The Site is located within Section 21 of Township 15 North, Range 4 East, Mt. Diablo Baseline and Meridian.

2.2 Operational History and Status

The only known historical uses of the Site property are for dry-crop farming, dairy operations, and cattle grazing. The northeastern part of the Site historically included a farm residence and other farm buildings, which reportedly date to 1912 (ARCADIS 2012a). Nine former structures, designated as B1 to B5 and F1 to F4, have been identified in this area (Figures 2 and 3):

- Five structures (B1 to B5) were observed during Site visits in 2009 and 2011. These structures have since been demolished, but their concrete foundations are still evident at the Site.
- Two historical structures (F1 and F2) have been recognized based on concrete foundations observed during Site visits. These foundations also remain evident at the Site.

- Two additional historical structures (F3 and F4) have been recognized based only on historical aerial photographs. No foundations or other physical evidence of these structures have been observed.

A few other historical features are still evident at the Site (Figures 2 and 3):

- Pavement exists in parts of the former building area in the northeastern part of the Site. A roadway runs southward from Hammonton Smartsville Road to this area.
- Two water supply wells are located near the F2 location. There is also a concrete surge basin in this area, apparently for regulating irrigation water flow,
- A concrete water trough is located near the F3 and F4 locations.

A variety of agricultural equipment and debris, and piles of trash and municipal waste, were observed at the Site during the 2009 and 2011 Site visits. This material was subsequently removed from the Site.

2.3 Topography

The Site is essentially flat, with a gentle slope towards the southwest. The ground surface elevations at the Site range from approximately 72 to 68 feet above mean sea level, based on local topographic maps. Elevations are a few feet lower in the vicinity of the Linda Drain.

2.4 Geology and Hydrogeology

2.4.1 Site Geology

The Site is located on the eastern side of the Sacramento River Valley, near the confluence of the Yuba and Feather Rivers, within the Great Valley Geomorphic Province. The surficial sediments include unconsolidated alluvial deposits of Holocene to Pliocene age (ARCADIS 2012a).

The Site soils have been mapped predominantly as “San Joaquin Loam”. San Joaquin soils consist of a mixture of sand, silt, and clay. They are typically associated with alluvial deposits derived from predominantly granitic sources, which is consistent with the regional geologic setting.

2.4.2 Site Hydrogeologic Setting

The Site is located about 1.7 miles southeast of the Yuba River; the Yuba River joins the Feather River about 3.2 miles west of the Site. Local surface drainage is predominantly to the southwest, towards the

Feather River. A small drainage channel, known as the “Linda Drain”, crosses the Site in the general northeast to southwest direction.

The Site lies in the South Yuba Subbasin of the Sacramento Valley Groundwater Basin. The shallow groundwater in this area is associated with unconsolidated alluvial deposits. In Spring 2004, the shallow groundwater in the vicinity of the Site were mapped at elevations of 40 to 50 ft msl (Onsoy et al. 2005, fig. 4), which represents depths of approximately 20 to 30 ft below ground surface at the Site. The general direction of groundwater flow was towards the southwest, consistent with the local topography.

Two water-supply wells have been reported at the Site, to the east of the F2 location (ARCADIS 2012a). However, no well construction information or groundwater data are available for these wells.

2.5 Surrounding Land Use and Sensitive Ecosystems

2.5.1 Surrounding Land Use

The Site lies within the general area of the unincorporated community of Linda. The neighboring properties are used for residential or agricultural uses, or are undeveloped.

The Site is directly bordered by Hammonton Smartsville Road to the north, by undeveloped land to the east and west, and by residential properties to the south. Other residential properties exist within 1,000 feet of the Site to the north, east, and west, but they do not border the Site directly.

A 12-inch water line, oriented north-south, crosses the western part of the Site. (Section 2.1). A 115 kilovolt power line, oriented north-south, is located approximately 1,000 feet to the west of the Site.

2.5.2 Sensitive Ecosystems

The Site is located within a generally developed suburban area, surrounded by residential and agricultural properties. No ecological resources have been identified at the Site, and its development is not expected to have a deleterious effect on any ecological resources located off site.

2.6 Meteorology

The Marysville, California area is characterized by a Mediterranean-type climate, with hot dry summers and mild wet winters.

Climate data were obtained from the Western Regional Climate Center for the Marysville-Yuba County Airport (Station KMYV), which is located approximately three miles southwest of the Site. The average

temperature and precipitation results are based on October 2000 through December 2008 data, while the average wind speed and direction data are based on 1992 to 2002 data. The results obtained from this station were as follows:

- **Maximum average air temperatures:** Highest in July and August, at 94 to 97 degrees Fahrenheit (°F). Lowest in December and January, at 54 to 55°F.
- **Minimum average air temperatures:** Highest in June, July, and August, at 57 to 62°F. Lowest in December, January and February, at 37 to 40°F.
- **Average precipitation:** Average rainfall of 18.62 inches annually. Wettest from November through March (14.89 inches), driest from June to September (0.28 inches).
- **Wind speed:** Average observed wind speed of 6.7 miles per hour (mph). Wind speeds are highest in April to June (7.5 to 7.6 mph); lowest in September to November (5.4 to 5.9 mph).
- **Wind direction:** The prevailing wind direction is from the south-southeast. This wind direction predominates in every month except April, when the prevailing wind direction is from the southeast.

2.7 Regional Radon and Asbestos Information

2.7.1 Regional Radon Information

Radon in California is most commonly associated with certain rock types, such as granitic rocks or Miocene marine sedimentary rocks (CDMG 1991). These rock types are not present near the Site, which is located in a large river valley underlain by alluvium.

The California Department of Public Health (CDPH; 2010) maintains a database of radon measurements in California, based on zip code. A total of 20 measurements have been collected from the 95901 (Marysville) zip code, which includes the Site. None of these measurements showed elevated radon results (greater than or equal to 4.0 pCi/L). The potential for elevated radon levels at the Site appears to be low for aboveground and below ground structures. Additional radon information is presented in the PEA WP (ARCADIS 2012a).

2.7.2 Vicinity Review of Naturally Occurring Asbestos

Naturally occurring asbestos in California is most often related to the occurrence of ultramafic rocks. There are exposures of ultramafic rocks in the Sierra foothills to the east of the Site, in the general upgradient direction (Saucedo and Wagner 1992; CDMG 2000b). However, these exposures occur at distances of

more than 10 miles from the Site. The exposures therefore do not represent a significant concern, based on California Department of Toxic Substances Control (DTSC; 2004) guidance for school sites. Additional naturally occurring asbestos information is presented in the PEA WP (ARCADIS 2012a).

2.8 Previous Site Actions

Soil sampling was previously conducted at the Site Environmental investigations during a PEA in April 2012 (ARCADIS 2012b) and during a SSI between January 2013 and July 2013 (ARCADIS 2013). No previous environmental investigations are known to have occurred at the Site.

The PEA and SSI results are briefly summarized below. Soil data collected during the PEA and SSI are summarized on the SSI Figures in Appendix A and tabulated on the SSI tables in Appendix B.

2.8.1 2012 Preliminary Environmental Assessment

The PEA addressed a variety of potential environmental impacts to shallow soil, including:

- organochlorine pesticides (OCPs), including potential impacts from termiticide application around the perimeter of building foundations, agricultural applications, pesticide mixing or storage, and uncharacterized fill.
- lead, including potential impacts from lead-based paint and wood/trash piles.
- other metals, including potential impacts from fertilizer storage, a municipal waste pile, a possible burn pit, and uncharacterized fill.
- hydrocarbons, including potential impacts from uncharacterized fill, wood/trash piles, a possible burn pit, and a municipal waste pile. Hydrocarbons were analyzed as total petroleum hydrocarbons (TPH) or as polynuclear aromatic hydrocarbons (PAHs).
- polychlorinated biphenyls (PCBs), including potential impacts from a pole-mounted transformer.

The PEA included a human health risk screening evaluation, which concluded that further delineation of OCPs, lead, and arsenic in soil in the northeastern part of the Site was warranted. No further evaluation of other metals, hydrocarbons, or PCBs was deemed necessary and confirmed by the DTSC.

OCPs were the most commonly detected concern in the soil samples; there were relatively few samples with elevated lead or arsenic concentrations. Most of the affected samples were collected at a depth of 0.5 ft below ground surface (ft bgs).



Revised Removal Action Work Plan

Hammonton Smartsville Property
Yuba County, California

2.8.2 2013 Supplemental Site Investigation

Four further rounds of soil sampling were conducted in the northeastern part of the Site in January 2013, April 2013, June 2013, and July 2013. The lateral and vertical extent of soil affected by OCPs, lead, and arsenic was deemed to be sufficiently delineated after the final round of sampling and confirmed by the DTSC.

The affected soils were associated with the historical buildings and other features in the northeastern part of the Site; they did not appear to have migrated off-site. The deepest affected samples were collected at depths of 6.0 ft bgs. A RAW was recommended to address the affected soils.

3. Nature, Source, and Extent of Contaminants in Soil

Multiple phases of soil assessment were conducted at the Site during 2012 and 2013 (Section 2.8). Assessment results were consolidated and synthesized in the SSI (ARCADIS 2013), and are summarized below.

3.1 Type, Source, and Location of Contaminants

The principal COCs at the Site are various OCPs. Elevated OCP concentrations have been detected in shallow soil adjacent to the perimeters of most of the historical structures at the Site, where they were most likely applied as termiticides. OCPs have also been detected in other adjacent areas where pesticides may have been handled and mixed with water, or applied to livestock for insect control.

A variety of OCPs have been detected at the Site, including 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, technical chlordane, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, gamma-BHC (Lindane), heptachlor, heptachlor epoxide, methoxychlor, and toxaphene. The detections were primarily in surficial (0.5 ft bgs) samples. However, OCPs have been detected locally at greater depths (up to 6.0 ft bgs) near historical structures B3 and B4.

Secondary COCs include lead and arsenic. Elevated lead concentrations have been detected adjacent to the perimeters of several historical structures in the northeastern part of the Site; these results are most likely associated with the historical use of lead-based paint. The affected samples were primarily collected at surficial depths (0.5 ft bgs), but in a few cases at greater depths (2.5 ft bgs).

Elevated arsenic concentrations have been detected only near the northern side of historical structure B5. This area was formerly occupied by a shed that was used to store bagged fertilizer; the arsenic results are most likely associated with this historical fertilizer storage. The affected samples were collected exclusively at surficial depths (0.5 ft bgs).

3.2 Extent and Volume of Contamination

The proposed excavation areas at the Site are shown in Figures 4A to 4D. These areas are described briefly in the following table:

Table A. Proposed Areas of Concern and Excavation Areas

Figure	Area of Concern	Chemicals of Concern	Estimated Excavation Volume (cy)	Notes
4A	Former Structure B1	OCPs	646	Most extensive excavation area at Site, with approximately 86 percent (%) of the affected soil site wide. Proposed excavation depth is typically 2.5 ft bgs, but locally deeper. Deepest excavations are to 6.0 ft bgs in the former livestock handling area north of B4. OCPs may have been applied to livestock for insect control in this area. This area also includes the former livestock handling areas near B3 and B4.
	Former Structure B2	OCPs and Lead		
	Former Structure B3	OCPs and Lead		
	Former Structure B4	OCPs and Lead		
4B	Former Structure B5	OCPs and Lead	47	Arsenic most likely associated with historical fertilizer storage in the shed north of B5. Proposed excavation depth is 2.5 ft bgs.
	Former Shed North of B5	OCPs, Lead and Arsenic		
4C	Former Structure F1	OCPs and Lead	32	Proposed excavation depth is 2.5 ft bgs.
4D	Former Structure F2	OCPs	28	Proposed excavation depth is 2.5 ft bgs. OCPs may have been prepared by mixing with water in the supply well area.
	Supply Well Area Near F2	OCPs		

The vertical and lateral extent of the proposed excavations has been defined based on “clear” samples collected during the PEA and SSI. The proposed excavations will extend vertically and laterally to these previous “clear” samples, which are shown as “previous bottom definition samples” or as “previous sidewall definition samples” on Figures 4A to 4D. Additional sidewall and bottom samples will be collected for verification purposes after the excavations have been conducted; the proposed additional sampling locations are shown on Figures 4A to 4D.

In SSI report comments dated October 30, 2013, DTSC requested sidewall samples adjacent to paved areas. Such samples have been included adjacent to the roadway east of B2, and adjacent to the paved walkway between the B3 and B4 locations (Figure 4A). Previous definition samples are assumed to provide adequate delineation near the roadway to the west of B2.

The total area affected soil at the Site, based on the available assessment data, is estimated at approximately 7,370 square feet, or about 0.17 acre. The total volume of affected soil at the Site, based on the available assessment data, was estimated at approximately 753 cy for excavation purposes.

Most of the affected soils at the Site were collected at surficial (0.5 ft bgs) depths. The estimated volumes of affected soil assume remedial excavations to a depth of 2.5 ft bgs in most parts of the Site, with local excavations to 3.5 ft bgs, 5.0 ft bgs, or 6.0 ft bgs in a few areas near B2, B3, and B4.

During the PEA and SSI, two isolated areas with slightly elevated OCPs were identified and delineated at the SS-28 and SS-41 sample locations (Figure 3). These two locations are small relative to the other remediation areas at the Site, are not associated with those areas, and are considered delineated; if left in place, they are not anticipated to significantly increase the overall health risk for the Site. Based on discussions with DTSC, and agreement during the RAW scoping meeting on January 22, 2014, no remedial action is considered warranted for these two locations.

3.3 Health Effect of Contaminants

Health effects of COCs identified on the Site are presented in Table 1.

3.4 Targets Potentially Affected by the Site

A Conceptual Site Model (CSM) was developed to identify the receptors that may come into contact with affected soil and dust and to indicate potential exposure pathways. The CSM is based on the following conditions and assumptions:

- The detected OCPs, lead, and arsenic are the COCs at the Site.
- Residential exposure conditions were assumed, as directed by the DTSC. This is the most sensitive exposure scenario used to characterize properties without land restrictions.
- Exposures to COCs during and following implementation of this RAW considered ingestion, inhalation, and dermal contact pathways from shallow soils at the Site.
- During the implementation of this RAW, the receptors will be site workers and occupants of neighboring properties.
- Following development of the Site, the receptors will be students, faculty, administrative staff, maintenance workers, and custodial workers.

3.5 Confirmation Sampling

Confirmation soil sampling will be performed during implementation of this RAW to confirm that the soils affected by COCs at concentrations above the site-specific cleanup goals (CGs) have been removed from the Site (Section 7.6).

If elevated concentrations (above the site-specific CGs) of COCs are detected in confirmation soil samples collected following the soil removal activities, additional excavation and further confirmation sampling will be conducted as necessary and/or if requested by the DTSC.

4. Human Health Risk Evaluation and Cleanup Goals

In accordance with the *PEA Guidance Manual* (DTSC 1999), a screening-level human health risk evaluation was conducted as part of the PEA to provide an estimate of potential chronic (long-term) human health risks that may be associated with soil at the Site. The risk evaluation presented in the PEA has been updated and provided herein with the analytical data from all the field investigations conducted to date (e.g., PEA and SSI investigations). The updated risk evaluation spreadsheets are provided in Appendix B.

Per PEA guidance, land use of the Site was assumed to be residential, which represents a conservative land use scenario for continued school use. Complete exposure pathways included: (1) inhalation of airborne dust or volatile constituents from affected media, (2) ingestion of site soil, and (3) dermal absorption from direct contact with soil under a residential scenario.

The evaluation was conducted using the analytical models provided in the *PEA Guidance Manual*, which are structured to provide a conservative estimate of the chronic risk from affected media along exposure pathways that are most frequently encountered in a residential setting. The default factors contained in the analytical models are conservative in nature and represent a reasonable maximum exposure to COCs as defined by the United States Environmental Protection Agency (USEPA). The screening-level evaluation was conducted for each metal detected in site soil at concentrations above background concentrations and for the other detected chemicals.

4.1 Exposure Scenarios

Under the residential scenario, the receptors (referred to as “residents”) are assumed to be exposed up to 24 hours per day, 350 days per year, for 30 years, for the reasonable maximum exposure (RME) case (i.e., 6 years for a child and 24 years for an adult; DTSC 1999; DTSC 2011). The residents are assumed to be exposed via inhalation of airborne particulate emissions from the Site. Inhalation rates of 0.83 cubic meters per hour (m^3/hr) for a 24-hour day (i.e., 20 cubic meters per day [m^3/day]) for an adult resident and 0.43 m^3/hr for a 24-hour day (i.e., 10 m^3/day) for a child resident were used for the residents’ evaluations, as recommended by DTSC for the RME case.

The residents are also assumed to be exposed via incidental ingestion and direct dermal contact with soil at the Site. Ingestion rates of 100 milligrams per day (mg/day) for an adult resident and 200 mg/day for a child resident were used for the resident evaluations, as recommended by DTSC for the RME case. Exposed skin surface areas of 5,700 square centimeters per day (cm^2/day) for an adult resident and 2,900 cm^2/day for a child resident were used for the residential evaluations, as recommended by DTSC for the RME case. The default value for soil-to-skin adherence factor of 0.07 and 0.2 milligram per square centimeter was used in the residential evaluations for direct dermal exposure for adults and children, respectively. The adult resident and child residents were assumed to be exposed to soil via the direct dermal route 350 times per year. The

average body weights of an adult resident and a child resident were assumed to be 70 kilograms (kg) and 15 kg, respectively.

4.2 Identification of COCs

Each detected chemical was initially considered for the human health screening-level evaluation based on review of the overall PEA and SSI data set. COCs were initially categorized by chemical group, including metals (Table B-2) and pesticides (Table B-3). Petroleum hydrocarbons were also analytes but were not selected as COPCs based on the preference to evaluate these compounds, which are a mixture of chemicals, based on individual components that may be present. Analysis for PAHs did not identify the presence of detectable PAH analytes above laboratory reporting limits in the samples analyzed for PAHs. Additionally, some samples were analyzed for PCBs but these compounds were not detected above their laboratory reporting limits.

The screening-level evaluation was conducted for each metal detected in site soil at concentrations above regional background concentrations and/or where a statistical evaluation suggested statistically significant dataset variability indicating that perhaps more than a single background dataset may be present. For other analytes, the screening-level evaluation was conducted for each constituent detected above laboratory reporting limits.

It is noted that aldrin is flagged on Table B-3 in several instances where its reporting limit is above the residential California Human Health Screen Levels (CHHSLs; California Environmental Protection Agency, Office of Environmental Health Hazard Assessment [OEHHA] 2005/2009). While the reporting limit for this analyte is above the CHHSL in several instances, it is at locations where dilutions were required because of elevated concentrations of target analytes (COPCs). Aldrin was not selected as a COPC because it was not detected above the reporting limit in other samples, the majority of which had a reporting limit below the CHHSL. There is no evidence to believe that this analyte is present in site soils, and as such, it was not considered to be a COPC.

4.2.1 Metals

DTSC guidance suggests that metals should be evaluated based on a comparison to site-specific background levels, if available. In the absence of a site-specific background dataset, DTSC has suggested that the site metal data be compared to the CHHSL for that particular metal, and if the maximum site concentration is below the CHHSL, the metal can be eliminated as a COPC. Table B-2 presents a summary of metals concentrations reported, including the number of samples with detections, and the minimum, maximum, average, standard deviation, 95% UCL concentrations, as well as their respective CHHSL.

As shown in Table B-2, arsenic and lead were selected as COPCs as the maximum concentrations of these metals were above background concentrations (as well as their respective CHHSL).

It is noted that cadmium was detected above the residential CHHSL of 1.7 mg/kg (OEHHA 2005) in soil sample FM-4-1.5 collected from the fill material pile at a concentration of 3.4 mg/kg. Although the cadmium result was above the CHHSL, the estimated risk and hazard (calculated in Section 7 of the PEA), using this maximum concentration as the exposure point concentration were below the risk and hazard thresholds. In addition, the 3.4 mg/kg maximum result is below the DTSC-modified screening level of 4 mg/kg; therefore, the concentration of cadmium in sample FM-4-1.5 was not considered to be a concern and cadmium was not selected as a COC.

4.2.2 Lead

Per DTSC guidance, lead was evaluated separately. DTSC recommends evaluating blood lead levels using the LeadSpread Model and/or comparing to the CHHSL of 80 mg/kg, updated in 2009. Table B-2 presents a summary of lead concentrations detected, including the maximum and 95% UCL concentrations for comparison to the CHHSL.

4.2.3 Pesticides

Detected pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT, technical chlordane, dieldrin, endosulfan I, endosulfan sulfate, endrin, endrin aldehyde, gamma-BHC (Lindane), heptachlor, heptachlor epoxide, methoxychlor, and toxaphene) were considered COPCs and were evaluated within the risk assessment. Table B-3 presents the pesticides detected, as well as their maximum and 95% UCL concentrations.

The CHHSLs were listed in Table B-3 for comparison to discrete samples. Because composite samples contained 2, 3, or 4 discrete samples, depending upon the location, it was impractical to list a different CHHSL in Table 3 (and code different color screening criteria depending upon number of samples within a composite). However, for purposes of establishing whether the associated discrete samples comprising the composite were analyzed, each composite was individually reviewed based on comparison to the appropriate CHHSL criteria (e.g. CHHSL/number of discrete samples in the composite sample; for example, if a composite contained four samples, each pesticide result was compared to the respective CHHSL divided by 4). If the composite result exceeded the composite-specific CHHSL, the composite was discretely analyzed. This was done for OCP results at locations with potential termiticide application as well as a more conservative approach for OCP results at locations with potential historical agricultural use. In summary, 12 pesticide composite samples did not have subsequent discrete analysis; these 12 samples were evaluated and pesticide results were confirmed to be below the composite-specific CHHSL.

4.2.4 PCBs

As shown in Table B-4, PCBs were not detected in the sample submitted for PCB analysis. Therefore, PCBs were not selected as COPCs.

4.2.5 PAHs

PAHs were not detected in either of the two samples submitted for PAH analysis as shown in Table B-5. Therefore, PAHs were not selected as COPCs.

4.2.6 Petroleum Hydrocarbons

As summarized in the PEA (ARCADIS 2012b), TPH-Extractable Diesel Range Organics (TPH-E [DRO]), TPH-E Oil Range Organics (TPH-E [ORO]), and TPH-Purgeable Gasoline Range Organics (TPH-P [GRO]) (DRO) are mixtures of compounds and were not detected above their respective residential San Francisco Bay Region's Environmental Screening Levels (ESLs; RWQCB 2013) in soil samples analyzed for these compounds during the PEA. Also, TPH-P (GRO), which consists of the lightest range of petroleum hydrocarbons, was not reported above its laboratory reporting limit. Therefore, TPH-E (DRO), TPH-E (ORO), and TPH-P (GRO) were not selected as COPCs.

4.2.7 Summary of COPCs

COPCs for the screening risk evaluation included metals and pesticides. These soil COPCs were included in the evaluation of chronic health risk from the ingestion, dermal contact, and inhalation pathways. Per DTSC guidance, lead was evaluated separately based on comparison to the lead CHHSL.

In summary, the metals and pesticides detected at the Site are considered COPCs and will be evaluated in this human health screening evaluation. These compounds are presented in Table B-6 and summarized below:

COPCs	
Metals	Arsenic
	Lead
Pesticides	4,4'-DDD
	4,4'-DDE
	4,4'-DDT
	Technical Chlordane
	Dieldrin
	Endosulfan I
	Endosulfan sulfate
Pesticides (cont')	Endrin
	Endrin Aldehyde
	Gamma-BHC (Lindane)
	Heptachlor
	Heptachlor Epoxide
	Methoxychlor
	Toxaphene

It is noted that this list includes four COPCs that were added as a result of the SSI sampling (e.g. endosulfan I, endrin aldehyde, gamma-BHC (lindane), and methoxychlor).

4.3 Exposure Point Concentrations

Per DTSC PEA guidance, the maximum detected concentrations of COPCs were used in the exposure scenario evaluated in the human health screening evaluation. Maximum site concentrations are presented in Table B-6.

It is noted that if the maximum detected concentration was associated with a duplicate sample (as compared to the primary sample), the duplicate sample result was utilized. This was the case for chlordane, heptachlor epoxide and toxaphene.

Air concentrations from soil COPCs were estimated from the equation shown on Figure 2.8 of the PEA *Guidance Manual* and are shown in Tables B-9 through B-10 in Appendix B. The equation states that the

concentration in air is equal to the concentration in soil multiplied by 1.32×10^{-9} kilograms per cubic meter (kg/m^3).

4.4 Toxicity Values

The toxicity values for COPCs are summarized in Tables B-7 and B-8. The cancer slope factor values for COPCs were obtained from the California Environmental Protection Agency (CalEPA) Office of Environmental Health Hazard Assessment's (OEHHA's) Toxicity Criteria Database dated July 2012 (OEHHA 2012). The reference dose values for COPCs were obtained from USEPA's Integrated Risk Information System database (USEPA 2013a) and Regional Screening Levels (USEPA 2013b).

4.5 Risk and Hazard Characterization

The screening evaluation estimated a risk or hazard for soil and air pathways for each selected COPC at the Site. The equations presented on Figures 2.3 and 2.4 of the *PEA Guidance Manual* (DTSC 1999) were used in the risk and hazard estimations for non-volatile COPCs.

Carcinogenic risk and non-carcinogenic hazard characterization are summarized in Tables B-9 and B-10, respectively, and are discussed below.

4.5.1 Carcinogenic Risks

Arsenic, cadmium, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, technical chlordane (chlordane), dieldrin, gamma-BHC (lindane), heptachlor, heptachlor epoxide, and toxaphene were identified as carcinogens in site soils. Ingestion, inhalation, and dermal contact pathways from shallow soils at the Site were considered. As shown in Table B-9, the estimated cancer risk for the carcinogenic compounds using the maximum detected concentrations in soil samples collected during the PEA and SSI investigations is 1×10^{-3} , which is above 1×10^{-6} to 5×10^{-6} , the cancer risk target risk management range for school sites. Primary contributors are arsenic, 4,4'-DDT, 4,4'-DDE, chlordane, dieldrin, and toxaphene.

Eight of the 11 carcinogenic COPCs individually exceeded the 1×10^{-6} , the DTSC's cancer risk target. Arsenic is the primary contributor (70%) to the overall carcinogenic risk. OCPs cumulatively contributed to 30% to the overall carcinogenic risk. It is noteworthy that the inclusion of arsenic as a COPC is due primarily to the presence of a single elevated concentration of arsenic (46 mg/kg of arsenic at SS-45-0.5). With the removal of arsenic-affected soil at this location (and collection of an acceptable confirmatory sample result), the remaining concentrations of arsenic are arguably within background concentrations and therefore would not contribute to the overall risk. Pesticides would then be considered to be contributing 100% of the risk. With arsenic removed, the top contributors of pesticide COPCs to the remaining risk would be 4,4'-DDT

(61%), dieldrin (13%), 4,4'-DDE (9%), toxaphene (8%), and technical chlordane (5%) with incidental contribution from 4,4'-DDD and heptachlor epoxide.

4.5.2 Non-carcinogenic Hazards

The non-carcinogenic health hazard estimate for COPCs was also evaluated for inhalation and ingestion/dermal pathways from shallow soil at the Site. As shown in Table B-10, the hazard index (HI) for non-carcinogenic effects using the maximum detected concentration collected during the PEA and SSI sampling activities is 13, which is well above the 1.0 hazard index. 4,4'-DDT is the primary contributor (61%) to the overall hazard index. Pesticides contribute 86% to the overall hazard index. If arsenic was removed (the inclusion of arsenic as a COPC is due primarily to the presence of a single elevated concentration of arsenic), pesticides would contribute approximately 99% to the overall hazard.

4.5.3 Lead Evaluation

While many CHHSLs are evaluated on a point by point basis (e.g. comparison of each data point to the CHHSL), the lead CHHSL is based on a 95% UCL of the dataset, meaning that the 95% UCL of the site dataset is calculated and that result is compared to 80 mg/kg. It is possible to have samples with concentrations above 80 mg/kg, but have the resulting UCL below 80 mg/kg.

Based on a review of the lead data, 138 samples were collected with a maximum concentration of 730 mg/kg and a 95% UCL of 103 mg/kg.

Five samples appear to be elevated with concentrations of 730, 620, 530, 330, and 320 mg/kg (SS-13c-0.5, SS-13b-0.5, SS-18-0.5, SS-15a-0.5, and SS-5a-0.5 [duplicate of SS-5-0.5]). If these samples are removed, the maximum concentration is 230 mg/kg and the resulting 95% UCL is 70 mg/kg, which is below the 80 mg/kg CHHSL. Lead concentrations that contribute significantly to the elevated 95% UCL and deeper lead results at these locations are summarized on Table B-2.

According to discussion provided in DTSC's LeadSpread8 User Guide, it is acknowledged that "use of PRG90s [80 mg/kg] is a departure from the previously utilized Cal-modified USEPA Region 9 PRG value of 150 mg/kg for residential land use. HERO implements this risk-based soil concentration as a residential use (i.e. unrestricted use) scenario Exposure Point Concentration (EPC), calculated as the 95 percent upper confidence limits on the arithmetic mean (95% UCL) of 80 mg/kg or less of soil lead". The user guide indicates that "if sufficient data are available", HERO recommends calculating the 95% UCL on the arithmetic mean lead concentration for each exposure area. It further indicates "if individual samples exceed the PRG90 [80 mg/kg], it would not mean that the exposure area itself is in exceedance of the PRG90 as long as the 95% UCL itself is below ~80 mg/kg for residential."

Additionally, a poster presentation by DTSC and OEHHA at the recent Society of Toxicology Conference¹ suggests that “In our [DTSC/OEHHA] experience, cleanup goals consistent with a 95% UCL equal to the revised residential CHHSL [of 80 mg/kg] can generally be approached by excavating contaminated soils with lead concentrations above approximately 150 mg/kg....”

The current lead dataset for the site consists of 138 samples (154 including duplicate samples) and is considered a “sufficient” data set. It is recognized that five samples (SS-13c-0.5 at 730mg/kg, SS-13b-0.5 at 620 mg/kg, SS-15a-0.5 at 330 mg/kg, SS-18-0.5 at 530 mg/kg, and SS-5a-0.5 at 320 mg/kg [duplicate of SS-5-0.5) are contributing to a 95% UCL greater than 80 mg/kg.

There is a natural break between 180 to 200 mg/kg and 160 mg/kg in the soil lead concentration dataset. Therefore, based on the DTSC information above, further evaluation of lead in soil samples greater than 160 mg/kg is more consistent with general DTSC guidance.

4.5.4 Summary

Using maximum concentrations of COPCs detected during the PEA and SSI, the total estimated cancer risk is 1×10^{-3} . The total estimated hazard index is 15.

Arsenic is the primary contributor (70%) to the overall carcinogenic risk while pesticides contribute 30%. Inclusion of arsenic as a COPC is due primarily to the presence of a single elevated concentration of 46 mg/kg in surface soil sample SS-45-0.5. With the removal of arsenic-affected soil at this location (and collection of acceptable confirmatory sample results), the remaining concentrations of arsenic are arguably within background concentrations and therefore would not contribute to the overall risk. Pesticides would then be considered to be contributing 100% of the risk (predominantly 4,4-DDT, dieldrin, 4,4-DDE, toxaphene, and technical chlordane).

Lead concentrations were above their residential CHHSL (OEHHA 2005/2009) based on the comparison of the 95% UCL (96 mg/kg) of site lead data; however, elevated concentrations of lead (above the 95% UCL) were detected in five of the 138 samples for lead. Therefore, only the five locations from which these soil samples were collected are recommended for a removal action. With removal of the lead-affected soil in these areas and collection of acceptable confirmation soil samples, the anticipated 95% UCL (70 mg/kg) would be below the CHHSL for lead (80 mg/kg).

¹ *Lead Soil Screening Levels and Cleanup at California Hazardous Waste Sites*, by Behrsing, T, Carlisle, J, Sciuillo, E, Spearow, J., Davis, B, Day, K., and Wade, M

Based on the results of this risk assessment, subsequent remediation of pesticide-, arsenic- and lead-affected soils is warranted.

4.6 Uncertainty Analysis

The human health screening evaluation followed the conservative risk estimation procedures recommended by USEPA and CalEPA. Many of the assumptions regarding future land uses, relevant exposure scenarios, screening procedures, and exposure parameters selected for the risk assessment were very conservative and would likely “err on the side of safety.” Particularly under the “conservative” exposure parameters in each scenario, certain assumptions about exposure frequency and intake rates are far greater than would be reasonably expected. The “maximum probable exposure” calculated using these conservative exposure parameters may not be “probable” in a quantitative sense; it is highly unlikely that the exposures and risks for any given individual would exceed this maximum.

Examples of some of the specific areas of conservatism in this assessment are presented below:

- For the human health evaluation, conservative upper-bound chemical concentrations (e.g., the maximum concentrations) in site surface soils were established, and continuous exposure to these levels over a period of several years was assumed. Using the maximum concentration as the exposure point concentration assumes that exposure to the maximum concentration occurs throughout the entire Site, when in fact it is only at a selected location(s), thereby overestimating the risk to the remainder of the Site, since it is unlikely that a child would be “stationed” at only the one location. Therefore, the use of the maximum concentration will overestimate risks. Furthermore, the residential scenario assumes constant occupancy (24 hours per day) over a period of many years – an assumption that is overly conservative and would overstate the actual risk.
- The assumption of no pavement being present under the future school buildings is another example of the conservatism in the risk assessment. The risk assessment evaluates exposure to surface soils, and assumes that only bare land is present over the timeframe examined. However, once the school has been redeveloped, much of the Site’s surface will be covered by concrete, buildings, or asphalt, thus substantially reducing the potential direct-contact exposures to soil at the Site.

4.7 Cleanup Goals

Compounds were selected for cleanup goal development if they were identified in the PEA and/or SSI with greater than a 1×10^{-6} risk or a hazard quotient greater than 1. Arsenic, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, technical chlordane, dieldrin, endrin, heptachlor epoxide and toxaphene in soil were selected for CG development.

In addition, lead, evaluated outside of the risk assessment process, was selected for CG development due to several elevated concentrations of lead that contributed to a 95% UCL of the lead data greater than 80 mg/kg.

The CGs for COCs at the Site is presented in Table 2 (the resulting risk for each proposed CG is provided in Table B-11) and summarized as follows:

- For arsenic, a 12 mg/kg CG was proposed, which is considered to be a background concentration
- For the eight pesticides, the following CGs were proposed:
 - o 4,4-DDD – 2,300 µg/kg (CHHSL)
 - o 4,4-DDE – 1,600 µg/kg (CHHSL)
 - o 4,4-DDT – 1,600 µg/kg (CHHSL)
 - o Chlordane – 430 µg/kg (CHHSL)
 - o Dieldrin – 35 µg/kg (CHHSL)
 - o Endrin – 21,000 µg/kg (CHHSL)
 - o Heptachlor Epoxide – 53 µg/kg (USEPA Regional Screening Level [RSL])
 - o Toxaphene – 460 µg/kg (CHHSL)
- For lead, an 80 mg/kg CHHSL (using 95% UCL of the site-wide data set) CG was proposed.

To confirm that the resulting risk from these COCs would be acceptable, the risk was re-calculated using left in place soil following the removal action and considering the maximum detected concentrations for the COCs. The total estimated cancer risk would be 4.0×10^{-6} and would be within the target risk management range of 1×10^{-6} to 5×10^{-6} . As such, the CHHSLs (or RSL in the case of Heptachlor Epoxide) will serve as the CGs for the proposed removal action.

It should be noted that, upon completion of remediation activities, a human health screening evaluation will be conducted on the final confirmation sampling data set (data from soil left in place) to confirm that the cumulative risk from any detected analytes is within or below the target range of 1×10^{-6} to 5×10^{-6} , and that the cumulative HI from any detected analytes is at or below the non-carcinogenic HI of 1.0. Because there

are nine COCs (that exceed the CHHSL concentrations currently), the CHHSL for each COC is a representative CG (e.g., if there were ten COCs, theoretically, CGs should be developed below the CHHSL such that the cumulative risk/hazard is below their respective targets).

4.8 Ecological Screening Risk Evaluation

The site parcel is located within an established residential area, was historically developed with residential and other structures dating from the 1920s to the 1950s, and remains zoned for residential use today. Ecological resources have not been identified at the Site, and its development would not be expected to have a deleterious effect on any ecological resources located off site. Based on these points, the PEA (ARCADIS 2012b) concluded that a detailed ecological screening evaluation of the Site is not warranted.

4.9 Endangerment Determination

The results of the human health risk screening evaluation performed for the Site indicate that soil could pose a potential threat to human health under the residential exposure scenario. The nearest sensitive receptors are students and faculty of the school or children and adults at the residences. Additional receptors at risk in the area include workers (during construction) and future hypothetical students.

There have been no documented instances of human exposure to the COCs detected at the Site. However, disturbance of the COC-affected soil may result in direct routes of exposure, including ingestion of soil, dermal contact with soil, and inhalation of airborne soil particles, and therefore should be avoided.

5. Engineering Evaluation / Cost Analysis

The EE/CA described in this section is based on the *Guidance on Conducting Non-Time-Critical Removal Under CERCLA* (USEPA 1993).

RAOs are specific goals for protecting human health and the environment. The National Contingency Plan (40 Code of Federal Regulations [CFR] Section 300) specifies that RAOs must be developed that address the following site-specific elements:

- chemicals of concern
- media of concern
- receptors of concern
- complete or potentially complete exposure pathways

RAOs are developed by evaluating the results of the site characterizations, risk assessment results, and ARARs. RAOs describe the remedial actions needed to protect human health, environmental quality, or both. They are generally narrative statements; however, they can also include specific, quantitative concentrations of chemicals to be achieved.

For the Site, the COCs selected for removal are OCPs, lead, and arsenic in shallow soil.

During the implementation of this RAW, the receptors will be site workers and occupants of neighboring properties. The MJUSD plans to redevelop the majority of the approximately 50-acre site for use as MJUSD educational support facilities, a middle school, an alternative education high school, and an adult education center. The DTSC considers this to be a sensitive land use, and makes risk management decisions for a school site assuming a residential land use. Consequently, for the EE/CA, residential adults and children have been assumed to be the future receptors of concern.

The exposure pathways of concern for receptors (including students and school staff at the proposed school) are:

- incidental soil ingestion
- dermal (soil-to-skin) contact
- inhalation of airborne particulates

The RAOs for this project are to:

- eliminate or minimize potential residential human contact with the COCs resulting from direct contact and wind erosion
- minimize or eliminate the need for future maintenance of a remediation system (e.g., a cap) due to the presence of OCPs in the soil
- obtain unrestricted future land use designation

5.1 Removal Action Scope

The goal of a removal action is to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or potential release of a hazardous substance that may result in a threat to the public and/or environment. The overall remedial action goal for the Site is to obtain an unrestricted future land use designation by preventing human exposure to soil containing COCs at concentrations presenting unacceptable human health risks and hazards.

5.2 Evaluation of Removal Action Alternatives

In this section, remedial action alternatives are identified, individually analyzed, and comparatively evaluated to provide a basis for the selection of a preferred alternative. Section 7 describes the implementation of the preferred alternative.

This section presents remedial alternatives and a detailed analysis of each alternative to address the presence of toxaphene, other OCPs, lead, and arsenic in soil. The detailed analysis was conducted to provide sufficient information to compare the alternatives, select an appropriate removal action for the Site, and that the recommended action does not pose unacceptable health hazards following implementation. The extent to which actions are assessed during the detailed analysis is influenced by the available data.

The following remedial alternatives were considered for the Site:

- Alternative 1 – No Further Action (NFA)
- Alternative 2 – Capping and Deed Restriction (“capping”)
- Alternative 3 – Excavation and Off-Site Disposal of Affected Soil (“removal”)
- Alternative 4 – On-Site Bioremediation of Affected Soil

5.2.1 Alternative 1: No Further Action

Under this option, the Site would be left in its existing condition. Consequently, there would be no reduction in the volume of affected soil. Although readily implementable and inexpensive, this alternative would not be effective in meeting the remedial goals for the Site.

5.2.2 Alternative 2: Capping and Deed Restriction

Under the Capping and Deed Restriction option, a low-permeability surface cap (e.g., clay and/or asphalt) would be placed over affected soil at the Site. The cap would reduce the potential for human exposure to and leaching of contaminants from affected soil. To confirm that the potential for future exposure to contaminants is minimized, the cap would require periodic maintenance. Because affected soil would not be removed from the Site under this alternative, a deed restriction would be required to restrict future use of the Site. The land use covenant would be recorded with the Yuba County Assessor's Office before the DTSC grants approval of the completion of the final removal action.

This alternative provides for 30 years of site maintenance to confirm the continuous integrity of the cap. Site maintenance would consist of an annual inspection of the cover, maintenance of the drainage structures, and biannual resurfacing of the cap.

Under this alternative, institutional controls would be needed to protect the cap. The institutional controls are likely to preclude reuse of the Site as a residence, a daycare center for children, a long-term care hospital, or a public or private school for persons less than 21 years of age. As the planned use of the Site is as part of a school, this is not a viable option, but this scenario was explored for the purposes of this cost analysis.

The affected portions of the Site would require capping under the above scenario. Although the capping technology is readily implementable and could be completed within approximately one week, the alternative would require an ongoing maintenance and monitoring program. Additionally, the cap would require complete replacement every 30 years.

Capping combined with institutional controls would be an effective method to reduce contaminant exposure, but would not meet the MJUSD's goal of fully eliminating the unacceptable risk from the school Site, and would not permit the Site to be used as part of a school facility. Furthermore, the necessary maintenance activities and reporting requirements would represent an ongoing operations and maintenance cost for the MJUSD.

5.2.3 Alternative 3: Excavation and Off-Site Disposal of Affected Soil

This alternative would involve excavation of affected soil identified on the Site with COC concentrations above the CGs. Excavation would be conducted using conventional earthmoving equipment (e.g., backhoes, excavators, articulated loaders, dump trucks). Hand tools (shovels, picks, wheelbarrows) could potentially be used on a limited basis in certain sensitive areas (e.g. adjacent to trees or utilities). The excavated soil would be temporarily stockpiled at the Site, and then removed from the Site for disposal at an appropriate facility.

The initial steps for implementing this alternative would be marking the excavation boundaries and identifying underground utilities on the Site. The approximate excavation boundaries would correspond to the limits of distribution of affected soil, as shown on Figures 4A to 4D.

After the excavation boundaries have been marked and the underground utilities have been identified, the Site would be cleared and grubbed to remove vegetation. Currently, vegetation at the Site consists primarily of grasses and weeds. Green waste produced during implementation of this RAW would be removed during excavation of the affected soil and disposed of at an off-site facility, including the affected soil.

Earthmoving equipment would then be primarily used to excavate the affected soil. Excavated soil would initially be stockpiled on the Site to allow collection and analysis of waste classification samples. The stockpiled soil would then be loaded into dump trucks for off-site disposal pending determination of an appropriate disposal facility.

Water would be used to keep the excavation and surrounding area moist to minimize dust emissions. Monitoring equipment would be used to measure dust emissions. Loaded dump trucks would be checked for mud and dirt and cleaned, if necessary, prior to leaving the Site. The loaded trucks would be covered with a tarp to minimize wind erosion of the soil during transport. Prior to disposal, samples of the excavated soil would be collected and analyzed for waste classification purposes and to establish an appropriate landfill for disposal.

Following the excavations, soil samples would be collected from the sidewalls and bottoms of the excavations and samples from soil left in place would also be utilized. Additional soil would be excavated if COC concentrations exceeding the CGs are present in confirmation soil samples collected following the initial removal activities and/or requested by the DTSC. Confirmation samples would be collected following the removal of additional affected soil. Excavation activities would cease once confirmation sample analytical results indicate that the concentrations of COCs remaining in on-site soil are less than the CGs and following DTSC agreement. The excavation areas would be backfilled if requested by MJUSD using soil in accordance with the October 2001 *Information Advisory – Clean Imported Fill Material* (DTSC 2001).

The volume of affected soil at the Site has been estimated at approximately 753 in-place cy. This represents approximately 1,130 tons, assuming a conversion factor of 1.5 tons per cy.

Based on the concentrations of COCs detected in soil samples collected from the Site to date, the excavated soils can be disposed of at one or more of the California landfills identified in the Transportation Plan. The waste would be classified before the dump trucks are loaded to allow selection of the appropriate disposal facility and proper dispatch of the dump trucks. Acceptance criteria at each landfill would be met.

Table 3 presents the estimate cost for implementation of the preferred remedial alternative, including backfill material and compaction. The total cost for the remedial work (including preparation of removal plans, excavation, disposal, backfill and compaction, oversight, air monitoring, confirmation sampling, and preparation of a completion report) is estimated to be approximately \$250,000. This cost does not, however, include DTSC oversight costs.

ARCADIS anticipates that completion of this alternative would require approximately 12 working days. Excavation of the affected soil would require approximately 10 working days. Following excavation, approximately two weeks would be required for laboratory analysis of the confirmation and soil classification samples. If no additional excavation is necessary, backfill and compaction of the excavated area would require approximately 2 additional working days.

No maintenance or ongoing reporting costs related to this alternative are anticipated.

5.2.4 Alternative 4: On-Site Bioremediation of Affected Soil

This alternative would involve on-site treatment of affected soil with amendments and/or nutrients that facilitate the biodegradation of OCPs by naturally occurring bacteria in soil. This approach is newer and not as well established as the other alternatives, but has been included in this evaluation for completeness. DTSC in historical documentation has noted that “although insufficient performance data are available to identify in situ bioremediation as a proven technology, in situ bioremediation may be a viable, cost-effective technology for some sites.”

Bioremediation may be conducted either in-situ or ex-situ. For in-situ applications, the amendments/nutrients are tilled into shallow soil, for ex-situ applications, the affected soil is excavated and placed into specially constructed treatment cells on site. Treatment typically takes periods of weeks or months, usually with periodic mixing, tilling, or irrigation. In either case, an initial pilot study is required to assess the applicability of the technique and the appropriate mixture of amendments or nutrients.

The Site is not ideally suited for the in-situ approach, because elevated OCP concentrations have been detected in samples at depths as great as 6.0 ft bgs. Case histories cited by DTSC for in-situ bioremediation

of OCPs were restricted to surficial soils, at depths of no more than 2.0 ft bgs, which can be readily tilled. Such treatment would not address the deeper soils, and so this alternative would have the same limitations as capping.

The ex-situ approach would involve excavation of affected soil, followed by construction of lined treatment cells onsite. The ex-situ approach (unlike the in-situ approach) would address both shallow and deep affected soils. However, this approach may not be sufficiently effective, given the relatively high OCP concentrations found in the most affected samples at the Site.

A further problem, with both the in-situ and ex-situ approaches, is that some of the OCP-affected soils at the Site also contain lead and arsenic at concentrations above CGs. On-site bioremediation would reduce OCP concentrations, but would not affect these metals. Therefore treated soils could still contain elevated concentrations of lead or arsenic, as well as residual concentrations of OCPs. The time requirements for both in-situ and ex-situ treatments would be significant, because it would be necessary to conduct an initial pilot study, followed by weeks to months of soil treatment. But even after such treatment, neither in-situ nor ex-situ treatment is assured of fully eliminating the unacceptable risk from the Site.

5.2.5 Evaluation Criteria

The criteria of effectiveness, implementability, and estimated cost are used below to comparatively evaluate the alternatives and provide a basis for the selection of a preferred option, as required by the document titled *Guidance on Conducting Non-Time-Critical Removals under CERCLA* (USEPA 1993).

5.2.5.1 Effectiveness

Effectiveness is the primary criterion that a removal action must meet. The effectiveness of an alternative depends on its ability to: (1) protect human health and the environment, (2) comply with ARARs, and (3) fulfill CGs. A removal action is considered protective if it adequately eliminates, reduces, or controls current and potential risks posed through each exposure pathway at a site.

To fully assess an alternative's efficacy, both short- and long-term protection of human health and the environment should be considered. This is done by analyzing the alternative's ability to eliminate, reduce, or control exposures to COCs. Particular factors to consider include the following:

- Overall Protection of Human Health and the Environment. Each alternative should be evaluated on whether or not it protects the environmental, community, and worker health during implementation, and how risk posed through each exposure pathway is eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs. Each alternative should be evaluated on whether or not it meets appropriate federal, state, and local environmental laws, regulations, and guidelines.
- Short-Term Effectiveness. Each alternative should be evaluated on whether or not it can be completed within the project's time frame, and what, if any, adverse impacts on human health and the environment may be posed during the construction and implementation period until the CGs are achieved.
- Long-Term Effectiveness. Each alternative should be evaluated on whether or not it can continue to offer reliable protection of human health and the environment over time after CGs have been met.
- Reduction of Toxicity, Mobility, and Volume through Treatment. Each alternative should be evaluated on whether or not it can reduce the toxicity, mobility, and volume of COCs present at the Site.
- Protection of Workers. Each alternative should be evaluated on whether or not it protects the site workers, as well as on the effectiveness and reliability of protective measures.
- Environmental Impacts. Each alternative should be evaluated on whether or not its implementation would adversely affect the environment, as well as on the reliability of mitigation measures in preventing or reducing the potential impacts.
- Time Until Response Objectives are Achieved. Each alternative should be evaluated on the length of time needed for implementation to achieve protection for the Site or for individual elements or threats associated with the Site.

Based on the above definition, various options have been evaluated. Alternative 1 (NFA) would not be effective. Alternative 2 (capping) would be effective in protecting human health and the environment and complying with ARARs, but would require long-term operations and maintenance of the Site's cap. Alternative 4 (bioremediation) is likely to leave soils with significant residual OCP, lead, and arsenic concentrations. The removal option (Alternative 3) would be the most effective of those evaluated in terms of cost and time effectiveness.

5.2.5.2 Implementability

Implementability addresses the technical and administrative feasibility of executing an alternative, and the availability of various services and materials required for its execution. The following factors should be evaluated:

- Technical Feasibility, including the ease of construction and operation of the alternative; the adaptation of the alternative to the environmental conditions at the Site; the reliability (maturity) of the technologies composing the alternative; prior use under similar conditions for similar wastes; the ease of undertaking additional removal action, if needed; and the ability to monitor the effectiveness of the remedy.
- Administrative Feasibility, such as obtaining operating permits and/or approvals; the ease of implementation of institutional controls; and coordination needed with other agencies for implementation of each alternative.
- Availability of Services and Materials, including the availability of personnel and technology; off-site treatment, storage, and disposal capacity and services; and availability of necessary services, equipment, materials, and specialists to implement an alternative within the time frame of the removal schedule.
- State and Community Acceptance, including acceptability of the alternatives by the applicable regulatory agencies based on their review of the available information and evaluating/addressing community concerns (e.g., does the community prefer one alternative over another, and are community concerns addressed by the alternative).

The evaluated alternatives are readily implementable with regard to technical, administrative, and availability considerations. However, Alternative 1 (NFA) and, perhaps to a lesser degree, Alternatives 2 (capping) and 4 (bioremediation) are not readily implementable because of anticipated difficulties with obtaining state and community acceptance. Overall, Alternative 3 (removal) would be the most implementable of the three options evaluated.

5.2.5.3 Cost

Removal action alternatives should be comparatively evaluated based on cost estimates, including total cost and capital costs that reduce risk in the most cost-effective manner and achieve the RAOs. The cost estimates have an accuracy of -30% to +50%. The accuracy of each cost estimate depends on the assumptions made and the availability of costing information.

The total cost is presented as the 30-year present worth and evaluates the direct capital cost, indirect capital cost, and operations and maintenance expenses. Capital costs consist of direct and indirect expenditures, which are typically derived from literature sources and vendor quotes. Direct costs include expenses incurred for construction, equipment, materials, buildings, services, treatment, and operational costs, while indirect costs include non-construction and overhead costs, including engineering and design expenses, construction supervision, legal fees, license fees, permit costs, start-up expenses, and other services that are not part of the actual alternative but are required to complete and/or maintain it.

No capital or indirect costs would be associated with Alternative 1 (NFA); however, this alternative would not be effective in meeting the remedial goals for the Site.

Alternative 2 (capping) has an estimated cost of approximately \$541,000 over 30 years based on the estimates below:

- \$75,000 in initial capping cost, including site grading effort, construction permit fees, environmental oversight during cap installation, and other general construction oversight costs
- \$25,000 for a land use covenant
- \$6,000 in initial MJUSD training cost to train the appropriate MJUSD personnel to conduct periodic site inspections
- \$11,500 annually for 30 years (equaling \$345,000) in cap inspection cost, including contractor inspection field effort, inspection summary report preparation and distribution activities, MJUSD summary report review effort, and periodic cap maintenance costs
- \$3,000 annually for 30 years (equaling \$90,000) in DTSC oversight cost

In addition, costs for cap replacement would likely be incurred after 30 years. This alternative would be unacceptable due to the anticipated high cost and the use of the Site as a school site.

Alternative 3 (removal) has an estimated direct cost of approximately \$250,000; no maintenance or ongoing reporting costs are anticipated for this alternative. Estimated costs for the excavation alternative are summarized in Table 3.

The costs for Alternative 4 are difficult to estimate, as bioremediation is not a “proven technology.” The costs would vary depending on the results of a site-specific pilot study, and the degree of remediation required. However, it is unlikely that Alternative 4 would be cost-effective compared to excavation and off-site disposal, given the relatively small volume of soil involved and the need for treatment to low CGs. In addition, there is no assurance that the required CGs would be achieved; it is likely that treated soil would prove unsuitable for onsite reuse as a school site, due to the presence of residual OCPs, lead, and arsenic.

5.3 Description of Selected Remedy

Based on effectiveness, implementability, and cost, Alternative 3 (removal) has been selected as the preferred removal action alternative for the Site. This alternative to address pesticide-affected soils will be protective of human health and the environment, comply with regulatory criteria, avoid ongoing maintenance

and administrative costs, and achieve the MJUSD's goal of obtaining unrestricted land use for the Site. In addition, this alternative is anticipated to have community and state acceptance and would allow the Site to be developed as a school.

Dust suppression measures (such as spraying the area with water or covering stockpiled or binned soil with plastic) will be implemented during excavation activities, as necessary. These suppression measures will continue until confirmation samples indicate that concentrations of COCs are below the CGs.

A miniature real-time aerosol monitor (DataRAM) will be used to monitor exposure to total dusts. As per the Health and Safety Plan (HASP) (Appendix C), engineering controls for dust suppression (e.g., spraying soil with water) and continuous monitoring will be conducted if dust levels exceed 25 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) above the established background level. Work will be stopped and engineering controls reviewed if dust levels exceed 50 $\mu\text{g}/\text{m}^3$ above the established background level. The background level for total airborne dust will be assessed prior to RAW field implementation.

Noise may result primarily from the operation of excavating equipment and other mechanical equipment. For this reason, noise monitoring will be conducted in the work zone and at the closest residential fence line if excavation work will be conducted within 250 feet of nearby residences. If noise monitoring results indicate that noise exceeds 80 decibels, appropriate mitigation measures may be undertaken.

Applicable transportation regulations, as defined in the California Department of Motor Vehicles Vehicle Code Division 15, Chapters 2 through 5, will be met for this project. If California Vehicle Code regulations are not met during implementation of the RAW, the transportation contractor will be required to obtain the proper transportation permits.

Additional details on implementation of this alternative are presented in Section 7.

6. Potentially Applicable or Relevant and Appropriate Requirements

6.1 Federal, State, and Local Requirements

Federal, state, and local environmental laws and regulations were evaluated to determine if they are potentially ARARs for the proposed Alternatives for this removal action. Relatively few ARARs were identified for the proposed alternatives because the Site is unlikely to generate RCRA-hazardous waste, is unlikely to affect ecological environments or groundwater, will have minimal impacts to storm water based upon the proposed excavation and grading activities, and will likely result in minimal fugitive dust emissions.

The potential federal, state, and local ARARs are identified in Tables 4, 5, and 6, respectively. Permits and approvals identified in this RAW will be obtained prior to the removal action.

6.2 Public Participation

The MJUSD and ARCADIS are working with the DTSC to implement a public participation program for the Site. The public participation requirements for the RAW process include:

- (1) the development of a community profile,
- (2) publishing a notice of the availability of the RAW for public review and comment,
- (3) making the RAW and other supporting documents available at DTSC's office and in the local information repository, and
- (4) responding to public comments received on the RAW.

In accordance with the Community Profile prepared for this site, the following additional activities will be conducted:

- (1) a fact sheet will also be sent out to the site mailing list describing the site and the proposed removal action;
- (2) the length of the public review and comment period will be 30-days;
- (3) a public meeting or workshop will be held if there is sufficient community interest; and,
- (4) site documents will be available in electronic format on DTSC's publicly accessible EnviroStor database.

Once the public comment period is completed, DTSC will review and respond to the comments received. The RAW will be revised, as necessary, to address the comments received. If significant changes to the RAW are required, the RAW will be revised and be resubmitted for public review and comment. If significant changes are not required, the RAW will be modified as necessary and DTSC will approve the modified RAW for implementation.

6.3 California Environmental Quality Act

The CEQA, modeled after the National Environmental Policy Act (NEPA) of 1969, was enacted in 1970 as a system of checks and balances for land-use development and management decisions in California. It is an administrative procedure to ensure comprehensive environmental review of cumulative impacts prior to project approval. It has no agency enforcement tool, but allows challenge in courts.

CEQA applies all discretionary activities proposed to be carried out or approved by California public agencies, unless an exemption applies.

The proposed soil removal project will not have a significant effect on public health or the environment because of the relatively small volume, short project duration, and the controlled manner in which contaminated soils will be excavated, loaded onto trucks and taken off site for disposal. The Site is not on the Hazardous Waste and Substances Sites List or in a sensitive cultural or biological resource area. It is anticipated that this cleanup action will be a Class 30 action, defined under section 15330 of Title 14, California Code of Regulations, to be taken to prevent, minimize, stabilize, mitigate, or eliminate the release or threat of release of a hazardous waste or substance; the RA estimated to cost approximately \$250,000 to \$285,000.

An *Initial Study and Mitigated Negative Declaration*, prepared by Rincon Consultants, Inc., and dated July 2012 (Rincon 2012), has previously been prepared for the Site. The MJUSD is preparing a Supplemental Initial Study and will be issuing a Mitigated Negative Declaration associated with the Supplemental Initial Study to address the impact of the remediation activities at the Site.

6.4 Hazardous Waste Management

Soil containing OCP or metal concentrations greater than their corresponding California Total Threshold Limit Concentration (CA TTLC) and/or Soluble Threshold Limit Concentration (STLC) will likely be classified as non-RCRA hazardous waste. The COCs, together with corresponding TTLC and STLC concentrations are listed in Section 4.2 of the Transportation Plan.

Post-excavation soil samples of the excavated soil will be collected for waste classification purposes. It is anticipated that approximately 60% of the removed soil would be classified as non-hazardous and

approximately 40% of the removed soil would be classified as non-RCRA (California listed) hazardous waste, subject to the analytical results of the waste classification soil samples.

For disposal purposes of affected soil, a temporary EPA ID number for the Site will be obtained in accordance with the DTSC requirements of hazardous waste generation, temporary on-site storage, transportation, and disposal. Excavated soil will be stockpiled onsite and will be properly labeled with a hazardous waste label. Prior to 90 days after its generation, the non-RCRA hazardous waste will be transported off site for disposal. Any shipment of hazardous wastes in California will be transported by a registered hazardous waste hauler under a uniform hazardous waste manifest. Land ban requirements will also be followed as necessary.

6.5 Air Quality Management District

Dust emissions during the potential remedial action are regulated by the California Air Resources Board, which implements the federal Clean Air Act, as well as the Health and Safety Code (HSC) through local air quality management districts. The local air district for the Site is the Feather River Air Quality Management District (FRAQMD). FRAQMD regulations are considered chemical-specific local ARARs (Table 6) and would be applicable to the Site, because removal and off-site disposal has been selected as the remedial alternative.

6.6 Health and Safety Plan

Action-specific ARARs include those in local, state, and federal HSCs. Activities conducted during implementation of this RAW will be in compliance with applicable California Occupational Safety and Health Administration regulations, particularly those in California Code of Regulations Title 8, Section 5192, 29 CFR 1910.120, and other applicable federal, state, and local laws, regulations, and statutes. The HASP prepared by ARCADIS for use during the PEA and SSI fieldwork, has been modified for use during implementation of this RAW and is included as Appendix C.

The Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65) requires that warnings be posted with information on exposure to listed chemicals above specified concentrations or risk levels. If appropriate and suggested by the DTSC, a posting will be made for the Site.

HSC Section 25123.3 allows for the temporary accumulation of non-RCRA contaminated soil for 90 days or less, as long as specific requirements are met. Soil excavated from the Site as part of the removal action will not remain at the Site for more than 90 days.

6.7 Quality Assurance Project Plan

Preparation of a Quality Assurance Project Plan (QAPP) satisfies action-specific ARARs. A QAPP that details procedures for collection of representative data and appropriate completion of the remedial activities at the Site has been prepared and is attached as Appendix D.

7. Removal Action Implementation

Data from previous investigations indicate that affected soils with OCPs, lead, and arsenic at concentrations above their respective CGs are present at the Site. Removal by soil excavation and off-site disposal has been selected as the most effective remedial action. Removal activities will be performed by a California licensed contractor under the supervision of a California Professional Geologist or Professional Engineer following DTSC RAW approval. This RAW will be implemented using the guidelines presented herein and those presented in the site-specific HASP (Appendix C), QAPP (Appendix D), and Transportation Plan (Appendix E).

ARCADIS anticipates that work hours at the Site will be between 7:00 A.M. and 6:00 P.M., Monday through Friday, although noise-related activities (e.g., heavy equipment and/or trucking activities) would only occur between 8:00 A.M. and 5:00 P.M., Monday through Friday.

The soil removal, transportation, and disposal activities will be performed in accordance with applicable federal, state, and local laws, regulations, and ordinances.

A Removal Action Completion Report (RACR) will be prepared after execution of the removal action at the Site.

7.1 Field Documentation

The remedial action contractor will be responsible for maintaining a field logbook during the remediation activities. The field logbook will serve to document observations, personnel on the Site, equipment arrival and departure times, and other vital project information, as necessary.

Field logbooks or daily field sheets will document where, when, how, and from whom any vital project information was obtained. Entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound and have consecutively numbered pages. Each page of the logbook will be dated and the time of entry will be noted. Alternatively, daily field sheets may be used for the project. Logbook and daily field sheet entries will be written in ink and signed by the individual making the entries. Language will be factual, objective, and free of personal opinions or other terminology. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed.

Entries in the field logbook or on the daily field sheet entries will include, at a minimum, the following for each fieldwork date:

- site name and address
- recorder's name
- team members and their responsibilities
- time of arrival/entry on the Site and time of departure from the Site
- other personnel on the Site
- summary of on-site meetings
- quantity of affected soil (in terms of disposal classification) excavated and temporarily stored on-site
- quantity of excavated soils in truckloads (in terms of disposal classification) transported off site
- names of waste transporters and proposed disposal facilities
- copies or numbers of manifests or other shipping documents (such as bill of lading) for waste shipments
- quantity of import fill material in truckloads
- deviations from this RAW and site-specific HASP
- changes in personnel and responsibilities as well as reasons for the changes
- levels of safety protection
- calibration readings for equipment used and equipment model and serial number.

Information that will be recorded during the collection of each sample is summarized in the QAPP. Chain of custody records are used to document sample collection and shipment to the laboratory for analysis. Chain of custody procedures are also discussed in the QAPP (Appendix D).

In addition, photographs will be taken of representative sample locations, excavation areas and other on-site areas of interest. The photographs will supplement information entered in the field logbook. When a photograph is taken, the following information will be written in the logbook or will be recorded on a separate field photography log: the time, date, location, and weather conditions; the description of the subject photographed; and, the name of person taking the photograph.

7.2 Site Preparation and Security Measures

Site preparations for the proposed removal action may include site reconnaissance, boundary staking, sampling, excavation area demarcation, mapping of known utilities, and construction fencing installation.

7.2.1 Delineation of Excavation Areas

The excavation limits will be demarcated before commencement of removal activities. The areas to be excavated will be called the “excavation areas” and they will be marked (as well as the exclusion zones) in the field with stakes, construction fencing and/or high-visibility paint.

7.2.2 Utility Clearance

Clearance of subsurface utilities and other hazardous underground obstacles will be performed prior to initiating any soil intrusion or subsurface investigation activities. Such possible obstacles may include water, electrical, gas, oil, communication cable, phone cable, TV cable, and sewer lines. No invasive activities will begin without a notification to Underground Services Alert at least 48 hours prior to the start of excavation work, and utility clearance performed by a private utility locating contractor, at a minimum. The site structures have been removed; therefore, encountering active underground utilities is unlikely.

7.2.3 Security Measures

Appropriate barriers and/or construction fencing will be installed prior to beginning the excavation process to confirm that all work areas are secure and safe. To confirm trespassers or unauthorized personnel are not allowed near work areas, security measures may include, but are not limited to:

- Posting notices directing visitors to the Site Manager.
- Maintaining a visitor’s log. Visitors must have prior approval from the Site Manager to enter the Site. Visitors will not be permitted to enter the Site without first receiving site-specific health and safety training from the Site Safety Officer.
- Installing barrier fencing to restrict access to sensitive on-site areas, such as exclusion zones.
- Providing adequate site security to confirm unauthorized personnel have no access to work areas and/or contaminated materials.
- Before leaving the Site, all personnel must sign out in the visitor’s log.
- Maintaining a safe and secure work area, including areas where equipment is stored or placed at the close of each workday.

Persons requesting site access will be required to demonstrate a valid purpose for access and provide appropriate documentation to demonstrate they have received the proper training detailed in the HASP (Appendix C).

7.2.4 Contamination Control

In order to limit potential exposure of materials to the adjacent properties, the following measures will be implemented during soil excavation activities at the Site:

- Removal action will be conducted following DTSC's approval of the RAW.
- MJUSD will take necessary steps to minimize impacts to the community. Because dust control and strict monitoring procedures will be implemented during excavation activities at the Site, and because the proposed excavation areas are approximately 450 feet from the nearest residence, the covering of windows and doors at the nearby residences is not warranted or anticipated. Removal action activities will not be conducted during periods of unfavorable wind conditions.

7.2.5 Permits and Plans

As discussed in Section 5, all necessary permits or approvals will be obtained prior to the implementation of excavation activities at the Site.

7.3 Excavation

ARCADIS estimates that approximately 753 cy of OCP-, arsenic and lead-affected soil will be excavated from the Site during the removal action. The excavation areas are depicted on Figures 4A to 4D.

Assuming a 1.5 tons per cy conversion factor, 753 cy of bank (unexcavated) soil represents approximately 1,130 tons of excavated soil. Assuming 26 ton maximum capacity, this represents approximately 44 truckloads of soil to be transported offsite.

7.3.1 General Excavation Procedures

Fieldwork will be completed by properly trained and equipped hazardous waste workers. Affected soil will be removed with a backhoe, bulldozer, tracked excavator, shovels, or other types of earth-moving equipment, as necessary. As soil is excavated, it will be temporarily stored in staging areas on site (Section 7.3.3). In addition, Cal/OSHA Construction Safety Orders (especially 8 CCR 1539 and 1541) will be followed as appropriate.

The estimated affected site soil extent that exceeds the CGs for OCPs, lead and arsenic is shown on Figures 4A to 4D. Upon completion of each initial excavation or after the entire removal action is complete, confirmation soil samples will be collected from the sidewalls and bottom of each excavation (Section 7.6.2). If COCs are detected at concentrations above the CGs in the confirmation soil samples, additional soils will be removed and the given area will be resampled until CGs are met as requested by the DTSC.

7.3.2 Confined Space and Excavation Entry

Workers will not enter excavations that exceed four feet in depth without appropriate protective systems, such as benching, sloping, or shoring (if necessary), as described in the HASP (Appendix C). Access to the excavation by on-site personnel will be limited and strictly monitored. Confirmation samples from the bottom of excavations deeper than four feet bgs will be collected from the excavation bucket at the surface.

7.3.3 Soil Staging and Storage Operations

The soil staging process will be monitored to confirm excessive dust is not created. Excavated soil will be placed in stockpiles placed on plastic sheeting. Figure 3 shows the proposed stockpile locations, staging, loading, and decontamination areas to be used during this project. Prior to off-site disposal, excavated soil within the stockpiles will be sampled for waste disposal classification in accordance with the requirements of the selected waste disposal facility.

Excavated soil will be temporarily stored in the stockpiles on the Site until approved for transportation to an appropriate disposal facility. The stockpiles will be located in a suitable site location and secured from unauthorized personnel. The stockpiles will be covered with plastic sheeting at the end of each workday or upon completion of excavation activities within a designated work area. The plastic sheeting will be secured to prevent dust emissions and silted runoff.

Stockpiles of excavated material, stockpiled backfill material, and excavation equipment will be stored onsite (Figure 3). Excavated soil will be placed in stockpiles located near the excavation areas. Additionally, storage and staging areas will be located near the excavations. A decontamination area will be set up near the site exit (Figure 3).

The temporary on-site storage of excavated soil wastes will be secured and properly labeled with hazardous waste signs, as appropriate, until they are ready for loading for off-site transportation and disposal. If waste soil is not considered hazardous, stockpiled soils will still be marked to indicate that they are slated for off-site disposal.

Wastewater will be temporarily stored on the Site in drums (i.e., 55-gallon drums) that will be brought to the Site and removed from the Site by truck for proper disposal at a licensed facility (if necessary). ARCADIS

does not anticipate the use of more than one 55-gallon drum to manage the potential equipment decontamination fluid (water/LiquiNox[®] mixture).

It is anticipated that backfill materials will be brought to the Site and/or excavated from site soils after the stockpiles have been removed; however, if backfill materials are brought to the Site prior to the removal of the stockpiles, they will be appropriately segregated from the excavated materials so that the integrity of the backfill material is maintained.

7.3.4 Decontamination Area

Entry to the excavation area will be limited to avoid unnecessary exposure and related transfer of OCP-, lead- and arsenic-affected soil. In unavoidable circumstances, equipment or trucks will be decontaminated in a designated decontamination area before leaving the Site, as discussed in the following section.

7.3.4.1 Decontamination Procedures

Equipment or trucks that come into contact with potentially contaminated soil or water will be decontaminated to confirm the quality of samples collected and/or to avoid cross-contamination. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal. Decontamination will occur prior to and after each designated use of a piece of equipment or truck. Excavating, transporting, and storage devices used at the Site will be decontaminated using the dry brushing method, as necessary.

Reusable sampling equipment (e.g., hand augers, sample probes) will be decontaminated using the following procedure:

- non-phosphate detergent and tap water wash, using a brush if necessary
- tap-water rinse
- initial deionized/distilled water rinse
- final deionized/distilled water rinse.

Equipment will be decontaminated in a pre-designated area on pallets or plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Material to be stored more than a few hours will also be covered.

7.3.5 Excavation Plan

Initial Excavation: The initial excavations will produce approximately 753 cy of in-place material, or approximately 1,130 tons, using a conversion factor of 1.5 tons per cy.

Confirmation Excavation: Additional excavation may be necessary depending on the results of confirmation sampling, as discussed in Section 7.6.2.

7.4 Air and Meteorological Monitoring

This section details the air and meteorological monitoring strategy and methodologies that will be used during the soil removal action. The strategy and methodologies are designed to achieve several goals:

- Identify and measure the potential air contaminants generated during the soil removal and decontamination activities to assign the appropriate personal protective equipment and safety systems specified for those activities.
- Provide feedback to site operations personnel regarding potential hazards from exposure to hazardous air contaminants generated through site activities.
- Identify and measure air contaminants at points outside of the soil removal and decontamination exclusion zones. Air monitoring will be conducted during work activities to measure potential exposure of sensitive receptors to site chemical constituents as a result of removal activities.

7.4.1 Air Monitoring

Air monitoring will be performed during site activities in which affected or potentially affected materials are being disturbed or handled. A DataRAM will be used to monitor total dust generated during site work. Field staff will obtain and document total dust readings from the DataRAM throughout each workday when soil excavation activities are occurring on the Site. These readings will be obtained from two to three designated air monitoring stations established along the perimeters of the active remediation area and will include upwind and downwind monitoring.

Background dust levels will be established by monitoring dust levels at the Site prior to implementation of this RAW. Background dust levels will be documented at designated air monitoring stations established in the upwind and downwind directions. The background dust level will be calculated as an 8-hour time-weighted average.

A DataRAM will be used to monitor exposure to total dusts. Engineering controls for dust suppression (e.g., spraying soil with water) and continuous monitoring will be conducted if dust levels exceed an action level of 2.5 milligrams per cubic meter (mg/m^3) above the established background level. Work will be stopped and engineering controls reviewed if dust levels exceed $10 \text{ mg}/\text{m}^3$, which is the CAL/OSHA Permissible Exposure Limit for airborne particulates.

In addition to monitoring for total dust using a DataRAM, personal air monitors (PAMs) to record total dust readings will be worn by selected site workers each workday when soil excavation activities are occurring on the Site. A PAM will be worn by at least one worker operating earth-moving equipment or another worker likely to have the highest exposure based on work activity. The cassettes will be submitted to a laboratory and analyzed for total dust on an expedited turnaround basis.

The "Indirect Source Review Guidelines" prepared by the FRAQMD, and dated June 7, 2010, were reviewed. No additional air monitoring requirements of potential applicability to the project were identified.

7.4.2 Meteorological Monitoring

On-site ambient weather conditions (wind speed, wind direction, and relative humidity) will be monitored with a handheld instrument, and by real time internet weather locations and the National Weather Service (if a local station can provide data relevant for the Site).

If storms that may result in significant rainfall are forecast for the site vicinity, the excavations will be covered with plastic sheeting, as appropriate, to reduce the amount of stormwater entering the excavations. In addition, the stockpiles will be covered with plastic sheeting to reduce runoff from the stockpiles.

Work will be stopped if wind speeds exceed 25 miles per hour (mph) continuously for up to five minutes, as monitored on site. If weather forecasts include periods of significant winds, the excavations will be sprayed with extra water and/or covered, depending upon the severity of the wind condition, to reduce the potential for wind-blown materials.

7.5 Dust Control Plan

The primary means of transport for COCs at the Site is dispersion in dust. Dust suppression measures and contaminant control will be implemented during excavation activities, as described below.

7.5.1 Dust Control

Dust control measures, such as spraying the area with water or covering stockpiled soil with plastic, will be employed during excavation and soil disposal activities to prevent the release of visible dust emissions beyond the immediate work zone.

Open excavations will continually be wetted as the excavations progress to minimize fugitive dust emissions. Excavation activities will be suspended when winds exceed 25 miles per hour continuously for up to five minutes.

Stockpiled soil will be placed on plastic sheeting for temporary storage and, if necessary, covered with plastic sheeting to minimize wind erosion. On-site vehicles will be staged in areas to limit excessive dust accumulation on the vehicles. Before exiting the Site, the vehicles will be checked to make sure excess dust and soil is not present.

7.5.2 Dust Monitoring

A DataRAM will be used to monitor exposure to total dusts. Engineering controls for dust suppression (e.g., spraying soil with water) and continuous monitoring will be conducted if dust levels exceed $25 \mu\text{g}/\text{m}^3$ above the established background level. Work will be stopped and engineering controls reviewed if dust levels exceed $50 \mu\text{g}/\text{m}^3$ above the established background level.

7.6 Excavation Soil Sampling

7.6.1 Waste Profiling Sampling

Soil samples will be collected from each stockpile for waste classification purposes. Waste profiling soil samples will be laboratory composited to achieve an overall characterization of each stockpile. Soil samples will be analyzed for OCPs, lead and/or arsenic in accordance with the USEPA methods detailed in the QAPP.

Approximately one four-point composite sample for every 150 cy of excavated soil (total of five samples) will be collected for profiling. After waste profiling, excavated soil will be disposed of at the appropriate facility. Waste classification sample analysis may vary and will depend on the disposal facility requirements.

7.6.2 Confirmation Sampling

Confirmation samples will be collected from the floor and sidewalls of the excavation, as noted on Figures 4A through 4D. Confirmation samples will be collected from the excavation floors and sidewalls using hand-

sampling equipment and metal sleeves and/or glass jars. For soil samples at depths greater than four feet bgs, a backhoe will be used to remove soil from the excavation floor and sidewalls, and the confirmation soil samples will be collected directly from the backhoe bucket.

The confirmation samples will be placed in an ice-chilled cooler for transport to a California state-certified laboratory for analysis under standard chain of custody protocol. The confirmation samples will be analyzed at a fixed laboratory using a normal 5-day laboratory turnaround time. Expedited turnaround times will be requested from the laboratory, if appropriate. ARCADIS anticipates that a normal 5-day laboratory response time would be acceptable for the confirmation samples because excavation work will cease during off-hauling of the affected soil.

ARCADIS anticipates that the removal action, including off-hauling of the affected soil and backfilling activities, will require up to 12 working days. It is anticipated that the initial excavation can be completed within approximately 10 working days but additional time may be warranted due to laboratory analyses, the possibility of additional excavations based on the final confirmation sample results, and scheduling disposal of any additional excavated soils (based on confirmation sampling results) and communication with DTSC.

The analytical results will be compared to the CGs for the COCs. Excavation will cease in those areas where analysis of confirmation samples indicates that the COCs are less than the CGs. If COC concentrations exceeding the CGs are identified in the confirmation soil samples, then ARCADIS assumes an additional 6-inch-thick layer of affected soil (or greater) will be removed across the continued affected areas. Additional confirmation samples will be collected following excavation of each layer of affected soil. Excavation activities will cease once analytical results for confirmation samples indicate that the affected soil has been removed from the Site and following DTSC agreement.

Quality assurance/quality control methodologies are detailed in the QAPP.

Confirmation soil samples will be analyzed for OCPs, lead and/or arsenic in accordance with the USEPA methods detailed in the QAPP. For the initial excavation, confirmation soil samples will include up to 28 bottom samples and up to 25 sidewall samples from the excavation areas (Figures 4A to 4D). A table summarizing the distribution of proposed bottom and sidewall samples, along with the distribution of previous bottom and sidewall samples used to delineate the remedial excavations, is included below.

Table B. Confirmation Sampling in Excavation Areas

Figure	Area of Concern	Chemicals of Concern	Estimated Excavation Volume (cy)	Sidewall Samples	Bottom Samples	Total Samples
4A	Former Structure B1	OCPs	646	17 proposed, 25 previous, 42 total	18 proposed, 43 previous, 61 total	34 proposed*, 66 previous*, 100 total*
	Former Structure B2	OCPs and Lead				
	Former Structure B3	OCPs and Lead				
	Former Structure B4	OCPs and Lead				
4B	Former Structure B5	OCPs and Lead	47	5 proposed, 12 previous, 17 total	7 proposed, 8 previous, 15 total	12 proposed, 16 previous*, 28 total
	Former Shed North of B5	OCPs, Lead and Arsenic				
4C	Former Structure F1	OCPs and Lead	32	1 proposed, 8 previous, 9 total	2 proposed, 6 previous, 8 total	3 proposed, 14 previous, 17 total
4D	Former Structure F2	OCPs	28	2 proposed, 12 previous, 14 total	1 proposed, 9 previous, 10 total	3 proposed, 21 previous, 24 total
	Supply Well Area Near F2	OCPs				
All Areas			753	25 proposed, 57 previous, 82 total	28 proposed, 66 previous, 94 total	52 proposed*, 117 previous*, 169 total*

Notes:

Previous samples are those collected during the PEA and SSI, and used to delineate the vertical and lateral extent of the remedial excavations.

*= The number of total samples is less than the sum of the sidewall and bottom samples, because some samples served as dual sidewall/bottom samples.

A "C" will be added to the sample identification number for confirmation samples to assist in differentiating the PEA and SSI sample locations and laboratory analytical results with confirmation soil samples collected following soil excavation activities.

7.7 Off-Site Disposal of Waste

The waste material will be profiled and approval from the disposal facility will be received before excavation backfill activities commence. The disposal facility will provide appropriate information to the RWQCB, as warranted, if the wastes are disposed of in-state (as they are anticipated to be done), in accordance with the facility's specific requirements with the RWQCB. Soil excavated from the Site during the initial excavation will be handled, transported, and disposed of based on waste characterization results.

Final determination of the landfill used for disposal will be based on approval from the landfill. Once the disposal facility is selected, copies of waste profile reports used to secure disposal permission from the landfill will be provided. In addition, compliance with the land disposal restriction and land ban requirements for hazardous wastes will be documented and provided once it is established which disposal facility will be used. Detailed information on waste transportation and disposal is described in the Transportation Plan (Appendix E).

7.8 Excavation Backfilling and Site Restoration

The excavation will be backfilled and compacted with clean fill material from an on-site and/or off-site source. The source location and data for the off-site fill material will be obtained prior to importing the material to the Site. An evaluation of the imported fill material will be performed in accordance with DTSC's advisory (DTSC 2001).

The deepest excavation areas will reach depths of approximately 6 ft bgs. These areas will remain open temporarily, pending review of confirmation sampling results, which will require approximately five working days. Temporary fencing will be used to prevent access to the excavated areas during that time.

After analysis of confirmation samples has confirmed that the cleanup criteria have been met, the excavation contractor will backfill the excavations using a series of lifts, which will be individually compacted and wetted.

It is anticipated that approximately 1,130 tons of loose affected soil (or approximately 44 truckloads) will be removed from the Site (Section 7.3). An approximately equivalent volume of loose imported fill will be required to backfill the excavations. This point will be noted in the future supplemental initial CEQA study (Section 6.3).

7.9 Variance

As conditions in the field may vary, it may become necessary to implement minor modifications to the RA as presented in this RAW. Field personnel will notify the Project Manager when deviations from this RAW are necessary. DTSC will be notified of the modification immediately, and a verbal or written approval will be obtained from DTSC before implementing the modifications, as appropriate. Modifications to the approved RAW will be documented in the field logbooks and in the RACR for this RAW.

8. Removal Action Completion Report and Project Schedule

The information obtained during the removal action will be evaluated and a RACR will be prepared for the Site. The report will include the following elements:

- a summary of relevant information obtained
- a description of field investigation methods
- copies of daily field reports
- a tabular summary of analytical results
- conclusions and recommendations
- figures showing the site location and layout with pertinent analytical results
- copies of laboratory analytical reports
- copies of waste manifests and other relevant shipping documents
- an updated human health risk assessment using left in place soil results



Revised Removal Action Work Plan

Hammonton Smartsville Property
Yuba County, California

A project schedule has been prepared for this soil removal action as summarized below and discussed during the RAW scoping meeting on January 22, 2014. Several of these activities can occur simultaneously.

Table C. Anticipated Project Schedule

Activity	Anticipated Completion Date (2014)
Draft RAW submitted to DTSC for review/approval	March 12
DTSC provides comments to the RAW, as needed	March 24
Response to Comments submitted to DTSC for review/approval	April 3
Revised RAW submitted to DTSC for review/approval	May 1
Public review period	May 29 – June 30
Address public comments, as needed	June 30
RAW approval by DTSC	July 7
Work notice to community	July 7
Implement RAW – Soil excavation, stockpiling and confirmation sampling activities	July 14 – July 28
Implement RAW – Off-site transport and disposal of waste soil and backfill activities	August 6 – August 8
Submit RACR	Up to 60 days following receipt of final analytical data from the laboratory
Removal action certification submitted by DTSC	Up to 30 days following DTSC receipt of RACR

9. Limitations

The opinions and recommendations presented in this RAW are based upon the scope of services, information obtained through the performance of the services, and the schedule as agreed upon by ARCADIS and the party for whom this report was originally prepared. This RAW is an instrument of professional service and was prepared in accordance with the generally accepted standards and level of skill and care under similar conditions and circumstances established by the environmental consulting industry. No representation, warranty or guarantee, express or implied, is intended or given. To the extent that ARCADIS relied upon any information prepared by other parties not under contract to ARCADIS, ARCADIS makes no representation as to the accuracy or completeness of such information. This RAW is expressly for the sole and exclusive use of the party for whom this report was originally prepared for a particular purpose. Only the party for whom this report was originally prepared and/or other specifically named parties have the right to make use of and rely upon this RAW. Reuse of this RAW or any portion thereof for other than its intended purpose, or if modified, or if used by third parties, will be at the user's sole risk.

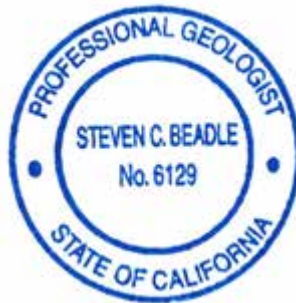
Results of any investigations or testing and any findings presented in this RAW apply solely to conditions existing at the time when ARCADIS' investigative work was performed. It must be recognized that any such investigative or testing activities are inherently limited and do not represent a conclusive or complete characterization. Conditions in other parts of the project Site may vary from those at the locations where data were collected. ARCADIS' ability to interpret investigation results is related to the availability of the data and the extent of the investigation activities. As such, 100% confidence in environmental investigation conclusions cannot reasonably be achieved.

ARCADIS, therefore, does not provide any guarantees, certifications, or warranties regarding any conclusions regarding environmental contamination of any such property. Furthermore, nothing contained in this document will relieve any other party of its responsibility to abide by contract documents and applicable laws, codes, regulations, or standards.

10. Certification

All geologic information, conclusions, and recommendations in this document have been prepared under the supervision of and reviewed by the undersigned ARCADIS California Professional Geologist.

Steven C. Beadle



May 1, 2014

Steven C. Beadle, CA-PG (No. 6129)
Senior Geologist

* A professional geologist's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations and ordinances.

11. References

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Hammonton Smartsville Property
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ARCADIS

Tables

**Table 1. Health Effects of Chemicals of Concern
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California**

Compound of Concern	Health Effect
Arsenic	Arsenic is a naturally occurring element that is widely distributed in the Earth's crust. Elemental arsenic (sometimes referred to as metallic arsenic) is a steel grey solid material. However, arsenic is usually found in the environment combined with other elements such as oxygen, chlorine, and sulfur. Arsenic combined with these elements is called inorganic arsenic. Most inorganic arsenic compounds are white or colorless powders that do not evaporate. They have no smell, and most have no special taste. Inorganic arsenic occurs naturally in soil and in many kinds of rock, especially in minerals and ores that contain copper or lead. Arsenic is a known human carcinogen by both the inhalation and oral exposure routes. By the inhalation route, the primary tumor types are respiratory system cancers, although a few reports have noted increased incidence of tumors at other sites, including the liver, skin, and digestive tract. In humans exposed chronically by the oral route, skin tumors are the most common type of cancer. In addition to skin cancer, there are a number of case reports and epidemiological studies that indicate that ingestion of arsenic also increases the risk of internal tumors (mainly of bladder and lung, and to a lesser extent, liver, kidney, and prostate).
Chlordane	Chlordane is a manufactured chemical that can take the form of a thick liquid that ranges from colorless to amber and has either no odor or a mild, irritating smell. Technical chlordane is a mixture of two isomers called alpha-chlordane and gamma-chlordane along with byproducts from production. Between 1948 and 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens. Because of concerns about damage to the environment and harm to human health, EPA banned the use of chlordane for all applications except termite control in 1983. EPA banned all uses of chlordane in 1988. Chlordane is hydrophobic and sticks to soil particles in surface soils for many years as it has a very slow breakdown rate. Chlordane affects the nervous system, digestive system, and liver. Headaches, irritability, confusion, weakness, vision problems, vomiting, stomach cramps, diarrhea, and jaundice have occurred in humans who breathed air containing high concentrations or ingested small amounts of chlordane. Consuming large amounts of chlordane causes convulsions and death in humans. Chlordane has been linked to certain types of cancer.

Compound of Concern	Health Effect
4,4-DDD, 4,4-DDE, and 4,4-DDT	DDT is a pesticide that was once widely used to control insects on agricultural crops and insects that carry diseases like malaria and typhus, but is now used in only a few countries to control malaria. Technical-grade DDT is a mixture of three forms, p,p'-DDT (85%), o,p'-DDT (15%), and o,o'-DDT (trace amounts). All of these are white, crystalline, tasteless, and almost odorless solids. Technical grade DDT may also contain DDE and DDD as contaminants. DDD was also used to kill pests, but to a far lesser extent than DDT. One form of DDD (o,p'-DDD) has been used medically to treat cancer of the adrenal gland. Both DDE and DDD are breakdown products of DDT. DDT does not occur naturally in the environment. After 1972, the use of DDT was no longer permitted in the United States except in cases of a public health emergency. It is, however, still used in some other areas of the world, most notably for controlling malaria. The use of DDD to kill pests has also been banned in the United States. DDT is an organochlorine pesticide whose best known effect is impairment of nerve impulse conduction. Effects of DDT on the nervous system have been observed in both humans and animals and can vary from mild altered sensations to tremors and convulsions. In addition to being a neurotoxicant, DDT is capable of inducing marked alterations on reproduction and development in animals. This is attributed to hormone-altering actions of DDT isomers and/or metabolites. Studies in animals have shown that DDT, DDE, and DDD can cause cancer, primarily in the liver. The possible association between exposure to DDT and various types of cancers in humans has been studied extensively, particularly breast cancer. Thus far, there is no conclusive evidence linking DDT and related compounds to cancer in humans. Possible genotoxic effects in humans have been reported in a few studies, but simultaneous exposure to other chemicals and lack of control for relevant confounders make the results inconclusive. For the most part, DDT and related compounds are not mutagenic in prokaryotic organisms.

Compound of Concern	Health Effect
Dieldrin	Dieldrin is a light brown crystal with a mild chemical odor. From the late 1930s until 1970, dieldrin was widely used for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of dieldrin in 1974, except to control termites. In 1987, EPA banned all uses. Dieldrin in soil or water breaks down (degrades) very slowly. Dieldrin sticks to soil and may stay there unchanged for many years. Water does not easily wash dieldrin off soil. Dieldrin does not dissolve in water very well and is therefore not found in water at high concentrations. Most dieldrin in the environment attaches to soil and to sediments at the bottoms of lakes, ponds, and streams. Dieldrin can travel large distances by attaching to dust particles, which can then be transported great distances by the wind. Short-term exposure to dieldrin can cause hyperirritability, headaches, dizziness, nausea, vomiting, blood in the urine, tremors, convulsions, and coma. Chronic exposure to moderate levels of dieldrin causes headaches, dizziness, irritability, vomiting, or uncontrollable muscle movements. Some sensitive people seem to develop a condition in which dieldrin causes the body to destroy its own blood cells. The EPA has classified dieldrin as a probable carcinogen.
Endrin	Endrin is a solid, white, almost odorless substance that was used as a pesticide to control insects, rodents, and birds. Endrin has not been produced or sold for general use in the United States since 1986. No long-term health effects have been noted in workers, either in factories or during field applications, who have been exposed to endrin by breathing or touching it. Studies in animals confirm that endrin's main target is the nervous system, probably because the brain and other parts of the nervous system contain much fatty tissue, and endrin tends to stay in those tissues. Birth defects, especially abnormal bone formation, have been seen in some animal studies. While there are no human data on birth defects, evidence in rodents suggests that exposure to high doses of endrin during pregnancy could be a health risk to developing fetuses. In studies using rats, mice, and dogs, endrin did not produce cancer. However, most of these studies did not accurately evaluate the ability of endrin to cause cancer. No significant excess of cancer has been found in exposed factory workers, although endrin metabolites have been detected in their urine. The EPA has determined that endrin is not classifiable as to its human carcinogenicity because there is not enough information to allow classification

Compound of Concern	Health Effect
Heptachlor Epoxide	(Discussion of Heptachlor Epoxide is in conjunction with Heptachlor). Heptachlor is a manufactured chemical that was used in the past for killing insects in homes, in buildings, and on food crops. It has not been used for these purposes since 1988. There are no natural sources of heptachlor or heptachlor epoxide. Like pure heptachlor, heptachlor epoxide is a white powder that does not explode easily. It was not manufactured and was not used as an insecticide like heptachlor. Bacteria and animals break down heptachlor to form heptachlor epoxide. These two chemicals are described together because about 20% of heptachlor is changed within hours into heptachlor epoxide in the environment and in the body. From 1953 to 1974, heptachlor entered the soil and surface water when farmers used it to kill insects in seed grains and on crops. It also entered the air and soil when homeowners and professional insect exterminators used it to kill termites. Today, heptachlor is no longer used by homeowners to kill termites or other insects. However, exterminators can still use existing stocks of heptachlor to kill fire ants in underground power transformers. In addition, no reliable human studies were found that show whether harmful effects occur from eating contaminated foods or by drinking liquids contaminated with heptachlor or heptachlor epoxide. Studies have shown a number of harmful health effects when animals were fed heptachlor or heptachlor epoxide. These effects were more harmful when the exposure levels were high or when exposure lasted many weeks. The effects observed in animals include damage to the liver, excitability, and decreases in fertility. Animals fed heptachlor throughout their lifetime had more liver tumors than animals that ate food without heptachlor. EPA considers heptachlor epoxide as a possible human carcinogen. ■
Lead	Lead (inorganic) is a bluish-white, silver or gray odorless solid. Short-term exposure to lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic and constipation. Considerable data exist on the effects of lead exposure in humans. It is a poison by ingestion and a suspected human carcinogen of the lungs and kidneys. There are data to suggest that lead is a mutagen and can cause reproductive effects. Human systemic effects by ingestion and inhalation (the two routes of absorption) include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis, and liver changes. Recent experimental evidence suggests that blood levels of lead below 10 µg/dl (micrograms per deciliter) can have the effect of diminishing the IQ scores of children.

Compound of Concern	Health Effect
Toxaphene	Toxaphene is usually found as a solid or gas. In its original form, toxaphene is a yellow to amber waxy solid that has a piney odor. Toxaphene is a manufactured pesticide comprising a complex mixture of hundreds of chlorinated terpenes. After DDT was banned from use in the US in 1972, toxaphene became the most popular substitute. In November of 1982, EPA canceled the registration of toxaphene for most uses as a pesticide or pesticide ingredient. All registered uses of toxaphene mixtures in the US were canceled in 1990. Toxaphene strongly adsorbs to particles and is relatively immobile in soils. Toxaphene does not dissolve well in water, so it is more likely to be found in air, soil, or the sediments at the bottom of lakes and streams. Once toxaphene is in the environment, it can last for many years because it breaks down very slowly. Acute poisoning from the prolonged ingestion or inhalation of high levels of toxaphene causes damage to the lungs, the nervous system, and the liver and kidneys in humans. Toxaphene caused liver cancer in mice and possibly thyroid cancer in rats that were given toxaphene in large amounts that you would not likely get by eating food or drinking water containing toxaphene. Based on animal studies, the EPA has classified toxaphene as a probable carcinogen.

Reference: Excerpts from ATSDR Toxicological Profiles

**Table 2. Preliminary Cleanup Goals for Chemicals of Concern
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California**

Compound of Concern		Preliminary Cleanup Goal (PCG)
Metals	Arsenic	12 mg/kg *
	Lead	160 mg/kg **
Pesticides ***	4,4'DDD	2,300 µg/kg
	4,4'-DDE	1,600 µg/kg
	4,4-DDT	1,600 µg/kg
	Technical Chlordane	430 µg/kg
	Dieldrin	35 µg/kg
	Endrin	21,000 µg/kg
	Heptachlor Epoxide	53 µg/kg
	Toxaphene	460 µg/kg

Notes: mg/kg = milligrams per kilogram (metals)

µg/kg = micrograms per kilogram (pesticides)

* 12 mg/kg is considered to be the upperbound background concentration for arsenic

** Proposed cleanup goal on a point by point comparison basis. However, 95% UCL of final confirmation sampling dataset should meet CHHSL of 80 mg/kg.

*** CHHSL concentrations proposed for each individual pesticide (with the exception of Heptachlor Epoxide which is the USEPA Regional Screening Level [RSL]). Upon completion of the proposed remediation, , confirm that the cumulative risk of the remaining data meets the target risk management range of 1×10^{-6} to 5×10^{-6} . (The assumption being that at least several COCs will be reduced to concentrations well below the CHHSL as a matter of all COCs meeting their target CHHSL). If it does not, additional remediation may be necessary at several select locations to reduce the cumulative risk to the target range.

Table 3
Estimated Cost for Preferred Remedial Alternative
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Task	Remedial Cost Estimate ¹				
Excavation/Stockpile (Mobilization 1)	1,130	ton	\$32	\$36,160	
Backfill (Mobilization 2)	1,130	ton	\$37	\$41,810	
Transportation/ Disposal	60% of excavated soil to Hay Road Landfill (Non- Haz)	680	ton	\$39	\$26,520
	40% of excavated soil to Kettleman Hills Landfill (Cal-Haz)	450	ton	\$185	\$83,250
Waste Characterization Sample Analyses ²	Six 4-pt composites	6	4-pt	\$410	\$2,460
Confirmation Sample Analyses ³					\$7,450
Misc. Equipment					\$3,500
Air Monitoring	12	day	\$350	\$4,200	
Consultant Oversight	12	day	\$1,950	\$23,400	
Consultant Project Management					\$12,800
Removal Action Completion Report					\$9,326

Estimated Total Project Cost: \$250,876

Notes:

1. Cost estimate is based on existing site data with 753 in-place cubic yards (cy) of soil to be excavated multiplied by 1.5 cy/ton = 1,130 tons.
2. Waste characterization samples to be analyzed at a fixed laboratory on a five-day laboratory response basis.
3. Confirmation samples to be analyzed at a fixed laboratory on a five-day laboratory response basis.



Table 4
Potential Federal ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Potential Federal Chemical-Specific ARARs				
No potential federal chemical-specific ARARs have been identified for this Site.				
Potential Federal Action-Specific ARARs				
RCRA as amended by the HSWA	42 U.S.C. Sections 6901-6992k	Establishes standards for management of hazardous waste.		
Identification and Listing of Hazardous Waste	40 C.F.R. Part 261	Criteria defining hazardous waste.	Yes/Yes ¹	Investigation-derived residuals meeting these criteria must be managed as hazardous waste.
Hazardous Waste Generator Standards	40 C.F.R. Part 262	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking, and labeling; accumulation time; recordkeeping and reporting.	Yes/Yes ¹	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation- derived residuals.
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart C	Preparedness and prevention requirements.	Yes/Yes ¹	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation- derived residuals.

Notes:

1 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 4
Potential Federal ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Hazardous Waste Generator Standards	40 C.F.R. Part 265.16	Training requirements.	Yes/Yes ¹	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart I	Container management requirements.	Yes/Yes ¹	Applicable to on-site accumulation of hazardous waste, such as some investigation-derived residuals, in containers for less than 90 days.
Land Disposal Restrictions	40 C.F.R. Part 268	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/Yes ¹	Hazardous waste sent off-site for disposal, including investigation-derived residuals, must meet appropriate treatment standards before being disposed of to land.
Hazardous Waste Transportation Requirements	40 C.F.R. Part 263	Requirements for hazardous waste transporters.	Yes/Yes ¹	Applicable for transportation of hazardous waste off-site.

Notes:

1 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 4
Potential Federal ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments
OSHA	29 U.S.C. Sections 651-678	Establishes workplace health and safety standards.		
OSHA Hazardous Waste Operations and Emergency Response Regulations	29 C.F.R. Section 1910.120	Standards for employee safety during specified hazardous waste operations.	Yes/Yes ¹	Worker protection standards applicable to cleanup operations.
OSHA Safety and Health Standards for Construction	29 C.F.R. Part 1926	Standards for construction and excavation.	Yes/No	Applicable to specified construction and excavation activities.
DOT Requirements for Hazardous Materials Transportation	40 C.F.R. Parts 171-177	Standards for transportation of hazardous materials.	Yes/Yes ¹	Applicable to off-site transportation of specified hazardous materials, including hazardous waste.
Potential Federal Location-Specific ARARs				
No potential federal location-specific ARARs have been identified for this Site.				

Notes:

1 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 5
Potential State ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Potential State Chemical-Specific ARARs					
California Human Health Screening Levels (CHHSLs) and Metal Specific Remediation Goals	OEHHA	Use of CHHSLs in Evaluation of Contaminated Properties, January 2005	Soil screening number to estimate the degree of effort that may be necessary to remediate specific set of contaminants on a property	Yes/Yes	Department of Toxic Substances Control (DTSC) utilizes CHHSLs and other metal specific concentrations to establish remediation goals for school sites
Potential State Action-Specific ARARs					
Construction Activities Storm-Water General Permit	California Environmental Protection Agency State Water Resources Control Board (SWRCB) – Division of Water Quality	Storm-Water Program, General Permit Order No. 99-08-DWQ	Requires a general permit for discharging of storm water at a construction site	Yes/No	Permit is required to manage potential storm-water discharge activities for a project that disturbs greater than one acre of earth movement. The soil disturbance areas are anticipated to be less than one acre.
Storm-Water Pollution Prevention Plan (SWPPP)	SWRCB	Order No. 99-08-DWQ	Discharges of storm-water runoff associated with construction activities	Yes/No	Not applicable to construction activities.



Table 5
Potential State ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65)	OEHHA	Cal. Health & Safety Code, Division 20, Chapter 6.6, Section 25249.5	Requires warnings of exposure to listed chemicals above specified concentrations or risk levels.	Yes/No	Investigation and remediation activities will consider warning requirements if they result in exposures above specified levels of "No significant risk."
California Hazardous Waste Control Law	DTSC	Cal. Health & Safety Code, Division 20, Chapter 6.5	Establishes standards for management of hazardous waste.		
Remediation Waste Staging	DTSC	Cal. Health & Safety Code, Section 25123.3	Establishes standards for management of remediation waste in staging piles	Yes/Yes	Applicable if excavated soil is temporarily managed in on-site staging piles.
Criteria for identification of hazardous and extremely hazardous waste	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 11	Establishes numerical criteria for identification of hazardous and extremely hazardous waste.	Yes/Yes	Investigation-derived residuals meeting these criteria must be managed as hazardous waste.

Notes:

1 = Relevant and appropriate if listed OCPs present at or above restricted concentrations and/or soil exhibits toxic characteristics.

2 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 5
Potential State ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 12	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking, and labeling; accumulation time; recordkeeping and reporting.	Yes/Yes	Applicable to site activities involving generation of hazardous waste, such as generation of investigative-derived waste (IDW).
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 3	Preparedness and prevention requirements.	Yes/Yes	Applicable to site activities involving generation of hazardous waste, such as generation of IDW.
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 4	Contingency Plan requirements.	Yes/Yes	Applicable to site activities involving generation of hazardous waste, such as generation of IDW.
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Section 66265.16	Training requirements.	Yes/Yes	Applicable to site activities involving generation of hazardous waste, such as generation of IDW.

Notes:

1 = Relevant and appropriate if listed OCPs present at or above restricted concentrations and/or soil exhibits toxic characteristics.

2 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 5
Potential State ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 9	Container management requirements.	Yes/Yes	Applicable to on-site accumulation of hazardous waste, such as some IDW, in containers stored on-site. Hazardous waste to be removed from Site within 90 days of start of accumulation date.
Land disposal restrictions	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 18	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/Yes ¹	Applicable to restricted hazardous waste disposed of off-site.
Hazardous waste transportation requirements	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 13	Requirements for hazardous waste transporters.	Yes/Yes ²	Applies to transportation of hazardous waste off-site.
Removal Action Work Plan Oversight Requirements	DTSC	Cal Health and Safety Code, Division 20, Chapter 6.8, Section 25356.1	Requirements for review and approval of Removal Action Work Plan as part of School Property Evaluation and Cleanup	Yes/Yes	Requires DTSC to review and approve any Removal Action Work Plan for a school site.
California Occupational Safety and Health Act	Cal/OSHA	Cal. Labor Code, Division 5	Establishes workplace health and safety standards.		

Notes:

1 = Relevant and appropriate if listed OCPs present at or above restricted concentrations and/or soil exhibits toxic characteristics.

2 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 5
Potential State ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Construction Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 4	Detailed construction safety requirements.	Yes/Yes	Applicable to on-site construction activities.
Electrical Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 5	Detailed electrical safety requirements.	Yes/Yes	Applicable to on-site investigation and remediation activities involving electrical wiring and equipment.
General Industry Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 7	Detailed safety requirements of general applicability.	Yes/Yes	Applicable to specific on-site investigation and remediation activities.
Hazardous Waste Operations and Emergency Response regulations	Cal/OSHA	8 Cal. Code Regs. Section 5192	Standards for employee safety during specified hazardous waste operations.	Yes/Yes ²	Worker protection standards applicable to cleanup operations.
Potential State Location-Specific ARARs					
No potential state location-specific ARARs have been identified for this Site.					

Notes:

1 = Relevant and appropriate if listed OCPs present at or above restricted concentrations and/or soil exhibits toxic characteristics.

2 = Analysis of soil samples collected to date has not revealed chemical compounds of concern at the Site at concentrations at or above hazardous waste levels; however, requirement/regulation would be met if waste characterization sampling and analysis indicates excavated soil to be handled, transported, and disposed of as hazardous waste.



Table 6
Potential Local ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

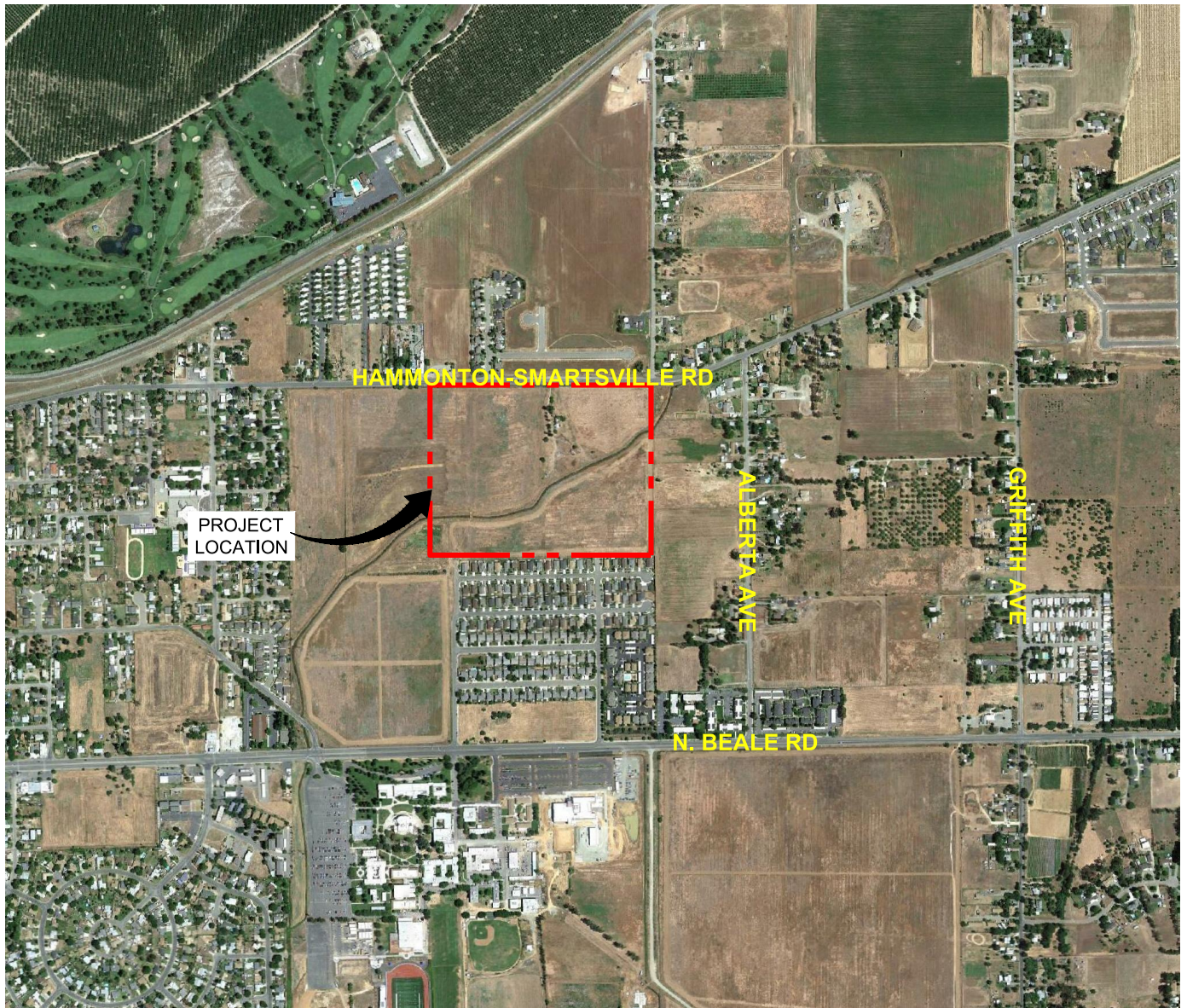
Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
Potential Local Action-Specific ARARs					
Grading Permit	Yuba County Public Works Department (YCPW)	Ordinance No. 1466, Chapter 11.25 Sections 060 and 070 (Exemptions)	Grading permit requirements and exemptions.	Yes/Yes	According to the YCPW, a grading permit is required for this soil removal activity.
Dust Control -Visible Emissions	Feather River AQMD	Feather River AQMD Rules and Regulations - Rule 3.0 (as adopted by Section 41701 of the California Health and Safety Code)	Prohibits significant emission of visible air contaminants into the atmosphere.	Yes/Yes	Applies to sources that emit or may emit air contaminants that are as dark or darker in shade than No. 2 on the Ringelman Chart for more than three minutes in any one hour -or- of such opacity as to obscure an observer's view to a degree equal to or greater than described above.
Fugitive Dust Emissions	Feather River AQMD	Feather River AQMD Rules and Regulations - Rule 3.16	Regulates operations that periodically may cause fugitive dust emissions into the atmosphere.	Yes/Yes	Reasonable precautions should be implemented to prevent emissions of fugitive dust from site activities. Where possible, a fine mist of water may be sprayed to minimize/eliminate fugitive dust.
Driveway Encroachment	Yuba County Department of Public Works	---	Permit required to enter and exit property.	Yes/Yes	Field activities will be conducted in accordance with the Prime Contractor Encroachment Permit.



Table 6
Potential Local ARARs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments
On-site Water Use	Olivehurst Water	---	Use of private water supply for dust control	Yes/Yes	Private water from a nearby Olivehurst Water Department (OWD) hydrant will be used during field activities. The OWD will be notified and waste use will be coordinated prior to the start of field activities.
Potential Local Chemical-Specific ARARs					
No potential local chemical-specific ARARs have been identified for this Site.					
Potential Local Location-Specific ARARs					
No potential local location-specific ARARs have been identified for this Site.					

Figures

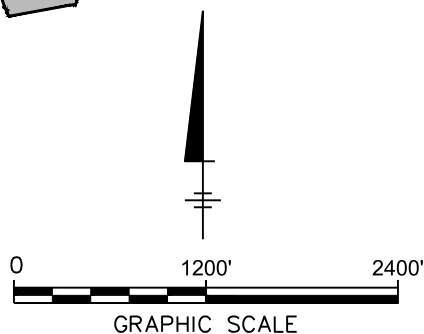


MAP SOURCE: Google Earth Pro™ 2011, 39°08'04.32"N, 121°32'08.12"W



LEGEND:

--- PROPERTY BOUNDARY



HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

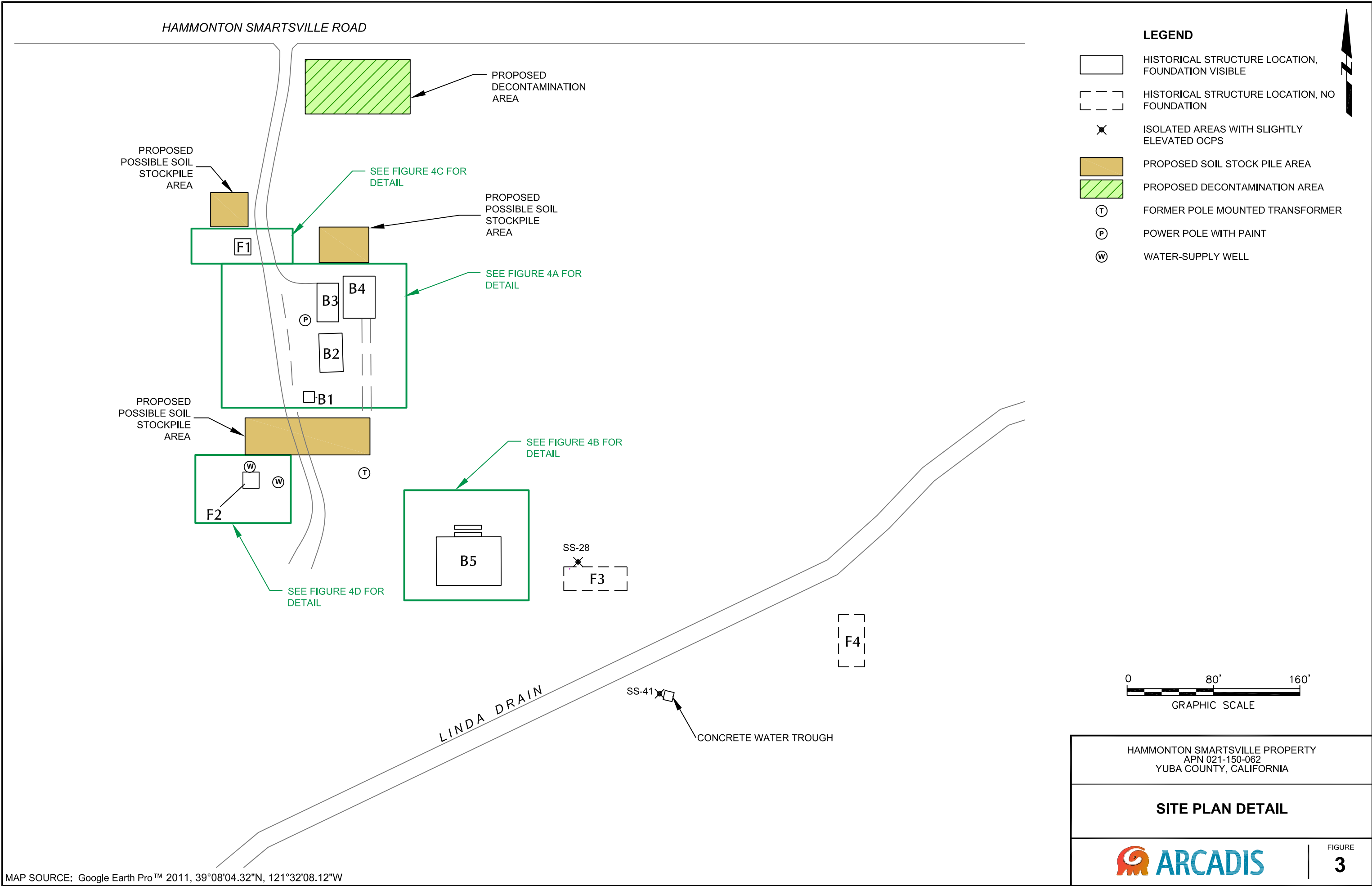
SITE LOCATION MAP



FIGURE
1



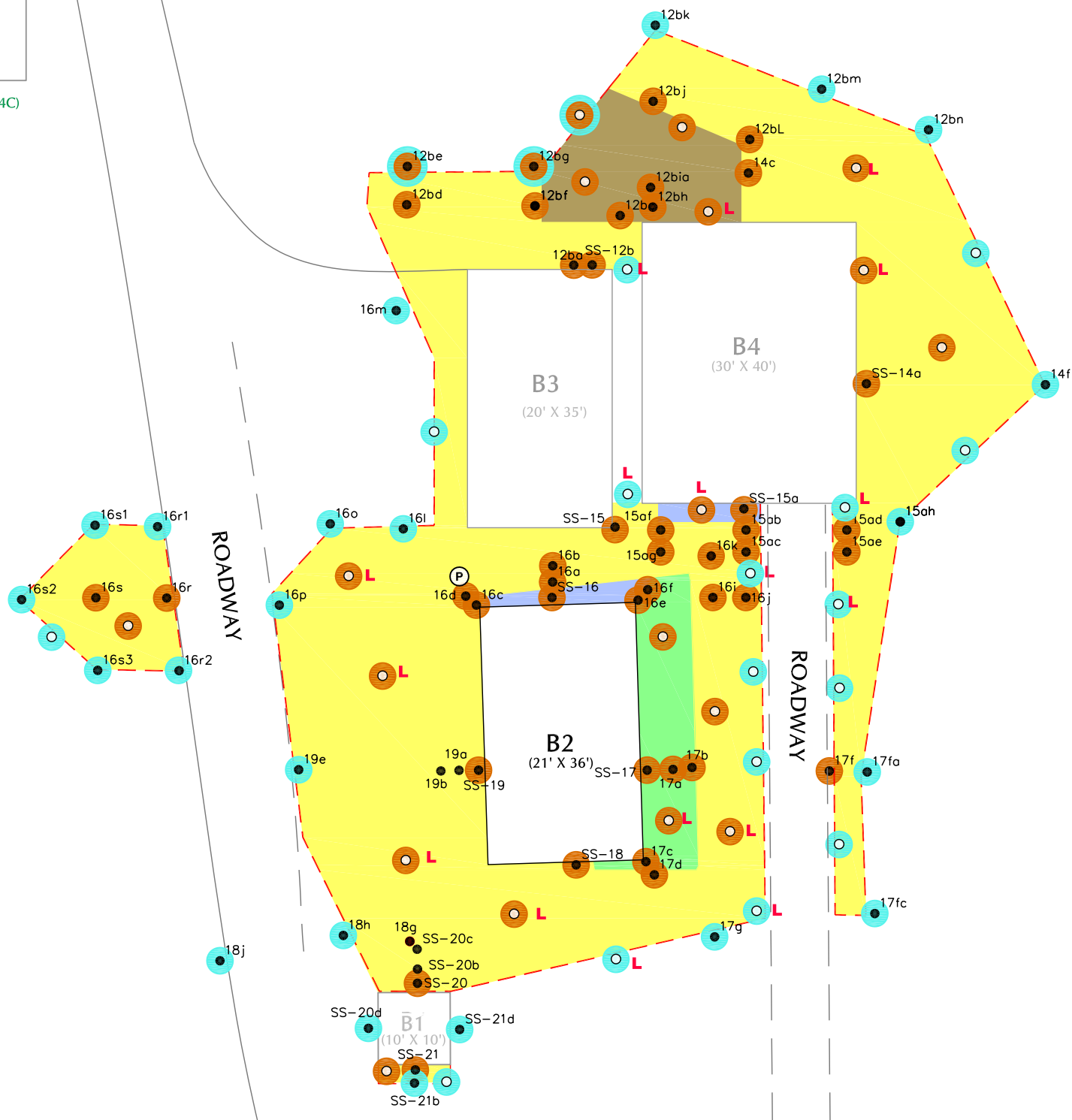
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MAP SOURCE: Google Earth Pro™ 2011, 39°08'04.32"N, 121°32'08.12"W

F1
(SEE FIGURE 4C)



LEGEND

POWER POLE WITH PAINT

PROPOSED EXCAVATION BOUNDARIES

PROPOSED EXCAVATION AREAS:

TO ~2.5 FEET (FT) BELOW GROUND SURFACE (BGS)

TO ~3.5 FT BGS

TO ~5.0 FT BGS

TO ~6.0 FT BGS

PREVIOUS SIDEWALL DEFINITION SAMPLE, CLEAN TO 0.5 FT BGS

PREVIOUS BOTTOM DEFINITION SAMPLE, CLEAN TO 2.5 FT BGS

PREVIOUS SIDEWALL/BOTTOM DEFINITION SAMPLE, CLEAN AT 0.5 AND DEEPER

PROPOSED SIDEWALL SAMPLE, AT 0.5 FT BGS

PROPOSED BOTTOM SAMPLE

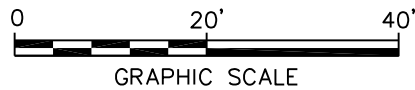
PROPOSED SIDEWALL/BOTTOM SAMPLE, AT 0.5 AND 6.0 FT BGS

NOTE:

ALL PROPOSED SAMPLES TO BE ANALYZED FOR OCPs.

L

- SUPPLEMENTAL ANALYSIS FOR LEAD.

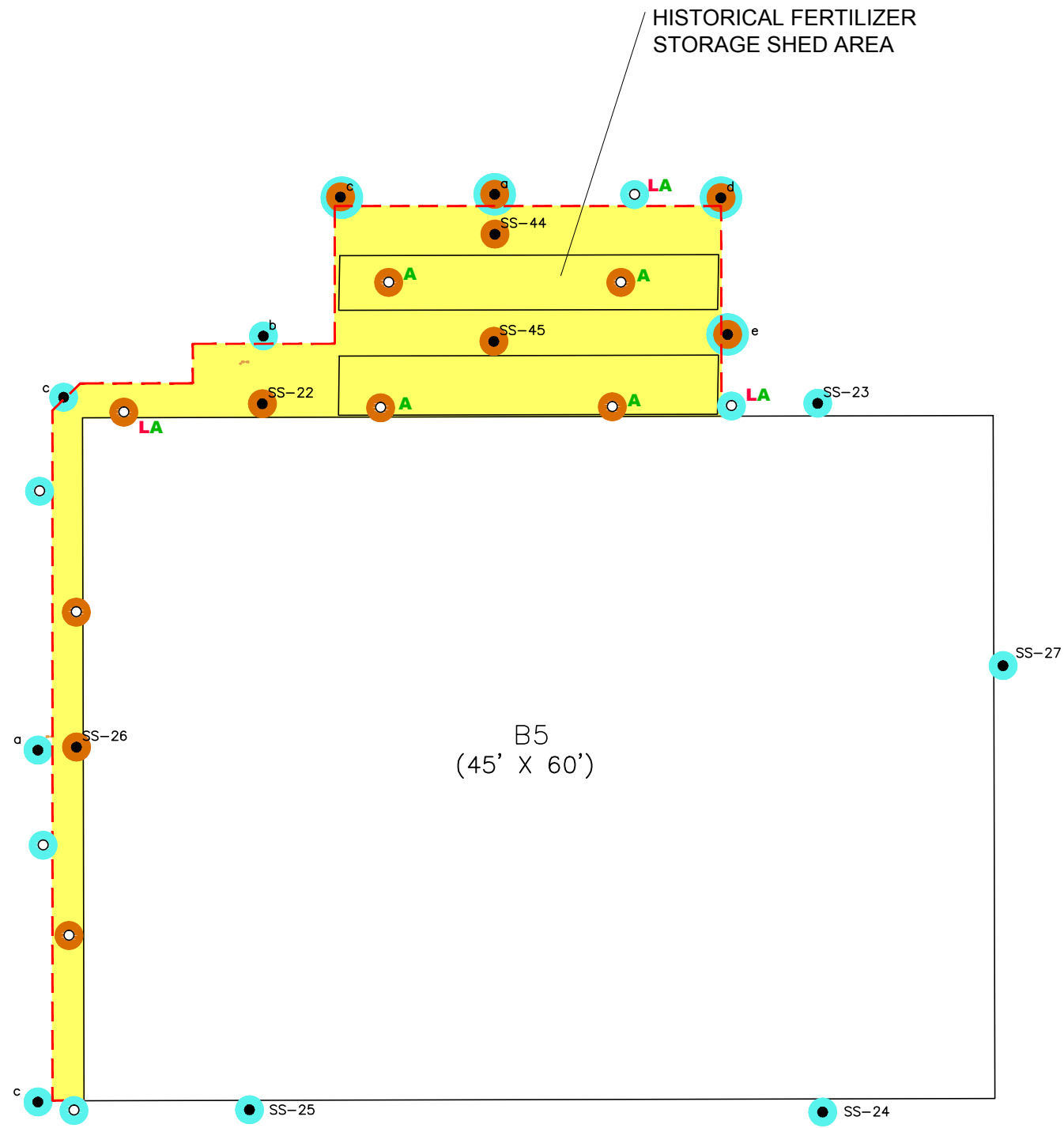


HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

**PROPOSED EXCAVATION
AND SAMPLING PLAN
B1-B4 AREA**

FIGURE
4A

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LEGEND

- PROPOSED EXCAVATION BOUNDARIES
- PROPOSED EXCAVATION AREA TO ~2.5 FEET (FT) BELOW GROUND SURFACE (BGS)
- PREVIOUS SIDEWALL DEFINITION SAMPLE, CLEAN TO 0.5 FT BGS
- PREVIOUS BOTTOM DEFINITION SAMPLE, CLEAN TO 2.5 FT BGS
- PROPOSED SIDEWALL SAMPLE, AT 0.5 FT BGS
- PROPOSED BOTTOM SAMPLE, AT 2.5 FT BGS

NOTE:
ALL PROPOSED SAMPLES TO BE ANALYZED FOR OCPs.

A - SUPPLEMENTAL ANALYSIS FOR ARSENIC.

L - SUPPLEMENTAL ANALYSIS FOR LEAD.



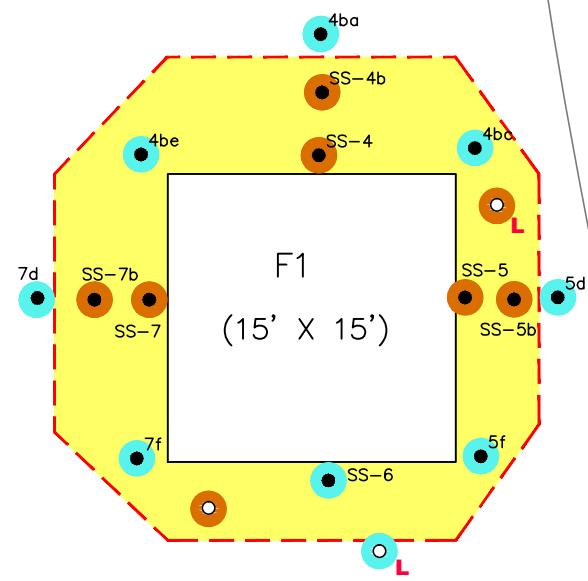
HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

PROPOSED EXCAVATION AND SAMPLING PLAN
B5 AREA



FIGURE
4B

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LEGEND

PROPOSED EXCAVATION BOUNDARIES

PROPOSED EXCAVATION AREA TO ~2.5 FEET (FT) BELOW GROUND SURFACE (BGS)

PREVIOUS SIDEWALL DEFINITION SAMPLE, CLEAN TO 0.5 FT BGS

PREVIOUS BOTTOM DEFINITION SAMPLE, CLEAN TO 2.5 FT BGS

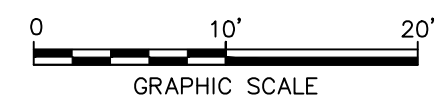
PROPOSED SIDEWALL SAMPLE, AT 0.5 FT BGS

PROPOSED BOTTOM SAMPLE, AT 2.5 FT BGS

NOTE:
ALL PROPOSED SAMPLES TO BE ANALYZED FOR OCPs.

L

 - SUPPLEMENTAL ANALYSIS FOR LEAD.



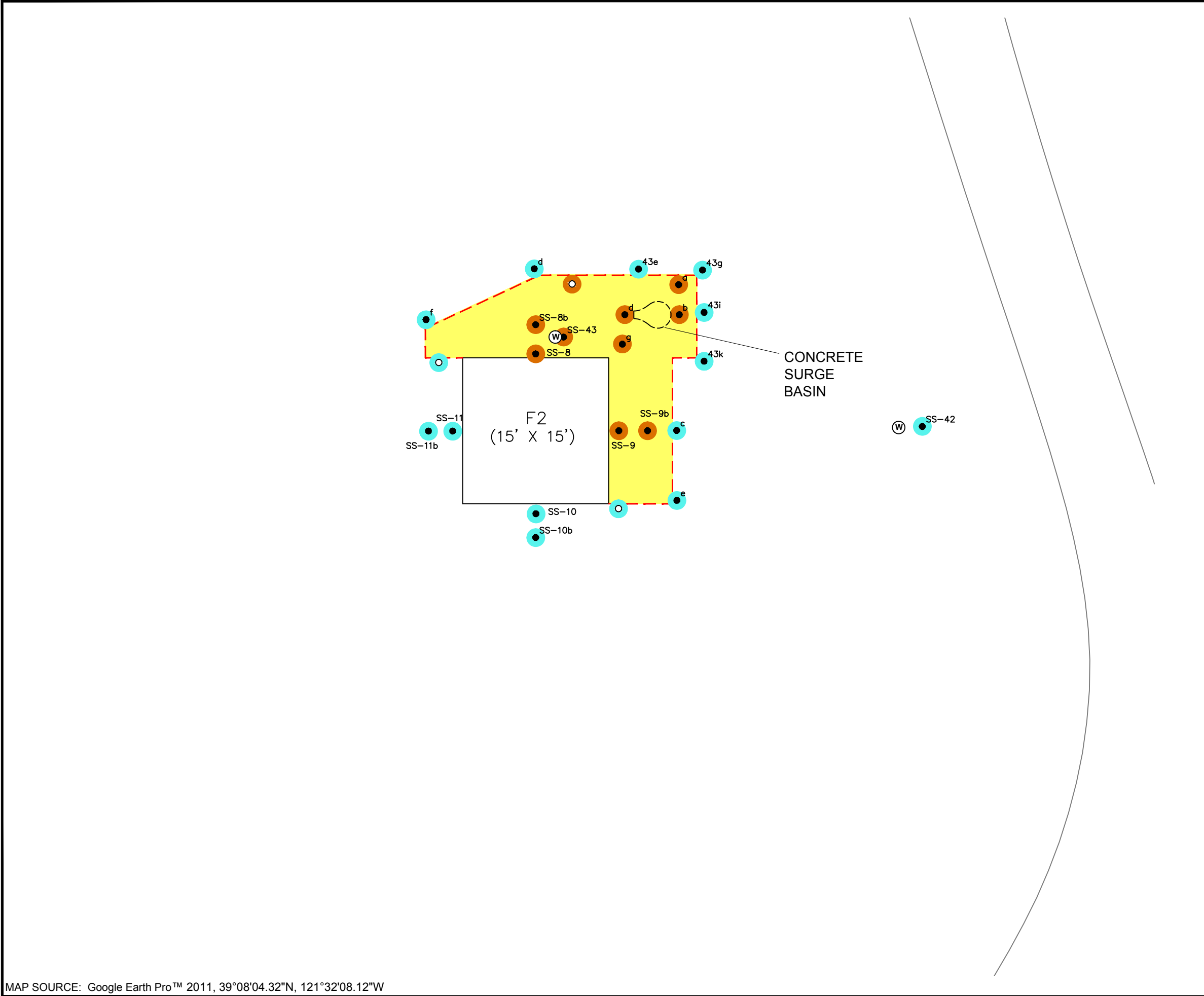
16m

HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

**PROPOSED EXCAVATION
AND SAMPLING PLAN
F1 AREA**

FIGURE
4C

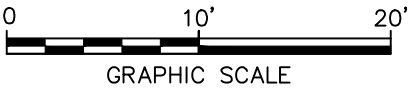
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LEGEND

- WATER-SUPPLY WELL
- PROPOSED EXCAVATION BOUNDARIES
- PROPOSED EXCAVATION AREA TO ~2.5 FEET (FT) BELOW GROUND SURFACE (BGS)
- PREVIOUS SIDEWALL DEFINITION SAMPLE, CLEAN TO 0.5 FT BGS
- PREVIOUS BOTTOM DEFINITION SAMPLE, CLEAN TO 2.5 FT BGS
- PROPOSED SIDEWALL SAMPLE, AT 0.5 FT BGS
- PROPOSED BOTTOM SAMPLE, AT 2.5 FT BGS

NOTE:
ALL PROPOSED SAMPLES TO BE ANALYZED FOR OCPs.



HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

PROPOSED EXCAVATION
AND SAMPLING PLAN
F2 AREA

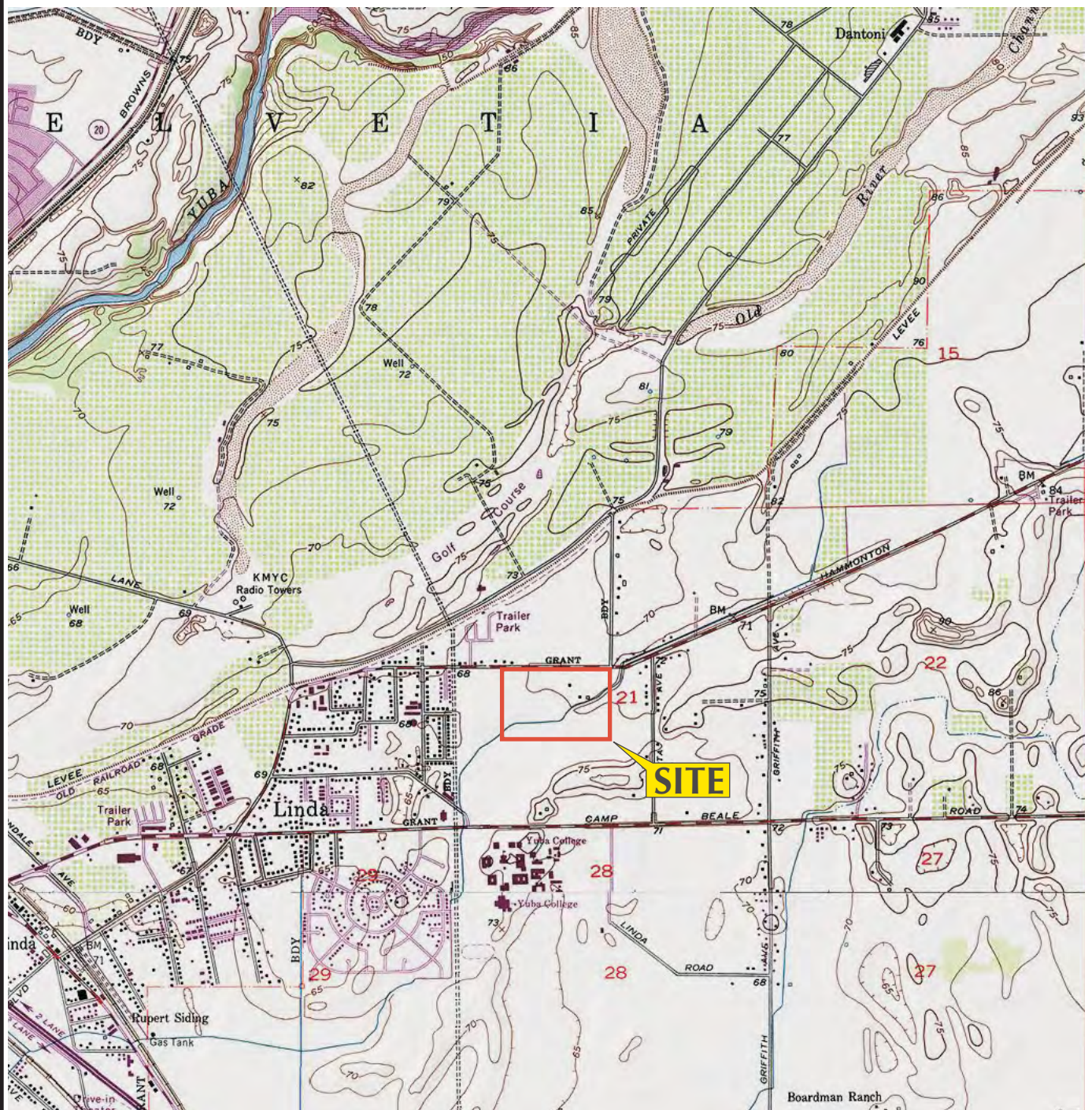


FIGURE
4D

Appendix A

Figures from SSI Report

G:\ENVCAD\Emeryville\ACT\RV009363\0006\00004\Hammon\CDR\RV009363 Hammon\B01.cdr



— SITE BOUNDARY



0 2,250 FEET

SOURCE: USGS California Topo CD

HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

SITE VICINITY MAP



FIGURE
1

CITY:\Reed\ DIV\GROUP\Reed\ DB\Reed\ LD\Opt\ PIC\Opt\ PNC\Reed\ TM\Opt\ LYS\Option\OFF=REF
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EXPLANATION	
	SITE BOUNDARY (APPROXIMATE)
	FILL MATERIAL
	PG&E 115kV POWER LINE
	12-INCH DIAMETER WATER PIPELINE
SS-2	SAMPLE IDENTIFICATION NAME
	Fill Material
	Stormwater Drainage Ditch
	Reduced Agricultural Sample

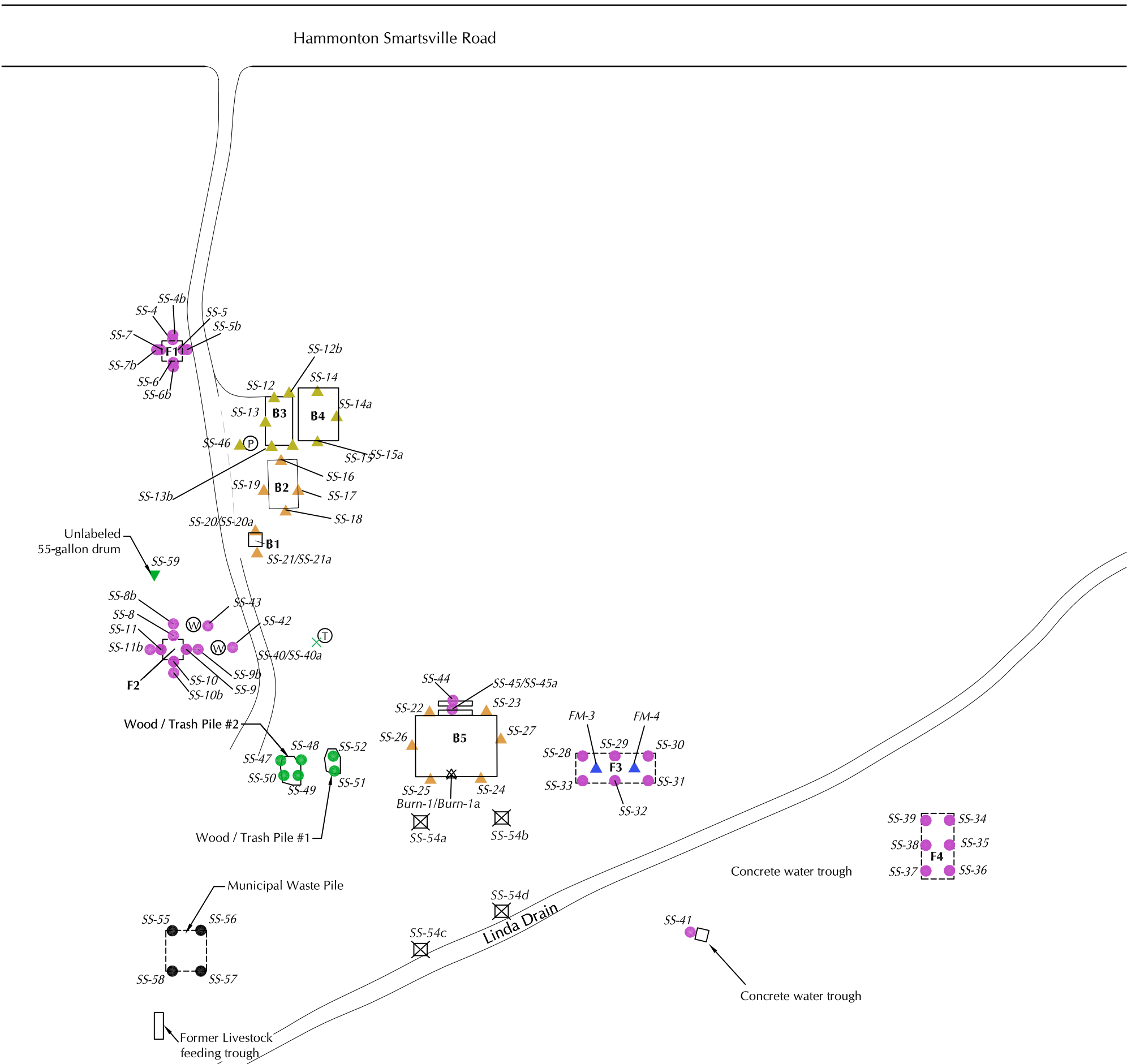
HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

SITE PLAN

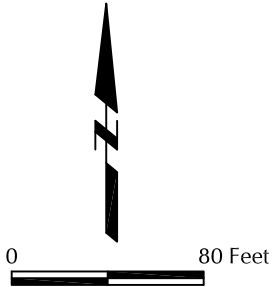


FIGURE
2

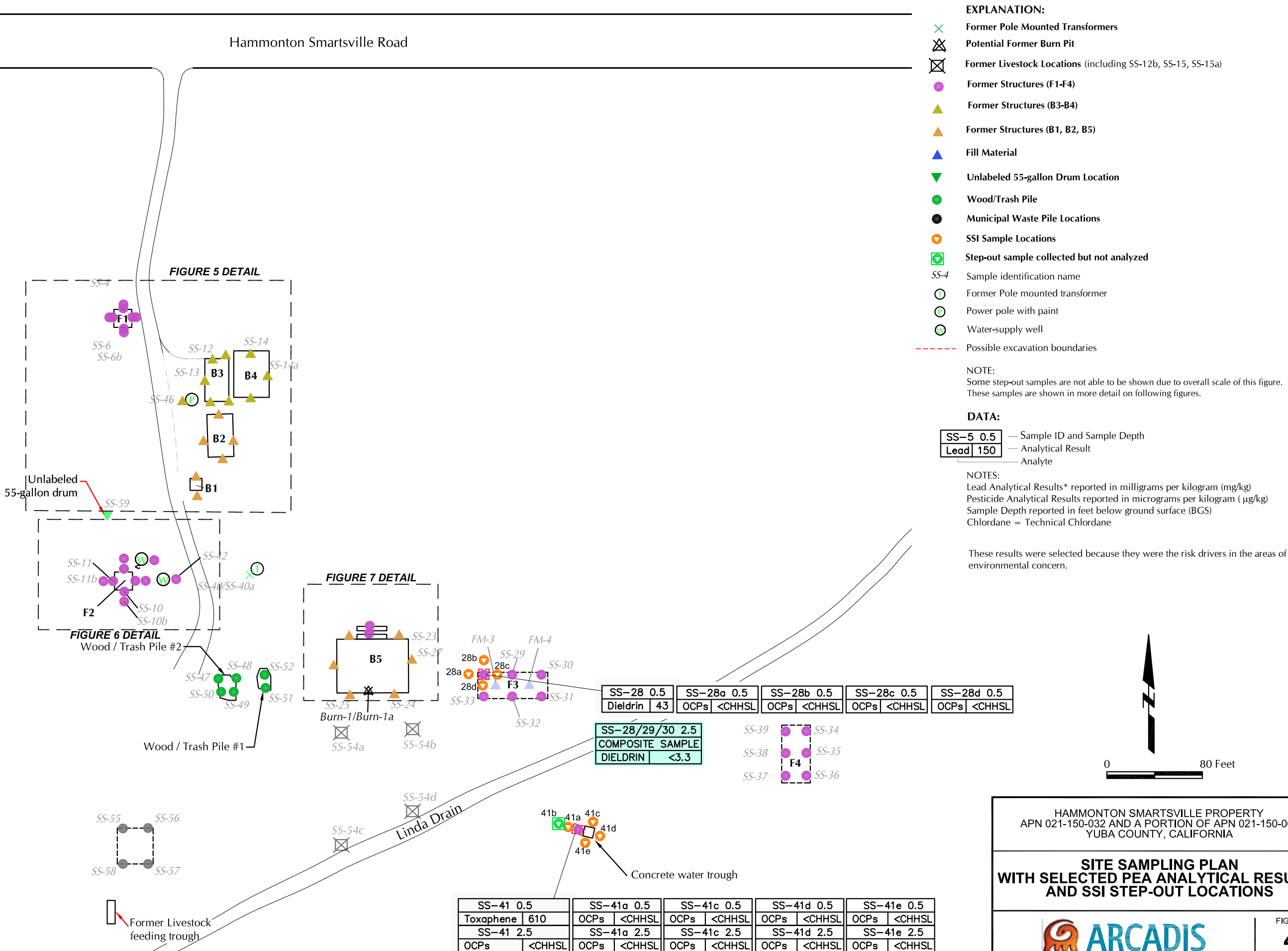
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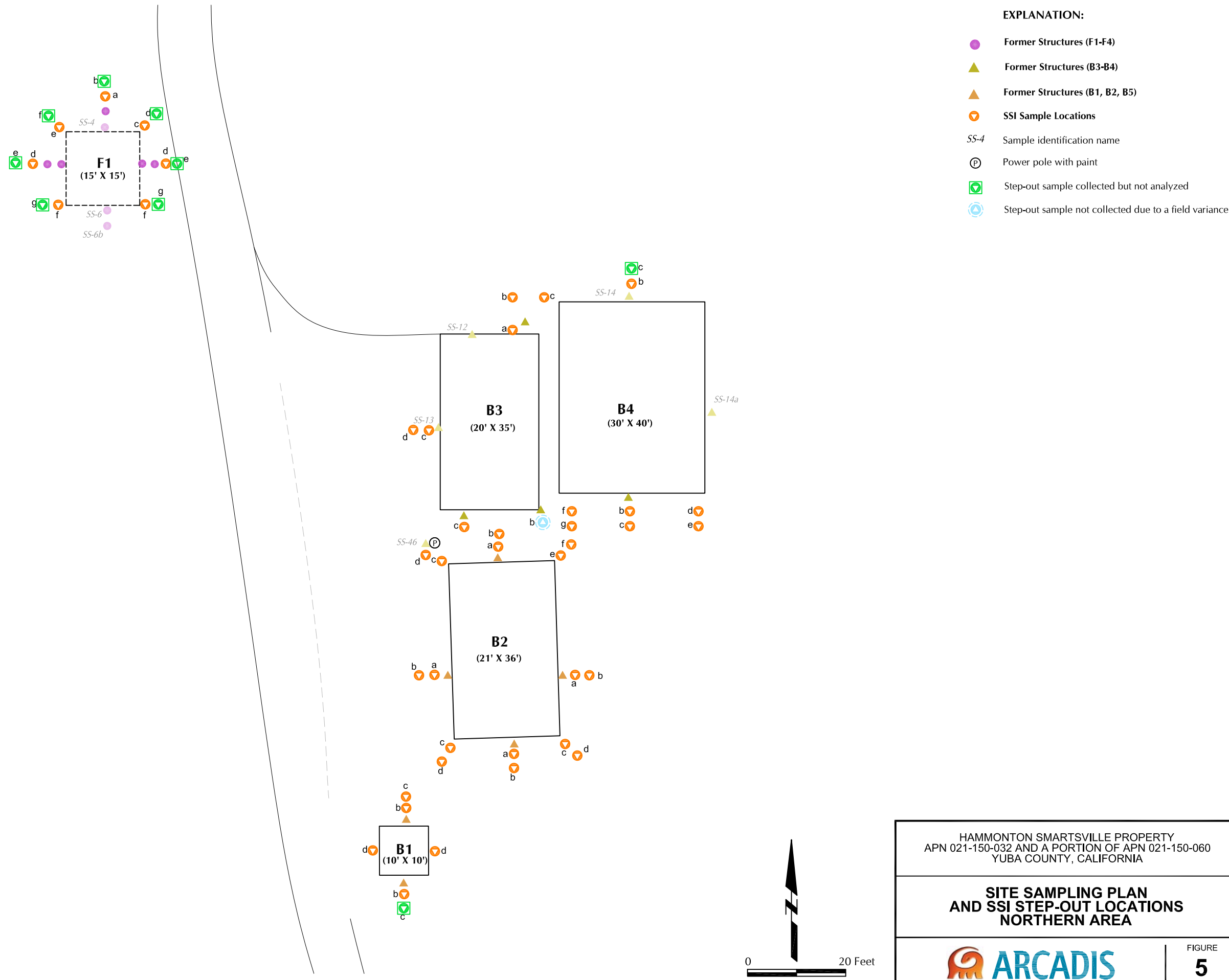


- EXPLANATION:**
- ✕ Former Pole Mounted Transformers
 - ⊗ Potential Former Burn Pit
 - ⊗ Former Livestock Locations (including SS-12b, SS-15, SS-15a)
 - Former Structures (F1-F4)
 - ▲ Former Structures (B3-B4)
 - ▲ Former Structures (B1, B2, B5)
 - ▲ Fill Material
 - ▼ Unlabeled 55-gallon Drum Location
 - Wood/Trash Pile
 - Municipal Waste Pile Locations
- SS-4 Sample identification name
- Ⓢ Former Pole mounted transformer
 - Ⓟ Power pole with paint
 - Ⓜ Water-supply well

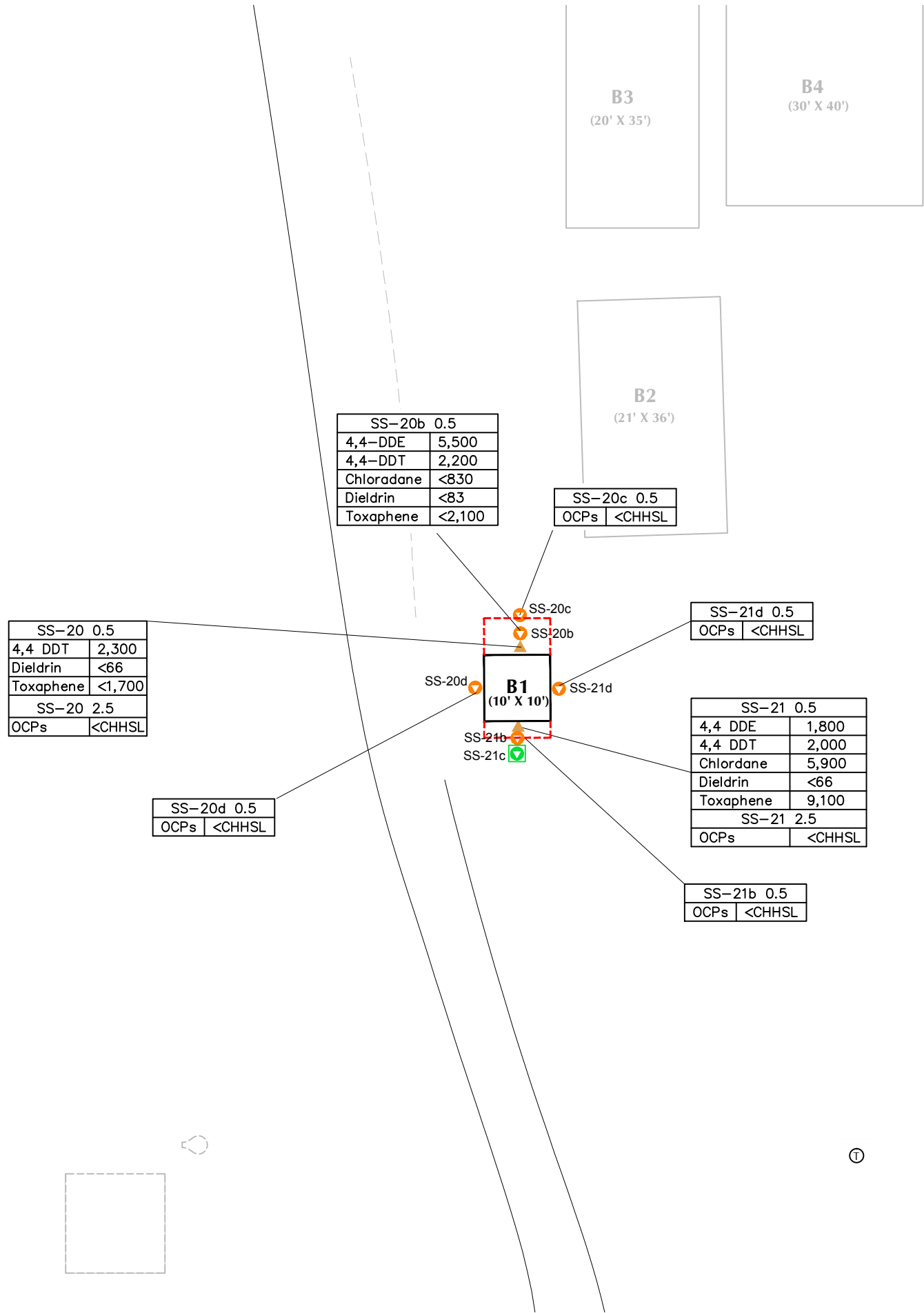


HAMMONTON SMARTSVILLE PROPERTY APN 021-150-032 AND A PORTION OF APN 021-150-060 YUBA COUNTY, CALIFORNIA	
SITE PLAN DETAIL	
	FIGURE 3





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EXPLANATION:

- Former Structures (F1-F4)
- Former Structures (B3-B4)
- Former Structures (B1, B2, B5)
- SSI Sample Locations
- SS-4 Sample identification name
- Former Pole mounted transformer
- Step-out sample collected but not analyzed
- Possible excavation boundaries

DATA:

Sample ID	Sample Depth	Analyte	Result
SS-5	0.5	Lead	150

Lead Analytical Results reported in milligrams per kilogram (mg/kg)
Pesticide Analytical Results reported in micrograms per kilogram (µg/kg)
Sample Depth reported in feet below ground surface (BGS)
Chlordane = Technical Chlordane

These results were selected because they were the risk drivers in the areas of environmental concern.

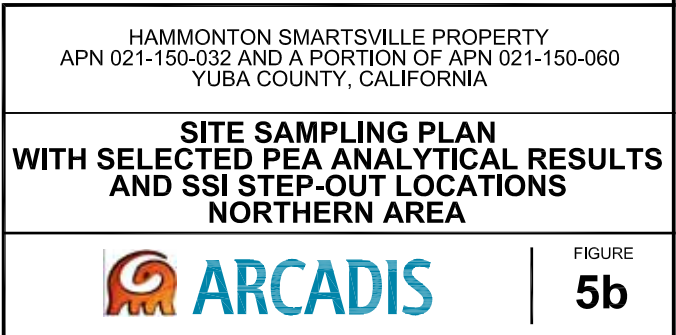
0 20 Feet

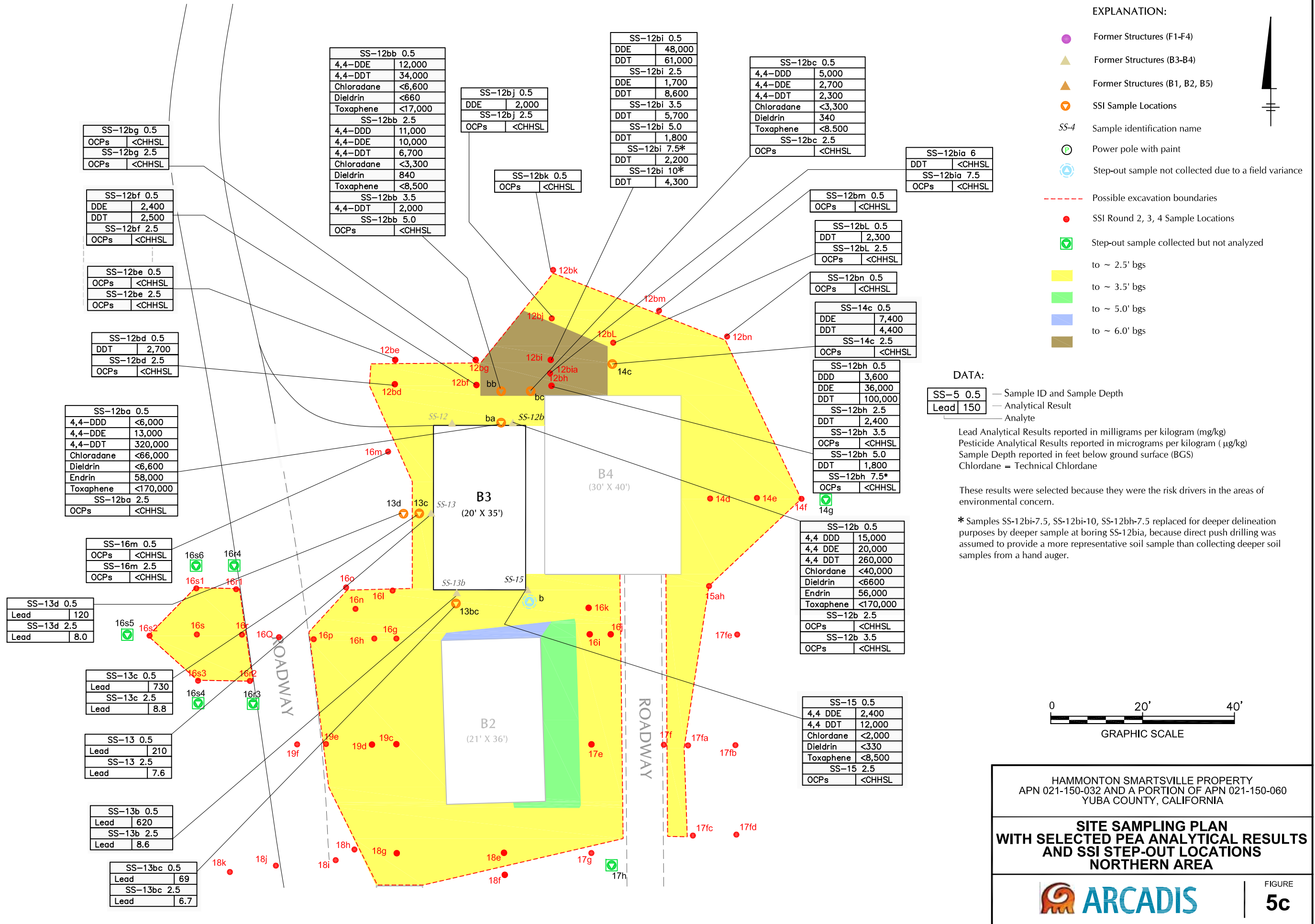
HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

**SITE SAMPLING PLAN
WITH SELECTED PEA ANALYTICAL RESULTS
AND SSI STEP-OUT LOCATIONS
NORTHERN AREA**

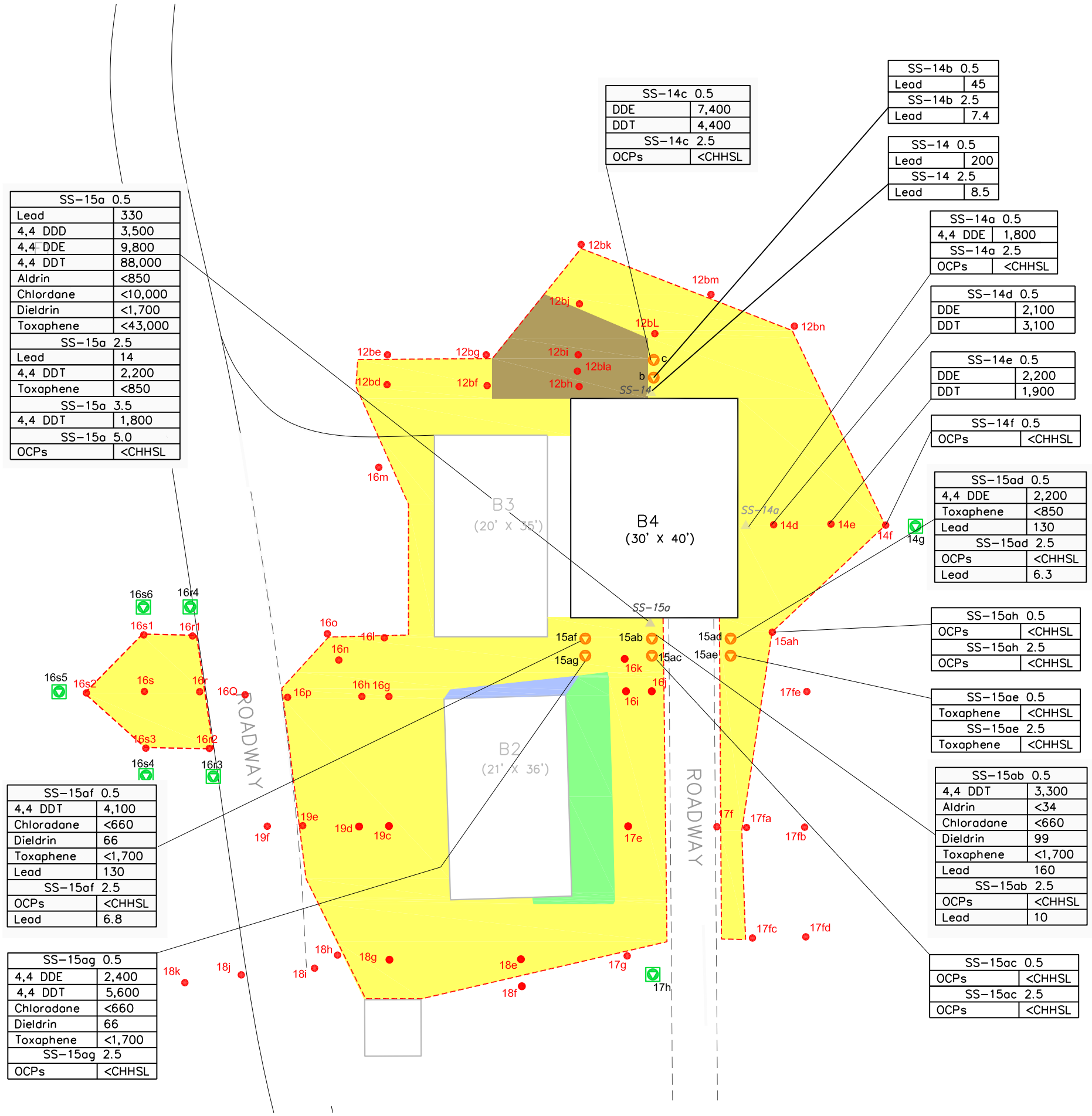
ARCADIS

FIGURE
5a





CITY:Costa Mesa, CA DIV:GROUP:ENVCAD DB:ENVCAD PKMS HACKMAN Z:\ENVCAD\CostaMesa\RETURN-TO-ENERGY\11-CAIRV008363\001500005RV\009363.0015 Sfte-SSI rev11.dwg LAYOUT:5D SAVED: 7/16/2013 9:29 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 7/16/2013 9:29 AM BY: ROBITAILLE, BEVERLY



- EXPLANATION:
- Former Structures (F1-F4)
 - Former Structures (B3-B4)
 - Former Structures (B1, B2, B5)
 - SSI Sample Locations
 - SS-4 Sample identification name
 - Power pole with point
 - Possible excavation boundaries
 - SSI Round 2, 3, 4 Sample Locations
 - Step-out sample collected but not analyzed
 - to ~ 2.5' bgs
 - to ~ 3.5' bgs
 - to ~ 5.0' bgs
 - to ~ 6.0' bgs

DATA:

SS-5 0.5	Sample ID and Sample Depth
Lead 150	Analytical Result
	Analyte

Lead Analytical Results reported in milligrams per kilogram (mg/kg)
Pesticide Analytical Results reported in micrograms per kilogram (µg/kg)
Sample Depth reported in feet below ground surface (BGS)
Chlordane = Technical Chlordane
These results were selected because they were the risk drivers in the areas of environmental concern.



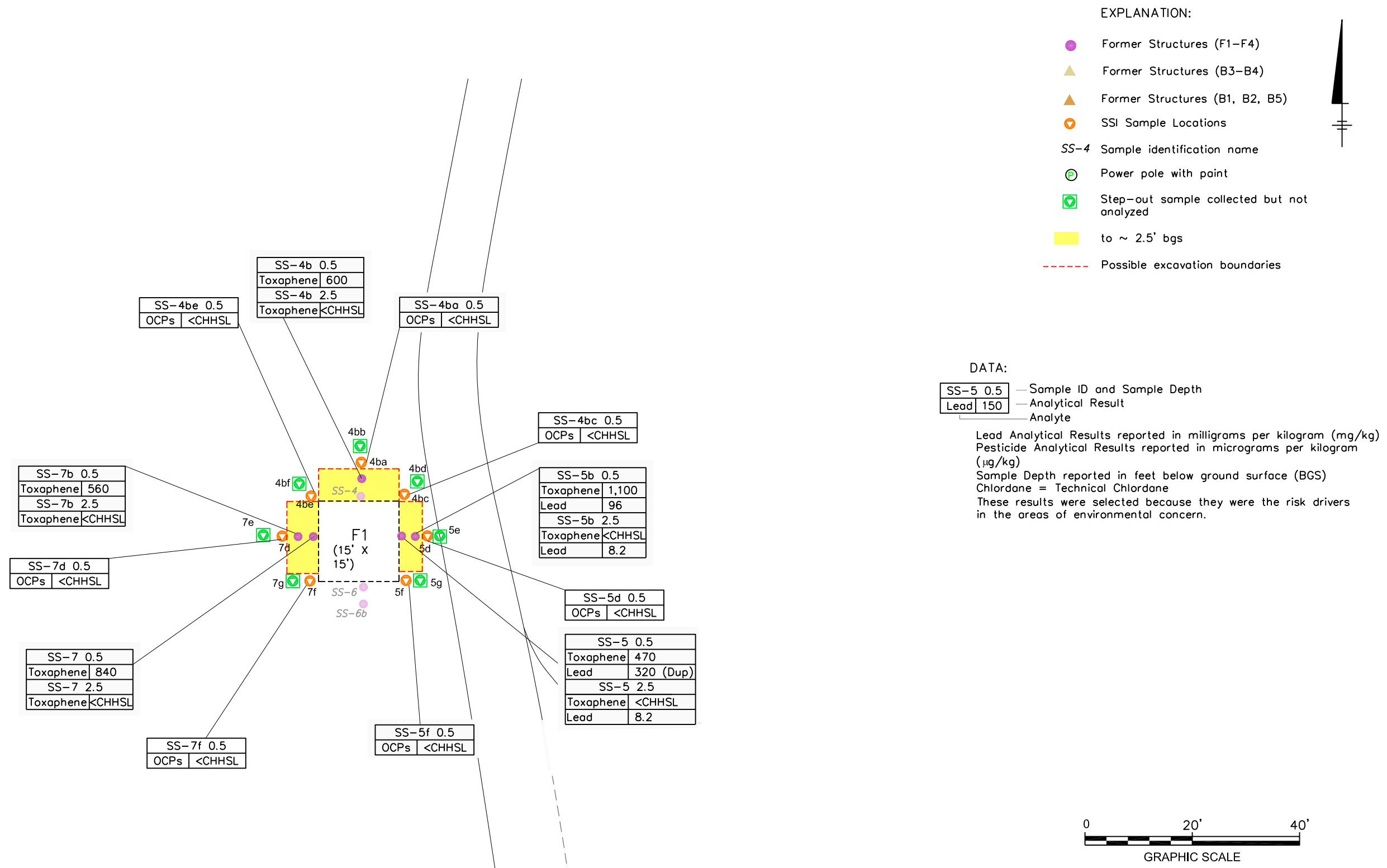
HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

**SITE SAMPLING PLAN
WITH SELECTED PEA ANALYTICAL RESULTS
AND SSI STEP-OUT LOCATIONS
NORTHERN AREA**

ARCADIS

FIGURE
5d

CITY:Costa Mesa, CA DIV:GROUP:ENVCAD DB:ENVCAD PKMS:HACKMAN Z:\ENVCAD\CostaMesa\RETURN-TO-Energy\Illu-CARV009363\0015\00005\RV\009363.0015 SRe-SSI rev6.dwg LAYOUT: 5E SAVED: 5/7/2013 3:18 PM ACADVER: 18.1s (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 5/7/2013 3:21 PM BY: ROBITAILLE, BEVERLY

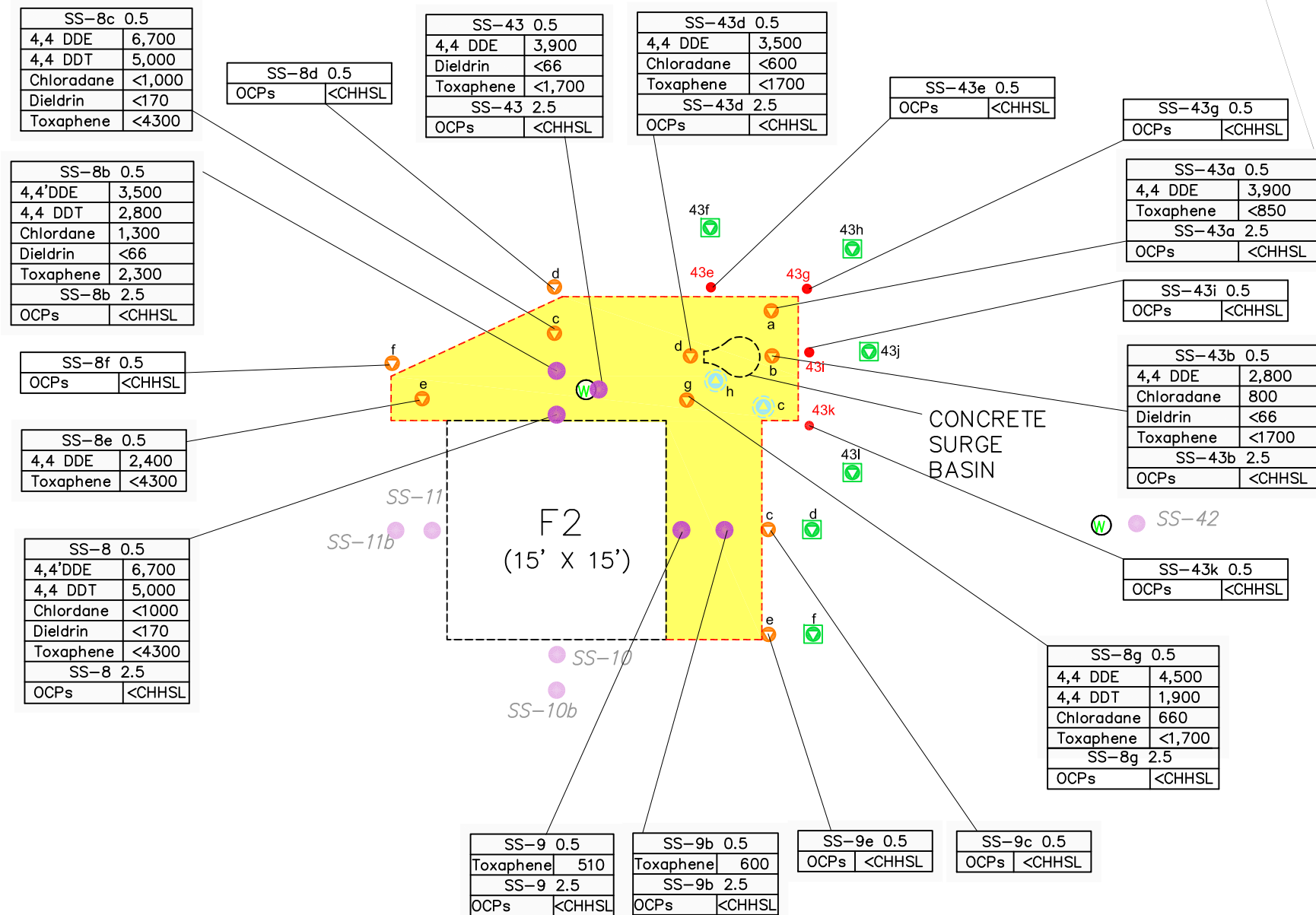


HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

**SITE SAMPLING PLAN
WITH SELECTED PEA ANALYTICAL RESULTS
AND SSI STEP-OUT LOCATIONS
NORTHERN AREA**

ARCADIS

FIGURE
5e

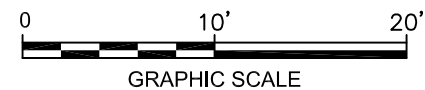


- EXPLANATION:
- Former Structures (F1-F4)
 - SSI Sample Locations
 - F1 Concrete foundation/former structure identifier
 - SS-4 Sample identification name
 - Water-supply well
 - Step-out sample not collected due to a field variance
 - Possible excavation boundaries
 - SSI Round 2/3 Sample Locations
 - Step-out sample collected but not analyzed
 - to ~ 2.5' bgs

DATA:

SS-9 0.5	— Sample ID and Sample Depth
Toxaphene 510	— Analytical Result
	— Analyte

Lead Analytical Results reported in milligrams per kilogram (mg/kg)
Pesticide Analytical Results reported in micrograms per kilogram (µg/kg)
Sample Depth reported in feet below ground surface (BGS)
Chlordane = Technical Chlordane
These results were selected because they were the risk drivers in the areas of environmental concern.

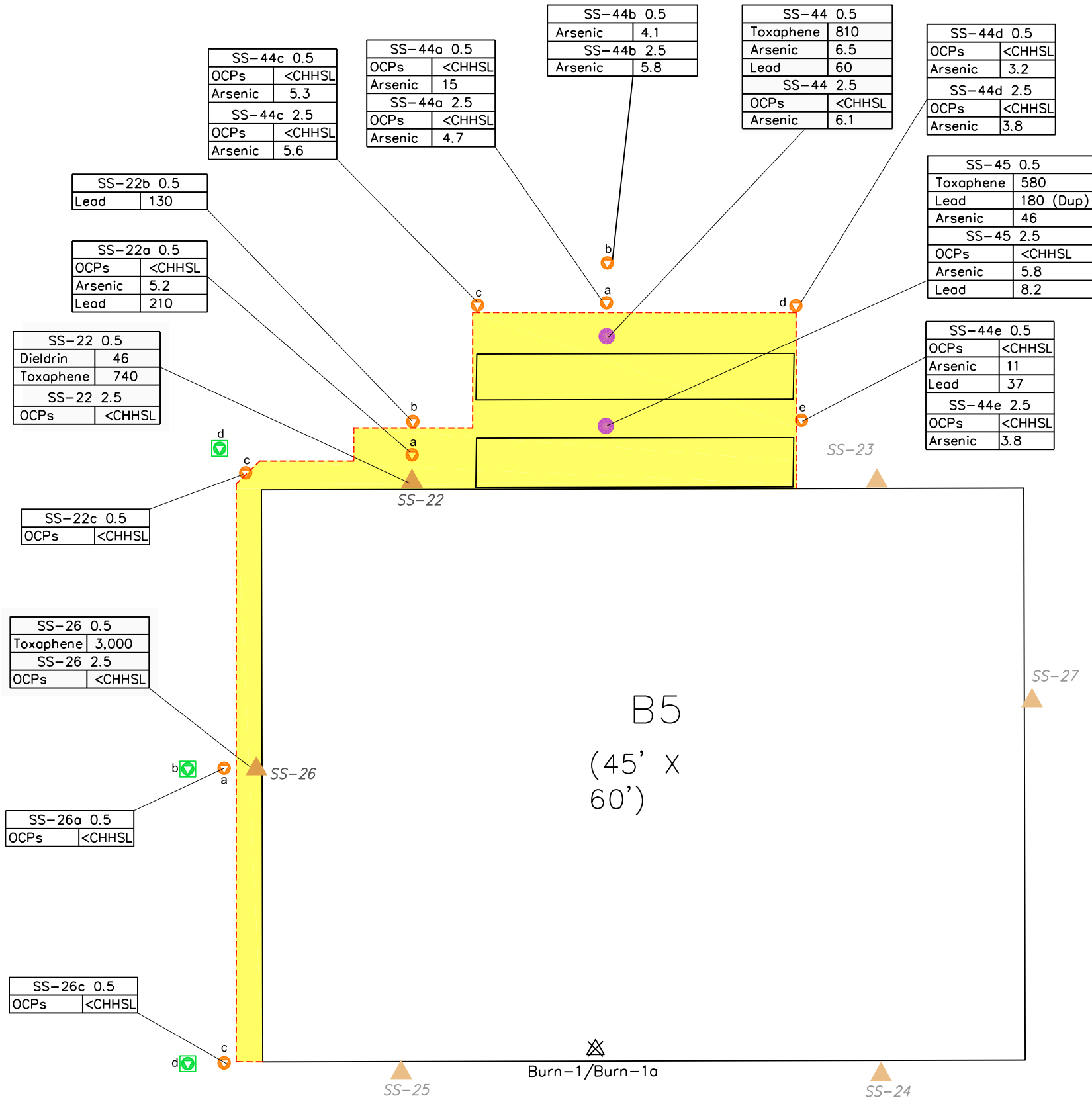


HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

**SITE SAMPLING PLAN
WITH SELECTED PEA ANALYTICAL RESULTS
AND SSI STEP-OUT LOCATIONS
CENTRAL AREA**

FIGURE
6

CITY: Costa Mesa, CA DIV: GROUP: ENVCAD DB: ENVCAD PKMS: HACKMAN Z:\ENVCAD\CostaMesa\RETURN-TO-ENERGY\B5-CARV009363\0015\000055RV\009363.dwg LAYOUT: 7 - SAVED: 5/7/2013 3:24 PM ACADVER: 18.1S (LMS TECH) PAGES: 7 PLOTSTYLETABLE: PLOTSTYLETABLE.dwt PLOTTED: 5/7/2013 3:25 PM BY: ROBITAILLE, BEVERLY



- EXPLANATION:
- ⊗ Potential Former Burn Pit
 - Former Structures (F1-F4)
 - ▲ Former Structures (B1, B2, B5)
 - SSI Sample Locations
 - SS-4 Sample identification name
 - ☑ Step-out sample collected but not analyzed
 - to ~ 2.5' bgs
 - Possible excavation boundaries

DATA:

SS-44 0.5	Sample ID and Sample Depth
Toxaphene 810	Analytical Result
	Analyte

Lead Analytical Results reported in milligrams per kilogram (mg/kg)
Pesticide Analytical Results reported in micrograms per kilogram (µg/kg)
Sample Depth reported in feet below ground surface (BGS)
Chlordane = Technical Chlordane

These results were selected because they were the risk drivers in the areas of environmental concern.



HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-032 AND A PORTION OF APN 021-150-060
YUBA COUNTY, CALIFORNIA

**SITE SAMPLING PLAN
WITH SELECTED PEA ANALYTICAL RESULTS
AND SSI STEP-OUT LOCATIONS
SOUTHEAST AREA**

ARCADIS

FIGURE
7

Appendix **B**

Tables from PEA and SSI Reports
Including Updated Risk Tables

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Center of Fill Material Piles	PEA	FM-1-1.5	1.0 - 1.5	Soil	X	--	--
	PEA	FM-2-1.5	1.0 - 1.5	Soil	X	--	--
	PEA	FM-3-1.5	1.0 - 1.5	Soil	X	--	--
	PEA	FM-4-1.5	1.0 - 1.5	Soil	X	--	--
Linda Drain - Upgradient (top of levee)*	PEA	SS-1a-0.5	0.0 - 0.5	Soil	X	--	--
Linda Drain - Upgradient (middle of levee)	PEA	SS-1b-0.5	0.0 - 0.5	Soil	X	--	--
Linda Drain - Center (top of levee)*	PEA	SS-2a-0.5	0.0 - 0.5	Soil	X	--	--
Linda Drain - Center (middle of levee)	PEA	SS-2b-0.5	0.0 - 0.5	Soil	X	--	--
Linda Drain - Downgradient (top of levee)*	PEA	SS-3a-0.5	0.0 - 0.5	Soil	X	--	--
Linda Drain - Downgradient (middle of levee)	PEA	SS-3b-0.5	0.0 - 0.5	Soil	X	--	--
Former Structure F1	PEA	SS-4-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-5-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-6-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-7-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-4-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-5-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-6-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-7-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-4b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-5b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-6b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-7b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-4b-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-5b-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-6b-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-7b-2.5	2.0 - 2.5	Soil		X	--
	SSI	4ba-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	4bb-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	4bc-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	4bd-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	4be-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	4bf-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	5d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	5e-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	5f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	5g-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	7d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	7e-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	7f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	7g-0.5	0.0 - 0.5	Soil	Field Variance		
	PEA	SS-8-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-9-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-10-0.5	0.0 - 0.5	Soil	X	X	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure F2	PEA	SS-11-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-8-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-9-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-10-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-11-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-8b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-9b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-10b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-11b-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-8b-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-9b-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-10b-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-11b-2.5	2.0 - 2.5	Soil		X	--
	SSI	8c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	8d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	8e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	8f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	8g-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	8g-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	8h-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	9c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	9d-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	9e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	9f-0.5	0.0 - 0.5	Soil	Field Variance		
Former Structure B1	PEA	SS-20-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-21-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-20-2.5	2.0 - 2.5	Soil	X	--	--
	PEA	SS-21-2.5	2.0 - 2.5	Soil		X	--
	SSI	20b-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	20c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	20d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	21b-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	21c-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	21d-0.5	0.0 - 0.5	Soil	X	--	--
Former Structure B2	PEA	SS-16-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-17-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-18-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-19-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-16-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-17-2.5	2.0 - 2.5	Soil	X	--	--
	PEA	SS-18-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-19-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	16-3.5	3.0 - 3.5	Soil	X	--	--
	SSI	16-5.0	4.5 - 5.0	Soil	X	--	--
	SSI	16a-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16a-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	16b-0.5	0.0 - 0.5	Soil	X	--	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure B2	SSI	16b-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	16c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16c-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	16d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16d-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16g-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	16h-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16e-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16e-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	16e-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI	16f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	16f-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16f-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	16f-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 2)	16i-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	16i-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16j-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	16j-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16k-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	16k-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16L-0.5	0.0 - 0.5	Soil	X	--	--
Former Structure B2 (continued)	SSI (round 2)	16L-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	16m-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	16m-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 3)	16n-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	16o-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	16p-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	16q-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	16q-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	16r-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	16r-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 4)	16r1-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	16r2-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	16r3-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 4)	16r4-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	16s-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	16s-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 4)	16s1-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	16s2-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	16s3-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	16s4-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 4)	16s5-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 4)	16s6-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	17-3.5	3.0 - 3.5	Soil	X	--	--
	SSI	17-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI	17a-0.5	0.0 - 0.5	Soil	X	--	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure B2 (continued)	SSI	17a-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	17a-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	17a-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI	17b-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	17b-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	17c-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	17c-2.5	2.0 - 2.5	Soil	X	X	--
	SSI (round 2)	17c-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	17c-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI	17d-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	17d-2.5	2.0 - 2.5	Soil	X	X	--
	SSI (round 2)	17e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	17f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	17f-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 3)	17f-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	17fa-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	17fa-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	17fa-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	17fb-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	17fb-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	17fb-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	17fc-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	17fc-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	17fc-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	17fd-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	17fd-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	17fd-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	17fe-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	17fe-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	17fe-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 2)	17g-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	17h-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	18a-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	18b-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	18c-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	18d-0.5	0.0 - 0.5	Soil	X	X	--
	SSI (round 2)	18e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	18f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	18g-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	18h-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	18i-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	18j-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	18j-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	18k-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	18k-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI	19a-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	19b-0.5	0.0 - 0.5	Soil	X	--	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure B3 and Former Livestock Handling Area in the Vicinity of B3 and B4	SSI (round 2)	19c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	19d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	19e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	19f-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 3)	19f-2.5	2.0 - 2.5	Soil	Field Variance		
	PEA	SS-12-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-13-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-13b-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-12-2.5	2.0 - 2.5	Soil	Not Collected		
	PEA	SS-12b-2.5	2.0 - 2.5	Soil	Not Collected		
	PEA	SS-13-2.5	2.0 - 2.5	Soil	Not Collected		
	PEA	SS-13b-2.5	2.0 - 2.5	Soil	Not Collected		
	PEA	SS-12b-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	12b-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	12b-3.5	3.0 - 3.5	Soil	X	--	--
	SSI	12b-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI	12ba-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	12ba-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	12bb-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	12bb-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bb-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	12bb-5.0	4.5 - 5.0	Soil	X	--	--
	SSI	12bc-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	12bc-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bd-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12bd-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bd-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 2)	12bd-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 2)	12be-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12be-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12be-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 2)	12be-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 2)	12bf-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12bf-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bf-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 2)	12bf-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 2)	12bg-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12bg-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bg-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 2)	12bg-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 2)	12bh-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12bh-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bh-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	12bh-5.0	4.5 - 5.0	Soil	X	--	--
	SSI (round 3)	12bh-7.5	7.0 - 7.5	Soil	X	--	--
	SSI (round 3)	12bh-10	9.5 - 10	Soil	Field Variance		

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure B3 and Former Livestock Handling Area in the Vicinity of B3 and B4 (continued)	SSI (round 2)	12bi-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	12bi-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	12bi-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 2)	12bi-5.0	4.5 - 5.0	Soil	X	--	--
	SSI (round 3)	12bi-7.5	7.0 - 7.5	Soil	X	--	--
	SSI (round 3)	12bi-10	9.5 - 10	Soil	X	--	--
	SSI (round 4)	12bia-6.0	5.5 - 6.0	Soil	X	--	--
	SSI (round 4)	12bia-7.5	7.0 - 7.5	Soil	X	--	--
	SSI (round 4)	12bia-10	9.5 - 10	Soil	Field Variance		
	SSI (round 4)	12bia-12.5	12.0 - 12.5	Soil	Field Variance		
	SSI (round 4)	12bia-14.5	14.0 - 14.5	Soil	Field Variance		
	SSI (round 3)	12bj-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	12bj-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 3)	12bj-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	12bj-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 3)	12bj-7.5	7.0 - 7.5	Soil	Field Variance		
	SSI (round 3)	12bj-10	9.5 - 10	Soil	Field Variance		
	SSI (round 3)	12bk-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	12bk-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	12bk-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	12bk-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 3)	12bk-7.5	7.0 - 7.5	Soil	Field Variance		
	SSI (round 3)	12bk-10	9.5 - 10	Soil	Field Variance		
	SSI (round 3)	12bL-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	12bL-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 3)	12bL-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	12bL-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 3)	12bL-7.5	7.0 - 7.5	Soil	Field Variance		
	SSI (round 3)	12bL-10	9.5 - 10	Soil	Field Variance		
	SSI (round 3)	12bm-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	12bm-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	12bm-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	12bm-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 3)	12bm-7.5	7.0 - 7.5	Soil	Field Variance		
	SSI (round 3)	12bm-10	9.5 - 10	Soil	Field Variance		
	SSI (round 3)	12bn-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	12bn-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	12bn-3.5	3.0 - 3.5	Soil	Field Variance		
	SSI (round 3)	12bn-5.0	4.5 - 5.0	Soil	Field Variance		
	SSI (round 3)	12bn-7.5	7.0 - 7.5	Soil	Field Variance		
	SSI (round 3)	12bn-10	9.5 - 10	Soil	Field Variance		
	SSI	13-2.5	2.0 - 2.5	Soil	--	X	--
	SSI	13c-0.5	0.0 - 0.5	Soil	--	X	--
	SSI	13c-2.5	2.0 - 2.5	Soil	--	X	--
	SSI	13d-0.5	0.0 - 0.5	Soil	--	X	--

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Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
	SSI	13d-2.5	2.0 - 2.5	Soil	--	X	--
	SSI	13b-2.5	2.0 - 2.5	Soil	--	X	--
	SSI	13c-0.5	0.0 - 0.5	Soil	--	X	--
	SSI	13c-2.5	2.0 - 2.5	Soil	--	X	--
Former Structure B4 and Former Livestock Handling Area in the Vicinity of B3 and B4	PEA	SS-15-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-14-0.5	0.0 - 0.5	Soil	--	X	--
	SSI	14-2.5	2.0 - 2.5	Soil	--	X	--
	PEA / SSI (round 3)	SS-14a-0.5	0.0 - 0.5	Soil	X	X	--
	SSI (round 3)	14a-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	14b-0.5	0.0 - 0.5	Soil	--	X	--
	SSI	14b-2.5	2.0 - 2.5	Soil	--	X	--
	SSI	14c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	14c-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 3)	14d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	14d-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 3)	14e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 3)	14e-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI (round 4)	14f-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 4)	14f-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	15-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	15b-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	15b-2.5	2.0 - 2.5	Soil	Field Variance		
	PEA	SS-15a-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15a-2.5	2.0 - 2.5	Soil	X	X	--
	SSI (round 3)	15a-3.5	3.0 - 3.5	Soil	X	--	--
	SSI (round 3)	15a-5.0	4.5 - 5.0	Soil	X	--	--
	SSI	15ab-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15ab-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	15ac-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15ac-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI	15ad-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15ad-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	15ae-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15ae-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	15af-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15af-2.5	2.0 - 2.5	Soil	X	X	--
	SSI	15ag-0.5	0.0 - 0.5	Soil	X	X	--
	SSI	15ag-2.5	2.0 - 2.5	Soil	X	X	--
	SSI (round 2)	15ah-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	15ah-2.5	2.0 - 2.5	Soil	X	--	--
Former Structure B5	PEA	SS-22-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-23-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-24-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-25-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-26-0.5	0.0 - 0.5	Soil	X	X	--

Table B-1
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Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Former Structure B5 (continued)	PEA	SS-27-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-22-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-23-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-24-2.5	2.0 - 2.5	Soil		--	--
	PEA	SS-25-2.5	2.0 - 2.5	Soil		--	--
	PEA	SS-26-2.5	2.0 - 2.5	Soil	X	--	--
	PEA	SS-27-2.5	2.0 - 2.5	Soil		--	--
	SSI	22a-0.5	0.0 - 0.5	Soil	X	X	X
	SSI	22b-0.5	0.0 - 0.5	Soil	--	X	--
	SSI	22c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	22d-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	26a-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	26b-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	26c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	26d-0.5	0.0 - 0.5	Soil	Field Variance		
Former Structure F3	PEA	SS-28-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-29-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-30-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-31-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-32-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-33-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-28-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-29-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-30-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-31-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-32-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-33-2.5	2.0 - 2.5	Soil		X	--
	SSI	28a-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	28b-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	28c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	28d-0.5	0.0 - 0.5	Soil	X	--	--
Former Structure F4	PEA	SS-34-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-35-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-36-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-37-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-38-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-39-0.5	0.0 - 0.5	Soil	X	X	--
	PEA	SS-34-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-35-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-36-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-37-2.5	2.0 - 2.5	Soil	X	X	--
	PEA	SS-38-2.5	2.0 - 2.5	Soil		X	--
	PEA	SS-39-2.5	2.0 - 2.5	Soil		X	--
Pole-Mounted Transformer	PEA	SS-40-0.5	0.0 - 0.5	Soil	--	--	--
Low-lying Area Adjacent to Water Trough	PEA	SS-41-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	41-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	41a-0.5	0.0 - 0.5	Soil	X	--	--

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Hammonton Smartsville Property
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On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Low-lying Area Adjacent to Water Trough (continued)	SSI	41a-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	41b-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	41b-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI	41c-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	41c-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	41d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	41d-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	41e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	41e-2.5	2.0 - 2.5	Soil	X	--	--
Low-lying Area Adjacent to Supply Well	PEA	SS-42-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-43-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	43-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	43a-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	43a-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	43b-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	43b-2.5	2.0 - 2.5	Soil	X	--	--
	SSI	43c-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI	43c-2.5	2.0 - 2.5	Soil	Field Variance		
	SSI	43d-0.5	0.0 - 0.5	Soil	X	--	--
	SSI	43d-2.5	2.0 - 2.5	Soil	X	--	--
	SSI (round 2)	43e-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	43f-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 2)	43g-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	43h-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 2)	43i-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	43j-0.5	0.0 - 0.5	Soil	Field Variance		
	SSI (round 2)	43k-0.5	0.0 - 0.5	Soil	X	--	--
	SSI (round 2)	43L-0.5	0.0 - 0.5	Soil	Field Variance		
	PEA	SS-44-0.5	0.0 - 0.5	Soil	X	X	X
	PEA	SS-45-0.5	0.0 - 0.5	Soil	X	X	X
	SSI	44-2.5	2.0 - 2.5	Soil	X	X	X
	SSI	45-2.5	2.0 - 2.5	Soil	X	X	X
	SSI	44a-0.5	0.0 - 0.5	Soil	X	--	X
	SSI	44a-2.5	2.0 - 2.5	Soil	X	--	X
	SSI	44b-0.5	0.0 - 0.5	Soil	--	--	X
	SSI	44b-2.5	2.0 - 2.5	Soil	X	--	X
	SSI	44c-0.5	0.0 - 0.5	Soil	X	--	X
	SSI	44c-2.5	2.0 - 2.5	Soil	X	--	X
	SSI	44d-0.5	0.0 - 0.5	Soil	X	--	X
	SSI	44d-2.5	2.0 - 2.5	Soil	X	--	X
	SSI	44e-0.5	0.0 - 0.5	Soil	X	X	X
	SSI	44e-2.5	2.0 - 2.5	Soil	X	--	X
Painted Power Pole	PEA	SS-46-0.5	0.0 - 0.5	Soil	--	X	--
Wood/Trash Piles #1 and #2	PEA	SS-47-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-48-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-48-0.9	0.3 - 0.9	Soil	--	--	--

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On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Wood/Trash Piles #1 and #2 (continued)	PEA	SS-49-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-50-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-51-0.5	0.0 - 0.5	Soil	--	X	--
	PEA	SS-52-0.5	0.0 - 0.5	Soil	--	X	--
Reduced Agricultural Area	PEA	SS-53a-0.5	0.0 - 0.5	Soil	X	--	X
	PEA	SS-53b-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53c-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53d-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53e-0.5	0.0 - 0.5	Soil	X	--	X
	PEA	SS-53f-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53g-0.5	0.0 - 0.5	Soil		--	--
	PEA	SS-53h-0.5	0.0 - 0.5	Soil		--	--
	PEA	SS-53i-0.5	0.0 - 0.5	Soil	X	--	X
	PEA	SS-53j-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53k-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53L-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53m-0.5	0.0 - 0.5	Soil	X	--	X
	PEA	SS-53n-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53o-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-53p-0.5	0.0 - 0.5	Soil	X	--	--
Former Livestock Handling Area	PEA	SS-54a-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-54b-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-54c-0.5	0.0 - 0.5	Soil	X	--	--
	PEA	SS-54d-0.5	0.0 - 0.5	Soil	X	--	--
Potential Former Burn Pit	PEA	Burn-1-0.5	0.0 - 0.5	Soil	--	--	--
Municipal Trash Pile	PEA	SS-55-0.5	0.0 - 0.5	Soil	--	--	--
	PEA	SS-56-0.5	0.0 - 0.5	Soil	--	--	--
	PEA	SS-57-0.5	0.0 - 0.5	Soil	--	--	--
	PEA	SS-58-0.5	0.0 - 0.5	Soil	--	--	--
Waste Water Drum Sample	PEA	IDW	--	Water	X	--	--
Total Collected					284	127	19
Duplicate Samples							
Co-Collected at Sample FM-1-1.5	PEA	FM-1a-1.5	1.0 - 1.5	Soil	X	--	--
Co-Collected at Sample SS-4-0.5	PEA	SS-4a-0.5	0.0 - 0.5	Soil	X	X	--
Co-Collected at Sample SS-5-0.5	PEA	SS-5a-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-6-0.5	PEA	SS-6a-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-7-0.5	PEA	SS-7a-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-4b-0.5	PEA	SS-4c-0.5	0.0 - 0.5	Soil	X	X	--
Co-Collected at Sample SS-5b-0.5	PEA	SS-5c-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-6b-0.5	PEA	SS-6c-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-7b-0.5	PEA	SS-7c-0.5	0.0 - 0.5	Soil		X	--
Co-Collected at Sample SS-20-0.5	PEA	SS-20a-0.5	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample SS-21-0.5	PEA	SS-21a-0.5	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample SS-40-0.5	PEA	SS-40a-0.5	0.0 - 0.5	Soil	--	--	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic
Co-Collected at Sample SS-45-0.5	PEA	SS-45a-0.5	0.0 - 0.5	Soil	X	X	X
Co-Collected at Sample Burn-1-0.5	PEA	Burn-1a-0.5	0.0 - 0.5	Soil	--	--	--
Co-Collected at Sample 4ba-0.5	SSI	DUP1	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 4bb-0.5	SSI	DUP2	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 4bc-0.5	SSI	DUP3	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 4bd-0.5	SSI	DUP4	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 4be-0.5	SSI	DUP5	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 4bf-0.5	SSI	DUP6	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 13c-0.5	SSI	DUP7	0.0 - 0.5	Soil	--	X	--
Co-Collected at Sample 15b-0.5	SSI	DUP8	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 15ab-0.5	SSI	DUP9	0.0 - 0.5	Soil	X	X	--
Co-Collected at Sample 15ac-0.5	SSI	DUP10	0.0 - 0.5	Soil	X	X	--
Co-Collected at Sample 15ad-0.5	SSI	DUP11	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 15ae-0.5	SSI	DUP12	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 15af-0.5	SSI	DUP13	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 15ag-0.5	SSI	DUP14	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 44a-0.5	SSI	DUP16	0.0 - 0.5	Soil	--	--	X
Co-Collected at Sample 44b-0.5	SSI	DUP17	0.0 - 0.5	Soil	--	--	X
Co-Collected at Sample 17e-0.5	SSI (round 2)	DUP18	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 17f-0.5	SSI (round 2)	DUP19	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 17g-0.5	SSI (round 2)	DUP20	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 17h-0.5	SSI (round 2)	DUP21	0.0 - 0.5	Soil	Field Variance		
Co-Collected at Sample 18e-0.5	SSI (round 2)	DUP22	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 18f-0.5	SSI (round 2)	DUP23	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 16n-0.5	SSI (round 3)	DUP24	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 16p-0.5	SSI (round 3)	DUP25	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 16r-0.5	SSI (round 3)	DUP26	0.0 - 0.5	Soil	X	--	--
Co-Collected at Sample 16r1-0.5	SSI (round 4)	DUP27	0.0 - 0.5	Soil	X	--	--
Sample Blanks**							
Field Blank	PEA	FB1	--	Water	X	X	X
Equipment Blank	PEA	EB1	--	Water	X	X	X
Field Blank	SSI	FB2	--	Water	X	X	X
Equipment Blank	SSI	EB2	--	Water	X	X	X
Field Blank	SSI (round 2)	FB3	--	Water	X	--	--
Equipment Blank	SSI (round 2)	EB3	--	Water	X	--	--
Field Blank	SSI (round 3)	FB4	--	Water	X	--	--
Equipment Blank	SSI (round 3)	EB4	--	Water	X	--	--
Field Blank	SSI (round 3)	FB5	--	Water	X	--	--
Equipment Blank	SSI (round 3)	EB5	--	Water	X	--	--
Field Blank	SSI (round 4)	FB6	--	Water	X	--	--
Equipment Blank	SSI (round 4)	EB6	--	Water	X	--	--

Table B-1
Sampling and Analysis Summary
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Assessment Phase	Sample Location	Sample Depth (feet bgs)	Matrix	OCPs	Lead	Arsenic

Notes:

PEA samples were collected on April 9 and 10, 2012. Date specific sample results are tabulated on Tables 2 and 3.

PEA = Preliminary Environmental Assessment

SSI = Supplemental Site Investigation

"X" indicates sample was analyzed for the noted compound.

"P" indicates the sample is proposed for noted compound analysis as part of the SSI (round 3).

"Field Variance" indicates sample was not collected due to field variance or was held pending adjacent analytical and was not run.

Deeper samples to be placed on hold pending the results of the upper sample.

bgs = below ground surface

Organochlorine pesticides (OCPs) will be analyzed using EPA Method SW8081A for the SSI

Lead and Arsenic will be analyzed using U.S. EPA Method SW6020 for the SSI

* = Samples collected from the top of levee were alternated (north side of the levee at SS-1, south side of levee at SS-2 and north side of levee at SS-3).

** = One collected per field day assuming re-useable equipment is used

NA = Sample did not require analysis

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Center of Fill Material Piles	FM-1-1.5	1.0 - 1.5	4/10/2012	<1.0	3.1	88	0.47 J	<0.50	35	9.8	26	4.7	<0.040	<1.0	26	0.37 J	<0.50	<0.50	53	36
	FM-2-1.5	1.0 - 1.5	4/10/2012	<1.0	4.0	100	0.54	<0.50	57	11	27	6.5	0.17	<1.0	31	0.35 J	<0.50	<0.50	72	43
	FM-3-1.5	1.0 - 1.5	4/10/2012	<1.0	4.6	73	<0.50	0.25 J	25	7.5	21	13	0.12	<1.0	18	0.32 J	<0.50	<0.50	26	110
	FM-4-1.5	1.0 - 1.5	4/10/2012	<1.0	11	410	<0.50	3.4	15	7.2	52	23	0.036 J	5.5	39	0.54 J	<0.50	<0.50	12	2,000
Linda Drain	SS-1a-0.5	0.0 - 0.5	4/10/2012	<1.0	5.4	130	0.56	<0.50	43	14	34	16	0.039 J	<1.0	35	0.46 J	<0.50	<0.50	62	59
	SS-1b-0.5	0.0 - 0.5	4/10/2012	<1.0	6.4	110	0.39 J	<0.50	43	18	29	11	0.10	<1.0	32	<0.50	<0.50	<0.50	63	44
	SS-2a-0.5	0.0 - 0.5	4/9/2012	<1.0	5.8	140	0.48 J	<0.50	61	16	41	17	0.11	<1.0	49	<0.50	<0.50	<0.50	75	79
	SS-2b-0.5	0.0 - 0.5	4/9/2012	<1.0	5.3	120	0.48 J	<0.50	73	16	39	9.4	0.10	<1.0	61	<0.50	<0.50	<0.50	86	100
	SS-3a-0.5	0.0 - 0.5	4/9/2012	<1.0	5.0	85	0.41 J	<0.50	52	15	32	8.4	0.10	<1.0	35	<0.50	<0.50	<0.50	69	46
	SS-3b-0.5	0.0 - 0.5	4/9/2012	<1.0	5.8	130	0.53	<0.50	62	12	62	14	0.099	<1.0	61	0.34 J	<0.50	<0.50	100	100
	SS-4-0.5	0.0 - 0.5	4/9/2012									36								
Former Structure F1	SS-4-2.5	2.0 - 2.5	4/10/2012									7.3								
	SS-5-0.5	0.0 - 0.5	4/9/2012									150								
	SS-5-2.5	2.0 - 2.5	4/10/2012									11								
	SS-6-0.5	0.0 - 0.5	4/9/2012									52								
	SS-6-2.5	2.0 - 2.5	4/10/2012									9.6								
	SS-7-0.5	0.0 - 0.5	4/9/2012									48								
	SS-7-2.5	2.0 - 2.5	4/10/2012									9.7								
	SS-4b-0.5	0.0 - 0.5	4/9/2012									31								
	SS-4b-2.5	2.0 - 2.5	4/10/2012									13								
	SS-5b-0.5	0.0 - 0.5	4/9/2012									96								
	SS-5b-2.5	2.0 - 2.5	4/10/2012									8.2								
	SS-6b-0.5	0.0 - 0.5	4/9/2012									57								
	SS-6b-2.5	2.0 - 2.5	4/10/2012									3.9								
	SS-7b-0.5	0.0 - 0.5	4/9/2012									69								
	SS-7b-2.5	2.0 - 2.5	4/10/2012									8.3								
	SS-8-0.5	0.0 - 0.5	4/9/2012									69								
Former Structure F2	SS-8-2.5	2.0 - 2.5	4/10/2012									21								
	SS-8b-0.5	0.0 - 0.5	4/9/2012									49								
	SS-8b-2.5	2.0 - 2.5	4/10/2012									7.8								
	SS-9-0.5	0.0 - 0.5	4/9/2012									76								
	SS-9-2.5	2.0 - 2.5	4/10/2012									83								
	SS-9b-0.5	0.0 - 0.5	4/9/2012									76								
	SS-9b-2.5	2.0 - 2.5	4/10/2012									8.2								
	SS-10-0.5	0.0 - 0.5	4/9/2012									63								
	SS-10-2.5	2.0 - 2.5	4/10/2012									9.1								
	SS-10b-0.5	0.0 - 0.5	4/9/2012									41								
	SS-10b-2.5	2.0 - 2.5	4/10/2012									10								
	SS-11-0.5	0.0 - 0.5	4/9/2012									36								
	SS-11-2.5	2.0 - 2.5	4/10/2012									7.0								
	SS-11b-0.5	0.0 - 0.5	4/9/2012									33								
	SS-11b-2.5	2.0 - 2.5	4/10/2012									8.4								

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Former Structure B3	SS-12-0.5	0.0 - 0.5	4/10/2012									99								
	SS-12b-0.5	0.0 - 0.5	4/10/2012									130								
	SS-13-0.5	0.0 - 0.5	4/10/2012									210								
	SS-13-2.5	2.0 - 2.5	1/8/2013									7.6								
	SS-13b-0.5	0.0 - 0.5	4/10/2012									620								
	SS-13b-2.5	2.0 - 2.5	1/8/2013									8.6								
	SS-13c-0.5	0.0 - 0.5	1/8/2013									730								
	SS-13c-2.5	2.0 - 2.5	1/8/2013									8.8								
	SS-13bc-0.5	0.0 - 0.5	1/8/2013									69								
	SS-13bc-2.5	2.0 - 2.5	1/8/2013									6.7								
Former Structure B4	SS-13d-0.5	0.0 - 0.5	1/8/2013									120								
	SS-13d-2.5	2.0 - 2.5	1/8/2013									8.0								
	SS-14-0.5	0.0 - 0.5	4/10/2012									200								
	SS-14-2.5	2.0 - 2.5	1/8/2013									8.5								
	SS-14a-0.5	0.0 - 0.5	4/10/2012									140								
	SS-14b-0.5	0.0 - 0.5	1/8/2013									45								
	SS-14b-2.5	2.0 - 2.5	1/8/2013									7.4								
	SS-15-0.5	0.0 - 0.5	4/10/2012									70								
	SS-15-2.5	2.0 - 2.5	1/8/2013									7								
	SS-15a-0.5	0.0 - 0.5	4/10/2012									330								
	SS-15a-2.5	2.0 - 2.5	1/9/2013									14								
	SS-15ab-0.5	0.0 - 0.5	1/9/2013									160								
	SS-15ab-2.5	2.0-2.5	1/9/2013									10								
	SS-15ad-0.5	0.0 - 0.5	1/9/2013									130								
	SS-15ad-2.5	2.0-2.5	1/9/2013									6.3								
Former Structure B2	SS-15af-0.5	0.0 - 0.5	1/9/2013									130								
	SS-15af-2.5	2.0-2.5	1/9/2013									6.8								
	SS-16-0.5	0.0 - 0.5	4/9/2012									160								
	SS-16-2.5	2.0 - 2.5	4/10/2012									27								
	SS-17-0.5	0.0 - 0.5	4/9/2012									31								
	SS-17c -0.5	0.0-0.5	1/8/2013									230								
	SS-17c-2.5	2.0 - 2.5	1/8/2013									120								
	SS-17d-0.5	0.0 - 0.5	1/8/2013									120								
	SS-17d-2.5	2.0 - 2.5	1/8/2013									6.8								
	SS-18-0.5	0.0 - 0.5	4/9/2012									530								
	SS-18-2.5	2.0 - 2.5	4/10/2012									21								
	SS-18a-0.5	0.0-0.5	1/8/2013									100								
	SS-18b-0.5	0.0 - 0.5	1/8/2013									75								
	SS-18c-0.5	0.0-0.5	1/8/2013									180								
	SS-18d-0.5	0.0 - 0.5	1/8/2013									150								
	SS-19-0.5	0.0 - 0.5	4/9/2012									140								
	SS-19-2.5	2.0 - 2.5	4/10/2012									21								

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Former Structure B1	SS-20-0.5	0.0 - 0.5	4/9/2012									39								
	SS-21-0.5	0.0 - 0.5	4/9/2012									110								
	SS-21-2.5	2.0 - 2.5	4/10/2012									13								
Former Structure B5	SS-22-0.5	0.0 - 0.5	4/9/2012									130								
	SS-22-2.5	2.0 - 2.5	4/10/2012									11								
	SS-22a-0.5	0.0 - 0.5	1/9/2013		5.2							210								
	SS-22b-0.5	0.0 - 0.5	1/9/2013									130								
	SS-23-0.5	0.0 - 0.5	4/9/2012									91								
	SS-23-2.5	2.0 - 2.5	4/10/2012									31								
	SS-24-0.5	0.0 - 0.5	4/9/2012									76								
	SS-25-0.5	0.0 - 0.5	4/9/2012									54								
	SS-26-0.5	0.0 - 0.5	4/9/2012									68								
	SS-27-0.5	0.0 - 0.5	4/9/2012	<1.0	5.0	110	0.45 J	<0.50	50	15	31	7.2	0.037 J	<1.0	33	<0.50	<0.50	<0.50	85	41
Former Structure F3	SS-28-0.5	0.0 - 0.5	4/10/2012									32								
	SS-28-2.5	2.0 - 2.5	4/10/2012									9.0								
	SS-29-0.5	0.0 - 0.5	4/10/2012									29								
	SS-29-2.5	2.0 - 2.5	4/10/2012									7.0								
	SS-30-0.5	0.0 - 0.5	4/10/2012									23								
	SS-30-2.5	2.0 - 2.5	4/10/2012									9.0								
	SS-31-0.5	0.0 - 0.5	4/10/2012									25								
	SS-31-2.5	2.0 - 2.5	4/10/2012									8.9								
	SS-32-0.5	0.0 - 0.5	4/10/2012									24								
	SS-32-2.5	2.0 - 2.5	4/10/2012									7.9								
	SS-33-0.5	0.0 - 0.5	4/10/2012									25								
	SS-33-2.5	2.0 - 2.5	4/10/2012									7.4								
Former Structure F4	SS-34-0.5	0.0 - 0.5	4/10/2012									11								
	SS-34-2.5	2.0 - 2.5	4/10/2012									9.8								
	SS-35-0.5	0.0 - 0.5	4/10/2012									11								
	SS-35-2.5	2.0 - 2.5	4/10/2012									8.9								
	SS-36-0.5	0.0 - 0.5	4/10/2012									10								
	SS-36-2.5	2.0 - 2.5	4/10/2012									9.2								
	SS-37-0.5	0.0 - 0.5	4/10/2012									8.7								
	SS-37-2.5	2.0 - 2.5	4/10/2012									17								
	SS-38-0.5	0.0 - 0.5	4/10/2012									11								
	SS-38-2.5	2.0 - 2.5	4/10/2012									9.3								
	SS-39-0.5	0.0 - 0.5	4/10/2012									13								
	SS-39-2.5	2.0 - 2.5	4/10/2012									9.5								

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Former Wood Shed North of B5	SS-44-0.5	0.0 - 0.5	4/10/2012		6.5							60								
	SS-44-2.5	2.0 - 2.5	1/9/2013		6.1							9.0								
	SS-44a-0.5	0.0 - 0.5	1/9/2013		15															
	SS-44a-2.5	2.0 - 2.5	1/9/2013		4.7															
	SS-44b-0.5	0.0 - 0.5	1/9/2013		4.1															
	SS-44b-2.5	2.0 - 2.5	1/9/2013		5.8															
	SS-44c-0.5	0.0 - 0.5	1/9/2013		5.3															
	SS-44c-2.5	2.0 - 2.5	1/9/2013		5.6															
	SS-44d-0.5	0.0 - 0.5	1/9/2013		3.2															
	SS-44d-2.5	2.0 - 2.5	1/9/2013		3.8															
	SS-44e-0.5	0.0 - 0.5	1/9/2013		11							37								
Painted Power Pole	SS-44e-2.5	2.0 - 2.5	1/9/2013		3.8															
	SS-45-0.5	0.0 - 0.5	4/10/2012		46							160								
Wood/Trash Piles #1 and #2	SS-45-2.5	2.0 - .25	1/9/2013		5.8							8.2								
	SS-46-0.5	0.0 - 0.5	4/10/2012									88								
	SS-47-0.5	0.0 - 0.5	4/10/2012									150								
	SS-48-0.5	0.0 - 0.5	4/10/2012									75								
	SS-49-0.5	0.0 - 0.5	4/10/2012									97								
	SS-50-0.5	0.0 - 0.5	4/10/2012									42								
	SS-51-0.5	0.0 - 0.5	4/10/2012									92								
Reduced Agricultural Area	SS-52-0.5	0.0 - 0.5	4/10/2012									67								
	SS-53a-0.5	0.0 - 0.5	4/10/2012		5.2															
	SS-53e-0.5	0.0 - 0.5	4/9/2012		6.0															
	SS-53i-0.5	0.0 - 0.5	4/9/2012		6.5															
Municipal Trash Pile	SS-53m-0.5	0.0 - 0.5	4/9/2012		7.0															
	SS-55-0.5	0.0 - 0.5	4/10/2012	<1.0	4.9	120	0.52	<0.50	40	11	33	15	0.025 J	<1.0	28	0.39	<0.50	<0.50	63	76
	SS-56-0.5	0.0 - 0.5	4/10/2012	1.2	6.6	150	0.62	0.39 J	46	14	45	26	0.072	<1.0	31	0.39	<0.50	<0.50	75	100
	SS-57-0.5	0.0 - 0.5	4/10/2012	3.5	14	170	0.40 J	0.89	68	11	92	130	0.30	0.56 J	31	0.39	<0.50	<0.50	58	850
Potential Former Burn Pit	SS-58-0.5	0.0 - 0.5	4/10/2012	1.3	6.3	110	0.45 J	0.38 J	44	11	46	23	0.17	<1.0	29	<0.50	<0.50	<0.50	59	100
	Burn-1-0.5	0.0 - 0.5	4/9/2012	<1.0	5.0	110	0.45 J	<0.50	50	15	31	7.2	0.037 J	<1.0	33	<0.50	<0.50	<0.50	85	41
Statistical Summary of Soil Data																				
Number of Samples				16	35	16	16	16	16	16	16	138	16	16	16	16	16	16	16	16
Minimum Concentration				<1.0	3.1	73	<0.39 J	<0.25 J	15	7.2	21	3.9	<0.0	<0.6	18	<0.32	<0.50	<0.50	12	36
Maximum Concentration				3.5	46	410	0.62	3.4	73	18	92	730	0.30	5.5	61	0.540	<0.50	<0.50	100	2,000
Average Concentration				1.2	7.3	135	0.5	0.7	48	13	40	65	0.1	1.3	36	0.4	<0.50	<0.50	65	239
Standard Deviation				0.62	7.2	77.4	0.1	0.7	15.1	3.1	17.4	103	0.1	1.1	11.8	0.1	0.0	0.0	22.1	509
95% UCL (calculated for COPCs only):				--	16.2	--	--	--	--	--	--	103	--	--	--	--	--	--	--	--

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Background Metal Data																				
Reported Background*				< 6	28	410	1.0	5.6	120	25	63	43	0.42	4.8	272	4.9	2.9	10	90	140
Is Maximum Equal or Below Background?				YES	NO	YES	YES	YES	YES	YES	NO	NO	YES	NO	YES	YES	YES	YES	NO	NO
Coefficient of Variation:				0.52	1.00	0.57	0.13	1.09	0.32	0.25	0.43	1.60	0.73	0.91	0.33	0.17	0.00	0.00	0.34	2.13
Is Coefficient of Variation below 1:				YES	YES	YES	YES	NO	YES	YES	YES	NO	YES	YES	YES	YES	YES	YES	YES	NO
Is maximum < background and COV <1?				YES	NO	YES	YES	NO	YES	YES	NO	NO	YES	NO	YES	YES	YES	YES	NO	NO
Chemical is selected as a COPC (if answer on line above is "NO"):					YES			NO**			NO***	YES		NO***					NO***	NO****
Quality Control/IDW Samples																				
Duplicate Samples (Co-Located Samples)																				
Center of Fill Material Piles	FM-1-1.5	1.0 - 1.5	4/10/2012	<1.0	3.1	88	0.47 J	<0.50	35	9.8	26	4.7	<0.040	<1.0	26	0.37 J	<0.50	<0.50	53	36
	FM-1a-1.5 (DUP)	1.0 - 1.5	4/10/2012	<1.0	3.2	77	0.45 J	<0.50	32	9.7	28	6.0	<0.040	<1.0	26	<0.50	<0.50	<0.50	58	36
	RPD %			0%	3%	13%	4%	0%	9%	1%	7%	24%	0%	0%	0%	30%	0%	0%	9%	0%
Former Structure F1	SS-4-0.5	0.0 - 0.5	4/9/2012									36								
	SS-4a-0.5 (DUP)	0.0 - 0.5	4/9/2012									32								
	RPD %											12%								
	SS-5-0.5	0.0 - 0.5	4/9/2012									150								
	SS-5a-0.5 (DUP)	0.0 - 0.5	4/9/2012									320								
	RPD %											72%								
	SS-6-0.5	0.0 - 0.5	4/9/2012									52								
	SS-6a-0.5 (DUP)	0.0 - 0.5	4/9/2012									45								
	RPD %											14%								
	SS-7-0.5	0.0 - 0.5	4/9/2012									48								
	SS-7a-0.5 (DUP)	0.0 - 0.5	4/9/2012									46								
Former Structure F1	RPD %											4%								
	SS-4b-0.5	0.0 - 0.5	4/9/2012									31								
	SS-4c-0.5 (DUP)	0.0 - 0.5	4/9/2012									27								
	RPD %											14%								
	SS-5b-0.5	0.0 - 0.5	4/9/2012									96								
	SS-5c-0.5 (DUP)	0.0 - 0.5	4/9/2012									78								
	RPD %											21%								
	SS-6b-0.5	0.0 - 0.5	4/9/2012									57								
	SS-6c-0.5 (DUP)	0.0 - 0.5	4/9/2012									52								
	RPD %											9%								
	SS-7b-0.5	0.0 - 0.5	4/9/2012									69								
	SS-7c-0.5 (DUP)	0.0 - 0.5	4/9/2012									72								
	RPD %											4%								

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg
Former Structure B3	SS-13c-0.5	0.0 - 0.5	1/8/2013									730								
	SS-13c-0.5 (DUP)	0.0 - 0.5	1/8/2013									540								
	RPD %											30%								
Former Structure B4	SS-15ab-0.5	0.0 - 0.5	1/9/2013									160								
	SS-15ab-0.5 (DUP)	0.0 - 0.5	1/9/2013									86								
	RPD %											60%								
	SS-15af-0.5	0.0 - 0.5	1/9/2013									130								
	SS-15af-0.5 (DUP)	0.0 - 0.5	1/9/2013									140								
	RPD %											7%								
	SS-15d-0.5	0.0 - 0.5	1/9/2013									130								
	SS-15ad-0.5 (DUP)	0.0 - 0.5	1/9/2013									96								
Former Wood Shed North of B5	SS-44a-0.5	0.0 - 0.5	1/9/2013		15							160								
	SS-44a-0.5 (DUP)	0.0 - 0.5	1/9/2013		5.7							180								
	RPD %				90%							12%								
	SS-45-0.5	0.0 - 0.5	4/10/2012		46							160								
	SS-45a-0.5 (DUP)	0.0 - 0.5	4/10/2012		41							180								
	RPD %				11%							12%								
Potential Former Burn Pit	Burn-1-0.5	0.0 - 0.5	4/9/2012	<1.0	5.0	110	0.45 J	<0.50	50	15	31	7.2	0.037 J	<1.0	33	<0.50	<0.50	<0.50	85	41
	Burn-1a-0.5 (DUP)	0.0 - 0.5	4/9/2012	<1.0	4.9	100	0.44 J	<0.50	48	16	32	7.3	0.024 J	<1.0	34	<0.50	<0.50	<0.50	84	42
	RPD %			0%	2%	10%	2%	0%	4%	6%	3%	1%	43%	0%	3%	0%	0%	0%	1%	2%
Equipment and Field Blanks and IDW				Units:	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
EB1			4/10/2012	<0.005	<0.005	<0.005	<0.004	<0.005	<0.005	<0.005	<0.010	<0.005	<0.001	<0.005	0.011	<0.005	<0.005	<0.002	<0.005	<0.10
EB2-20130108			1/8/2013									<0.003								
EB2-20130109			1/9/2013		<0.005							<0.003								
FB1			4/10/2012	<0.005	<0.005	<0.005	<0.004	<0.005	0.0069	<0.005	<0.010	<0.005	<0.001	<0.005	0.011	<0.005	<0.005	<0.002	<0.005	<0.10
FB2-20130108			1/8/2013									<0.003								
FB2-20130109			1/8/2013		<0.005							<0.003								
IDW (PEA)			4/10/2012	<0.005	0.024	1.1	<0.004	0.0087	0.21	0.054	0.17	0.13	<0.001	<0.005	0.20	<0.005	<0.005	<0.002	0.28	0.63
IDW (SSI)			1/9/2013		0.01							0.062								
Soil Comparison Criteria																				
Residential Land Use CHHSL				30	--	5,200	150	1.7	10,000	660	3,000	80	18	380	1,600	380	380	5	530	23,000
DTSC Suggested Background Value				--	12 ¹	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table B-2
Summary of Analytical Results - Metals
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Antimony mg/kg	Arsenic mg/kg	Barium mg/kg	Beryllium mg/kg	Cadmium mg/kg	Chromium mg/kg	Cobalt mg/kg	Copper mg/kg	Lead mg/kg	Mercury mg/kg	Molybdenum mg/kg	Nickel mg/kg	Selenium mg/kg	Silver mg/kg	Thallium mg/kg	Vanadium mg/kg	Zinc mg/kg

Notes:
< = Not detected above laboratory reporting limit indicated.
-- = Not analyzed
CHHSL = California Human Health Screening Levels for Soil - Residential (OEHHA 2005, 2009)
"0 - 0.5" = Surface to 0.5-foot depth; depths measured from below ground surface
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
95% UCL (calculated for COPCs only): = upper confidence limit. In several instances, there were not sufficient unique data to calculate the 95% UCL (e.g. most data was non-detect). In these situations, the maximum is listed with an "M" adjacent to indicate data is a maximum value. 95% UCL was calculated using ProUCL (Version 4.00.05)
* Background data from *Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory* . Lawrence Berkeley National Laboratory. June 2002. Revised April 2009. Table 3 (Summary Statistics for Background Data Sets After Removal of Outliers).
** The 3.4 mg/kg maximum result is below the DTSC-modified screening level of 4 mg/kg (DTSC 2012a); therefore, the concentration of cadmium in sample FM-4-1.5 was not considered to be a concern.
*** Although maximum concentration is above comparison dataset, other statistical parameters suggest that data is within background.
**** The 2,000 mg/kg maximum result is below the CHHSL of 23,000 mg/kg; therefore the concentration of zinc in sample FM-4-1.5 was not considered a concern.
1 = DTSC suggested value for consideration of upperbound background arsenic concentration

bgs = below ground surface
mg/kg = Milligrams per kilogram

mg/l = Milligrams per liter

Bold

=Sample point removed from the dataset for a 95% UCL less than 80 mg/kg

Bold

= Analyte or reporting limit concentration is greater than the comparison criteria

YES

= Analyte chosen as a COPC

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Date Sampled	Analyte:		4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene				
					CHHSLs:	Units:	2,300 µg/kg	1,600 µg/kg	1,600 µg/kg	33 µg/kg			430 µg/kg		35 µg/kg			21,000 µg/kg			500 µg/kg	130 µg/kg	53 [RSL] µg/kg	340,000 µg/kg	460 µg/kg					
Center of Fill Material Piles	FM-1-1.5	1.0 - 1.5	4/10/2012	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85					
	FM-2-1.5	1.0 - 1.5	4/10/2012	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85					
	FM-3-1.5	1.0 - 1.5	4/10/2012	<3.3	8.6	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85					
	FM-4-1.5	1.0 - 1.5	4/10/2012	<3.3	37	7.7	J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	180					
Linda Drain	SS-1a-0.5	0.0 - 0.5	4/10/2012	8.0	180	29	J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	180					
	SS-1b-0.5	0.0 - 0.5	4/10/2012	<3.3	11	3.3		<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	120					
	SS-2a-0.5	0.0 - 0.5	4/9/2012	53	280	20		<3.4	<3.4	<3.4	<40	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	UJ	<6.6	<6.6	<3.4	<3.4	<3.4	<34	320					
	SS-2b-0.5	0.0 - 0.5	4/9/2012	75	520	J*	300	J*	<8.5	<8.5	<8.5	<100	<8.5	<17	<8.5	<17	<17	<17		<17	<17	<8.5	<8.5	<8.5	<85	<430				
	SS-3a-0.5	0.0 - 0.5	4/9/2012	13	72	3.5		<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	110					
	SS-3b-0.5	0.0 - 0.5	4/9/2012	39	J	82	8.3	J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	310				
Former Structure F1	SS-4-0.5	0.0 - 0.5	4/9/2012	8.0	J*	350	J	140	<3.4	<3.4	<3.4	100	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	780	J				
	SS-5-0.5	0.0 - 0.5																												
	SS-6-0.5	0.0 - 0.5																												
	SS-7-0.5	0.0 - 0.5																												
	SS-4-0.5	0.0 - 0.5	4/9/2012	9.5	J	52		22	J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	270				
	SS-5-0.5	0.0 - 0.5	4/9/2012	21.0	J	150		76	J	<1.7	<1.7	<1.7	22	<1.7	<3.3	<1.7	<3.3	<3.3	8.9	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	470	J		
	SS-6-0.5	0.0 - 0.5	4/9/2012	54.0	J	730		220	J	<8.5	<8.5	<8.5	<100	<8.5	<17	<8.5	<17	<17	61	<17	<17	<8.5	<8.5	<8.5	<85	UJ	430	UJ		
	SS-7-0.5	0.0 - 0.5	4/9/2012	<6.6		340		130		<3.4	<3.4	<3.4	410	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34		840			
	SS-4-2.5	2.0 - 2.5	4/10/2012	<3.3	12	4.7	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85					
	SS-5-2.5	2.0 - 2.5																												
	SS-6-2.5	2.0 - 2.5																												
	SS-7-2.5	2.0 - 2.5																												
	SS-4b-0.5	0.0 - 0.5	4/9/2012	9.3	J*	370	140	<3.4	<3.4	<3.4	96	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	UJ	<6.6	<6.6	<3.4	<3.4	<3.4	<34	1,100					
	SS-5b-0.5	0.0 - 0.5																												
	SS-6b-0.5	0.0 - 0.5																												
	SS-7b-0.5	0.0 - 0.5																												
	SS-4b-0.5	0.0 - 0.5	4/9/2012	<3.3		22		20	J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3		4.9	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	600	J	
	SS-4b-2.5	2.0 - 2.5	4/10/2012	200	14	6.5	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	100					
	SS-5b-2.5	2.0 - 2.5																												
	SS-6b-2.5	2.0 - 2.5																												
	SS-7b-2.5	2.0 - 2.5																												
	SS-4ba-0.5	0.0 - 0.5	1/8/2013	<3.3		52	J*	18	**	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	<120	D		
	SS-4bc-0.5	0.0 - 0.5	1/8/2013	<55	J	150		100	*	<8.5	<8.5	<8.5	<170	*	<8.5	<17	<8.5	<17	<17	<17	<17	<17	<8.5	<8.5	<8.5	<85		<430	*	
	SS-4be-0.5	0.0 - 0.5	1/8/2013	<3.3		64		37		<1.7	<1.7	<1.7	86		<1.7	3.7	<1.7	<3.3	<3.3	9.6	<3.3	<3.3	<1.7	<1.7	<1.7	<17		130	J**	
	SS-5b-0.5	0.0 - 0.5	4/9/2012	24.0	J	120		71	J	<1.7	<1.7	<1.7	36		<1.7	<3.3	<1.7	<3.3	11	12	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	1,100	J	
	SS-5d-0.5	0.0 - 0.5	1/8/2013	4.8	J	25		19		<1.7	<1.7	<1.7	<33		<1.7	<3.3	<1.7	<3.3	<3.3	3.7		<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	110	J**
SS-5f-0.5	0.0 - 0.5	1/8/2013	15.0	J	740	J*	190	J**	<4.3	<4.3	<4.3	<83		<4.3	<8.3	<4.3	<8.3	<8.3	39	J	<8.3	<8.3	4.3	<4.3	<4.3	<43		220	J**	
SS-6b-0.5	0.0 - 0.5	4/9/2012	88.0	J	1,100		330	J	<8.5	<8.5	<8.5	<100		<8.5	<17	<8.5	<17	96		<17	<17	<8.5	<8.5	<8.5	<85	UJ	460	J		
SS-7b-0.5	0.0 - 0.5	4/9/2012	21.0		250		120		<3.4	<3.4	<3.4	90		<3.4	<6.6	<3.4	<6.6	<6.6	16		<6.6	<6.6	<3.4	<3.4	<3.4	<34		560		
SS-7d-0.5	0.0 - 0.5	1/8/2013	4.9	J	280	J*	130	J*	<1.7	<1.7	<1.7	<33		<1.7	<3.3	<1.7	<3.3	<3.3	12	J	<3.3	<3.3	<1.7	<1.7	<1.7	<17		92	J**	
SS-7f-0.5	0.0 - 0.5	1/8/2013	16.0	*J	330	J*	290	J*	<1.7	<1.7	<1.7	150	J*	<1.7	16	J	<1.7	<3.3	<3.3	32	J	<3.3	<3.3	<1.7	<1.7	<1.7	<17		120	J**

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD µg/kg	4,4'-DDE µg/kg	4,4'-DDT µg/kg	Aldrin µg/kg	alpha-BHC µg/kg	beta-BHC µg/kg	Technical Chlordane µg/kg	delta-BHC µg/kg	Dieldrin µg/kg	Endosulfan I µg/kg	Endosulfan II µg/kg	Endosulfan sulfate µg/kg	Endrin µg/kg	Endrin aldehyde µg/kg	Endrin ketone µg/kg	gamma-BHC (Lindan) µg/kg	Heptachlor µg/kg	Heptachlor epoxide µg/kg	Methoxychlor µg/kg	Toxaphene µg/kg
					2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
Former Structure F2		SS-8-0.5	0.0 - 0.5	4/9/2012	95	2,300	1,500 J	<17	<17	<17	<200	<17	<33	<17	<33	<33	<33 UJ	<33	<33	<17	<17	<17	<170 UJ	1,000 J
		SS-9-0.5	0.0 - 0.5																					
		SS-10-0.5	0.0 - 0.5																					
		SS-11-0.5	0.0 - 0.5																					
		SS-8-0.5	0.0 - 0.5	4/9/2012	<170	6,700	5,000	<85	<85	<85	<1000	<85	<170	<85	<170	<170	1,200	<170	<170	<85	<85	<85	<850	<4300
		SS-8c-0.5	0.0 - 0.5	1/9/2013	100 **	3,700	1100	<34	<34	<34	2,800	<34	66 J	<34	<66	<66	170	<66	<66	<34	<34	<34	<340	< 1700
		SS-8d-0.5	0.0 - 0.5	1/9/2013	39 *	1,400	600	<17	<17	<17	<165 +	<17	<33	<17	<33	<33	130	<33	<33	<17	<17	<17	<170	< 425 +
		SS-8e-0.5	0.0 - 0.5	1/9/2013	36	2,400	510	<17	<17	<17	<330	<17	<33	<17	<33	<33	210	<33	<33	<17	<17	<17	<170	<850
		SS-8f-0.5	0.0 - 0.5	1/9/2013	< 33	1,300	430	<17	<17	<17	<165 +	<17	<33	<17	<33	<33	110	<33	<33	<17	<17	<17	<170	< 425 +
		SS-8g-0.5	0.0 - 0.5	1/9/2013	490	4,500	1,900	<34	<34	<34	660	<17	66	<34	<66	<66	860	<66	<66	<34	<34	<34	<340	< 1700
		SS-8g-2.5	2.0 - 2.5	1/9/2013	17	28	14 J	<1.7	<1.7	<1.7	<33	<1.7	9.1	<1.7	<3.3	<3.3	5.8	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<170
		SS-9-0.5	0.0 - 0.5	4/9/2012	35 J*	970	270 J	<8.5	<8.5	<8.5	<100	<8.5	<17	<8.5	<17	<17	74	<17	<17	<8.5	<8.5	<8.5	<85	< 510
		SS-9c-0.5	0.0 - 0.5	1/9/2013	48	750	200	<8.5	<8.5	<8.5	<170	<8.5	<17	<8.5	<17	<17	78	<17	<17	<8.5	<8.5	<8.5	<85	< 430
		SS-9e-0.5	0.0 - 0.5	1/9/2013	9.5 *	55	14	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	4.1	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
		SS-10-0.5	0.0 - 0.5	4/9/2012	<3.3	4.6	23 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<440
		SS-11-0.5	0.0 - 0.5	4/9/2012	4.1 J	92	26 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	4.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	300
		SS-8-2.5	2.0 - 2.5	4/10/2012	<6.6	390	65 J	<3.4	<3.4	<3.4	<40	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6 UJ	<6.6	<6.6	<3.4	<3.4	<3.4	<34 UJ	<110
		SS-9-2.5	2.0 - 2.5																					
		SS-10-2.5	2.0 - 2.5																					
		SS-11-2.5	2.0 - 2.5																					
		SS-8b-0.5	0.0 - 0.5	4/9/2012	61	1,300	910 J	<8.5	<8.5	<8.5	310 J	<8.5	<17	<8.5	<17	<17	<17 UJ	<17	<17	<8.5	<8.5	<8.5	<85 UJ	1,300 J
		SS-9b-0.5	0.0 - 0.5																					
		SS-10b-0.5	0.0 - 0.5																					
		SS-11b-0.5	0.0 - 0.5																					
		SS-8b-0.5	0.0 - 0.5	4/9/2012	<66	3,500	2,800	<34	<34	<34	1,300 J*	<34	<66	<34	<66	<66	<630	<66	<66	<34	<34	<34	<340	2,300
		SS-9b-0.5	0.0 - 0.5	4/9/2012	42 J	970	290 J	<8.5	<8.5	<8.5	<100	<8.5	<17	<8.5	<17	<17	79	<17	<17	<8.5	<8.5	<8.5	<85	600
		SS-10b-0.5	0.0 - 0.5	4/9/2012	<3.3	<3.3	6.9 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	410
		SS-11b-0.5	0.0 - 0.5	4/9/2012	4.7 J	140	24 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	4.6	<3.3	<3.3	1.7	<1.7	<1.7	<17	250
		SS-8b-2.5	2.0 - 2.5	4/10/2012	<3.3	14	5.5	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85
		SS-9b-2.5	2.0 - 2.5																					
		SS-10b-2.5	2.0 - 2.5																					
		SS-11b-2.5	2.0 - 2.5																					

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Date Sampled	Analyte:	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
					CHHSLs:	2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
					Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Livestock Handling Area	SS-12b-0.5	0.0 - 0.5	4/10/2012		4,300	13,000 J	180,000 J	<1700	<1700	<1700	<20000	<1700	<3300	<1700	<3300	<3300	35,000	<3300	<3300	<1700	<1700	<1700	<17000	<85000	
	SS-15-0.5	0.0 - 0.5																							
	SS-15a-0.5	0.0 - 0.5																							
	SS-15-2.5	2.0 - 2.5	1/8/2013	15	30 J*	100 **	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	39 J*	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85		
	SS-12b-0.5	0.0 - 0.5	4/10/2012	15,000 J*	20,000	260,000 J	<3400	<3400	<3400	<40000	<3400	<6600	<3400	<6600	<6600	56,000	<6600	<6600	<3400	<3400	<3400	<34000 UJ	<170000		
	SS-12ba-0.5	0.0 - 0.5	1/8/2013	<6000	13,000	320,000	<3400	<3400	<3400	<66000	<3400	<6600	<3400	<6600	<6600	58,000	<6600	<6600	<3400	<3400	<3400	<34000	<170000		
	SS-12bb-0.5	0.0 - 0.5	1/8/2013	<660	12,000	34,000	<340	<340	<340	<6600	<340	<660	<340	<340	<660	5,000	<660	<660	<340	<340	<340	<3400	<17000		
	SS-12bc-0.5	0.0 - 0.5	1/8/2013	5,000 *	2,700	2,300 J**	<170	<170	<170	<3300	<170	340	<170	<330	<330	1,200	<330	<330	<170	<170	<170	<1700	<8500		
	SS-12bd-0.5	0.0 - 0.5	4/11/2013	60	850	2,700	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	4.6	<1.0	<50	
	SS-12be-0.5	0.0 - 0.5	4/11/2013	28	130	440	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bf-0.5	0.0 - 0.5	4/11/2013	140	2,400	2,500	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	5.2	<50	
	SS-12bg-0.5	0.0 - 0.5	4/11/2013	19	1,200	740	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bh-0.5	0.0 - 0.5	4/11/2013	3,600	36,000	100,000	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	120	<5.0	<50	
	SS-12bi-0.5	0.0 - 0.5	4/11/2013	210	48,000	61,000	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	23	21	--	<5.0	<5.0	58	23	<50	
	SS-12bj-0.5	0.0 - 0.5	6/7/2013	42	2,000	760	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-12bk-0.5	0.0 - 0.5	6/7/2013	<5.0	120	66	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-12bl-0.5	0.0 - 0.5	6/7/2013	66	2,300	860	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-12bm-0.5	0.0 - 0.5	6/6/2013	<5.0	90	47	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-12bn-0.5	0.0 - 0.5	6/6/2013	11	320	140	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-15-0.5	0.0 - 0.5	4/10/2012	1,000 J	2,400	12,000 J	<170	<170	<170	<2000	<170	<330	<170	<330	<330	1,700	<330	<330	<170	<170	<170	<1700 UJ	<8500		
	SS-15a-0.5	0.0 - 0.5	4/10/2012	3,500 J*	9,800	88,000	<850	<850	<850	<10000	<850	<1700	<850	<1700	<1700	14,000	<1700	<1700	<850	<850	<850	<8500	<43000		
	SS-15ab-0.5	0.0 - 0.5	1/9/2013	260	1,500	3,300	<34	<34	<34	<660	<34	99	<34	<66	<66	1,300	<66	<66	<34	<34	<34	<340	<1700		
	SS-15ac-0.5	0.0 - 0.5	1/9/2013	39 J	470	1,100 J	<8.5	<8.5	<8.5	<85	<8.5	17	<8.5	<17	<17	280	<17	<17	<8.5	<8.5	<8.5	<85 UJ	<425		
	SS-15ad-0.5	0.0 - 0.5	1/9/2013	74	2,200	1,500	<17	<17	<17	<330	<17	33	<17	<33	<33	230	<33	<33	<17	<17	<17	<170	<850		
	SS-15ae-0.5	0.0 - 0.5	1/9/2013	<33	1,400	830	<17	<17	<17	<165 +	<17	<33	<17	<33	<33	120	<33	<33	<17	<17	<17	<170	<425 +		
	SS-15af-0.5	0.0 - 0.5	1/9/2013	440	1,400	4,100	<34	<34	<34	<660	<34	66	<34	<66	<66	740	<66	<66	<34	<34	<34	<340	<1700		
	SS-15ag-0.5	0.0 - 0.5	1/9/2013	140	2,400	5,600	<34	<34	<34	<660	<34	190	<34	<66	<66	1,400	<66	<66	<34	<34	<34	<340	<1700		
	SS-15ah-0.5	0.0 - 0.5	4/11/2013	38	970	380	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12b-2.5	2.0 - 2.5	1/8/2013	15 J*	23 J	110 J*	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	12 J	<3.3	<3.3	1.7	<1.7	<1.7	<17	<85		
	SS-12ba-2.5	2.0 - 2.5	1/8/2013	42 J**	390 J	1,200 J*	<8.5	<8.5	<8.5	<170	<8.5	21 J	<8.5	<17	<17	420 J	<17	<17	<8.5	<8.5	<8.5	<85	<430		
	SS-12bb-2.5	2.0 - 2.5	1/8/2013	11,000 *	10,000	6,700 J**	<170	<170	<170	<3300	<170	840	<170	<330	<330	3,200	<330	<330	<170	<170	<170	<1700	<8500		
	SS-12bc-2.5	2.0 - 2.5	1/8/2013	<3.3	67 J*	6 **	<17	<17	<17	<330	<17	< 33	<1.7	<3.3	<3.3	3.9	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85		
	SS-12bd-2.5	2.0 - 2.5	4/11/2013	<5.0	10	28	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12be-2.5	2.0 - 2.5	4/11/2013	<5.0	<5.0	14	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bf-2.5	2.0 - 2.5	4/11/2013	11	520	480	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bg-2.5	2.0 - 2.5	4/11/2013	<5.0	14	<5.0	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bh-2.5	2.0 - 2.5	4/11/2013	65	1,000	2,400	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-12bi-2.5	2.0 - 2.5	4/11/2013	130	1,700	8,600	<5.0	<5.0	<5.0	<50	<5.0	<5.0													

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Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
				2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
				µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Livestock Handling Area (continued)	SS-15af-2.5	2.0 - 2.5	1/9/2013	5 **	49	68	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	11	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-15ag-2.5	2.0 - 2.5	1/9/2013	<1.7	41	44 J	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	11	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-15ah-2.5	2.0 - 2.5	4/11/2013	<5.0	34	14	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	< 50
	SS-12b-3.5	3.0 - 3.5	1/8/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85
	SS-12bb-3.5	3.0 - 3.5	4/11/2013	60	270	2,000	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	2.5	<1.0	< 50
	SS-12bh-3.5	3.0 - 3.5	4/11/2013	35	96	140	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	5.4	<5.0	<50
	SS-12bi-3.5	3.0 - 3.5	4/11/2013	78	560	5,700	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	7.3	<5.0	<50
	SS-15a-3.5	3.0 - 3.5	6/6/2013	71	170	1,800	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-12bb-5.0	4.5 - 5.0	4/11/2013	65	220	1300	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	12-12bh-5.0	4.5 - 5.0	4/11/2013	190	1100	1,800	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	8.2	<5.0	<50
	SS-12bi-5.0	4.5 - 5.0	4/11/2013	130	410	1,800	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	7.9	<5.0	<50
	SS-15a-5.0	4.5 - 5.0	6/6/2013	26	230	1,100	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-12bia-6.0	5.5 - 6.0	7/2/2013	<5.0	22	47	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-12bia-7.5	7.0 - 7.5	7/2/2013	<5.0	<5.0	8.3	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-12bh-7.5	7.0 - 7.5	6/6/2013	<5.0	22	44	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
Former Structure B2	SS-12bi-7.5	7.0 - 7.5	6/6/2013	73	910	2,200	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-12bi-10	9.5 - 10	6/6/2013	85	1,000	4,300	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16-0.5	0.0 - 0.5	4/9/2012	600	37,000 J	10,000	<34	<34	<34	850	<34	680	<34	<66	<66	<66	<66	<66	<34	<34	<34	<340	5,300 J
	SS-17-0.5	0.0 - 0.5																					
	SS-18-0.5	0.0 - 0.5																					
	SS-19-0.5	0.0 - 0.5																					
	SS-16-0.5	0.0 - 0.5	4/9/2012	2,300 J	5,400	22,000 J	<170	<170	<170	<2000	<170	850	<170	<330	<330	3,700	<330	<330	<170	<170	<170	<1700 UJ	<8500
	SS-17-0.5	0.0 - 0.5	4/9/2012	380 J*	1,700	7,000	<68	<68	<68	<800	<68	<130	<68	<130	<130	1,100	<130	<130	<68	<68	<68	<680	5,700
	SS-18-0.5	0.0 - 0.5	4/9/2012	120 J	1,800	2,400 J	<34	<34	<34	<400	<34	520	<34	<66	<66	400	<66	<66	<34	<34	<34	<340 UJ	2,200
	SS-19-0.5	0.0 - 0.5	4/9/2012	370 J*	5,300	5,500	<68	<68	<68	<800	<68	1,500	<68	<130	<130	1,500	<130	<130	<68	<68	<68	<680	5,100
	SS-16a-0.5	0.0 - 0.5	1/8/2013	260 J**	950 J	10,000 *	<85	<85	<85	<1700	<85	260 J	<85	<170	<170	840 J	<170	<170	<85	<85	<85	<850	<4300
	SS-16b-0.5	0.0 - 0.5	1/8/2013	27 J*	530	980	<8.5	<8.5	<8.5	<170	<8.5	82	<8.5	<17	<17	220	<17	<17	<8.5	<8.5	<8.5	<85	430
	SS-16c-0.5	0.0 - 0.5	1/8/2013	130 J**	790 J	4,700 J*	<34	<34	<34	<660	<34	640 J	<34	<66	<66	910 J	<66	<66	<34	<34	<34	<340	<1700
	SS-16d-0.5	0.0 - 0.5	1/8/2013	52 J*	960	1,600	<17	<17	<17	<330	<17	160	<17	<33	<33	440	<33	<33	<17	<17	<17	<170	< 330
	SS-16e-0.5	0.0 - 0.5	1/8/2013	5,400 J	3,800 J	4,900 J*	<43	<43	<43	<830	<43	550 J	<43	<83	<83	760 J	<83	<83	<43	<43	<43	<430	2,300 J
	SS-16f-0.5	0.0 - 0.5	1/8/2013	540	910	3,400	<34	<34	<34	<660	<34	1,200	<34	<66	<66	740	<66	<66	<34	<34	<34	<340 UJ	< 1700
	SS-16g-0.5	0.0 - 0.6	4/11/2013	110	840	1,800	<1.0	<1.0	<1.0	<50	<1.0	51	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	8.5	<50
	SS-16h-0.5	0.0 - 0.5	4/11/2013	25	270	460	<5.0	<5.0	<5.0	<50	<5.0	57	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	< 50
	SS-16i-0.5	0.0 - 0.5	4/11/2013	1,100	6,100	19,000	<1.0	<1.0	<1.0	<50	<1.0	52	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	26	14	<50
	SS-16j-0.5	0.0 - 0.5	4/11/2013	130	1,600	7,800	<5.0	<5.0	<5.0	<50	<5.0	68	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	8.3	<5.0	<50
	SS-16k-0.5	0.0 - 0.5	4/11/2013	360	2,600	8,800	<1.0	<1.0	<1.0	<50	<1.0	65	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	18	11	<50
	SS-16l-0.5	0.0 - 0.5	4/11/2013	45	560	1,200	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	27	<50
	SS-16m-0.5	0.0 - 0.5	4/11/2013	49	740	840	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	SS-16n-0.5	0.0 - 0.5	6/6/2013	97	230	1,800	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	7.5	<250
	SS-16o-0.5	0.0 - 0.5	6/6/2013	8.6	51	140	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16p-0.5	0.0 - 0.5	6/6/2013	<5.0	18	23	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16r-0.5	0.0 - 0.5	6/6/2013	16	440	270	<5.0	<5.0	<5.0	<250	<5.0	55	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16r1-0.5	0.0 - 0.5	7/2/2013	<5.0	420	260	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
				2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
				µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Structure B2 (continued)	SS-16r2-0.5	0.0 - 0.5	7/2/2013	<5.0	310	390	<5.0	<5.0	<5.0	<250	<5.0	22	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16s-0.5	0.0 - 0.5	6/6/2013	11	590	260	<5.0	<5.0	<5.0	<250	<5.0	270	<5.0	<5.0	<5.0	<5.0	17	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16s1-0.5	0.0 - 0.5	7/2/2013	<5.0	550	170	<5.0	<5.0	<5.0	<250	<5.0	13	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16s2-0.5	0.0 - 0.5	7/2/2013	<5.0	340	100	<5.0	<5.0	<5.0	<250	<5.0	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16s3-0.5	0.0 - 0.5	7/2/2013	<5.0	310	120	<5.0	<5.0	<5.0	<250	<5.0	11	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-17a-0.5	0.0 - 0.5	1/8/2013	58 J*	620	1,700	<17	<17	<17	<330	<43	<33	<17	<33	<33	390 J	<33	<33	<17	<17	<17	<170	<850
	SS-17b-0.5	0.0 - 0.5	1/8/2013	40	380	1,000	<8.5	<8.5	<8.5	<170	<8.5	230	<8.5	<17	<17	200	<17	<17	<8.5	<8.5	<8.5	<85	1,500
	SS-17c-0.5	0.0 - 0.5	1/8/2013	200 J*	1,100 J	1,600	<17	<17	<17	<330	<17	140 J	<17	<33	<33	340 J	<33	<33	<17	<17	<17	<170	<1100 D
	SS-17d-0.5	0.0 - 0.5	1/8/2013	120	980	1,300	<17	<17	<17	<330	<17	160	<17	<33	<33	180	<33	<33	<17	<17	<17	<170 UJ	<850
	SS-17e-0.5	0.0 - 0.5	4/11/2013	44	1,300	1,700	<1.0	<1.0	<1.0	<50	<1.0	24	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	1.8	<50
	SS-17f-0.5	0.0 - 0.5	4/11/2013	170	1,500	2,600	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	SS-17fa-0.5	0.0 - 0.5	6/6/2013	26	440	250	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	17	<250
	SS-17fc-0.5	0.0 - 0.5	6/6/2013	25	740	240	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-17g-0.5	0.0 - 0.5	4/11/2013	31	1,100	950	<1.0	<1.0	<1.0	<50	<1.0	32	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<50
	SS-18a-0.5	0.0 - 0.5	1/8/2013	48 J**	1,500	1,700	<17	<17	<17	<330	<17	330	<17	<33	<33	240	<33	<33	<17	<17	<17	<170	<850
	SS-18b-0.5	0.0 - 0.5	1/8/2013	290	820	4,000	<34	<34	<34	<660	<34	<66	<34	<66	<66	580	<66	<66	<34	<34	<34	<340	<1700
	SS-18c-0.5	0.0 - 0.5	1/8/2013	390 J	1,600	1,200	<17	<17	<17	<350 D	<17	180	<17	<33	<33	230	<33	<33	<17	<17	<17	<170	<850
	SS-18d-0.5	0.0 - 0.5	1/8/2013	330 *	1,500	4,400	<34	<34	<34	<660	<34	200	<34	<66	<66	730	<66	<66	<34	<34	<34	<340	<1700
	SS-18e-0.5	0.0 - 0.5	4/11/2013	33	1,300	720	<1.0	<1.0	<1.0	<50	<1.0	67	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<50
	SS-18f-0.5	0.0 - 0.5	4/11/2013	130	470	930	<5.0	<5.0	<5.0	<50	<5.0	14	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	11	<50
	SS-18g-0.5	0.0 - 0.5	4/11/2013	200	1,100	2,700	<1.0	<1.0	<1.0	<50	<1.0	28	<1.0	<1.0	<1.0	<1.0	<1.0	--	1.3	<1.0	<1.0	13	<50
	SS-18h-0.5	0.0 - 0.5	6/6/2013	27	460	310	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-18j-0.5	0.0 - 0.5	6/6/2013	18	390	240	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-19a-0.5	0.0 - 0.5	1/8/2013	200 J**	2,500 J	4,100 J*	<34	<34	<34	700	<34	390 J	<34	<66	<66	770 J	<66	<66	<34	<34	<34	<340	<1800 D
	SS-19b-0.5	0.0 - 0.5	1/8/2013	370	2,300	4,200	<34	<34	<34	< 660	<34	480	<34	<66	<66	1,200	<66	<66	<34	<34	<34	<340	< 1700
	SS-19c-0.5	0.0 - 0.5	4/11/2013	600	2,200	6,800	<1.0	<1.0	<1.0	<50	<1.0	20	<1.0	<1.0	<1.0	<1.0	<1.0	--	4.0	<1.0	8.9	<1.0	<50
	SS-19d-0.5	0.0 - 0.5	4/11/2013	400	1,400	5,900	<5.0	<5.0	<5.0	<50	<5.0	19	<5.0	<5.0	<5.0	<5.0	<5.0	--	5.9	<5.0	6.4	38	<50
	SS-19e-0.5	0.0 - 0.5	6/6/2013	37	200	520	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250
	SS-16-2.5	2.0 - 2.5	4/10/2012	47	200 J	1,400 J	<17	<17	<17	<200	<17	<33	<17	<33	<33	<33	<33	<33	<17	<17	<17	<170	420
	SS-17-2.5	2.0 - 2.5																					
	SS-18-2.5	2.0 - 2.5																					
	SS-19-2.5	2.0 - 2.5																					
	SS-16-2.5**	2.0 - 2.5	4/10/2012	270 J	180	1600 J	<8.5	<8.5	<8.5	<100	<8.5	110	<8.5	<17	<17	170	<17	<17	<8.5	<8.5	<8.5	<85	<430
	SS-17-2.5**	2.0 - 2.5		72 J	160	530 J	<3.4	<3.4	<3.4	<40	<3.4	66	<3.4	<6.6	<6.6	80	<6.6	<6.6	<3.4	<3.4	<3.4	<34	400
	SS-18-2.5**	2.0 - 2.5		40	94	280	<3.4	<3.4	<3.4	<40	<3.4	12	<3.4	<6.6	<6.6	57	<6.6	<6.6	<3.4	<3.4	<3.4	<34	<170
	SS-19-2.5**	2.0 - 2.5		26 J	96	160 J	<1.7	<1.7	<1.7	<20	<1.7	22	<1.7	<3.3	<3.3	24	<3.3	<3.3	<1.7	<1.7	<1.7	<17	100
	SS-16a-2.5	2.0 - 2.5	1/8/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85
	SS-16b-2.5	2.0 - 2.5	1/8/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-16c-2.5	2.0 - 2.5	1/8/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85
	SS-16d-2.5	2.0 - 2.5	1/8/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-16e-2.5	2.0 - 2.5	1/8/2013	<3.3	17	3.4	<1.7	<1.7	<1.7	<33	<1.7	40	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85
	SS-16f-2.5	2.0 - 2.5	1/8/2013	520	340	1000	<8.5	<8.5	<8.5	<17	<8.5	160	<8.5	<17	<17	120	<17	<17	<8.5	<8.5	<8.5	<85	<430
	SS-16i-2.5	2.0 - 2.5	4/11/2013	22	110	290	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	SS-16j-2.5	2.0 - 2.5	4/11/2013	<5.0	<5.0	7.8	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	SS-16k-2.5	2.0 - 2.5	4/11/2013	<5.0	29	110	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50
	SS-16l-2.5	2.0 - 2.5	4/11/2013	<5.0	30	70	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	
					2,300	1,600	1,600	33			430		35			21,000			500	130	53 [RSL]	340,000	460		
					µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Structure B2 (continued)	SS-16m-2.5	2.0 - 2.5	4/11/2013	<5.0	22	32	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<50	
	SS-16r-2.5	2.0 - 2.5	6/6/2013	<5.0	<5.0	6.3	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-16s-2.5	2.0 - 2.5	6/6/2013	<5.0	5.6	<5.0	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-17a-2.5	2.0 - 2.5	1/8/2013	65 J**	98	1,900	<17	<17	<17	<330	<17	41	<17	<33	<33	140	<33	<33	<33	<17	<17	<17	<170	<850	
	SS-17b-2.5	2.0 - 2.5	1/8/2013	9.0	61	120	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	21	<3.3	<3.3	<1.7	<1.7	<1.7	<17	310		
	SS-17c-2.5	2.0 - 2.5	1/8/2013	20 J**	440 J	680 J*	<4.3	<4.3	<4.3	<83	<4.3	130 J	<4.3	<8.3	<8.3	140 J	<8.3	<8.3	<4.3	<4.3	<4.3	<43	<1100 J	D	
	SS-17d-2.5	2.0 - 2.5	1/8/2013	<3.3	5.3	11	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	<85	
	SS-16-3.5	3.0 - 3.5	1/8/2013	94 J*	140 J	830	<8.5	<8.5	<8.5	<170	<8.5	84 J	<8.5	<17	<17	180 J	<17	<17	<17	<8.5	<8.5	<8.5	<85	<430	
	SS-16e-3.5	3.0 - 3.5	4/11/2013	21	14	29	<1.0	<1.0	<1.0	<50	<1.0	7.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<50	
	SS-16f-3.5	3.0 - 3.5	4/11/2013	23	18	39	<1.0	<1.0	<1.0	<50	<1.0	8.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	<50	
	SS-17f-2.5	2.0 - 2.5	6/6/2013	<5.0	42	18	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-17-3.5	3.0 - 3.5	1/8/2013	31 J**	240 J	730	<8.5	<8.5	<8.5	<170	<8.5	<17	<8.5	<17	<8.5	<170 J	<17	<17	<17	<8.5	<8.5	<8.5	<85	<430	
	SS-17a-3.5	3.0 - 3.5	4/11/2013	7.2	41	140	<1.0	<1.0	<1.0	<50	<1.0	8.6	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	1.0	<1.0	<50	
	SS-17c-3.5	3.0 - 3.5	4/11/2013	2.1	24	36	<1.0	<1.0	<1.0	<50	<1.0	5.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	1.0	<1.0	<50	
SS-16-5.0	4.5 - 5.0	1/8/2013	6.7	27	250	<1.7	<1.7	<1.7	<33	<1.7	16	<1.7	<3.3	<3.3	29	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	85	
Former Structure B1	SS-20-0.5	0.0 - 0.5	4/9/2012	200 J*	1,500 J*	2,000 J*	<17	<17	<17	2,500 J*	<17	<33	<17	<33	<33	<33	<33	<33	<33	<17	<17	<17	<170	2,700	
	SS-21-0.5	0.0 - 0.5		73	1,300	2,300	<34	<34	<34	<400	<34	<66	<34	<66	<66	620	<66	<66	<66	<34	<34	<34	<340	<1700	
	SS-20-0.5	0.0 - 0.5	4/9/2012	150 *	5,500	2,200	<43	<43	<43	<830	<43	<83	<43	<83	<83	1,100	<83	<83	<43	<43	<43	<83	<2100		
	SS-20c-0.5	0.0 - 0.5	1/9/2013	<3.3	78	17	<1.7	<1.7	<1.7	<85	<1.7	<3.3	<1.7	<3.3	<3.3	5.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85		
	SS-20d-0.5	0.0 - 0.5	1/9/2013	16	370	280	<3.4	<3.4	<3.4	<66	<3.4	7.3	<3.4	<6.6	<6.6	34	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	<170	
	SS-21-0.5	0.0 - 0.5	4/9/2012	370	1,800	2,000	<34	<34	<34	5,900	<34	<66	<34	<66	<66	530	<66	<66	<66	<34	<34	170	<340	9,100	
	SS-21b-0.5	0.0 - 0.5	1/9/2013	18	<8.3	650	<4.3	<4.3	<4.3	<83	<4.3	<8.3	<4.3	<8.3	<8.3	120	<8.3	<8.3	<8.3	<4.3	<4.3	<4.3	<43	<83	
	SS-21d-0.5	0.0 - 0.5	1/9/2013	52	710	990	<8.5	<8.5	<8.5	< 170	<8.5	19	<8.5	<8.5	<17	200	<17	<17	<8.5	<8.5	8.5	<85	< 430		
	SS-20-2.5	2.0 - 2.5	4/10/2012	15 J	58	50 J	<1.7	<1.7	<1.7	29	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	170
	SS-21-2.5	2.0 - 2.5																							
Former Structure B4	SS-14a-0.5	0.0 - 0.5	6/6/2013	94	1600	1800	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-14c-0.5**	0.0 - 0.5	1/8/2013	< 150	7,400	4,400	<10	<20	<100	< 200	<100	<10	<150	<150	<150	<150	<150	<150	--	<100	<50	<20	<150	<200	
	SS-14d-0.5	0.0 - 0.5	6/6/2013	160	2,100	3,100	<5.0	<5.0	<5.0	<250	<5.0	<5.0	14	<5.0	5.1	<5.0	19	--	<5.0	<5.0	<5.0	<5.0	<250		
	SS-14e-0.5	0.0-0.5	6/6/2013	180	2,200	1,900	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-14f-0.5	0.0-0.5	7/2/2013	<5.0	220	140	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-14a-2.5	2.0 - 2.5	6/6/2013	<5.0	43	44	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<5.0	<250	
	SS-14c-2.5**	2.0 - 2.5	1/8/2013	< 150	<150	<150	<10	<20	<100	< 200	<100	<10	<150	<150	<150	<150	<150	<150	--	<100	<50	<20	<150	<200	

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Analyte: CHHSLs: Units:	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
					µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Structure B5	SS-22-0.5	0.0 - 0.5	4/9/2012		<33	160 J*	110 J*	<17	<17	<17	<200	<17	<33	<17	<33	<33	35 J*	<33	<33	<17	<17	<17	<170	530 J
	SS-23-0.5	0.0 - 0.5																						
	SS-24-0.5	0.0 - 0.5																						
	SS-22-0.5**	0.0 - 0.5	4/9/2012		73 J*	220	96 J*	<1.7	<1.7	<1.7	56	<1.7	46	<1.7	<3.3	<3.3	32	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	740
	SS-23-0.5**	0.0 - 0.5	4/9/2012		11 J	61	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	230
	SS-24-0.5**	0.0 - 0.5	4/9/2012		11 J	67	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	210
	SS-22a-0.5	0.0 - 0.5	1/9/2013		9.4	56	27	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	8.1	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-22c-0.5	0.0 - 0.5	1/9/2013		27	78	57	<3.4	<3.4	<3.4	<66	<3.4	<6.6	<3.4	<6.6	<6.6	27	<6.6	<6.6	<3.4	<3.4	<3.4	<34	150
	SS-22-2.5	2.0 - 2.5	4/10/2012		<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-23-2.5	2.0 - 2.5																						
	SS-24-2.5	2.0 - 2.5																						
	SS-25-0.5	0.0 - 0.5	4/9/2012		<83	89	<83 UJ	<43	<43	<43	<500	<43	<83	<43	<83	<83	<83 UJ	<83	<83	<43	<43	<43	<430 UJ	1,600
	SS-26-0.5	0.0 - 0.5																						
	SS-27-0.5	0.0 - 0.5																						
	SS-25-0.5	0.0 - 0.5	4/9/2012		<3.3	63	17 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	15	<3.3	<3.3	<1.7	<1.7	1.7	<17 UJ	250
	SS-26-0.5	0.0 - 0.5	4/9/2012		<33	140	94 J	<17	<17	<17	<200	<17	<33	<17	<33	<33	<33	<33	<33	<17	<17	<17	<170 UJ	3,000
	SS-26a-0.5	0.0 - 0.5	1/9/2013		<9.9	18	<9.9	<5.1	<5.1	<5.1	<99	<5.1	<9.9	<5.1	<9.9	<9.9	12	<9.9	<9.9	<5.1	<5.1	<5.1	<51	170
	SS-26c-0.5	0.0 - 0.5	1/9/2013		<9.9	55	<9.9	<5.1	<5.1	<5.1	<99	<5.1	10 **	<5.1	<9.9	<9.9	31 *	44	<9.9	<5.1	<5.1	<5.1	<51	280
	SS-27-0.5	0.0 - 0.5	4/9/2012		4.1 J	60	22 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	9.0	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	200
	SS-25-2.5	2.0 - 2.5	4/10/2012		<3.3	4.2 J	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-26-2.5	2.0 - 2.5																						
	SS-27-2.5	2.0 - 2.5																						
Former Structure F3	SS-28-0.5	0.0 - 0.5	4/10/2012		13 J	110	5.6 J	<1.7	<1.7	<1.7	48	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	360
	SS-29-0.5	0.0 - 0.5																						
	SS-30-0.5	0.0 - 0.5																						
	SS-28-0.5**	0.0 - 0.5	4/10/2012		9.0 J	120	6.0 J	<1.7	<1.7	<1.7	<20	<1.7	43	<1.7	<3.3	<3.3	3.6	<3.3	<3.3	<1.7	<1.7	<1.7	<17	330
	SS-29-0.5**	0.0 - 0.5	4/10/2012		23 J	150	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	370
	SS-30-0.5**	0.0 - 0.5	4/10/2012		<3.3	20	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	220
	SS-28a-0.5	0.0 - 0.5	1/9/2013		<3.3	16	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-28b-0.5	0.0 - 0.5	1/9/2013		<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-28c-0.5	0.0 - 0.5	1/9/2013		<3.3	6.6	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-28d-0.5	0.0 - 0.5	1/9/2013		<1.7	23	<1.7	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-28-2.5	2.0 - 2.5	4/10/2012		<3.3	3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-29-2.5	2.0 - 2.5																						
	SS-30-2.5	2.0 - 2.5																						
	SS-31-0.5	0.0 - 0.5	4/10/2012		5.9 J	59	5.7 J	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	350
	SS-32-0.5	0.0 - 0.5																						
	SS-33-0.5	0.0 - 0.5																						
	SS-31-0.5**	0.0 - 0.5	4/10/2012		5.6 J	52	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	370
	SS-32-0.5**	0.0 - 0.5	4/10/2012		<3.3	43	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	300
	SS-33-0.5**	0.0 - 0.5	4/10/2012		9.2 J	55	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	280
	SS-31-2.5	2.0 - 2.5	4/10/2012		<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3 UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-32-2.5	2.0 - 2.5																						
	SS-33-2.5	2.0 - 2.5																						

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

			Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD 2,300 µg/kg	4,4'-DDE 1,600 µg/kg	4,4'-DDT 1,600 µg/kg	Aldrin 33 µg/kg	alpha-BHC µg/kg	beta-BHC µg/kg	Technical Chlordane 430 µg/kg	delta-BHC µg/kg	Dieldrin 35 µg/kg	Endosulfan I µg/kg	Endosulfan II µg/kg	Endosulfan sulfate µg/kg	Endrin 21,000 µg/kg	Endrin aldehyde µg/kg	Endrin ketone µg/kg	gamma-BHC (Lindan) 500 µg/kg	Heptachlor 130 µg/kg	Heptachlor epoxide 53 [RSL] µg/kg	Methoxychlor 340,000 µg/kg	Toxaphene 460 µg/kg				
On-Site Location	Sample ID	Sample Depth (feet bgs)																									
Former Structure F4	SS-34-0.5	0.0 - 0.5	4/9/2012	<3.3	4.4	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	270	J	
	SS-35-0.5	0.0 - 0.5																									
	SS-36-0.5	0.0 - 0.5																									
	SS-34-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	93				
	SS-35-0.5**	0.0 - 0.5	4/9/2012	<3.3	3.5	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	130			
	SS-36-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	170			
	SS-34-2.5	2.0 - 2.5	4/9/2012	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	<85		
	SS-35-2.5	2.0 - 2.5																									
	SS-36-2.5	2.0 - 2.5																									
	SS-37-0.5	0.0 - 0.5	4/9/2012	<3.3	7.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	220		
	SS-38-0.5	0.0 - 0.5																									
	SS-39-0.5	0.0 - 0.5																									
	SS-37-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	<85		
	SS-38-0.5**	0.0 - 0.5	4/9/2012	<3.3	11	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	170		
	SS-39-0.5**	0.0 - 0.5	4/9/2012	<3.3	7.0	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17		170	J	
SS-37-2.5	2.0 - 2.5	4/9/2012	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	UJ	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	130			
SS-38-2.5	2.0 - 2.5																										
SS-39-2.5	2.0 - 2.5																										
Low-Lying Area Adj to Water Trough	SS-41-0.5	0.0 - 0.5	4/9/2012	13	350	18	J	<3.4	<3.4	<3.4	<40	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	UJ	610	J	
	SS-41a-0.5	0.0 - 0.5	1/9/2013	6.4	200	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	86		
	SS-41c-0.5	0.0 - 0.5	1/9/2013	<3.3	77	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85		
	SS-41d-0.5	0.0 - 0.5	1/9/2013	<3.3	63	3.4	J	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	100		
	SS-41e-0.5	0.0 - 0.5	1/9/2013	<3.3	28	3.4	J	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	100		
	SS-41-2.5	2.0 - 2.5	1/9/2013	<3.3	68	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85		
	SS-41a-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85		
	SS-41c-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85		
	SS-41d-2.5	2.0 - 2.5	1/9/2013	<3.3	11	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85		
SS-41e-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3	UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	UJ	< 85			
Low-Lying Area Adj to Supply Well	SS-42-0.5	0.0 - 0.5	4/10/2012	<3.3	21	13		<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17		210		
	SS-43-0.5	0.0 - 0.5	4/10/2012	110	3,900	J		<34	<34	<34	<400	<34	<66	<34	<66	<66	<66	<66	<66	<34	<34	<34	<340		<1700		
	SS-43a-0.5	0.0 - 0.5	1/9/2013	120	2,600	*		<17	<17	<17	1,500	<17	<33	<170	<33	<33	<33	<33	<33	<17	<17	<17	<170		<850		
	SS-43b-0.5	0.0 - 0.5	1/9/2013	570	2,800			<34	<34	<34	800	*	<34	<66	<34	<66	<66	<66	670	<66	<66	<34	<34	<34	<340	<1700	
	SS-43d-0.5	0.0 - 0.5	1/9/2013	200	3,500			<34	<34	<34	<660	<1.7	<3.3	<34	<66	<66	<66	340	<66	<66	<34	<34	<34	<340	< 1700		
	SS-43e-0.5	0.0 - 0.5	4/11/2013	51	1,400			<1.0	<1.0	<1.0	<50	<1.0	1.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	< 50		
	SS-43g-0.5	0.0 - 0.5	4/11/2013	32	930			<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	< 50		
	SS-43i-0.5	0.0 - 0.5	4/11/2013	99	1,100			<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	< 50		
	SS-43k-0.5	0.0-0.5	4/11/2013	110	1,100			<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<1.0	< 50		
	SS-43-2.5	2.0 - 2.5	1/9/2013	50	85			<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17		< 85		
	SS-43a-2.5	2.0 - 2.5	1/9/2013	9.3	190			<1.7	<1.7	<1.7	57	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	9.7	<3.3	<3.3	<1.7	<1.7	<1.7	<17		< 85	
	SS-43b-2.5	2.0 - 2.5	1/9/2013	42	160			<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	41	<3.3	<3.3	<1.7	<1.7	<1.7	<17		< 85	
	SS-43d-2.5	2.0 - 2.5	1/9/2013	4.1	230			<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	29	<3.3	<3.3	<1.7	<1.7	<1.7	<17		< 85		

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene
				2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
				µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Wooden Shed North of B5	SS-44-0.5	0.0 - 0.5	4/10/2012	35 J	130	32 J	<1.7	<1.7	<1.7	170	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	3.0	<1.7	<17	810
	SS-44a-0.5	0.0 - 0.5	1/9/2013	<3.3	12	13 J	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	3.6	<3.3	<3.3	<1.7	1.7	<1.7	<17 UJ	110
	SS-44c-0.5	0.0 - 0.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44d-0.5	0.0 - 0.5	1/9/2013	<3.3	35	<3.3 UJ	<1.7	<1.7	<1.7	39	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44e-0.5	0.0 - 0.5	1/9/2013	45	41	120 J	<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	98	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	100
	SS-45-0.5	0.0 - 0.5	4/10/2012	9.9 UJ	43	15 J	<1.7	<1.7	<1.7	36	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	580
	SS-44-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	< 85
	SS-44a-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44b-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44c-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44d-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-44e-2.5	2.0 - 2.5	1/9/2013	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
	SS-45-2.5	2.0 - 2.5	1/9/2013	<3.3	3.4	<3.3 UJ	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85
Reduced Agricultural Area	SS-53a-0.5	0.0 - 0.5	4/10/2012	<3.3	3.5	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	190
	SS-53b-0.5	0.0 - 0.5	4/10/2012																				
	SS-53c-0.5	0.0 - 0.5	4/9/2012																				
	SS-53d-0.5	0.0 - 0.5	4/9/2012																				
	SS-53a-0.5	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	170
	SS-53b-0.5	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	140
	SS-53c-0.5	0.0 - 0.5	4/9/2012	<3.3	6.0	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	200
	SS-53c-0.5** (2nd extraction)	0.0 - 0.5	4/9/2012	<3.3	6.0	<3.3 UJ	<1.7	<1.7	<1.7	<33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	130 J
	SS-53d-0.5	0.0 - 0.5	4/9/2012	<3.3	6.1 J	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	13 J	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	180
	SS-53e-0.5	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	110
	SS-53f-0.5	0.0 - 0.5																					
	SS-53g-0.5	0.0 - 0.5																					
	SS-53h-0.5	0.0 - 0.5																					
	SS-53i-0.5	0.0 - 0.5	4/9/2012	<3.3	10	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	180 J
	SS-53j-0.5	0.0 - 0.5																					
	SS-53k-0.5	0.0 - 0.5																					
	SS-53l-0.5	0.0 - 0.5																					
	SS-53i-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	130
	SS-53j-0.5**	0.0 - 0.5	4/9/2012	7.5 J	39	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	130
	SS-53k-0.5**	0.0 - 0.5	4/9/2012	<3.3	4.1	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-53l-0.5**	0.0 - 0.5	4/9/2012	<3.3	5.0	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	150
	SS-53m-0.5	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	140
	SS-53n-0.5	0.0 - 0.5																					
	SS-53o-0.5	0.0 - 0.5																					
	SS-53p-0.5	0.0 - 0.5																					
	SS-53m-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	350
	SS-53n-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85
	SS-53o-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	130
	SS-53p-0.5**	0.0 - 0.5	4/9/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<85

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units: Date Sampled	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindane)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	
					2,300 µg/kg	1,600 µg/kg	1,600 µg/kg	33 µg/kg	µg/kg	µg/kg	430 µg/kg	µg/kg	35 µg/kg	µg/kg	µg/kg	µg/kg	21,000 µg/kg	µg/kg	µg/kg	µg/kg	500 µg/kg	130 µg/kg	53 [RSL] µg/kg	340,000 µg/kg	460 µg/kg
Former Livestock Handling Area	SS-54a-0.5	0.0 - 0.5	4/9/2012	<3.3	14	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	220	
	SS-54b-0.5	0.0 - 0.5																							
	SS-54c-0.5	0.0 - 0.5																							
	SS-54d-0.5	0.0 - 0.5																							
	SS-54a-0.5**	0.0 - 0.5	4/9/2012	<3.3	11	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	230 J		
	SS-54b-0.5**	0.0 - 0.5	4/9/2012	<3.3	20	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	4.0	<3.3	<3.3	<1.7	<1.7	<1.7	<17	290 J		
	SS-54c-0.5**	0.0 - 0.5	4/9/2012	<3.3	14	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	230 J		
		SS-54d-0.5**	0.0 - 0.5	4/9/2012	<3.3	22	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	240 J	
Summary Statistics																									
Number of Samples					303	303	303	303	303	303	303	303	303	303	303	303	303	303	216	303	303	303	303	303	
Minimum Concentration					<1.7	<3.3	<1.7	<1.0	<1.0	<1.0	<17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<3.3	<1.0	<1.0	<1.0	<1.0	<50	
Maximum (Detected) Concentration*					15,000	48,000	320,000	NA	NA	NA	6,700	NA	1,500	6.1	NA	13 J	58,000	44	NA	5.9	3	250	38	12,000	
Quality Control Samples																									
Replicate Samples (Co-Located Samples)																									
Center of Fill Material Piles	FM-1-1.5	1.0 - 1.5	4/10/2012	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85	
	FM-1a-1.5 (DUP)	1.0 - 1.5	4/10/2012	<3.3	<3.3	<3.3 UJ	<1.7	<1.7	<1.7	<20	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	<85	
	RPD %			0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Former Structure F1	SS-4-0.5	0.0 - 0.5	4/9/2012	8.0 J*	350 J	140	<3.4	<3.4	<3.4	100	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	780 J	
	SS-5-0.5	0.0 - 0.5																							
	SS-6-0.5	0.0 - 0.5																							
	SS-7-0.5	0.0 - 0.5																							
	SS-4a-0.5 (DUP)	0.0 - 0.5	4/9/2012	13 J*	390	150	<3.4	<3.4	<3.4	150	<3.4	<6.6	<3.4	<6.6	<6.6	37 J	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	550	
	SS-5a-0.5 (DUP)	0.0 - 0.5																							
	SS-6a-0.5 (DUP)	0.0 - 0.5																							
	SS-7a-0.5 (DUP)	0.0 - 0.5																							
		RPD %			48%	11%	7%	0%	0%	0%	40%	0%	0%	0%	0%	139%	0%	0%	0%	0%	0%	0%	0%	35%	
Former Structure F1	SS-4b-0.5	0.0 - 0.5	4/9/2012	9.3 J*	370	140	<3.4	<3.4	<3.4	96	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6 UJ	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	1,100	
	SS-5b-0.5	0.0 - 0.5																							
	SS-6b-0.5	0.0 - 0.5																							
	SS-7b-0.5	0.0 - 0.5																							
	SS-4c-0.5 (DUP)	0.0 - 0.5	4/9/2012	12	430	160	<3.4	<3.4	<3.4	80	<3.4	<6.6	<3.4	<6.6	<6.6	<6.6 UJ	<6.6	<6.6	<6.6	<3.4	<3.4	<3.4	<34	540	
	SS-5c-0.5 (DUP)	0.0 - 0.5																							
	SS-6c-0.5 (DUP)	0.0 - 0.5																							
	SS-7c-0.5 (DUP)	0.0 - 0.5																							
		RPD %			25%	15%	13%	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	68%	
Former Structure F1	SS-4ba-0.5	0.0 - 0.5	1/8/2013	<3.3	52 J*	18 **	<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<120 D	
	SS-4ba-0.5-DUP	0.0 - 0.5	1/8/2013	<3.3	52 J*	36 *	<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	<120 D		
	RPD %			0%	0%	67%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Former Structure F1	SS-4bc-0.5	0.0 - 0.5	1/8/2013	<55 J	150	100 *	<8.5	<8.5	<8.5	<170 *	<8.5	<17	<8.5	<17	<17	<17	<17	<17	<17	<8.5	<8.5	<8.5	<85	< 430 *	
	SS-4bc-0.5-DUP	0.0 - 0.5	1/8/2013	<45 J	140	110 *	<8.5	<8.5	<8.5	<170	<8.5	<17	<8.5	<17	<17	<17	<17	<17	<17	<8.5	<8.5	<8.5	<85	< 850 J	
	RPD %			20%	7%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	66%	
Former Structure F1	SS-4be-0.5	0.0 - 0.5	1/8/2013	< 3.3	64	37	<1.7	<1.7	<1.7	86	<1.7	3.7	<1.7	<3.3	<3.3	<3.3	9.6	<3.3	<3.3	<1.7	<1.7	<1.7	<17	130 J**	
	SS-4be-0.5-DUP	0.0 - 0.5	1/8/2013	7.3 J	72	39	<1.7	<1.7	<1.7	85	<1.7	3.8	<1.7	<3.3	<3.3	<3.3	4.8	<3.3	<3.3	<1.7	<1.7	<1.7	<17	220 J**	
	RPD %			75%	12%	5%	0%	0%	0%	1%	0%	3%	0%	0%	0%	67%	0%	0%	0%	0%	0%	0%	0%	51%	

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location	Sample ID	Sample Depth (feet bgs)	Date Sampled	Analyte: CHHSLs: Units:																			
				4,4'-DDD µg/kg	4,4'-DDE µg/kg	4,4'-DDT µg/kg	Aldrin µg/kg	alpha-BHC µg/kg	beta-BHC µg/kg	Technical Chlordane µg/kg	delta-BHC µg/kg	Dieldrin µg/kg	Endosulfan I µg/kg	Endosulfan II µg/kg	Endosulfan sulfate µg/kg	Endrin µg/kg	Endrin aldehyde µg/kg	Endrin ketone µg/kg	gamma-BHC (Lindan) µg/kg	Heptachlor µg/kg	Heptachlor epoxide µg/kg	Methoxychlor µg/kg	Toxaphene µg/kg
				2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460
Former Livestock Handling Area	SS-15ab-0.5	0.0 - 0.5	1/9/2013	260 *	1,500	3,300	< 34	< 34	< 34	< 660	<34	99.0	<34	<66	< 66	1,300	<66	<66	<34	<34	<34	<340	< 1700
	SS-15ab-0.5 (DUP)	0.0 - 0.5	1/9/2013	92 *	650	2,400	< 17	< 17	< 17	< 330	<17	< 33	<17	<33	< 33	700	<33	<33	<17	<17	<17	<170	< 850
	RPD %			95%	79%	32%	67%	67%	67%	67%	67%	100%	67%	67%	67%	60%	67%	67%	67%	67%	67%	67%	67%
	SS-15ad-0.5	0.0 - 0.5	1/9/2013	74	2,200	1,500	<17	<17	<17	<330	<17	<33	<17	<33	<33	230	<33	<33	<17	<17	<17	<170	<850
	SS-15ad-0.5 (DUP)	0.0 - 0.5	1/9/2013	67	1,900	1,300	< 17	< 17	< 17	< 330	<17	< 33	<17	<33	< 33	210	<33	<33	<17	<17	<17	<170	< 850
	RPD %			10%	15%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%	0%	0%	0%
	SS-15ae-0.5	0.0 - 0.5	1/9/2013	< 33	1,400	830	<17	<17	<17	<330	<17	<33	<17	<33	<33	120	<33	<33	<17	<17	<17	<34	< 170
	SS-15ae-0.5 (DUP)	0.0 - 0.5	1/9/2013	10	360 *	330 *	<3.4	<3.4	<3.4	< 66	<3.4	<6.6	<3.4	<6.6	<6.6	40 *	<6.6	<6.6	<3.4	<43	<3.4	<430	< 2100
	RPD %			107%	118%	86%	133%	133%	133%	133%	133%	133%	133%	133%	133%	100%	133%	133%	133%	87%	133%	171%	170%
	SS-15af-0.5	0.0 - 0.5	1/9/2013	440	1,400	4,100	<34	<34	<34	<660	<34	< 66	<34	<66	<66	740	<66	<66	<34	<34	<34	<340	<1700
SS-15af-0.5 (DUP)	0.0 - 0.5	1/9/2013	560 *	1,300	6400	< 43	< 43	< 43	< 830	<43	< 83	<43	<83	< 83	1,300	<83	<83	<43	<43	<43	<430	< 2100	
RPD %			24%	7%	44%	23%	23%	23%	23%	23%	23%	23%	23%	23%	55%	23%	23%	23%	23%	23%	23%	21%	
Former Structure B1	SS-20-0.5	0.0 - 0.5	4/9/2012	200 J*	1,500 J*	2,000 J*	<17	<17	<17	2,500 J*	<17	<33	<17	<33	<33	<33	<33	<33	<17	<17	<17	<170	2,700
	SS-21-0.5	0.0 - 0.5																					
	SS-20a-0.5 (DUP)	0.0 - 0.5	4/9/2012	340 J*	2,000 J*	2,900 J*	<17	<17	<17	5,400 J*	<17	<33	<17	<33	<33	<33	<33	<33	<17	<17	<17	<170	5,400
	SS-21a-0.5 (DUP)	0.0 - 0.5																					
	RPD %			52%	29%	37%	0%	0%	0%	73%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	67%
	SS-20-0.5	0.0 - 0.5	4/9/2012	73	1,300	2,300	<34	<34	<34	<400	<34	<66	<34	<66	<66	620	<66	<66	<34	<34	<34	<340	<1700
	SS-20a-0.5 (DUP)	0.0 - 0.5	4/9/2012	<66	1,100	2,200	<34	<34	<34	<400	<34	<66	<34	<66	<66	510	<66	<66	<34	<34	<34	<340	<1700
	RPD %			10%	17%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	19%	0%	0%	0%	0%	0%	0%	0%
Former Structure B2	SS-21-0.5	0.0 - 0.5	4/9/2012	370	1,800	2,000	<34	<34	<34	5,900	<34	<66	<34	<66	<66	530	<66	<66	<34	<34	170	<340	9,100
	SS-21a-0.5 (DUP)	0.0 - 0.5	4/9/2012	470	1,900	2,300	<34	<34	<34	6,700	<34	<66	<34	<66	<66	710	<66	<66	<34	<34	250	<340	12,000
	RPD %			24%	5%	14%	0%	0%	0%	13%	0%	0%	0%	0%	0%	29%	0%	0%	0%	0%	38%	0%	27%
	SS-17e-0.5	0.0 - 0.5	4/11/2013	44	1,300	1,700	<1.0	<1.0	<1.0	<50	<1.0	24	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	DUP18	0.0 - 0.5	4/11/2013	52	1,300	2,100	<1.0	<1.0	<1.0	<50	<1.0	20	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	RPD %			17%	0%	21%	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	0%	0%	0%	0%	0%	57%	0%
	SS-17f-0.5	0.0 - 0.5	4/11/2013	170	1,500	2,600	<5.0	<5.0	<5.0	<50	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<50
	DUP19	0.0 - 0.5	4/11/2013	180	1,700	1,400	<1.0	<1.0	<1.0	<50	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	RPD %			6%	13%	60%	133%	133%	133%	0%	133%	133%	133%	133%	133%	133%	133%	133%	--	133%	133%	133%	0%
	SS-17g-0.5	0.0 - 0.5	4/11/2013	31	1,100	950	<1.0	<1.0	<1.0	<50	<1.0	32	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	DUP20	0.0 - 0.5	4/11/2013	30	770	720	<1.0	<1.0	<1.0	<50	<1.0	21	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	RPD %			3%	35%	28%	0%	0%	0%	0%	0%	42%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SS-18e-0.5	0.0 - 0.5	4/11/2013	33	1,300	720	<1.0	<1.0	<1.0	<50	<1.0	67	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	--	<1.0	<1.0	<1.0	<50
	DUP22	0.0 - 0.5	4/11/2013	17	1,200	430	<5.0	<5.0	<5.0	<50	<5.0	66	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<50
	RPD %			64%	8%	50%	133%	133%	133%	0%	133%	2%	133%	133%	133%	133%	133%	133%	--	133%	133%	133%	0%
	SS-18f-0.5	0.0 - 0.5	4/11/2013	130	470	930	<5.0	<5.0	<5.0	<50	<5.0	14	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<50
	DUP23	0.0 - 0.5	4/11/2013	72	640	1,700	<5.0	<5.0	<5.0	<50	<5.0	20	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<50
	RPD %			57%	31%	59%	0%	0%	0%	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	75%	0%
	SS-16n-0.5	0.0 - 0.5	6/6/2013	97	230	1,800	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	7.5	<250
	DUP24	0.0 - 0.5	6/6/2013	82	250	1,200	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<250
	RPD %			17%	8%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	38%	0%
	SS-16p-0.5	0.0 - 0.5	6/6/2013	<5.0	18	23	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<250
	DUP25	0.0 - 0.5	6/6/2013	<5.0	28	41	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<250
	RPD %			0%	43%	56%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	SS-16r-0.5	0.0 - 0.5	6/6/2013	16	440	270	<5.0	<5.0	<5.0	<250	<5.0	55	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<250
	DUP26	0.0 - 0.5	6/6/2013	10	490	340	<5.0	<5.0	<5.0	<250	<5.0	51	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	<5.0	<5.0	<250
	RPD %			46%	11%	23%	0%	0%	0%	0%	0%	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table B-3
Summary of Analytical Results - OCPs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

On-Site Location		Sample ID	Sample Depth (feet bgs)	Analyte: CHHSLs: Units:	4,4'-DDD	4,4'-DDE	4,4'-DDT	Aldrin	alpha-BHC	beta-BHC	Technical Chlordane	delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Endrin ketone	gamma-BHC (Lindan)	Heptachlor	Heptachlor epoxide	Methoxychlor	Toxaphene	
					2,300	1,600	1,600	33			430		35				21,000			500	130	53 [RSL]	340,000	460	
					µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Former Structure B2	SS-16r1-0.5		0.0-0.5	7/2/2013	<5.0	420	260	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<250	
	DUP27		0.0-0.5	7/2/2013	<5.0	310	150	<5.0	<5.0	<5.0	<250	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<250	
	RPD%				0%	30%	54%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Former Wooden Shed North of B5	SS-44a-0.5		0.0 - 0.5	1/9/2013	<3.3	12	13 J	<1.7	<1.7	<1.7	< 85	<1.7	<3.3	<1.7	<3.3	<3.3	3.6	<3.3	<3.3	<1.7	1.7	<1.7	<17 UJ	110	
	SS-44a-0.5 (DUP)		0.0 - 0.5	1/9/2013	< 3	< 3	< 3 UJ	<1.7	<1.7	<1.7	< 33	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17 UJ	< 85	
	RPD %				0%	114%	119%	0%	0%	0%	88%	0%	0%	0%	0%	0%	9%	0%	0%	0%	0%	0%	0%	26%	
	SS-45-0.5		0.0 - 0.5	4/10/2012	9.9 J	43	15 J	<1.7	<1.7	<1.7	36	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	580	
	SS-45a-0.5 (DUP)		0.0 - 0.5	4/10/2012	12 J	67	32 J	<1.7	<1.7	<1.7	44	<1.7	<3.3	<1.7	<3.3	<3.3	<3.3	<3.3	<3.3	<1.7	<1.7	<1.7	<17	260	
	RPD %				19%	44%	72%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	76%
Equipment and Field Blanks and IDW		Units:			µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	
EB1			4/10/2012		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
EB2-20130108			1/8/2013		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
EB2-20130109			1/9/2013		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
EB3			4/11/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<0.05	<2	
FB1			4/10/2012		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
FB2-20130108			1/8/2013		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
FB2-20130109			1/9/2013		<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.5	<2.5	
FB3			4/11/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
EB4			6/6/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
FB4			6/6/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
EB5			6/7/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
EB6			7/2/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
FB5			6/7/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
FB6			7/2/2013		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	--	<0.05	<0.05	<0.05	<2	
IDW (PEA)			4/10/2012		<0.1	0.15	0.13 *	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<2.5	
IDW COMP-W-20130109 (SSI)			1/9/2013		0.2	0.9	2.2	<0.05	<0.05	<0.05	<0.5	<0.05	<0.1	<0.05	<0.1	<0.1	0.99	<0.1	<0.1	<0.05	<0.05	<0.05	<0.5	<2.5	
Comparison Criteria																									
Residential Land Use CHHSL					2300	1600	1600	33	--	--	430	--	35	--	--	--	21000	--	--	500	130	53 [RSL]	340000	460	

Notes:
< = Not detected above laboratory reporting limit indicated.
-- = Not Analyzed
bgs = below ground surface
DTSC = Department of Toxic Substances Control
Organochlorine pesticides were analyzed using U.S. EPA Method 8081A.
CHHSLs = California Human Health Screening Levels for Soil - Residential (OEHHA 2005)
RSL = [USEPA] Regional Screening Level (provided alongside CHHSLs above for Heptachlor Epoxide as a CHHSL for this analyte is not available)
µg/kg = micrograms per kilogram
µg/l = micrograms per liter
* If the maximum detected concentration was associated with a composite sample, the discrete sample concentrations were considered. If all of the discrete concentrations were lower than the associated composite maximum, the next highest concentration was reported (as in the case of 4,4'-DDE).
** 95% UCL (calculated for COPCs only): = upper confidence limit. In several instances, there were not sufficient unique data to calculate the 95% UCL (e.g. most data was non-detect and some detection limits are very high due to the dilutions required for other analytes). In these situations, the maximum is listed with an "M" adjacent to indicate data is a maximum value. 95% UCL was calculated using ProUCL (Version 4.00.05)

Bold = Analyte or reporting limit concentration is greater than the Residential Land Use CHHSL
* = The RPD exceeded 40%. Since there was not interference, the higher value was reported
** = Sample was extracted outside of the 14-day hold time and analyzed. Sample data was verified by second column confirmation of SS-53c-0.5.
J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte
D = Reporting limits were increased due to high concentrations of non-target analytes
+ = Reported analytes are ND at half of the reporting limit

Table B-4
Summary of Analytical Results, PCBs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Sample ID	Sample Depth (feet bgs)	Analyte: Units: Date Sampled	Aroclor-1016 µg/kg	Aroclor-1221 µg/kg	Aroclor-1232 µg/kg	Aroclor-1242 µg/kg	Aroclor-1248 µg/kg	Aroclor-1254 µg/kg	Aroclor-1260 µg/kg
SS-40-0.5	0.0 - 0.5	4/10/2012	<20	<20	<20	<20	<20	<20	<20
Quality Control/IDW Samples									
Duplicate Samples (Co-Located Samples)									
SS-40-0.5	0.0 - 0.5	4/10/2012	<20	<20	<20	<20	<20	<20	<20
SS-40a-0.5 (DUP)	0.0 - 0.5	4/10/2012	<20	<20	<20	<20	<20	<20	<20
RPD %			0%	0%	0%	0%	0%	0%	0%
Equipment and Field Blanks and IDW			Units: mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
EB1		4/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
FB1		4/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
IDW		4/10/2012	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Comparison Criteria									
DTSC Screening Level in soil (µg/kg)			300	300	300	300	300	300	300

QC: MM 05-10-12

Notes:

< = not detected above laboratory reporting limit indicated.

bgs = below ground surface

µg/kg = micrograms per kilogram

mg/l = milligrams per liter

DTSC = Department of Toxic Substances Control

PCBs = polychlorinated biphenyls analyzed using U.S. EPA Method SW8082

Table B-5
Summary of Analytical Results, TPH and PAHs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Sample ID	Sample Depth (feet bgs)	Date Sampled	Total Petroleum Hydrocarbons			PAHs µg/kg
			TPH-E (DRO) C13 - C22 mg/kg	TPH-E (ORO) C22 - C40 mg/kg	TPH-P (GRO) C4 - C13 mg/kg	
		Analyte: Carbon Range: Units:				
FM-1-1.5	1.0 - 1.5	4/10/2012	1.3	< 10	<1.6	--
FM-2-1.5	1.0 - 1.5	4/10/2012	1.4	< 10	<1.5	--
FM-3-1.5	1.0 - 1.5	4/10/2012	4.0	12	<1.8	--
FM-4-1.5	1.0 - 1.5	4/10/2012	<1.0	< 10	<2.6	--
SS-55-0.5	0.0 - 0.5	4/10/2012	7.6 L	21	--	--
SS-56-0.5	0.0 - 0.5	4/10/2012	12 L	45	--	--
SS-57-0.5	0.0 - 0.5	4/10/2012	15 L	52	--	--
SS-58-0.5	0.0 - 0.5	4/10/2012	32 L	120	--	--
Burn-1-0.5	0.0 - 0.5	4/9/2012	--	--	--	ND*
SS-48a-0.9	0.4 - 0.9	4/10/2012	--	--	--	ND*
Number of Samples			8	8	4	2
Number of Detects			7	5	0	0
Minimum Concentration			1	10	1.5	ND*
Maximum (Detected) Concentration			32	120	< 2.6	ND*
Average Concentration			9.3	35.0	1.9	--
Standard Deviation			10.6	38.2	0.5	--
Quality Control Samples						
Duplicate Samples (Co-Located Samples)						
FM-1-1.5	1.0 - 1.5	4/10/2012	1.3	<10	<1.6	--
FM-1a-1.5 (DUP)	1.0 - 1.5	4/10/2012	1.3	<10	<1.5	--
Burn-1-0.5	0.0 - 0.5	4/9/2012	--	--	--	ND*
Burn-1a-0.5 (DUP)	0.0 - 0.5	4/9/2012	--	--	--	ND*
Equipment and Field Blanks and IDW			Units: mg/l	mg/l	mg/l	µg/l
EB1		4/10/2012	<0.05	<0.50	<0.050	--
FB1		4/10/2012	<0.05	<0.50	<0.050	--
IDW		4/10/2012	0.81 L	6.0	<0.050	ND*
Comparison Criteria						
Residential ESLs (SFRWQCB 2008)			83	370	83	

QC: MM 05-10-12

Table B-5
Summary of Analytical Results, TPH and PAHs
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Notes:

ND* = Polycyclic aromatic hydrocarbons (PAHs) were not detected greater than their reporting limit of 25 µg/kg or 0.020 µg/l.

< = not detected above laboratory reporting limit indicated

-- = not analyzed or not applicable

bgs = below ground surface

mg/kg = milligrams per kilogram

µg/kg = micrograms per kilogram

mg/l = milligrams per liter

µg/l = micrograms per liter

ESLs = Environmental Screening Levels for Residential Soil and Groundwater (SFRWQCB 2008-Table A)

TPH-E (DRO) = total petroleum hydrocarbons extractable (diesel range organics)

TPH-E (ORO) = total petroleum hydrocarbons extractable (oil range organics)

TPH-P (GRO) = total petroleum hydrocarbons purgeable (gasoline range organics)

TPH-E (DRO), TPH-E (ORO), and TPH-P (GRO) were analyzed using U.S. EPA Method 8015B. TPH quantified as gasoline was collected using U.S. EPA Method 5035-Terracore samplers.

PAHs were analyzed using U.S. EPA Method SW8270C SIM

L = DRO concentration may include contributions from heavier-end hydrocarbons that elute in the DRO range

Table B-6
Selection of Chemicals of Potential Concern in Soil
Hammonton Smartsville Property
Yuba County, California

Chemical	Site Soil Data ¹		Selected as COPC	Rationale for Selection or Exclusion
	Maximum Detected Concentration (mg/kg)	95% UCL Concentration (mg/kg)		
Metals				
Arsenic	46	16.2	Yes	Above DTSC schools unit risk management screening value
Lead	730	103	Yes	DTSC Recommends Separate Evaluation of Lead
Pesticides				
4,4'-DDD	15	--	Yes	Detected
4,4'-DDE	48	--	Yes	Detected
4,4'-DDT	320	--	Yes	Detected
Technical Chlordane	6.7	--	Yes	Detected
Dieldrin	1.5	--	Yes	Detected
Endosulfan I	0.006		Yes	Detected
Endosulfan sulfate	0.013 J	--	Yes	Detected
Endrin	58	--	Yes	Detected
Endrin Aldehyde	0.04		Yes	Detected
gamma-BHC (Lindane)	0.006		Yes	Detected
Heptachlor	0.003	--	Yes	Detected
Heptachlor Epoxide	0.250	--	Yes	Detected
Methoxychlor	0.038		Yes	Detected
Toxaphene	12.0	--	Yes	Detected
TPH				
TPH-E (DRO)	32	--	No	TPH evaluated based on components
TPH-E (ORO)	120	--	No	TPH evaluated based on components
PCBs and PAHs				
None Detected	--	--	No	None detected above laboratory reporting limits

Table B-6
Selection of Chemicals of Potential Concern in Soil
Hammonton Smartsville Property
Yuba County, California

Notes:

¹ Statistical summary of analytical data collected at the Hammerton Smartville School Site during the April 2012 PEA Assessment and 2013 SSI sampling events.

² Refer to Table 2 for background comparison and calculation of coefficient of variation (COV). A COV > 1 suggesting dataset variability and possibility that more than one data population exists and as such, metal was selected as a COPC.

95% UCL (calculated for metal COPCs only): = upper confidence limit. In several instances, there were not sufficient unique data to calculate the 95% UCL (e.g. most data was non-detect and some detection limits are very high due to the dilutions required for other analytes). In these situations, the maximum is listed with an "M" adjacent to indicate data is a maximum value. 95% UCL was calculated using ProUCL (Version 4.00.05)

Analytes with detected concentrations are summarized herein.

COPC = chemical of potential concern

Chemical identified as a COPC during the PEA investigation

Chemical identified as an additional COPC during the SSI activities

DTSC = Department of Toxic Substances Control

mg/kg = milligrams per kilogram

TPH = Total Petroleum Hydrocarbons

PCBs = polychlorinated biphenyls

PAHs = polychlorinated aromatic hydrocarbons

-- = Not calculated

QA/QC: smg

Table B-7
Carcinogenic Toxicity Information for Chemicals of Potential Concern
Hammonton Smartsville Property
Yuba County, California

Chemical	Oral Cancer Slope Factor (SFO) (mg/kg-day) ⁻¹	Inhalation Unit Risk (IUR) (mg/m ³) ⁻¹	Inhalation Cancer Slope Factor (SFi) ¹ (mg/kg-day) ⁻¹	Weight-of Evidence Classification	Toxicity Information Reference Source ²
Metals					
Arsenic	9.50E+00	3.30E+00	12	A	Cal/EPA
Lead	--	--	--	--	--
Pesticides					
4,4'-DDD	2.4E-01	6.9E-02	0.24	B2	Cal/EPA
4,4'-DDE	3.4E-01	9.7E-02	0.34	B2	Cal/EPA
4,4'-DDT	3.4E-01	9.7E-02	0.34	B2	Cal/EPA
Technical Chlordane	1.3E+00	3.4E-01	1.2	B2	Cal/EPA
Dieldrin	1.6E+01	4.6E+00	16	B2	Cal/EPA
Endosulfan I	--	--	--	--	--
Endosulfan sulfate	--	--	--	--	--
Endrin	--	--	--	--	--
Endrin Aldehyde	--	--	--	--	--
gamma-BHC (Lindane)	1.1E+00	3.1E-01	1.1E+00	2B	Cal/EPA
Heptachlor	4.1E+00	--	4.1E+00	B2	Cal/EPA
Heptachlor Epoxide	5.5E+00	--	5.5E+00	B2	Cal/EPA
Methoxychlor	--	--	--	--	--
Toxaphene	1.2E+00	3.4E-01	1.2	B2	Cal/EPA

Table B-7
Carcinogenic Toxicity Information for Chemicals of Potential Concern
Hammonton Smartsville Property
Yuba County, California

Notes:

¹ For the inhalation risk criteria, SFi is used in the risk calculations. If IUR was provided instead of SFi, SFi was calculated by multiplying IUR by the default adult body weight (70 kg) and dividing by the default adult inhalation rate (20 m³/day). If SFi criteria was provided, no conversion was necessary.

² California EPA OEHHA Cancer Criteria Database, July 2012 <http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>

Abbreviations:

--- = not applicable as chemical is not a carcinogen or not a carcinogen by this route

Cal/EPA = California Environmental Protection Agency

DDD = Dichlorodiphenyldichloroethane

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

gamma BHC = hexachlorocyclohexane, gamma isomer

mg/kg-day = Milligrams per kilogram per day

Weight-of-Evidence Classification:

A - Human carcinogen

B1 - Probable human carcinogen - indicates that limited human data are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and
inadequate or no evidence in humans

C - Possible human carcinogen

D - Not classifiable as to human carcinogenicity

Table B-8
Noncarcinogenic Toxicity Information for Chemicals of Potential Concern
Hammonton Smartsville Property
Yuba County, California

Chemical	Oral Reference Dose (RfDo) (mg/kg-day)	RfC/Chronic Inhalation Value (mg/m ³)	Inhalation Reference Dose (RfDi) (mg/kg-day)	Toxicity Information Reference Source ¹
Metals				
Arsenic	3.0E-04	1.5E-05	4.3E-06	IRIS/CalEPA
Lead	--	--	--	--
Pesticides				
4,4'-DDD	--	--	--	--
4,4'-DDE	--	--	--	--
4,4'-DDT	5.0E-04	--	--	IRIS
Technical Chlordane	5.0E-04	7.0E-04	0.0002	IRIS
Dieldrin	5.0E-05	--	--	IRIS
Endosulfan I	--	--	0.006	IRIS
Endosulfan sulfate	--	--	--	--
Endrin	3.0E-04	--	--	IRIS
Endrin Aldehyde	--	--	--	--
gamma-BHC (Lindane)	--	--	0.0003	IRIS
Heptachlor	5.0E-04	--	--	IRIS
Heptachlor Epoxide	1.3E-05	--	--	IRIS
Methoxychlor	--	--	0.005	IRIS
Toxaphene	--	--	--	--

Notes:

Reference Source Info:

U.S. EPA Integrated Risk Information System (IRIS) database, as cited in U.S. EPA Region 9 Regional Screening Levels (RSLs), May 2012.

U.S. EPA Health Effects Assessment Summary Tables (HEAST), Annual Update, FY 1997 as cited in U.S. EPA Region 9 Regional Screening Levels (RSLs), May 2012.

California EPA OEHHA Cancer Criteria Database, July 2012 <http://www.oehha.ca.gov/risk/ChemicalDB/index.asp>

-- = Not available

Abbreviations:

DDD = Dichlorodiphenyldichloroethane

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

mg/kg-day = Milligrams per kilogram per day

NA = Not applicable

QA/QC smg

Table B-9
Carcinogenic Risk Estimate for Chemicals of Potential Concern
Using Maximum Concentrations of Site Data
Hammonton Smartsville Property
Yuba County, California

Chemical	Oral Cancer Slope Factor (Sfo) (mg/kg-day) ⁻¹	Inhalation Cancer Slope Factor (Sfi) (mg/kg-day) ⁻¹	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil ¹ (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m ³)	RISK for Soil Pathway	RISK for Air Pathway
Metals							
Arsenic	9.5E+00	1.2E+01	0.03	46	6.1E-08	7.5.E-04	1.0.E-07
Pesticides							
4,4'-DDD	2.4E-01	2.4E-01	0.05	15	2.0E-08	6.6.E-06	7.1.E-10
4,4'-DDE	3.4E-01	3.4E-01	0.05	48	6.3E-08	3.0.E-05	3.2.E-09
4,4'-DDT	3.4E-01	3.4E-01	0.05	320	4.2E-07	2.0.E-04	2.1.E-08
Technical Chlordane	1.3E+00	1.2E+00	0.05	6.7	8.8E-09	1.6.E-05	1.6.E-09
Dieldrin	1.6E+01	1.6E+01	0.05	1.5	2.0E-09	4.4.E-05	4.7.E-09
Endosulfan I	--	--	0.05	0.006	8.1E-12	0.0.E+00	0.0.E+00
Endosulfan sulfate	--	--	0.05	0.013	1.7E-11	0.0.E+00	0.0.E+00
Endrin	--	--	0.05	58	7.7E-08	0.0.E+00	0.0.E+00
Endrin Aldehyde	--	--	0.05	0.044	5.8E-11	0.0.E+00	0.0.E+00
gamma-BHC (Lindane)	1.1E+00	1.1E+00	0.05	0.0059	7.8E-12	1.2.E-08	1.3.E-12
Heptachlor	4.1E+00	4.1E+00	0.05	0.003	4.0E-12	2.2.E-08	2.4.E-12
Heptachlor Epoxide	5.5E+00	5.5E+00	0.05	0.25	3.3E-10	2.5.E-06	2.7.E-10
Methoxychlor	--	--	0.05	0.038	5.0E-11	0.0.E+00	0.0.E+00
Toxaphene	1.2E+00	1.2E+00	0.05	12.0	1.6E-08	2.6.E-05	2.8.E-09
Risk for Pathway						1.1.E-03	1.4.E-07
Overall risk from metals:			7.5E-04				
Overall risk from pesticides:			3.2E-04				
TOTAL RISK (across all chemicals and exposure routes):			1.E-03				

Table B-9
Carcinogenic Risk Estimate for Chemicals of Potential Concern
Using Maximum Concentrations of Site Data
Hammonton Smartsville Property
Yuba County, California

Notes:

¹ Maximum detected concentration in soil during PEA and SSI investigations

"- ." = not available

Highlighted analytes represent those COPCs contributing a 1×10^{-6} risk or greater and are therefore considered risk drivers.

Abbreviations:

mg/kg = Milligrams per kilogram

mg/kg-day = Milligrams per kilogram per day

mg/m³ = Milligrams per cubic meter

kg/m³ = kilogram per cubic meter

DDD = Dichlorodiphenyldichloroethane

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

Calculations:

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):

$$\text{RISK} = ((\text{Cs} \times \text{SFo}) \times (1.57 \times 10^{-6})) + ((\text{Cs} \times \text{SFo}) \times (5.05 \times 10^{-6}) \times \text{ABS})$$

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):

$$\text{RISK} = (\text{Ca} \times \text{SFi}) \times 0.149$$

where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):

$$\text{Ca} = \text{Cs} \times (1.32\text{e-}9 \text{ kg/m}^3)$$

CalEPA = California Environmental Protection Agency

ABS = Dermal Absorption Fraction; ABS Values Obtained from CalEPA 1999, Table 2: Screening Level Dermal Absorption Fractions From Soil
 CalEPA 1999. *Preliminary Endangerment Assessment (PEA) Guidance Manual*. CalEPA Department of Toxic Substances Control (DTSC). June.

QA/QC _____

Table B-10
Noncarcinogenic Hazard Estimate for Chemicals of Potential Concern
Using Maximum Concentrations of Site Data
Hammonton Smartsville Property
Yuba County, California

Chemical	Oral Reference Dose (RfDo) (mg/kg-day)	Inhalation Reference Dose (RfDi) (mg/kg-day)	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil ¹ (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m ³)	HAZARD for Soil Pathway	HAZARD for Air Pathway
Metals							
Arsenic	3.0E-04	4.3E-06	0.03	46	6.1E-08	2.1E+00	9.1E-03
Pesticides							
4,4'-DDD	--	--	0.05	15	2.0E-08	0.0E+00	0.0E+00
4,4'-DDE	--	--	0.05	48	6.3E-08	0.0E+00	0.0E+00
4,4'-DDT	5.0E-04	--	0.05	320	4.2E-07	9.4E+00	0.0E+00
Technical Chlordane	5.0E-04	2.0E-04	0.05	6.7	8.8E-09	2.0E-01	2.8E-05
Dieldrin	5.0E-05	--	0.05	1.5	2.0E-09	4.4E-01	0.0E+00
Endosulfan I	--	6.0E-03	0.05	0.006	8.1E-12	0.0E+00	8.6E-10
Endosulfan sulfate	--	--	0.05	0.013	1.7E-11	0.0E+00	0.0E+00
Endrin	3.0E-04	--	0.05	58	7.7E-08	2.8E+00	0.0E+00
Endrin Aldehyde	--	--	0.05	0.044	5.8E-11	0.0E+00	0.0E+00
gamma-BHC (Lindane)	--	3.0E-04	0.05	0.006	7.8E-12	0.0E+00	1.7E-08
Heptachlor	5.0E-04	--	0.05	0.003	4.0E-12	8.8E-05	0.0E+00
Heptachlor Epoxide	1.3E-05	--	0.05	0.25	3.3E-10	2.8E-01	0.0E+00
Methoxychlor	--	5.0E-03	0.05	0.038	5.0E-11	0.0E+00	6.4E-09
Toxaphene	--	--	0.05	12.0	1.6E-08	0.0E+00	0.0E+00
Hazard Index for Pathway						15	0.01
Overall hazard from metals:			2.1				
Overall hazard from pesticides:			13				
TOTAL HAZARD (across all chemicals and exposure route:			15				

Table B-10
Noncarcinogenic Hazard Estimate for Chemicals of Potential Concern
Using Maximum Concentrations of Site Data
Hammonton Smartsville Property
Yuba County, California

Notes:

¹ Maximum detected concentration in soil during PEA and SSI investigations

"- -" = not available

Highlighted analytes represent those COPCs contributing a hazard quotient of 1.0 or greater and are therefore considered hazard drivers.

Abbreviations:

mg/kg = Milligrams per kilogram

mg/kg-day = Milligrams per kilogram per day

mg/m³ = Milligrams per cubic meter

kg/m³ = kilogram per cubic meter

DDD = Dichlorodiphenyldichloroethane

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

Calculations:

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):

$$\text{HAZARD} = ((\text{Cs}/\text{RfDo}) \times (1.28 \times 10^{-5})) + ((\text{Cs}/\text{RfDo}) \times (3.71 \times 10^{-5}) \times \text{ABS})$$

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):

$$\text{HAZARD} = (\text{Ca}/\text{RfDi}) \times 0.639$$

where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):

$$\text{Ca} = \text{Cs} \times (1.32\text{e-}9 \text{ kg/m}^3)$$

CalEPA = California Environmental Protection Agency

ABS = Dermal Absorption Fraction; ABS Values Obtained from CalEPA 1999, Table 2: Screening Level Dermal Absorption Fractions From Soil

CalEPA 1999. *Preliminary Endangerment Assessment (PEA) Guidance Manual*. CalEPA Department of Toxic Substances Control (DTSC). June.

QA/QC ____

Table B-11
Cleanup Goals for Chemicals of Concern
Hammonton Smartsville Property
Yuba County, California

Chemical	Oral Cancer Slope Factor (Sfo) (mg/kg-day) ⁻¹	Inhalation Cancer Slope Factor (Sfi) (mg/kg-day) ⁻¹	Dermal Absorption Fraction (ABS) (dimensionless)	Cleanup Goal (Concentration in Soil) (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m ³)	RISK for Soil Pathway	RISK for Air Pathway
Metals							
Arsenic	9.5E+00	1.2E+01	0.03	Background	--	--	--
Pesticides							
4,4'-DDD	2.4E-01	2.4E-01	0.05	2.3	3.0E-09	1.0.E-06	1.1.E-10
4,4'-DDE	3.4E-01	3.4E-01	0.05	1.6	2.1E-09	9.9.E-07	1.1.E-10
4,4'-DDT	3.4E-01	3.4E-01	0.05	1.6	2.1E-09	9.9.E-07	1.1.E-10
Technical Chlordane	1.3E+00	1.2E+00	0.05	0.43	5.7E-10	1.0.E-06	1.0.E-10
Dieldrin	1.6E+01	1.6E+01	0.05	0.035	4.6E-11	1.0.E-06	1.1.E-10
Endosulfan I	--	--	0.05	0.006	8.1E-12	0.0.E+00	0.0.E+00
Endosulfan sulfate	--	--	0.05	0.013	1.7E-11	0.0.E+00	0.0.E+00
Endrin	--	--	0.05	21	2.8E-08	0.0.E+00	0.0.E+00
Endrin Aldehyde	--	--	0.05	0.044	5.8E-11	0.0.E+00	0.0.E+00
gamma-BHC (Lindane)	1.1E+00	1.1E+00	0.05	0.0059	7.8E-12	1.2.E-08	1.3.E-12
Heptachlor	4.1E+00	4.1E+00	0.05	0.003	4.0E-12	2.2.E-08	2.4.E-12
Heptachlor Epoxide	5.5E+00	5.5E+00	0.05	0.053	7.0E-11	5.3.E-07	5.7.E-11
Methoxychlor	--	--	0.05	0.038	5.0E-11	0.0.E+00	0.0.E+00
Toxaphene	1.2E+00	1.2E+00	0.05	0.46	6.1E-10	1.0.E-06	1.1.E-10
Risk for Pathway						6.6.E-06	7.0.E-10
Overall risk from metals:			0.0E+00				
Overall risk from pesticides:			6.6E-06				
TOTAL RISK (across all chemicals and exposure routes):			7.E-06	see note 2			

Table B-11
Cleanup Goals for Chemicals of Concern
Hammonton Smartsville Property
Yuba County, California

Notes:

¹ CHHSL concentrations for those shaded COCs (with the exception of Heptachlor epoxide which is the USEPA RSL as a CHHSL is not available for this COC). Maximum detected concentration in soil during PEA and SSI investigations for non-shaded COCs.

² Although the calculated risk at the cleanup goal is slightly above the target range of 1 to 5×10^{-6} if all COCs are exactly at their target cleanup goal, it is likely that upon completion of remediation at least some COCs will be sufficiently below the CHHSL such that the resulting overall risk will be within the target.

"- "- = not available

Highlighted analytes represent those COCs contributing a 1×10^{-6} risk or greater and are therefore considered risk drivers. (Additionally, Endrin is a driver of the hazard and as such, a cleanup goal is also presented for Endrin)

CHHSL concentrations to be used as cleanup goals for risk (or hazard) drivers.

Abbreviations:

mg/kg = Milligrams per kilogram

mg/kg-day = Milligrams per kilogram per day

mg/m³ = Milligrams per cubic meter

kg/m³ = kilogram per cubic meter

DDD = Dichlorodiphenyldichloroethane

DDE = Dichlorodiphenyltrichloroethylene

DDT = Dichlorodiphenyltrichloroethane

RSL = Regional Screening Level (USEPA)

Calculations:

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):

$$\text{RISK} = ((\text{Cs} \times \text{SFo}) \times (1.57 \times 10^{-6})) + ((\text{Cs} \times \text{SFo}) \times (5.05 \times 10^{-6}) \times \text{ABS})$$

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):

$$\text{RISK} = (\text{Ca} \times \text{SF}_i) \times 0.149$$

where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):

$$\text{Ca} = \text{Cs} \times (1.32\text{e-}9 \text{ kg/m}^3)$$

CalEPA = California Environmental Protection Agency

ABS = Dermal Absorption Fraction; ABS Values Obtained from CalEPA 1999, Table 2: Screening Level Dermal Absorption Fractions From Soil
 CalEPA 1999. *Preliminary Endangerment Assessment (PEA) Guidance Manual*. CalEPA Department of Toxic Substances Control (DTSC). June.

Appendix C

Health and Safety Plan



Site Specific Health and Safety Plan

Revision 11 9/20/2012

Project Name: Marysville Joint Unified School District
Hammonton Smartsville Property

Project Number: RV009363.0015
Client Name: Marysville Joint Unified School District
Date: 4/29/2014
Revision: V1.2

Approvals:

HASP Developer: Marilyn Morrow

A handwritten signature in black ink, appearing to read "Marilyn Morrow", written over a horizontal line.

HASP Reviewer: Grant Sprick

A handwritten signature in blue ink, appearing to read "Grant Sprick", written over a horizontal line.

Project Manager: Scott Hackman

A handwritten signature in black ink, appearing to read "Scott Hackman", written over a horizontal line.

Emergency Information

Site Address: 2176 Hammonton Smartsville Road
Linda, California

Emergency Phone Numbers:

Emergency (fire, police, ambulance)	911
Emergency (facility specific, if applicable):	
Yuba County Emergency Services	(530) 749-7520
Emergency Other (specify)	
Client Contact	
WorkCare (non-lifethreatening injury/illness)	1-800-455-6155
Project H&S	PM Scott Hackman
Task Manager	Marilyn Morrow
Project Manager	Scott Hackman
Corporate H&S Specialist	Alec McAdam
Corporate H&S Director	Dennis Balcer

Hospital Name and Address: Rideout Memorial Hospital
276 4th Street
Marysville, California

Hospital Phone Number: 530-749-4300

Incident Notification Process

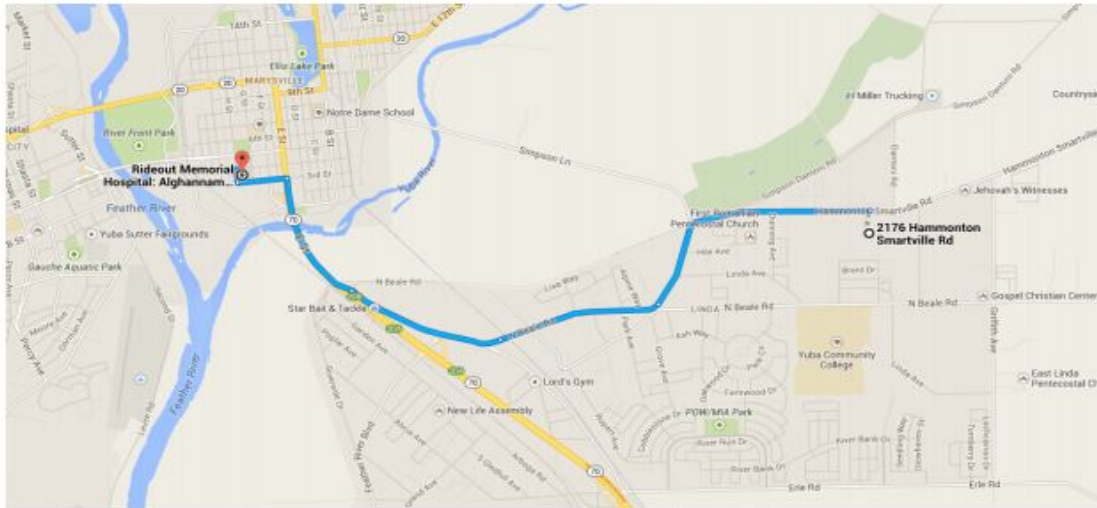
1 Dial 911/Facility Emergency Number/WorkCare as applicable	
2 Contact PM/Supervisor	Scott Hackman
3 Contact Corporate H&S	Dennis Balcer
4 Contact Client	0

Complete below, as applicable, or clear cell contents:

Location of Assembly Area(s): Will establish on a daily basis
by Field Lead or Site Safety Officer.

Nearest Storm Shelter: Inside vehicle.

Route to the Hospital



○ 2176 Hammonton Smartville Rd

Linda, CA 95901

1. Head west on Hammonton Smartville Rd toward Trevor Dr
↑ 1.4 mi
2. Turn right onto N Beale Rd
↘ 0.8 mi
3. Keep right to stay on N Beale Rd
↘ 0.8 mi
4. Take the ramp onto CA-70 N
⬆ 0.7 mi
5. Turn left onto 3rd St
↙ 0.2 mi
6. Turn right onto H St
↘ 404 ft

◎ Rideout Memorial Hospital: Alghannam Muhammad MD

726 4th St, Marysville, CA 95901

Site Type (select all applicable where work will be conducted):

☐ Active	☐ Railroad
☐ Bridge	☒ Remote Area
☐ Buildings	☐ Residential
☐ Commercial	☐ Retail
☒ Construction	☐ Roadway (public, including right-of-way)
☐ Government	☐ Secure
☐ Inactive	☐ Unknown
☐ Industrial	☒ Unsecured
☐ Landfill	☐ Utility
☐ Marine	☒ Other (specify): <u>Undeveloped area</u>
☐ Mining	
☐ Parking Lot/Private Roadway	

Surrounding Area and Topography (select one):

- ☒ Surrounding area and topography (*briefly describe*):
- The Site property, which measures approximately 50 acres in area, is located on the south side of Hammonton Smartsville Road, to the southwest of the intersection with Dantoni Road, in unincorporated Yuba County, California. There were historically a number of small structures in the northeastern part of the Site, including a farm residence and other buildings associated with farming and dairy operations. However, all structures in this area have been demolished; only concrete foundations, some pavement, and a concrete water trough were still evident as of 2013. The remainder of the Site was historically used for farming or grazing, and shows no evidence of other previous development.

Site Background:

- ☒ Site background (*briefly describe*):
- Soil sampling was previously conducted at the Site associated with the Preliminary Environmental Assessment (PEA) and Supplemental Site Investigation (SSI) processes. Chemicals of concern detected in site soil during the PEA and SSI included arsenic, lead, 4,4'DDD, 4,4'DDE, 4,4'DDT, technical chlordane, dieldrin, endrin, heptachlor epoxide, and toxaphene. These chemicals in soil will be remediated during a removal action. The scope of work associated with the removal action is presented in the Removal Action Work Plan (RAW). This Health and Safety Plan is included as an appendix of the RAW. A more detailed site background summary is also presented in the RAW.

Based on a review of the analytical data in soil, 35 arsenic samples were collected with a maximum detected concentration of 46 milligrams per kilogram (mg/kg), 138 lead samples were collected with a maximum detected concentration of 730 mg/kg, and 303 pesticide samples were collected with maximum detected concentrations of 15,000 micrograms per kilogram (µg/kg) 4,4'DDD, 48,000 µg/kg 4,4'DDE, 320,000 µg/kg 4,4'DDT, 6,700 µg/kg technical chlordane, 1,500 µg/kg dieldrin, 58,000 µg/kg endrin, 250 µg/kg heptachlor epoxide, and 12,000 µg/kg toxaphene, respectively.

Soil samples with 4,4'DDD, 4,4'DDE, 4,4'DDT, technical chlordane, dieldrin, endrin, and toxaphene concentrations detected above their respective residential California Human Health Screening Level, heptachlor epoxide concentrations detected above the 53 µg/kg USEPA Regional Screening Level, lead concentrations detected above the 80 mg/kg CHHSL (using 95% UCL of the site-wide data set), and arsenic concentrations detected above 12 mg/kg will be removed (excavated) associated with the removal action.

Project Tasks

The following tasks are identified for this project:

Examples: "Drilling/soil sampling", "Surveying", "General Inspections", "Construction Management/Inspections"

- 1 General site work
- 2 Oversight of soil removal activities
- 3 Confirmation soil sampling possibly via hand auger
- 4 Oversight of backfilling activities
- 5

- ☐ Subcontractor H&S information is attached
 ☒ ARCADIS Standards apply to augment JSA
☒ Utility clearance required. *[list standard(s) below]*
☒ ARCADIS Field H&S Handbook sections apply *(list below)*

Comments:

ARC HSF019 - Utility clearance; ARC HSGE015 - Personal protective equipment;

ARC HSCS005 - Excavation and Trenching; ARC HSGE024 - Motor vehicle safety program; ARC HSIH013 - Heat Stress

H&S Handbook Sections: Section III-A through C, G, GG, II, J, L, M, T, U.

Roles and Responsibilities

Name	Role	Additional Responsibilities (Describe)
1 Scott Hackman	PM	
2 Marilyn Morrow	TM	
3 TBD	Field Lead	
4 TBD	SSO	
5		
6		

Training

<i>All ARCADIS employees are required to have the following training:</i> ☒ 40 hr HAZWOPER w current refresh. ☐ 24 hr HAZWOPER ☐ 10 hr Construction ☐ HazMat #1 (Ground/Air/MOT) ☐ HazMat #4 (MOT) ☐ HazCom/Emergency Action Plan ☒ H&S Orientation (classroom); or ☐ H&S Orientation (on-line) ☒ PPE ☐ Respiratory protection ☐ MSHA ☐ Smith System (on-line) ☐ OTS/eRailsafe ☐ Client specific: ☐ Other:	<i>Selected ARCADIS employees are required to have the following additional training:</i> Names or Numbers from above ☐ Not applicable ☒ First aid/CPR/BBP ☐ 30 hr Construction ☐ 10 hr Construction ☒ HazMat #1 (Gr./Air/MOT) ☐ HazMat #4 (MOT) ☐ Confined space entrant ☐ Confined space rescue ☐ Excavation CP ☐ Electrical (NFPA 70E) ☐ Lockout/Tagout ☐ H&S Orientation (class) ☐ OTS/eRailsafe ☐ Smith Sys. (hands on) ☐ Boating safety ☒ Other: Excavation Awareness

Hazard Analysis

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low	4 - Medium	8 - High	12 - High

Division

Environment

Business Unit

All Categories

Task 1: General site work

Hazardous Activity #1

General-Lifting and movement of equipment of varying weights at varying frequencies by manual methods

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	L	Chemical	L	Driving	L	Electrical	L
Environmental	L	Gravity	L	Mechanical	L	Motion	L
Personal Safety	L	Pressure	L	Radiation	L	Sound	L

Overall Unmitigated Risk:

Medium

Mitigated Risk:

Medium

if utilizing:

Primary Controls:

Think safety first and use good communication.

Secondary Controls:

JSAs Job Briefing/Site Awareness Specialized Equipment Admin. Controls Engineering Controls

Hazardous Activity #2

General-Noise - exposure when working in areas of loud equipment or machinery

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	M

Overall Unmitigated Risk:

Medium

Mitigated Risk:

Low

if utilizing:

Primary Controls:

TRACK H&S Standards Engineering Controls PPE (see HASP "PPE" section)

Secondary Controls:

See HASP "Monitoring" section Job Briefing/Site Awareness Admin. Controls

Hazardous Activity #3

General-Redundant tasks

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	-	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	M	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk:

Medium

Mitigated Risk:

Medium

if utilizing:

Primary Controls:

TRACK Job Rotation JSAs Job Briefing/Site Awareness

Secondary Controls:

Inspections

Hazardous Activity #4

General-Vehicle -motor vehicle operation (all types on roadways)

Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):

Biological	-	Chemical	-	Driving	M	Electrical	-
Environmental	-	Gravity	-	Mechanical	-	Motion	-
Personal Safety	-	Pressure	-	Radiation	-	Sound	-

Overall Unmitigated Risk:

Medium

Mitigated Risk:

Low

if utilizing:

Primary Controls:

TRACK Smith System (on line) Inspections

Secondary Controls:

JSAs Admin. Controls

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low	4 - Medium	8 - High	12 - High

Oversight of soil removal activities			
Task 2:			
Hazardous Activity #1			
Field-Excavation - soil removal, installation or removal piping, tanks or utilities, geologic investigations, etc			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Environmental <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Gravity <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Personal Safety <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Pressure <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Driving <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Electrical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Mechanical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>M</td></tr></table>	M	Motion <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Overall Unmitigated Risk: High	Mitigated Risk: Medium if utilizing:		
Primary Controls: Ensure proper PPE use and air monitoring plan is followed.			
Secondary Controls: JSAs HASP Job Briefing/Site Awareness Client Training/Briefing Cont/Emerg. Planning PPE (see HASP "PPE" section) Specialized Equipment Housekeeping Inspections			
Hazardous Activity #2			
Field-Excavations - working adjacent to or within trenches and excavations			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Environmental <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Gravity <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>H</td></tr></table>	H
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Personal Safety <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Pressure <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Driving <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Electrical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Overall Unmitigated Risk: High	Mitigated Risk: Medium if utilizing:		
Primary Controls: TRACK Competent Person Required (designated person) H&S Standards Excavation Awareness Training Engineering Controls			
Secondary Controls: JSAs Job Briefing/Site Awareness Specialized Equipment Housekeeping Inspections			
Hazardous Activity #3			
Field-Equipment - working on ground in the vicinity of heavy equipment			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Mechanical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>H</td></tr></table>	H	Motion <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>H</td></tr></table>	H
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>M</td></tr></table>	M
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M			
Overall Unmitigated Risk: High	Mitigated Risk: Medium if utilizing:		
Primary Controls: TRACK JSAs Job Briefing/Site Awareness Site Awareness			
Secondary Controls: HASP H&S Standards Field H&S Handbook Engineering Controls Admin. Controls Specialized Equipment Inspections			
Hazardous Activity #4			
None			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>		Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>	
Environmental <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>		Gravity <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>	
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Driving <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>		Electrical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>	
Mechanical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>		Motion <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>	
Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>		Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td></td></tr></table>	
Overall Unmitigated Risk: Not Ranked	Mitigated Risk: Not Ranked if utilizing:		
Primary Controls:			
Secondary Controls:			

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
2 - Minor health effect	Minor damage	0 - Low	2 - Low	4 - Medium	6 - Medium
3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low	4 - Medium	8 - High	12 - High

Task 3: Confirmation soil sampling possibly via hand auger			
Hazardous Activity #1			
Field-Sampling - manual soil sampling (hand auger, trowel, etc)			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Driving <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Electrical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Overall Unmitigated Risk: Medium			
Mitigated Risk: Low if utilizing:			
Primary Controls: Ensure sampling equipment is in good condition and used properly.			
Secondary Controls: Inspections Specialized Equipment			
Hazardous Activity #2			
Field-Contaminated media (contact with impacted soil, water, air, sediment, etc)			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>H</td></tr></table>	H
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>M</td></tr></table>	M	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Overall Unmitigated Risk: High			
Mitigated Risk: Low if utilizing:			
Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section)			
Secondary Controls: H&S Standards HASP Admin. Controls HAZWOPER Training			
Hazardous Activity #3			
Chemical -Carcinogens - exposure to these materials			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Environmental <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Gravity <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Overall Unmitigated Risk: Low			
Mitigated Risk: Low if utilizing:			
Primary Controls: TRACK HASP Engineering Controls PPE (see HASP "PPE" section)			
Secondary Controls: Job Briefing/Site Awareness Hazcom Training MSDS (see also HASP Hazcom section) Client Training/Briefing Specialized Equipment			
Hazardous Activity #4			
Field-Sampling - sample cooler preparation			
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):			
Biological <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Chemical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>M</td></tr></table>	M
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Personal Safety <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>M</td></tr></table>	M	Pressure <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Driving <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Electrical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
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Mechanical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L	Motion <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>L</td></tr></table>	L
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Radiation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-	Sound <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>-</td></tr></table>	-
-			
-			
Overall Unmitigated Risk: Medium			
Mitigated Risk: Low if utilizing:			
Primary Controls: TRACK JSAs Engineering Controls PPE (see HASP "PPE" section) See HASP "Monitoring" section			
Secondary Controls: Job Briefing/Site Awareness Admin. Controls Work Plan			

Risk Assessment Matrix		Likelihood Ratings** (likelihood that incident would occur)			
Consequences Ratings*		A	B	C	D
People	Property	0 Almost impossible	1 Possible but unlikely	2 Likely to happen	3 Almost certain to happen
1 - Slight or no health	Slight or no damage	0 - Low	1 - Low	2 - Low	3 - Low
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3 - Major health effect	Local damage	0 - Low	3 - Low	6 - Medium	9 - High
4 - Fatalities	Major damage	0 - Low	4 - Medium	8 - High	12 - High

Task 4: Oversight of backfilling activities	
Hazardous Activity #1	
Field-Equipment - working on ground in the vicinity of heavy equipment	
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):	
Biological <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table> Environmental <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table> Personal Safety <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table>	Chemical <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table> Gravity <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table> Pressure <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">L</table>
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Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:	
Primary Controls: Keep clear of heavy equipment and use good communication.	
Secondary Controls: HASP H&S Standards Field H&S Handbook Engineering Controls Admin. Controls Specialized Equipment Inspections	
Hazardous Activity #2	
Field-Excavations - working adjacent to or within trenches and excavations	
Hazard Types (unmitigated ranking H-High, M-Medium, L-Low):	
Biological <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">-</table> Environmental <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">-</table> Personal Safety <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">-</table>	Chemical <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">-</table> Gravity <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">H</table> Pressure <table border="1" style="display: inline-table; width: 40px; height: 20px; text-align: center;">-</table>
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Overall Unmitigated Risk: High Mitigated Risk: Medium if utilizing:	
Primary Controls: TRACK Competent Person Required (designated person) H&S Standards Excavation Awareness Training Engineering Controls	
Secondary Controls: JSAs Job Briefing/Site Awareness Specialized Equipment Housekeeping Inspections	

Hazard Communication (HazCom)/Global Harmonization System (GHS)

☐ HAZCOM/GHS for this project is managed by the client or general contractor

List the chemicals anticipated to be used by **ARCADIS** on this project per HazCom/GHS requirements.

(Modify quantities as needed)

Acids/Bases	Qty	Decontamination	Qty	Calibration	Qty.
☒ Not applicable		☐ Not applicable		☒ Not applicable	
☐ Hydrochloric acid	<500 ml	☒ Alconox	• 5 lbs	☐ Isobutylene/air	1 cyl
☐ Nitric acid	<500 ml	☒ Liquinox	• 1 gal	☐ Methane/air	1 cyl
☐ Sulfuric acid	<500 ml	☐ Acetone	• 1 gal	☐ Pentane/air	1 cyl
☐ Sodium hydroxide	<500 ml	☐ Methanol	• 1 gal	☐ Hydrogen/air	1 cyl
☐ Zinc acetate	<500 ml	☐ Hexane	• 1 gal	☐ Propane/air	1 cyl
☐ Ascorbic acid	<500 ml	☐ Isopropyl alcohol	• 4 gal	☐ Hydrogen sulfide/air	1 cyl
☐ Acetic acid	<500 ml	☐ Nitric acid	• 1 L	☐ Carbon monoxide/air	1 cyl
☐ Other:		☐ Other:		☐ pH standards (4,7,10)	• 1 gal
_____		_____		☐ Conductivity standards	• 1 gal
_____		_____		☐ Other:	
_____		_____		_____	

Fuels	Qty.	Kits	Qty.
☒ Not applicable		☐ Not applicable	
☐ Gasoline	• 5 gal	☐ Hach (specify):	_____ 1 kit
☐ Diesel	• 5 gal	☐ DTECH (specify):	_____ 1 kit
☐ Kerosene	• 5 gal	☐ EPA 5035 Soil (specify kit):	_____ 1 kit
☐ Propane	1 cyl	☐ Other:	
☐ Other:		_____	
_____		_____	

Remediation	Qty.	Other:	Qty.	Qty.
☒ Not applicable		☒ Not applicable		☐ _____
☐ _____		☐ Spray paint	• 6 cans	☐ _____
☐ _____		☐ WD-40	• 1 can	☐ _____
☐ _____		☐ Pipe cement	• 1 can	☐ _____
☐ _____		☐ Pipe primer	• 1 can	☐ _____
☐ _____		☐ Mineral spirits	• 1 gal	☐ _____

Material safety data sheets (MSDSs)/Safety Data Sheets (SDSs) must be available to field staff.

Indicate below how MSDS information will be provided:

☐ Not applicable	☐ Contractor MSDSs/SDSs are not applicable
☐ Printed copy in company vehicle	☐ Contractor MSDSs/SDSs are attached
☐ Printed copy in the project trailer/office	☒ Contractor MSDSs/SDSs will be on
☒ Printed copy attached	site and located:
☐ Electronic copy on field computer	<u>Contractor work truck</u>

☐ Bulk quantities of the following materials will be stored: _____

Contact the project H&S contact for information in determining code and regulatory requirements associated with bulk storage of materials.

Monitoring

☐ Chemical air monitoring is not required for this project.

Boundary Air Monitoring - relevant constituents representing a hazard to site workers.

Constituent	Max. Conc.	TWA	STEL	IDLH	LEL/UEL	VD	VP	IP
	Units	Units	Exp. Limit	Units	(%)	Air=1	(mm Hg)	(eV)
Lead	620 ppm	9999 m	NA	-	100 m	NA/NA	NA	0 NA
DDT	260 ppm	1 m	NA	-	500 m,N	NA/NA	NA	2.0x10-6 NA
Toxaphene	12 ppm	0.5 m,s,O	NA	-	200 m	NA/NA	NA	0.4 NA
None	ppm	9999 -	0	-	0	0	0	0
None	ppm	9999 -	0	-	0	0	0	0
None	ppm	9999 -	0	-	0	0	0	0
Notes: TWAs are ACGIH 8 hr-TLVs unless noted.	p-ppm s- skin r- respirable	m-mg/m3 c-ceiling i-inhalable	c2- ceiling (2 hr) "9999" - NA N-NIOSH 10 hr REL	se-sensitizer O-OSHA PEL	#N/A" -Constituent is not in database, manually enter information			

Monitoring Equipment and General Protocols

Air monitoring is required for any task or activity where employees have potential exposure to vapors or particulates above the TWA. Action levels below are appropriate for most situations. Contact the project H&S contact for all stop work situations. Select monitoring frequency and instruments to be used.

Monitoring Frequency:	Hourly
Indicator Tube/Chip Frequency:	Indicator tube/chip monitoring not required

Instrument	Action Levels (above background)	Actions
☐ Photoionization Detector	< 0.000 0.000 - 0.0 > 0.0	Continue work Sustained >5 min. continuous monitor, review eng. controls and PPE, proceed with caution Sustained >5 min. stop work, contact SSO
☐ Flame Ionization Detector (FID)	< 0.0 0.0 - 0.0 > 0.0	Continue work Sustained >5 min. continuous monitor, review eng. controls and PPE, use caution Sustained >5 min. stop work, contact SSO
☐ LEL/O2 Meter	0-5% LEL >5-10% LEL >10% LEL 19.5%-23.5% O2 <19.5% O2 >23.5% O2	Continue work Continuous monitor, review eng. controls, proceed with caution Stop work, evacuate, contact SSO Normal, continue work O2 deficient, stop work, evacuate, cont. SSO O2 enriched, stop work, evacuate, contact SSO
☐ Indicator: ☐ ube ☐ hip	≤PEL/TLV >PEL/TLV	Continue work Stop work, review eng. controls and PPE, contact SSO
☐ Compound(s):		
☒ Particulate Monitor (mists, aerosols, dusts in mg/m ³)	< 2.5 2.5 - 5 > 10	Continue work Use engineering controls, monitor continuously Stop work, review controls, contact SSO
☐ Other:	< 0.01 f/cc > 0.01 f/cc	Continue work Stop work, review controls, contact SSO and/or CAC

A DataRAM PDR will be used to monitor total dust at two to three perimeter locations and on one person when soil excavation activities are being conducted. Engineering controls for dust suppression (e.g., spraying soil with water) and continuous monitoring will be conducted if dust levels exceed 2.5 mg/m³ above the established background level. Work will be stopped and engineering controls reviewed if dust levels exceed 10 mg/m³ above the established background level. PDRs will be calibrated at the start of each work day.

Personal Protective Equipment (PPE)

See JSA for the task being performed for PPE requirements . If the work is not conducted under a JSA, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work not covered by a JSA on this project:

Level D or Level D Modified:

☒ Hard hat	☐ Snake chaps/guards	☐ Coveralls:	Specify Type: _____
☒ Safety glasses	☐ Briar chaps	☐ Apron:	_____
☐ Safety goggles	☐ Chainsaw chaps	☒ Chem. resistant gloves:	<u>nitrile gloves</u>
☐ Face shield	☐ Sturdy boot	☒ Gloves other:	<u>leather gloves</u>
☐ Hearing protection	☒ Steel toe boot	☐ Chemical boot:	_____
☐ Rain suit	☐ Metatarsal boot	☐ Boot other:	_____
☐ Other:	_____	☒ Traffic vest:	<u>Type II</u>
		☐ Life vest:	_____

Task specific PPE:

Comments:

JSAs detail additional PPE other than that which is detailed above.

Medical Surveillance (*check all that apply*)

- ☐ Medical Surveillance is not required for this project.
- ☒ HAZWOPER medical surveillance applies to all ARCADIS site workers on the project.
- ☐ HAZWOPER medical surveillance applies to all subcontractors on the project.
- ☐ HAZWOPER medical surveillance applies to all site workers on the project except:

☐ Other medical surveillance required (describe type and who is required to participate):

☐ Client drug and/or alcohol testing required.

Hazardous Materials Shipping and Transportation (*check all that apply*)

- ☐ Not applicable, no materials requiring a Shipping Determination will be transported or shipped
- ☒ A Shipping Determination has been reviewed and provided to field staff
- ☐ A Shipping Determination is attached
- ☐ All HazMat will be transported under Materials of Trade by ARCADIS
- ☐ Other (specify):

#REF!

Roadway Work Zone Safety (*check all that apply*)

- ☒ Not applicable for this project
- ☐ All or portions of the work conducted under a TCP
- ☐ All or portions of the work conducted under a STAR Plan
- ☐ TCP or STAR Plan provided to field staff
- ☐ TCP or STAR Plan attached
- ☐ Other (specify):

#REF!

ARCADIS Commercial Motor Vehicles (CMVs)

This section is applicable to ARCADIS operated vehicles only

- ☒ This project will **not** utilize CMV drivers
- ☐ This project will utilize CMV drivers

Site Control (check all that apply)

- ☐ Not applicable for this project.
- ☒ Site control protocols are addressed in JSA or other supporting document (attach)
- ☒ Maintain an exclusion zone of 25 ft. around the active work area
- ☐ Site control is integrated into the STAR Plan or TCP for the project
- ☐ Level C site control - refer to Level C Supplement attached
- ☐ Other (specify):

Decontamination (check all that apply)

- ☐ Not applicable for this project.
- ☐ Decontamination protocols are addressed in JSA or other governing document (attach)
- ☒ Level D work- wash hands and face prior to consuming food, drink or tobacco.
- ☒ Level D Modified work- remove coveralls and contain, wash hands and face prior to consuming food, drink or tobacco. Ensure footwear is clean of site contaminants
- ☐ Level C work - refer to the Level C supplement attached.
- ☐ Other (specify):

Sanitation (check all that apply)

- ☐ Mobile operation with access to off-site restrooms and potable water
- ☒ Restroom facilities on site provided by client or other contractor
- ☐ Project to provide portable toilets (1 per 20 workers)
- ☐ Potable water available on site
- ☒ Project to provide potable water (assume 1 gal./person/day)
- ☐ Project requires running water (hot and cold, or tepid) with soap and paper towels

Safety Briefings (check all that apply)

- ☒ Safety briefing required daily
- ☐ Safety briefing required twice a day
- ☐ Safety briefings required at the following frequency: _____
- ☐ Subcontractors to participate in ARCADIS safety briefings
- ☐ ARCADIS to participate in client/contractor safety briefings
- ☐ Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA for the task being performed. If work is not performed under a JSA, the following safety equipment is required to be present on site in good condition (Check all that apply):

☒ First aid kit	☒ Insect repellent
☐ Bloodborne pathogens kit	☒ Sunscreen
☒ Fire extinguisher	☐ Air horn
☐ Eyewash (ANSI compliant)	☐ Traffic cones
☒ Eyewash (bottle)	☐ 2-way radios
☒ Drinking water	☐ Heat stress monitor
☐ Other:	
- _____

☐ H&S metrics are provided on the account level, refer to account guidance

☒ TIP required at the following frequency on this project:
Select One: X mhrs time(s) Define: 40 hours

☐ H&S Field Assessment required at the following frequency on this project:
Select One: _____ mhrs time(s) Define: _____

☐ Other (specify): _____

Hand-augering

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

[illegible]

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachments

Table 1. Health Effects of Chemicals of Concern
Marysville Joint Unified School District
Hammonton Smartsville Property
Yuba County, California

Compound of Concern	Health Effect
Arsenic	Arsenic is a naturally occurring element that is widely distributed in the Earth's crust. Elemental arsenic (sometimes referred to as metallic arsenic) is a steel grey solid material. However, arsenic is usually found in the environment combined with other elements such as oxygen, chlorine, and sulfur. Arsenic combined with these elements is called inorganic arsenic. Most inorganic arsenic compounds are white or colorless powders that do not evaporate. They have no smell, and most have no special taste. Inorganic arsenic occurs naturally in soil and in many kinds of rock, especially in minerals and ores that contain copper or lead. Arsenic is a known human carcinogen by both the inhalation and oral exposure routes. By the inhalation route, the primary tumor types are respiratory system cancers, although a few reports have noted increased incidence of tumors at other sites, including the liver, skin, and digestive tract. In humans exposed chronically by the oral route, skin tumors are the most common type of cancer. In addition to skin cancer, there are a number of case reports and epidemiological studies that indicate that ingestion of arsenic also increases the risk of internal tumors (mainly of bladder and lung, and to a lesser extent, liver, kidney, and prostate).
Chlordane	Chlordane is a manufactured chemical that can take the form of a thick liquid that ranges from colorless to amber and has either no odor or a mild, irritating smell. Technical chlordane is a mixture of two isomers called alpha-chlordane and gamma-chlordane along with byproducts from production. Between 1948 and 1983, chlordane was used as a pesticide on crops like corn and citrus and on home lawns and gardens. Because of concerns about damage to the environment and harm to human health, EPA banned the use of chlordane for all applications except termite control in 1983. EPA banned all uses of chlordane in 1988. Chlordane is hydrophobic and sticks to soil particles in surface soils for many years as it has a very slow breakdown rate. Chlordane affects the nervous system, digestive system, and liver. Headaches, irritability, confusion, weakness, vision problems, vomiting, stomach cramps, diarrhea, and jaundice have occurred in humans who breathed air containing high concentrations or ingested small amounts of chlordane. Consuming large amounts of chlordane causes convulsions and death in humans. Chlordane has been linked to certain types of cancer.

Compound of Concern	Health Effect
4,4-DDD, 4,4-DDE, and 4,4-DDT	DDT is a pesticide that was once widely used to control insects on agricultural crops and insects that carry diseases like malaria and typhus, but is now used in only a few countries to control malaria. Technical-grade DDT is a mixture of three forms, p,p'-DDT (85%), o,p'-DDT (15%), and o,o'-DDT (trace amounts). All of these are white, crystalline, tasteless, and almost odorless solids. Technical grade DDT may also contain DDE and DDD as contaminants. DDD was also used to kill pests, but to a far lesser extent than DDT. One form of DDD (o,p'-DDD) has been used medically to treat cancer of the adrenal gland. Both DDE and DDD are breakdown products of DDT. DDT does not occur naturally in the environment. After 1972, the use of DDT was no longer permitted in the United States except in cases of a public health emergency. It is, however, still used in some other areas of the world, most notably for controlling malaria. The use of DDD to kill pests has also been banned in the United States. DDT is an organochlorine pesticide whose best known effect is impairment of nerve impulse conduction. Effects of DDT on the nervous system have been observed in both humans and animals and can vary from mild altered sensations to tremors and convulsions. In addition to being a neurotoxicant, DDT is capable of inducing marked alterations on reproduction and development in animals. This is attributed to hormone-altering actions of DDT isomers and/or metabolites. Studies in animals have shown that DDT, DDE, and DDD can cause cancer, primarily in the liver. The possible association between exposure to DDT and various types of cancers in humans has been studied extensively, particularly breast cancer. Thus far, there is no conclusive evidence linking DDT and related compounds to cancer in humans. Possible genotoxic effects in humans have been reported in a few studies, but simultaneous exposure to other chemicals and lack of control for relevant confounders make the results inconclusive. For the most part, DDT and related compounds are not mutagenic in prokaryotic organisms.

Compound of Concern	Health Effect
Dieldrin	Dieldrin is a light brown crystal with a mild chemical odor. From the late 1930s until 1970, dieldrin was widely used for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of dieldrin in 1974, except to control termites. In 1987, EPA banned all uses. Dieldrin in soil or water breaks down (degrades) very slowly. Dieldrin sticks to soil and may stay there unchanged for many years. Water does not easily wash dieldrin off soil. Dieldrin does not dissolve in water very well and is therefore not found in water at high concentrations. Most dieldrin in the environment attaches to soil and to sediments at the bottoms of lakes, ponds, and streams. Dieldrin can travel large distances by attaching to dust particles, which can then be transported great distances by the wind. Short-term exposure to dieldrin can cause hyperirritability, headaches, dizziness, nausea, vomiting, blood in the urine, tremors, convulsions, and coma. Chronic exposure to moderate levels of dieldrin causes headaches, dizziness, irritability, vomiting, or uncontrollable muscle movements. Some sensitive people seem to develop a condition in which dieldrin causes the body to destroy its own blood cells. The EPA has classified dieldrin as a probable carcinogen.
Endrin	Endrin is a solid, white, almost odorless substance that was used as a pesticide to control insects, rodents, and birds. Endrin has not been produced or sold for general use in the United States since 1986. No long-term health effects have been noted in workers, either in factories or during field applications, who have been exposed to endrin by breathing or touching it. Studies in animals confirm that endrin's main target is the nervous system, probably because the brain and other parts of the nervous system contain much fatty tissue, and endrin tends to stay in those tissues. Birth defects, especially abnormal bone formation, have been seen in some animal studies. While there are no human data on birth defects, evidence in rodents suggests that exposure to high doses of endrin during pregnancy could be a health risk to developing fetuses. In studies using rats, mice, and dogs, endrin did not produce cancer. However, most of these studies did not accurately evaluate the ability of endrin to cause cancer. No significant excess of cancer has been found in exposed factory workers, although endrin metabolites have been detected in their urine. The EPA has determined that endrin is not classifiable as to its human carcinogenicity because there is not enough information to allow classification

Compound of Concern	Health Effect
Heptachlor Epoxide	(Discussion of Heptachlor Epoxide is in conjunction with Heptachlor). Heptachlor is a manufactured chemical that was used in the past for killing insects in homes, in buildings, and on food crops. It has not been used for these purposes since 1988. There are no natural sources of heptachlor or heptachlor epoxide. Like pure heptachlor, heptachlor epoxide is a white powder that does not explode easily. It was not manufactured and was not used as an insecticide like heptachlor. Bacteria and animals break down heptachlor to form heptachlor epoxide. These two chemicals are described together because about 20% of heptachlor is changed within hours into heptachlor epoxide in the environment and in the body. From 1953 to 1974, heptachlor entered the soil and surface water when farmers used it to kill insects in seed grains and on crops. It also entered the air and soil when homeowners and professional insect exterminators used it to kill termites. Today, heptachlor is no longer used by homeowners to kill termites or other insects. However, exterminators can still use existing stocks of heptachlor to kill fire ants in underground power transformers. In addition, no reliable human studies were found that show whether harmful effects occur from eating contaminated foods or by drinking liquids contaminated with heptachlor or heptachlor epoxide. Studies have shown a number of harmful health effects when animals were fed heptachlor or heptachlor epoxide. These effects were more harmful when the exposure levels were high or when exposure lasted many weeks. The effects observed in animals include damage to the liver, excitability, and decreases in fertility. Animals fed heptachlor throughout their lifetime had more liver tumors than animals that ate food without heptachlor. EPA considers heptachlor epoxide as a possible human carcinogen. ■
Lead	Lead (inorganic) is a bluish-white, silver or gray odorless solid. Short-term exposure to lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic and constipation. Considerable data exist on the effects of lead exposure in humans. It is a poison by ingestion and a suspected human carcinogen of the lungs and kidneys. There are data to suggest that lead is a mutagen and can cause reproductive effects. Human systemic effects by ingestion and inhalation (the two routes of absorption) include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis, and liver changes. Recent experimental evidence suggests that blood levels of lead below 10 µg/dl (micrograms per deciliter) can have the effect of diminishing the IQ scores of children.

Compound of Concern	Health Effect
Toxaphene	Toxaphene is usually found as a solid or gas. In its original form, toxaphene is a yellow to amber waxy solid that has a piney odor. Toxaphene is a manufactured pesticide comprising a complex mixture of hundreds of chlorinated terpenes. After DDT was banned from use in the US in 1972, toxaphene became the most popular substitute. In November of 1982, EPA canceled the registration of toxaphene for most uses as a pesticide or pesticide ingredient. All registered uses of toxaphene mixtures in the US were canceled in 1990. Toxaphene strongly adsorbs to particles and is relatively immobile in soils. Toxaphene does not dissolve well in water, so it is more likely to be found in air, soil, or the sediments at the bottom of lakes and streams. Once toxaphene is in the environment, it can last for many years because it breaks down very slowly. Acute poisoning from the prolonged ingestion or inhalation of high levels of toxaphene causes damage to the lungs, the nervous system, and the liver and kidneys in humans. Toxaphene caused liver cancer in mice and possibly thyroid cancer in rats that were given toxaphene in large amounts that you would not likely get by eating food or drinking water containing toxaphene. Based on animal studies, the EPA has classified toxaphene as a probable carcinogen.

Reference: Excerpts from ATSDR Toxicological Profiles

**Hammonton Smartsville Property
EMERGENCY ACTION PLAN**

1.0 FACILITY INFORMATION**1.1 Facility**

Name: Hammonton Smartsville Property
Address: 2176 Hammonton Smartsville Road, Unincorporated Yuba County
Phone Number: NA

1.2 Owner

Name: Marysville Joint Unified School District
Contact: Gay Todd
Address: 1919 B Street, Marysville, California 95901

1.3 Operator

Name: ARCADIS U.S., Inc.
Contact: Scott Hackman
Address: 101 Creekside Ridge Court, Suite 200, Roseville, CA 95678
Phone Number: 916-786-7369
E-mail Address: scott.hackman@arcadis-us.com

1.4 Emergency Coordinator

Name: Scott Hackman
Title: Project Manager
Business Phone: 916-786-7369
Cell Phone (24-hr Phone):

1.5 Facility Profile

The Hammonton Smartsville Property, which measures approximately 50 acres in area, is located on the south side of Hammonton Smartsville Road, to the southwest of the intersection with Dantoni Road, in unincorporated Yuba County, California. There were historically a number of small structures in the northeastern part of the Site, including a farm residence and other buildings associated with farming and dairy operations. However, all structures in this area have been demolished; only concrete foundations, some pavement, and a concrete water trough were still evident as of 2013. The remainder of the Site was historically used for farming or grazing, and shows no evidence of other previous development. Soil sampling was previously conducted at the Site Environmental investigations during a PEA in April 2012 and during a SSI between January 2013 and July 2013. The PEA addressed a variety of potential environmental impacts to shallow soil, including OCPs, lead, hydrocarbons, PCBs, and other metals.

2.0 EMERGENCY NOTIFICATION PROCEDURES**2.1 Discovery and Initial Response**

Once an employee discovers, or is informed of a release, he/she shall take the following steps:

- a. Immediately evacuate the affected area
- b. Notify the site safety officer to coordinate the clean up and initiate emergency notification procedures, if needed.

The designated site safety officer shall take the following steps:

- a. Determine if an evacuation is warranted and order accordingly.
- b. For spills consisting of an unknown product or more than one product, the onsite environmental contractor will use conservative clean-up procedures to stop the leak and containerize the waste.
- c. For spills onsite and consisting of one product, consult the MSDS for product specific clean-up instructions.
- d. Obtain a spill clean-up kit from the designated onsite storage area. The kit must contain single-use nitrile gloves, absorbent, broom, plastic shovel, durable bag and plastic container, and chemical splash goggles.
- e. Clean up spill per instructions on MSDS.
- f. Containerize waste in designated waste storage area.

2.2 Emergency Notification Procedures

ARCADIS will provide verbal notification to applicable federal, state, and local agencies as required.

Local Fire department:	911 or (530)-477-0641 (non-emergency)
State Spill Hotline (SERC):	1-800-852-7550 (24 hrs)
State Environmental Dept.:	(530) 749-5450 (Yuba County CUPA)
National Response Center:	800-424-8802 (24 hrs.)

If written reporting is required, ARCADIS will submit the reports to applicable agencies.

2.2 Emergency Fire Procedures

Once a site worker discovers a fire, they shall take the following steps:

- a. Immediately evacuate the affected area.
- b. Immediate notification of 911 for fire department response.
- c. If necessary, initiate site evacuation.

2.3 Evacuation

- a. In the event of required evacuation, a series of blasts from an air horn will indicate to site workers to evacuate the site to the established rally points.

2.4 Sustained Actions

In the unlikely event that a spill would require a prolonged clean-up procedure, ARCADIS would dispatch a licensed emergency response contractor. The emergency response contractors will utilize properly trained associates to clean up and remove hazardous wastes at the site.

3.0 HAZMAT RESPONSE RESOURCES

3.2 Containment and Clean up

Spill Kits - Spill kits are to be located at designated areas in the support areas of the site. These kits include single-use nitrile gloves, safety glasses, overshoe or disposable shoe covers.

3.3 Personal Protection Equipment

All site visitors are required to follow the PPE requirements detailed in the the HASP. Spill kits include single-use nitrile gloves, safety glasses, overshoe or disposable shoe covers.

3.4 Decontamination Equipment

Eye Wash Stations - Eye wash stations will be maintained in support areas of the site. The equipment can be used to flush eyes.

4.0 EMERGENCY PUBLIC INFORMATION

The public would be notified in the event of an emergency by the Fire Department.

6.0 ATTACHMENTS

- Site Plan

Job Safety Analysis**General**

JSA ID	10334	Status	(3) Completed
Job Name	Environmental-Drum sampling/handling	Created Date	11/27/2013
Task Description	Drum Handling	Completed Date	12/25/2013
Template	False	Auto Closed	True

Client / Project

Client	EXXONMOBIL
Project Number	B00859280168
Project Name	30168 - 109 MORRIS ST, MORRIST
PIC	DAVIES, SCOTT E
Project Manager	KRUCZEK, JESSICA

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Kochan, Richard	12/18/2013	11/27/2013	Kruczek, Jessica	☒
HASP Reviewer	Mason, Greg	12/11/2013		Mattingly, James	☒
Quality Reviewer	Sada, Ebenezer	11/26/2013	11/26/2013	Herner, Holly	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Inspect Drums for signs of Bulging, Leaking, Crystals, Temperature, and Odor	1 Exposure to chemicals stored in drum or container.	Read drum labels for information about contents. Review all relevant MSDSs about chemical contents. If labels are not attached, call PM or Local H&S Representative.	None
		2 Contents of the drum can cause fire/explosion hazard.	Use air monitoring meters to screen drums. % LEL and VOCs (PPM). If either of the values are above the action levels described in the HASP or MSDS then Stop Work, move away from the area, and reassess the situation. Call PM and H&S staff for support.	
2	Remove lids or bungs from Drums	1 Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	Wear appropriate work gloves. When removing ring from drum, fingers can get pinched between ring and drum. Keep fingers clear of this space. Select proper tool for task. If large amount of drums will be encountered, use a speed or drum wrench.	Employee H&S Field book, Section III Subpart II, page 104. Also Section III Subpart L, page 38.
		2 Rapid depressurization from empty or partially full drums can cause flying parts or volatile COCs releasing on staff.	Do not handle or open bulging drums (contact Corp H&S for assistance). Bleed any built up pressure by carefully loosening bung prior to removing ring. Keep face and arms away from bung opening when loosening. Slightly lift lid, insert end of air monitoring device to monitor air inside drum.	
		3 Use of mechanical tools to remove bolts from drum lids causes excessive noise.	Wear hearing protection.	
		4 Splashing can occur if filling drum, or collecting samples.	Wear eye and face protection. Pour liquids into drum slowly to minimize splashing.	
		5 When working with COCs that have fire/explosive properties, sparking or heat could cause fire/explosion.	Use brass or non Spark Hand Tools if such a hazard exists or is suspected.	
3	Sample Contents from Drums	1 Exposure to COCs can occur by contacting impacted contents.	Select proper dermal protection for task, at a minimum nitrile gloves should be worn. Wear appropriate eye face and body protection as outlined in the HASP.	
		2 Staff can be exposed to chemical vapors/fumes when sampling.	Conduct air monitoring as outlined in the HASP, and if required, select appropriate respiratory protection for the task.	
		3 Sharp edges and broken sample containers can cause lacerations.	Discard any broken sample ware or glass properly. Do not over tighten sample containers.	

3	Sample Contents from Drums	4	Chemical burns or skin irritation can occur from contact with sample preservatives.	Wear chemical protective gloves when collecting samples, or when handling damaged sample containers.	
4	Replace drum lids	1	Hand Injuries can occur from sharp edges, pinch points, and from use of hand tools.	see step 2 above	
5	Moving and Storing Drums	1	Drum storage areas can be accessed by the general public, or may not be secure.	Calculate how many drums will be stored in new location. Ensure that drums are not easily accessed by the general public. Do not store such that drums impede pedestrian or vehicular traffic.	
		2	Muscle strain can occur when lifting/pulling/pushing drums.	Drums that are full can weigh as much as 800 lbs. Use a lift assist device whenever possible, and use a team lift approach. When moving soil drum generated by drilling, have drillers use their equipment to move the drums. Using dolly, slightly lift drum away from dolly to install forks under drum. Slowly let drum come back down and rest on dolly. Using hook on top of dolly, ensure it latches on top of drum bung.	
		3	Body parts can be pinched between lift device, or drum and the ground.	Be aware of hand and foot placement during drum staging. Do not hurry through task.	
		4	When moving, the drum can tip or the dolly could become unstable from uneven ground surface.	Plan travel route with drum prior to moving. With drum secure on dolly, have one employee pull back on dolly, and other employee slowly push back on drum toward dolly. Have second worker act as spotter for traffic, pedestrians, and any trip hazards along the way.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)		Required
Eye Protection	faceshield		Required
	safety goggles		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)		Required
Hearing Protection	ear plugs		Required

Supplies			
Type	Supply	Description	Required
Miscellaneous	Other	dolly	Required

Review Comments		
Reviewer	Comments	
Employee: Role Review Type Completed Date	Sada, Ebenezer Quality Reviewer NA 11/26/2013	Excellent written JSA. Provides excellent coverage of potential hazards and associated critical actions!

Job Safety Analysis**General**

JSA ID	8511	Status	(2) Review
Job Name	Environmental-Geophysical survey	Created Date	11/15/2012
Task Description	Geophysical Survey of Excavated Work Areas	Completed Date	
Template	False	Auto Closed	False

Client / Project

Client	DEPT. OF TOXIC SUBSTANCES CONTROL
Project Number	RV0098950001
Project Name	Central Valley Fertilizer
PIC	BEATTY, JENIFER J.
Project Manager	BEATTY, JENIFER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Frattali, John	12/6/2012	11/15/2012	Burgess, Thomas	☒
HASP Reviewer	Merrifield, Chris	11/29/2012		Burgess, Thomas	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Mobilization of equipment to survey area	1 Lifting hazards (heavy or bulky equipment)	Use TRACK to plan lifts and routes to work location. Use proper lifting techniques. Keep back straight and bend with your knees. Avoid twisting torso instead lead with your feet. Park as close to work area as possible to avoid carry heavy objects a greater distance.	
		2 Awkward body positions and twisting	Plan activity to avoid twisting of body or awkward body positions. Use buddy system or job rotation to reduce exposure to conditions that cannot be avoided.	
		3 Trip and fall hazards from uneven ground or restricted view when carrying equipment	Break loads down to manageable size that does not obstruct view of ground. Plan route and use TRACK, wear footwear with good tread and ankle support. Use buddy system for large or bulky items when carrying.	
		4 Insect bites or bee stings, being bit by snake.	Avoid sticking hands or body parts in dark areas that you can not see into. Wear insect repellant as needed. Avoid walking through tall grasses or lifting up objects that could house a snake. Call animal control if a snake is found.	
2	Set up survey grid and control	1 Slip trip and fall hazards from wet, uneven ground or over vegetation.	See step one controls.	
		2 Crush hazard or contact stress to hands/fingers from inserting pins or stakes.	Wear leather gloves when inserting pins, flagging, or stakes into the ground. Do not hurry task if hammering.	
		3 Struck by hazards by vehicles if working in traffic area.	Establish traffic control and wear a Class II traffic vest if in traffic area. Use vehicles to block work area when practical.	
		4 Repetitive stress from repeated bending or squatting during grid construction	Use job rotation when hazard exists, stretch before performing work activity. Use paint device that allows employee to stand up while spraying.	
		5 Chemical exposure from using spray paint	Stand up wind of paint spraying activities	
3	Performing survey	1 Slips trips and falls on wet, uneven or steep sloped surfaces	See step one controls.	
		2 Scrapes or cuts to hands, arms or legs from equipment or vegetation in area.	Wear leather or other suitable gloves when performing survey, wear long pants, wear heavy long sleeve shirt if arm hazard exists.	

3	Performing survey	3	Noise hazards from survey equipment using percussion devices	Wear hearing protection, keep unnecessary workers away from devices when activated.	
		4	Ergonomic injury from improper or prolonged use of carried devices that are long or bulky.	Use job rotation to reduce potential for injury.	
4	Demobilization and clean up	1	Muscle strain from removing pins or stakes	Use devices that maintain neutral body positions to remove pins when practical. Do not bend at waist when removing.	
		2	Pinch hazards to fingers from equipment cases	Identify hazard and avoid, pack equipment properly so that no wires or cables protrude from case requiring fingers to push into case when closing.	
		3	Lifting hazards from demobilizing equipment from work area	See step one controls.	
		4	Slip, trip and falls carrying equipment that obstructs view or on wet or uneven surfaces.	See step one controls.	
5	Preparation and return shipment of equipment	1	Cuts to hands and forearms from cutting strapping tape	Do not hurry during package preparation, Use TRACK, Use the right cutting tool for the task activity, use cutting tools with self retracting blades	
		2	Pinch hazards to fingers from equipment cases and placement of equipment in boxes	See step 4 controls.	
		3	Lifting hazards from completed shipping packages	See step 1 controls	
		4	Fire hazard from improperly packed spare batteries	Cover battery terminals or keep in original packaging when shipping, protect batteries from other metal objects in packages, perform shipping determination for number of spare batteries permitted to be shipped in package or consignment.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies			
Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	first aid kit		Required
Personal	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Required

Job Safety Analysis

General

JSA ID	8512	Status	(2) Review
Job Name	Environmental-Soil sampling/well installation - manual	Created Date	11/15/2012
Task Description	Soil Sampling using Hand Auger	Completed Date	
Template	False	Auto Closed	False

Client / Project

Client	DEPT. OF TOXIC SUBSTANCES CONTROL
Project Number	RV0098950001
Project Name	Central Valley Fertilizer
PIC	BEATTY, JENIFER J.
Project Manager	BEATTY, JENIFER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Frattali, John	12/6/2012	11/15/2012	Burgess, Thomas	☒
HASP Reviewer	Merrifield, Chris	11/29/2012		Burgess, Thomas	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Sampling set-up	1 Underground utilities could be encountered during hand augering	Follow the Utility Clearance HS Standard	Utility Clearance HS Standard ARCHSF019
		2 Muscle fatigue can occur from lifting heavy equipment in and out of vehicle	Park as close as possible to the sample locations. Use lifting techniques outlined in the Field H&S Handbook	
		3 Slips/trips/falls could occur from uneven walking and working surfaces	Remove any gravel or debris from sampling location. Gravel will get stuck in auger and continue to fall back down in hole. A five gallon bucket with the bottom cut out will retain gravel from falling back down in the hole.	
2	Sampling set-up	1 Underground utilities could be encountered during hand augering	Follow the Utility Clearance HS Standard.	Utility Clearance HS Standard ARCHSF019
		2 Muscle strains can occur from lifting heavy equipment in and out of vehicle	Park as close as possible to the sampling locations. Use lifting techniques as outlined in the Field H&S Handbook.	
		3 Slips/trips/falls could occur from uneven walking and working surfaces	Remove any gravel or debris from sample location. Gravel will get stuck in auger or will continue to fall back down in hole. A five gallon bucket with the bottom cut out will retain gravel from falling back down in the hole.	
3	Installation of hand auger boring	1 Muscle strains from pulling/pushing could occur when installing the boring, and when removing the auger from the hole	Stretch out arms/back/shoulder muscles prior to beginning. Using firm grip on handle, slowly turn auger and progress downward in 6" increments. Slowly pull auger from hole-use legs to pull auger out of hole. If water is encountered, a suction will be created when trying to remove the auger. Ask for assistance from another worker if you can't remove safely on your own.	
		2 Hand strain and blisters could develop from prolonged hand augering	Select proper gloves for task, usually leather type work gloves or mechanics style gloves. If hot spots develop on hands (Hot Spots are where blisters start to form) readjust gloves or change to better padded glove. If blisters begin to form, stop work so as not to worsen blistering.	
		3 Over-exertion could occur when trying to force an auger forward if there is refusal.	If refusal occurs, Stop Work. Remove auger from hole and check hole with flashlight if possible. DO NOT overexert by using excessive force.	

3	Installation of hand auger boring	4	Fatigue can occur due to strenuous nature of hand augering activities	Take rest breaks as needed or switch out task with another employee.	
4	Collect Sample Soil Sample	1	Staff can come into contact with impacted soils	Wear chemical protective gloves as outlined in the HASP, and wear safety glasses.	
		2	Sharp edges and broken glassware can cause lacerations	Discard any broken sample containers or glass. Do not overtighten sample containers.	
		3	Containerizing and moving soil cuttings can cause muscle strains	Dispose of left over soil cuttings in a drum or bucket and dispose properly. Only fill buckets half full due to weight and strength of bucket. Wear leather work gloves and use good lifting techniques when handling buckets.	
5	Decon Hand Auger	1	Exposure to COCs while deconing equipment.	Wear chemical protective gloves as outlined in the HASP, and wear safety glasses.	
		2	Cleaning solutions can splash while deconing equipment	Use PPE as outlined in the HASP, and try to minimize splashing.	
		3	The end of the hand auger has sharp edges, and lacerations can occur	Use brush to scrub off soils and not hands. Do not reach into the nose (the end with teeth) of the auger with hand.	
6	Fill in Sample Location	1	Open boreholes are a trip hazard	Fill in hole with imported clean fill.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies			
Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)		Required
Miscellaneous	first aid kit		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Required

Job Safety Analysis

General

JSA ID	8513	Status	(2) Review
Job Name	Construction-Excavation and trenching	Created Date	11/15/2012
Task Description	Soil Excavation	Completed Date	
Template	False	Auto Closed	False

Client / Project

Client	DEPT. OF TOXIC SUBSTANCES CONTROL
Project Number	RV0098950001
Project Name	Central Valley Fertilizer
PIC	BEATTY, JENIFER J.
Project Manager	BEATTY, JENIFER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Frattali, John	12/6/2012	11/15/2012	Burgess, Thomas	☒
HASP Reviewer	Merrifield, Chris	11/29/2012		Burgess, Thomas	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Site preparation	1 Improper utility clearance may result in utility/equipment damage or injury.	Perform utility clearance with a minimum of 3 lines of evidence. Document utility clearance for reference including any ticket numbers or phone numbers of utilities.	
		2 Clearing vegetation may result in impact hazards.	Stand at least 25 ft from clearing operations using manual or mechanized methods. Larger vegetation like trees may be under stress and may break and wood parts may fly in any direction.	
		3 Slip trip and fall hazards from walkover activities (vegetation, uneven surfaces, etc and applies to all job steps in this JSA)	Plan route and focus on the task at hand (walking). Do not walk while looking at utility maps/drawings or talking on cell phones.	
2	Excavation and backfilling	1 Struck by equipment during excavation.	Stay at least 10 feet beyond the reach of excavation equipment unless establishing communication with operator. Wear PPE required by this JSA for increased visibility. Keep unnecessary workers away from the excavation area.	
		2 Worker falls from uneven walking/working surfaces caused by excavated soils. Soils will be excavated at a maximum of 2 feet bgs causing depressions in walking surfaces.	Take only designated walking pathways while navigating the work area. Mark all fall or trip hazards with cones and/or flagging. Walk deliberately with each step and watch for drop offs ranging from 1 inch to 2 feet.	
		3 Chemical exposure to site contaminants.	Wear protective clothing specified in this JSA, avoid skin contact with soil materials or any liquids in the excavation. Use air monitoring to ensure TLVs are not exceeded. Wash hands and face prior to eating, drinking or consuming tobacco.	
		4 Noise from excavation equipment	Keep distance from equipment to reduce noise levels. If levels cannot be controlled wear hearing protection appropriate for the hazard.	
3	Excavation equipment decontamination	1 Slips and falls on wet surfaces.	Wear footwear appropriate for wet environments. Reduce amount of pressure washing required by removing soils using dry methods to extent practical	

3	Excavation equipment decontamination	2	Flying particles from cleaning activities.	Wear eye and skin protection during decontamination activities. Use face shield if overspray or flying debris is a persistent problem. Avoid cleaning (pressure washing) in direction of other nearby workers, keep unnecessary workers clear of decontamination activity.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Dermal Protection	chemical protective suit (specify type)	Tyvek per SSO	Required
Eye Protection	faceshield	During decontamination (per SSO)	Required
	safety glasses		Required
Foot Protection	rubber boots	Wet environments (per SSO)	Required
	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile when handling impacted soils	Required
	work gloves (specify type)	leather or equivalent (per SSO)	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Required
Miscellaneous PPE	traffic vest--Class II or III	Class II	Required
Respiratory Protection	half face respirator	per SSO	Required

Supplies			
Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	walkie talkie		Required
Miscellaneous	fire extinguisher	ABC 10 pound minimum	Required
	first aid kit		Required
Personal	eye wash (specify type)	Bottle	Required
	insect repellent		Recommended
	sunscreen		Recommended
	water/fluid replacement		Required

Job Safety Analysis

General

JSA ID	166	Status	(3) Completed
Job Name	Environmental-Sample cooler handling	Created Date	5/1/2009
Task Description	Sample cooler handling	Completed Date	05/13/2009
Template	True	Auto Closed	False

Client / Project

Client	ARCADIS-AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	NO PROJECT MANAGER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	12/19/2011	5/11/2009	Coates, Gary	☒
HASP Reviewer	Moyers, Sam	5/25/2009	5/13/2009	Coppola, Mija	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Transfer field samples to sample packing area	1 Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field.	
		2 Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3 Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4 Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re-perform all Shipping determinations if free product is collected and not anticipated during planning.	
2	Sample cooler selection	1 Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2 Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	
3	Pack Samples	1 Pinch points and abrasions to hands from cooler lid closing unexpectedly	Beware that lid could slam shut; block/brace if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	

3	Pack Samples	2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on rough gravel surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA HazMat shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrier or lab courier for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required

Supplies			
Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Review Comments		
Reviewer	Comments	
Employee: Role Review Type Completed Date	Moyers, Sam HASP Reviewer Revise 5/11/2009	Kevlar is required? Leather work gloves are listed. i suggest just leather gloves.
Employee: Role Review Type Completed Date	Moyers, Sam HASP Reviewer Approve 5/13/2009	

Job Safety Analysis

General

JSA ID	344	Status	(3) Completed
Job Name	Construction-Heavy equipment operation	Created Date	5/29/2009
Task Description	Heavy equipment operation	Completed Date	06/15/2009
Template	True	Auto Closed	False

Client / Project

Client	ARCADIS-AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	NO PROJECT MANAGER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	5/21/2012	5/29/2009	Coates, Gary	☒
HASP Reviewer	Moyers, Sam	6/12/2009	6/15/2009	Coppola, Mija	☒

Job Steps

Job Step No.	Job Step Description	Potential Hazard	Critical Action	H&S Reference
1	Loading and Unloading Equipment from transport vehicles.	1 Stake or impact hazards from moving equipment	Stand clear of equipment loading or unloading form transport vehicles	FHSHB Section IV (E); ARCHSF019, FHSHB Section III(MM)
		2 Equipment damage from improper removal or placement on vehicle	Ensure any ramps used are rated for weight and properly placed and secure prior to moving equipment across, ensure trailers being loaded or unloaded are properly secured against movement.	
		3 Overhead utility contact for equipment with booms or extensions	Plan position of transport vehicle to maintain safe distance (>20 ft) from all overhead lines and structures, Use spotters since operator focus may be on vehicle alignment with ramps or other ground level distractions.	
		4 Ascending/Descending equipment cab.	Do not hurry through task, wear footwear with good tread and ankle support, maintain 3 points of contact while accessing or egress equipment, no jumping off trailers or truck beds.	
2	Pre-operation inspection	1 Pinch hazards to hands	Wear gloves appropriate for hazard while maintaining dexterity. Keep hand in field of vision and watch for and keep hands clear of obvious hazards like door or cover closures. Do not hurry during the removal or placement of covers or equipment components.	
		2 Head injury from striking equipment covers or components	Wear hard hat, stay focused on surroundings, avoid standing or raising up suddenly especially if door cover is overhead.	
		3 Exposure to engine fluids or lubricants	Wear protective gloves, ensure MSDS is available for engine fluids and lubricants, promptly wash exposed skin, contact WorkCare immediately for any situation where diesel is injected under the skin.	
		4 Awkward body positions and twisting	Plan inspection activity and do not hurry through task, stretch before crawling or squatting. Avoid overreaching.	
		5 Entanglement in equipment components.	Do not circumvent protective guards or shields, ensure equipment is not operational (LOTO if necessary) when accessing engine compartment if intrusion required.	

3	Equipment operation	1	Strike or impact hazards with other workers, equipment or structures.	Keep eyes moving and watch for unanticipated worker movement. Keep workers 15 ft from any extendable area of the equipment, Maintain 360 degrees of awareness and ensure adequate communication method with other workers. All workers to know emergency STOP hand signals. Verify that all back up alarms are functional.	
		2	Utility contact (subsurface or above ground)	Follow utility clearance procedure prior to any intrusive work with equipment. Immediately stop work if any unusual or unanticipated condition encountered.	
		3	Rollovers on slopes or from improper usage	Follow equipment manufacturer instructions for use on slopes or load capacities, wear seatbelt at all times, Ensure all outriggers, if equipped are properly deployed on stable surface.	
		4	Noise from engine or work activity	Wear hearing protection as required, keep equipment well maintained.	
		5	Slips and falls from accessing or egress from equipment	Maintain 3 points of contact when access or egress equipment, keep any ladder or steps on equipment clean and dry to extent practical, ensure equipment doors, if present, are in good working order.	
		6	Exposure to tools and metal edges and damaged metal resulting in cuts lacerations to hands during maintenance	Wear protective gloves that allow for good dexterity. Mitigate sharp surfaces to extent practical.	
		7	Pinch/crush hazards to hands from doors or covers	Wear gloves appropriate for hazard while maintaining dexterity. Watch for and keep hands clear of obvious hazards like door or cover closures. Do not hurry during the removal or placement of covers or equipment components.	
		8	Contact stress to knees and hands	Use padding or knee pads if kneeling on hard surfaces for an extended period of time. Avoid placing weight on hands for extended periods of time.	
4	Maintenance	1	Awkward body positions and twisting	Plan inspection activity and do not hurry through task, stretch before crawling or squatting. Avoid overreaching.	
		2	Excessive force turning bolts or lifting heavy components.	Use automated methods to loosen tight bolts, do not use excessive force or torque when using hand tools. Do not use "cheater bars".	
		3	Contact with engine fluids or lubricants	Wear protective gloves, ensure MSDS is available for engine fluids and lubricants, promptly wash exposed skin, contact WorkCare immediately for any situation where diesel is injected under the skin.	
		4	Flying debris during decontamination or cleaning activities.	Wear adequate eye and face protection when removing soils or solid media from tracks, buckets, or other component of equipment by using a pressure washer.	
		5	Entanglement in equipment components.	Do not circumvent protective guards or shields, ensure equipment is not operational (LOTO if necessary) when accessing engine compartment if intrusion required.	
		6	Exposure of hands and arms to hot engine components	Take the time to allow the engine to cool, wear protective gloves and forearm protection.	
		7	Struck by moving equipment or boom extensions	Keep at least 15 ft from any extendable area of the equipment, if entering within 15 ft, establish and maintain contact with equipment operator, wear high visibility clothing or work vest.	
5	Working in proximity to heavy equipment	1	Equipment damage from moving equipment	Keep other equipment not required for work outside of heavy equipment work area. Flag or mark equipment with high visibility markings, cones, etc.	
		2	Noise hazards from equipment operation	Wear hearing protection and increase distance if work activity permits.	

PPE Personal Protective Equipment			
Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	work gloves (specify type)		Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs	as needed	Recommended
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies			
Type	Supply	Description	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
Personal	eye wash (specify type)		Required

Review Comments		
Reviewer		Comments
Employee: Role Review Type Completed Date	Moyers, Sam HASP Reviewer Approve 6/15/2009	

	ARCADIS HS Standard Name Personal Protective Equipment	Revision Number 03
Implementation Date 20 February 2009	ARCADIS HS Standard No. ARC HSGE015	Revision Date 13 February 2012
Author Sam Moyers	Page 1 of 14	Approver Tony Tremblay

EXECUTIVE SUMMARY

Through the use of personal protective equipment (PPE), ARCADIS employees are protected from occupational hazards in the event that engineering and administrative controls are not sufficient or practical. PPE will be provided to ARCADIS full time and permanent part time employees that regularly conduct field work or visit project sites outside of office environments at no cost following training on the proper use and maintenance of PPE.

Project managers are responsible for assessing potential hazards on a worksite and determining the applicable PPE.

Project personnel are responsible for understanding and utilizing “Stop Work Authority” should a hazard present itself that was not previously identified or in doses higher than anticipated.

PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment
- The task-specific conditions and duration
- The hazards and potential hazards identified at the site

PPE may be categorized into levels A, B, C or D.

- Level A offers the highest skin and respiratory protection
- Level B offers a high degree of respiratory protection with lesser levels of skin protection
- Level C is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met
- Level D offers the least skin and respiratory protection

PPE training will include, at minimum:

- When and what PPE is necessary
- How to put on, adjust, wear and take off the PPE
- Limitations of the PPE
- Proper care, maintenance, useful life, and proper disposal of PPE

	<u>ARCADIS HS Standard Name</u> Personal Protective Equipment	<u>Revision Number</u> 03
<u>Implementation Date</u> 20 February 2009	<u>ARCADIS HS Standard No.</u> ARC HSGE015	<u>Revision Date</u> 13 February 2012
<u>Author</u> Sam Moyers	Page 2 of 14	<u>Approver</u> Tony Tremblay

1. POLICY

It is the policy of ARCADIS to assess the workplace to identify and assess hazards in order to appropriately implement controls for those hazards. In addition, it is ARCADIS policy to supply personal protective equipment (PPE) for employees in a working environment where engineering and administrative controls are not feasible or effective in the control of hazards. ARCADIS will train and supply this PPE at no cost to the employee.

2. PURPOSE AND SCOPE

2.1 Purpose

The purpose of PPE is to shield or isolate individuals from the chemical, physical and biologic hazards that may be encountered in their work environment. A hazard analysis or assessment will be performed before a job task is begun to evaluate if PPE is necessary to protect an employee from identified hazards and determine the type of PPE required. This analysis will include the identification of hazards/suspected hazards and their routes of exposure.

Combinations of protection may be needed to provide the appropriate level of protection for any given work environment. The level of PPE may change during a job, so periodic evaluation will be done to ensure that the most appropriate PPE is being used. Over-protection, as well as under-protection, can be hazardous and should be avoided where possible.

Subcontractors and other non-ARCADIS employees must supply their own PPE. ARCADIS will not supply PPE to any non-ARCADIS employees unless specific arrangements and agreements are made with the other party.

This Health and Safety Standard (HSS) provides guidance on the proper selection, use, care and maintenance of PPE.

2.2 Scope

Whenever possible, engineering, substitution and administrative controls will be used to reduce or eliminate hazards, but when they are not feasible, practical or adequate, PPE will be used to protect employees from exposure to hazards during ARCADIS-related work tasks.

3. DEFINITIONS

Definitions related to personal protective equipment can be found in Exhibit 1.

	ARCADIS HS Standard Name Personal Protective Equipment	Revision Number 03
Implementation Date 20 February 2009	ARCADIS HS Standard No. ARC HSGE015	Revision Date 13 February 2012
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4. RESPONSIBILITIES

4.1 ARCADIS Management

Responsible for providing resources for the acquisition of PPE and for the conduct of hazard assessments.

4.2 Project Managers

Project Managers are responsible, as part of the project hazard assessment, for determining PPE necessary to complete the project. In addition, the Project Manager is responsible for determining client requirements with respect to PPE. Project Managers notify health and safety staff of biological, chemical and physical hazards present or potentially present on the site. Project Managers are also responsible for ensuring that project staff has the appropriate and applicable training for PPE use prior to those staff beginning work.

4.3 Corporate Health and Safety

Corporate Health and Safety is responsible for keeping this standard up-to-date with current regulatory requirements and best practices and for assisting in determining the appropriate PPE for a particular task and work environment and for assisting in the identification of appropriate vendors of such PPE.

4.4 Health and Safety Staff

Project Health and Safety Staff including designated Writers and Reviewers of Project Health and Safety Plans (HASPs) are responsible for developing control processes and techniques on specific projects based on the physical, chemical and biological hazards expected to be encountered on project facilities.

4.5 ARCADIS Staff

ARCADIS staff is responsible for completing PPE training as required by this policy and standard, and for following all hazard control processes designated by the Project Manager, Project Health and Safety Staff and the project HASP. If project personnel believe that a hazard is present that was not previously identified or is at levels that are higher than expected, they should stop work and notify project health and safety staff or the project manager immediately and not proceed until authorized.

5. PROCEDURE

5.1 Minimum PPE Requirements

All full time and permanent part time employees that regularly conduct field work or visit project sites outside of office environments will be issued a field bag that contains, at a minimum, the following PPE:

- An ARCADIS logo'd hardhat

	ARCADIS HS Standard Name Personal Protective Equipment	Revision Number 03
Implementation Date 20 February 2009	ARCADIS HS Standard No. ARC HSGE015	Revision Date 13 February 2012
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- Two pair of safety glasses, one clear pair and one tinted pair, or one pair of prescription safety glasses with transitional lenses
- Hearing protection
- A minimum, Type 2 reflective vest in either orange, lime green or yellow
- Steel toe safety boots

Temporary full time/part time employees (temp staff) will be provided all of the above PPE; however, standard steel toed safety boots will only be provided to temp staff employees with the approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide standard steel toe boots or other non-specialty required footwear to temp staff, the employee will be informed of the requirement to provide their own footwear meeting project health and safety requirements prior to hire.

Office locations will stock extra bags with the equipment listed above for use by other staff that do not regularly go to field locations. Additional PPE and H&S equipment will be issued to staff based on the hazards they face on specific projects (i.e. respirators, goggles, chaps, etc.).

No ARCADIS staff should arrive at a field or project site without this minimum PPE.

5.2 The PPE Program

The basic objectives of a PPE program are to protect the wearer from safety and health hazards; and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. This document serves as the overall ARCADIS PPE program and is used as guidance for the development of a project-specific PPE program which becomes part of a project-specific health and safety plan. A project-specific PPE program in combination with this HSS will address the following:

- PPE selection based upon site hazards (Hazard Identification/Assessment).
 - Identify the hazards/suspected hazards and their potential routes of exposure (e.g., skin, inhalation, ingestion or eye contact).
- The use and limitations of the equipment including limitations during temperature extremes and under certain medical conditions;
- The work mission duration;
- Maintenance, storage, decontamination and disposal of PPE;
- Training including proper fit and how to properly put on and take off PPE;
- PPE inspection procedures prior to, during, and after use; and

	ARCADIS HS Standard Name Personal Protective Equipment	Revision Number 03
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- Periodic evaluation of the effectiveness of the PPE program.

5.3 PPE Selection

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress and impaired vision, mobility and communication. Over-protection, as well as under-protection, can be hazardous and should be avoided where possible. Site or project-specific health and safety plans take into consideration engineering, substitution, and administrative controls first as a means to eliminate/reduce the need for PPE. When it is not feasible or practical to eliminate the use of PPE, PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment;
- The task-specific conditions and duration; and
- The hazards and potential hazards identified at the site.

The level of protection will be increased whenever it is shown that increased protection is necessary to reduce employee exposures to the hazards. It may be decreased when it is shown that this will not result in hazardous exposure to employees.

5.4 Levels of PPE Protection

For work on hazardous sites, a combination of PPE may be categorized into levels A, B, C, or D with level A offering the highest level of protection and D the lowest. Monitoring the effectiveness of PPE will be done throughout a project to ensure that the appropriate level of protection is being worn. These levels of protection are described below.

5.4.1 Level A Protection

Level A PPE offers the highest level of respiratory and skin protection and should be worn when:

- The hazardous substance has been identified and requires the highest level of protection of the skin, eyes, and respiratory system based on either:
 - The measured (or potential) high concentrations of atmospheric gases, vapors, or particulates; or
 - If site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates which are harmful to skin eyes, or the respiratory system.
- There is a known or suspected high degree of hazard to the skin and skin contact is possible.

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- Conducting work in a confined, poorly ventilated area and the other criteria requiring Level A PPE have not been determined.

Level A equipment includes:

- NIOSH approved positive pressure, full-face piece self contained breathing apparatus (SCBA), or positive pressure supplied airline respirator with escape SCBA;
- Totally encapsulating chemical-protective suit (material based on the hazard);
- Chemical resistant outer **and** inner gloves (type and material based on the hazard);
- Chemical resistant boots with steel toe and shank;
- Disposable protective suit, gloves and boots (depending on suit construction, may be worn over the totally encapsulating suit);
- Coveralls (optional, as applicable);
- Long underwear (optional, as applicable); and
- Hard-hat - under suit (optional, as applicable).

5.4.2 Level B Protection

Level B PPE offers a high degree of respiratory protection with lesser levels of skin protection. Level B PPE should be worn when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection but less skin protection;
- The atmosphere contains less than 19.5 percent oxygen; or
- The presence of incompletely identified vapors or gases is indicated by direct reading organic vapor detection instruments, but the vapors and gases are not suspected of containing high levels of chemical harmful to the skin or capable of being absorbed through the skin. Level B is the minimum level of protection that should be worn when there is insufficient information to determine the hazards or potential hazards of the substance.

Level B PPE equipment includes:

- NIOSH approved positive pressure, full face piece self contained breathing apparatus 1(SCBA), or positive pressure supplied air respirator with escape SCBA;

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- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (material based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);
- Hard hat (optional, as applicable); and
- Face shield (optional as applicable).

5.4.3 Level C Protection

Level C PPE is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met. It should be worn when:

- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
- The types of air contaminants have been identified, concentrations measured, and an air purifying respirator is available that can remove the contaminants; and
- All criteria for the use of an air purifying respirator are met.

Level C PPE equipment includes:

- NIOSH approved full face or half mask air purifying respirator (with appropriate cartridges based on the hazards);
- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (materials based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);

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- Hard hat (optional, as applicable);
- Escape mask (optional, as applicable); and
- Face shield (optional, as applicable).

5.4.4 Level D Protection

Level D PPE offers the least skin and respiratory protection and should be worn when the atmosphere contains no known hazards, and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level D PPE equipment may include any or all of the following depending on the hazards of the site:

- Chemical resistant boots with steel toe and shank (optional, as applicable);
- Coveralls (optional, as applicable);
- Gloves (optional, as applicable);
- Outer chemical resistant boots (disposable) (optional, as applicable);
- Safety glasses or chemical splash goggles (optional, as applicable);
- Hard hat (optional, as applicable);
- Escape mask (optional as applicable); and
- Face shield (optional as applicable).

5.5 Combinations of Protection

Combinations of protection are acceptable if the task hazard analysis and the site conditions warrant modification of PPE levels.

5.6 Equipment List

5.6.1 Eye/Face Protection

All employees engaged in or working in or adjacent to areas with eye-hazardous activities or operations, such as but not limited to flying objects and hazardous chemicals shall wear appropriate eye protection.

- Safety glasses with side shields are required for impact protection and shall meet ANSI Standard Z87.1 requirements.

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- Chemical goggles (for protection against chemical splash).
- Face shields (for face protection from chemical splash and are not a substitute for primary eye protection).
- Full-face respirators can provide eye and face protection in lieu of safety glasses, goggles or face shields.
- Shaded eye protection meeting the minimum shade requirements established in 29 CFR 1910.133 (for employees exposed to sources of injurious light radiation [e.g., welding, cutting, lasers]).
- For prescription eye protection contact your supervisor to fill out an AOSafety order form available on APEX. For temp staff, standard prescription safety glasses will be provided with the approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide standard prescription safety glasses to temp staff, the employee will be informed of the requirement to provide their own prescription safety meeting project health and safety requirements prior to hire.

5.6.2 Respiratory Protection

Respirators will be provided and used in accordance with the ARCADIS Respiratory Protection Policy/Standard ARC HSGE017 and 29CFR 1910.134.

5.6.3 Hearing Protection

Hearing protection will be provided and used in accordance with the ARCADIS Hearing Conservation Policy/Standard ARC HSIH008 and 29CFR 1910.95.

5.6.4 Foot Protection

- Basic foot protection is required for all ARCADIS job sites and industrial locations. Specialized footwear will be provided as required by the nature of the work. Special foot protection may include, but is not limited to, chemically resistant, thermally shielded, metatarsal guards, etc.
- Leather Safety Boots will be provided for employees; one pair of leather safety boots will be provided as necessary by ARCADIS. The employee purchasing the footwear is required to ensure that it meets any of the consensus standards as specified by OSHA 29 CFR 1910.136 which include:
 - ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear"
 - ANSI Z41-1999, "American National Standard for Personal Protection -- Protective Footwear"

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- ANSI Z41-1991, "American National Standard for Personal Protection -- Protective Footwear"
- All consensus standards are incorporated by reference in OSHA 29CFR 1910.6
- In general, for most work done by ARCADIS, safety boots must be equipped with steel toes. Puncture resistant soles or in-soles equipped in the safety boots are project driven based on the Hazard Assessment. Some clients may require puncture resistant soles or in-soles.
- The maximum expenditure or reimbursement for approved safety shoe purchases will be \$150. Reimbursement requests must be approved by the employee's supervisor.
- Athletic-style safety shoes ("safety sneakers") are prohibited (due to the difficulties created by these styles in supervising proper use of protective footwear).

5.6.5 Head Protection

Hard hats meeting ANSI Z89.1 will be provided to protect employees from impact, penetration, falling objects and/or limited electrical shock and burn, as appropriate for work site hazards. A hard hat must be replaced when it becomes damaged, contaminated (and contamination cannot be removed) or it has been struck by an object of sufficient size to potentially compromise its integrity.

Hardhats must resist penetration by objects, be water resistant and slow burning, and have a chin strap if it is worn while working at elevation. It must be worn square on the head and not be pushed back, to the side or forward.

There are two types and three classes of head protection described in ANSI standard.

Other hazard situations to consider are:

- In areas of heavy vegetation or in any area where hunters may be present, it is recommended that some type of brightly colored head protection be worn. For example, a bright orange or yellow baseball cap or stocking cap.
- If cold exposure is an issue, hardhat liners are available (made specifically for the particular hardhat) or if a hardhat is not required, some type of insulated head protection such as a stocking cap should be worn.

5.6.6 Hand Protection

Appropriate hand protection will be provided if employee's hands are exposed to hazards while on the job.

Such as:

- pinch points

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- sharp/pointed tools or objects
- incorrect or inadequate tool use
- improper use
- rotating/energized/automated parts
- abrasive materials
- inadequate job planning
- lack of/inadequate protection
- changing weather conditions and extreme temperatures
- hazardous material
- jewelry and loose clothing.

Once these hazards are identified, the appropriate glove or hand protection must be selected. When choosing gloves, keep in mind:

- Hazardous Chemicals/Substances to be Contacted
- Nature of Contact (total immersion, splash, etc.)
- Duration of Contact
- Area of Protection (hand only, forearm, arm)
- Equipment (rotating, sharp edges, etc.)
- Grip (dry, wet, oily)
- Thermal Protection
- Abrasion/Cut/Puncture Resistance
- Tear/Tensile Strength
- Ergonomics (size, heat stress, dexterity)
- Decontamination/Disposal

In selecting chemically protective gloves, the toxic properties of the chemical(s) will be determined. Information provided on the manufacturer's label or by chemical compatibility charts regarding breakthrough time, permeation rate and degradation should be considered during selection.

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5.6.7 Body Protection

Protective clothing, gloves, boots, and other protective equipment will be provided as appropriate for the hazards associated with the tasks being performed.

Long pants are required for all field work unless approval is granted by corporate H&S. Additional protection such as cooling vests may be required. In environments with potential biological hazards such as ticks, plants or snakes, gloves and long sleeves should be worn along with head protection of some kind to protect the scalp. In areas of roadway work or other vehicle traffic high visibility Class II safety vests will be worn.

Chemically Protective Clothing (CPC) will be selected by evaluating the performance characteristics of the CPC against the requirements and limitations of the site and task-specific conditions. This selection should be performed by an employee with training and experience taking into consideration:

- Permeation, degradation, penetration of the CPC by the chemical and;
- Durability, flexibility, fit, temperature effects, ease of decontamination, compatibility with other necessary equipment (e.g., hardhats, SCBA, etc.); and duration of use that could affect the employees ability perform the task.

Where required, appropriate Fire Resistant (FR) protective clothing must be used where there is a potential for electrical arc flash hazards (refer to the ARCADIS Electrical Safety Standard HSFS006 for additional information). Jobs that expose workers to fire dangers require the use of FR protective clothing.

5.6.8 Specialized Equipment

All other specialized safety equipment required for an assignment (e.g., work gloves, specialized protective clothing, hip boots, field rain gear, personal floatation devices) will be provided by ARCADIS as specified in the HASP.

5.6.9 Extreme Cold Environments

Supervisors are responsible for ensuring that staff is properly equipped to protect themselves while working in extreme cold environments. The following is suggested as appropriate PPE for cold conditions:

- Hats/hat liners and gloves
- Thermal clothing
- Hi-Visibility clothing
- Winter footwear

Use of specialized equipment will be charged to projects in accordance with established policy and rental rates.

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5.7 Maintenance/Storage/Disposal

5.7.1 PPE Maintenance and Disposal

PPE must be inspected by the user before and after each use for defects, rips, tears and/or damaged parts. Damaged or compromised PPE will not be used and must be repaired before re-use or disposed. PPE must be disposed of according to the HASP and other project plans for the site. If non-disposable, PPE must be decontaminated and sanitized before being reused according to the HASP Contaminated PPE which cannot be properly decontaminated by normal procedures must be disposed of accordingly.

5.7.2 PPE Storage

All PPE must be stored to protect against dust, sunlight, extreme heat and cold, excessive moisture and damaging chemicals. Storage must be in accordance with the manufacturer's specifications and OSHA requirements.

5.7.3 Contaminated Boots

Single-use boots or boot covers which become contaminated on the job will be waste profiled, as necessary, and properly disposed. Work boots will be properly decontaminated upon exiting contaminated work zones (exclusion zones). Work boots that are damaged on the job must be replaced.

6. TRAINING

Training in the proper use of PPE will generally be provided in conjunction with HAZWOPER training or via coursework selected and approved by Corporate H&S. Training will be completed prior to the employee's use of PPE, when changes in the work place alter the use or type of PPE, and when inadequacies in the employee's knowledge or use of PPE are noted.

The training will include at a minimum:

- When and what PPE is necessary;
- How to put on, adjust, wear and take off the PPE;
- Limitations of the PPE; and
- Proper care, maintenance, useful life, and proper disposal of PPE.

7. REFERENCES (regulation citation, technical links, publications, etc.)

29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response"

29 CFR 1910 Subpart I "Personal Protective Equipment"

29 CFR 1910.136 Foot Protection

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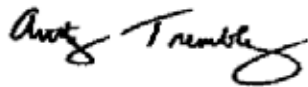
29 CFR 1910.6 Incorporation by reference

8. RECORDS - DATA RECORDING AND MANAGEMENT

Records of the PPE training are retained by the employee and in the ARCADIS training database. Medical clearance for respirator use is maintained by the employee and ARCADIS' medical vendor.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Tony Tremblay, Corporate Health and Safety



History of Change

Revision Date	Revision Number	Reason for change
20 February 2009	01	Original document
19 August 2011	02	Updated footwear protection consensus standards, clarified contaminated work boot section and updated document format
2 February 2012	03	Clarified temp staff PPE issues in sections 5.1 and 5.6.1

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Exhibit 1 – Definitions

Eye/Face Protection - Equipment designed to provide eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Foot Protection - Footwear designed to provide foot and toe protection when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and/or where an employee's feet are exposed to electrical hazards. These include such measures as steel toe and boot warmers.

Hand and Body Protection - Equipment designed to provide protection to the hands and body during exposures to potential hazards such as potential for skin absorption of harmful substances, sharp objects, abrasive surfaces, punctures, temperature extremes and chemical contact.

Hazard Assessment - The process utilized to identify hazards in the workplace and to select the appropriate PPE to guard people against potential hazards.

Head Protection - Equipment designed to provide protection to the head during exposure to potential hazards such as falling objects, striking against objects or electrical hazards.

Hearing Protection - Equipment designed to provide protection to an individual's hearing during exposure to excessive noise levels and any 8hr work day with noise levels consistently 85dB or above.

Personal Protective Equipment (PPE) - Equipment designed to provide protection to the wearer from potential hazards to the eyes, face, hands, head, feet, ears, extremities and respiratory system.

Respiratory Protection - Equipment designed to provide protection to the wearer from potential inhalation hazards such as vapors, mists, particulates and gases.

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1. POLICY

ARCADIS understands the hazards of personal exposure to lead. Based on this understanding, ARCADIS will implement the appropriate controls to minimize or eliminate the hazards of lead. These controls will focus first on engineering controls to mitigate lead hazards where appropriate and practical. Administrative controls may also be implemented as appropriate and practical. Where it is not appropriate or practical to implement engineering and administrative controls, personal protective equipment (PPE) will be implemented to control lead hazards below known occupational exposure limits.

2. PURPOSE AND SCOPE

2.1 Purpose

2.1.1 Exposure to Lead - This policy and associated procedures provides information to protect ARCADIS employees, subcontractors, and other effected personnel from exposures to lead while conducting work on ARCADIS projects.

2.1.2 OSHA Standards – This policy meets the requirements of the U.S. Occupational Safety and Health Administration (OSHA) regulations including Title 29 Code of Federal Regulations (CFR) Part 1910.1025 and Part 1926.62

2.2 Scope

This policy and the associated procedures apply to all projects where lead is known or thought to be present, and where ARCADIS employees, subcontractors and other effected personnel are or could be exposed to lead above the Action Level.

3. DEFINITIONS

Action Level is the airborne concentration established by OSHA that triggers certain regulatory requirements.

Authorized person means any person authorized by ARCADIS and required by work duties to be present in lead regulated areas.

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from gasoline, paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years.

Lead is encountered on ARCADIS projects as a contaminant in soils, ground and surface water, sediments, and other environmental media. It can also be encountered through the air where dusts containing lead are present. Personnel may also encounter lead in other forms at certain client facilities at which ARCADIS works. It can be encountered at mining and smelting operations, battery manufacturing facilities, chemical production facilities where metal coatings or

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plastics are manufactured and other types of industrial sites. In addition, other activities that may expose ARCADIS staff to lead include:

- Demolition or salvage of structures where lead or materials containing lead are present;
- Removal or encapsulation of materials containing lead;
- New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
- Installation of products containing lead;
- Lead contamination/emergency cleanup;
- Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed, and
- Maintenance operations associated with the construction activities described in this paragraph.

High-efficiency particulate air [HEPA] filter means a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter.

Permissible Exposure Limit (PEL) is an average airborne concentration regulatory limit established by OSHA above which requires control to protect people from adverse health effects.

Short Term Exposure Limit (STEL) is a PEL or TLV established as a limit of exposure measured over a designated period of time less than 8 hours.

Threshold Limit Value is a recommended average airborne concentration limit established by ACGIH. The TLVs are reviewed and updated as appropriate annually.

Time Weighted Average (TWA) is a measurement of airborne exposure to a chemical compound measured and averaged over a designated period of time for comparison to an STEL or an 8-hour PEL or TLV.

4. RESPONSIBILITIES

4.1 Project Managers are responsible, as part of the project hazard assessment, for determining if lead is or is potentially present on a project site. In addition, the project manager is responsible for determining client requirements with respect to the control of lead hazards. Project Managers notify health and safety staff when working on sites containing lead. Project Managers are also responsible for ensuring that project staff has the appropriate and applicable training for lead prior to those staff beginning work.

4.2 Corporate Health and Safety is responsible for keeping this policy and standard up-to-date with current regulatory requirements and best practices. In addition, Corporate Health and Safety oversees the medical surveillance program for lead, as applicable and provides a lead training package to for presentation to appropriate staff.

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4.3 Project Health and Safety Staff including designated Writers and Reviewers of Project Health and Safety Plans (HASPs) are responsible for developing control processes and techniques on specific projects based on the levels of lead expected to be encountered on project facilities.

4.4 Regional and Division HS Staff are responsible for supporting and assisting the project and task managers, and the project HS staff in the implementation of this policy and the associated standards.

4.5 Project Personnel are responsible for completing lead training as required by this policy and standard, and for following all hazard control processes designated by the Project Manager, Project Health and Safety Staff, and the project HASP. If project personnel believe that lead is present that was not previously identified or is at levels that are higher than expected, they should stop work and notify project health and safety staff or the project manager immediately and not proceed until authorized.

5. PROCEDURE

5.1 Lead Hazards

The health effects of lead are based on the type of exposure encountered by workers.

The primary route of exposure to lead in the work place is through inhalation of airborne lead. However, oral ingestion may represent a major route of exposure in contaminated workplaces. Most exposures occur with inorganic lead. Organic (tetraethyl and tetramethyl) lead, which was added to gasoline until the late 1970s, is not commonly encountered. Organic forms may be absorbed through the skin, while inorganic forms cannot.

Inorganic lead is not metabolized, but is directly absorbed, distributed and excreted. The rate depends on its chemical and physical form and on the physiological characteristics of the exposed person (e.g. nutritional status and age). Once in the blood, lead is distributed primarily among three compartments – blood, soft tissue (kidney, bone marrow, liver, and brain), and mineralizing tissue (bones and teeth). Absorption via the gastro-intestinal (GI) track following ingestion is highly dependent upon presence of levels of calcium, iron, fats, and proteins.

5.1.1 Exposure Limits and Regulated Areas

The following personal exposure limits are established for lead by inhalation:

- OSHA ACTION LEVEL – 30 micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$) lead in air 8-hour time weighted average (TWA).
- OSHA PERMISSIBLE EXPOSURE LEVELS (PELs)
 - TWA - 50 $\mu\text{g}/\text{m}^3$ lead in air averaged over an 8 hour period.
- ACGIH THRESHOLD LIMIT VALUES (TLVs)

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– TWA – 50 ug/m³ lead in air averaged over an 8 hour period.

- Personal exposure is the concentration of lead to which a person would be exposed if that person were not wearing respiratory protection. Personal exposures shall be measured over the exposure period in the breathing zone of the employee. Personal exposures should not be determined by area sampling.
- REGULATED AREA

An area where the lead exposure does or can be expected to exceed the PEL. Since it may be difficult to determine the exposure time for employees working in areas with concentrations that exceed PEL values, the facility/location may wish to regulate any area that exceeds the 8-hour TWA PEL.. Only Authorized Persons are permitted to enter regulated areas.

5.1.2 Actions for Employee Exposures Greater Than or Equal to the Action Level but Less Than the PELs

- Training – Annual lead training is required.
- Medical Surveillance – Initial and annual medical exams (see below) are required if employee personal exposures do or can be reasonably expected to exceed the Action Level on at least 30 calendar days during the coming year.
- Periodic Monitoring – shall be conducted at least annually until at least two consecutive exposure determinations (no less than 7 days apart) indicate the exposure is below the Action Level.

5.1.3 Actions for Employee Exposures Greater Than PELs

- Respiratory Protection – a minimum of full face air-purifying respirators equipped with HEPA filters shall be used in all regulated areas.
- Training – Annual lead training is required.
- Medical Surveillance – Initial and annual medical exams (see below) are required if employee personal exposures do or can be reasonably expected to exceed the PEL on a least 10 calendar days during the coming year.
- Written Program – A written program to reduce personal exposure is required detailing the methods to be used to reduce exposures below the PEL. These written programs will be in the form of the project HASP based on project-specific and client requirements. The HASP will indicate the schedule for the implementation of the any lead-related hazard control processes or methods. The HASP is reviewed periodically but at least annually per the ARCADIS SOP ARC HSFS010 – Health and Safety Plans. All project personnel have access to the project HASP at all times.
- Periodic Monitoring – at least every 6 months until at least two consecutive exposure determinations (no less than 7 days apart) indicate the exposure is below the PEL;

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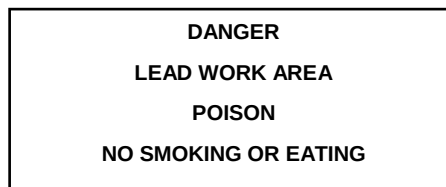
then annually until at least two consecutive exposure determinations (no less than 7 days apart) indicate the exposure is below the PEL Action Level.

5.1.4 Exposure Monitoring

- Representative personal exposure monitoring is required for each type of operation involving the handling of or potential exposure to lead.
- Initial monitoring can be omitted if there is documented data or industrial hygiene calculations to demonstrate that exposures are below the action level.
- Personal exposure monitoring shall utilize standard industrial hygiene sampling techniques and recordkeeping.
 - Employees who have been monitored for lead exposure shall be notified of the monitoring results within 15 working days of receipt of these results . If the PEL is exceeded, the notification must indicate the follow-up plans or corrective actions to be taken to reduce exposures to below the PEL.
- Personal TWA monitoring can be used for extended tasks, such as soil and sediment sampling, working on mine sites where lead is present, where clients require monitoring, etc.
- Area sampling can be used to determine regulated areas;
- Periodic Monitoring is required if exposures exceed the Action Level or PELs.

5.1.5 Requirements for Regulated Areas

- Posting – Regulated areas shall be indicated such as by barricades, barricade tape, painted demarcations, or other devices.
- A sign shall be posted at the access to the regulated area with the warning:



[Minimum lettering height: DANGER LEAD WORK AREA 4"; others 3"]

- Respiratory Protection – Respirators shall be worn by all personnel when in a regulated area, regardless of the time period or over-all personal exposure measurement.
- Labeling:

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- In addition to appropriate Hazard Communication labeling, containers or

CAUTION ITEMS CONTAMINATED WITH LEAD DO NOT REMOVE DUST BY BLOWING OR SHAKING DISPOSE OF LEAD CONTAMINATED MATERIALS AND WASH WATER IN ACCORDANCE WITH LOCAL, STATE (PROVINCIAL) OR FEDERAL REGULATIONS

equipment containing lead or lead compounds must also be labeled as such:

- Eating, drinking, smoking, chewing any item, or applying cosmetics is strictly prohibited in a lead regulated area.

5.1.6 Exposure Reduction

- Written Program:
 - The Project Manager and the Project Health and Safety Staff will develop a written program and make a determination as to the initial exposure levels to be included in the project HASP for exposure reduction if there is a determination that employee exposures may exceed the OSHA Action Level. The HASP will be reviewed at least annually. The program must include:
 - o The locations and operations of potential lead exposure
 - o Means to achieve compliance
 - o Available air monitoring data or industrial hygiene estimates of airborne concentrations
 - o Schedule for implementing control procedures
 - o Exposure control processes
 - o Medical surveillance requirements
 - o Training requirements
 - o Emergency response
 - o The written program must list the corrective actions that will be taken to reduce employee exposure to at or below the OSHA Action Level:
 - o identify regulated areas/tasks and the operations where lead may be encountered;

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- o the specific means to achieve compliance with OSHA, client, and other applicable requirements;
 - o engineering controls;
 - o revised work practices;
 - o respiratory protection and protective clothing; and
 - o schedule of development and implementation.
- Spills and Emergencies:

An emergency is any occurrence which may result in an unexpected significant release of lead or lead-containing compounds that may result in a significant inhalation. After an emergency, appropriate monitoring must be conducted to assure the ambient lead levels are back to normal; and conduct appropriate medical surveillance for affected employee(s).

- Respiratory Protection and Personal Protective Equipment:
 - Respirators shall be worn, maintained and managed in accordance with the OSHA standard, 29 CFR 1910.134 and ARCADIS SOP ARC HSGE017 – Respiratory Protection. In addition, any client requirements on project sites will be followed.
 - Respiratory protection will be worn in all areas as determined in the project HASP and per client requirements. Respirators will be at a minimum, full-face air purifying respirators equipped with HEPA filters.
 - Protective clothing will be worn per the requirements of the client or the project HASP and will include at a minimum at or above the OSHA Action Level:

Coveralls

Gloves

Hood

Boots and boot covers

Face shield (depending on operation)

Goggles

- Ventilation Systems:

Where appropriate, ventilation systems will be utilized to control the level of airborne lead per the client and HASP requirements. These ventilation systems will be equipped with HEPA filtration and be maintained to ensure effective collection of the lead particulate.

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Personnel who maintain these systems and change the filters will be appropriately protected per this policy and standard to minimize exposure.

- Personal Hygiene:

Where lead is present at any level, project personnel handling such media containing lead will wear gloves to minimize exposure of lead to the skin that can then be transferred to the mouth. In all areas where lead is present, personnel will dutifully wash their hands and face before leaving the area to eat, drink, smoke, chew or apply cosmetics. Decontamination and changing facilities will be provided as necessary. In situations as indicated in the project HASP, PPE will be worn to protect the skin from exposure. However, even where PPE is worn, hand and face washing is required.

5.1.7 Medical Surveillance

- Initial medical surveillance is required:
 - If employee personal exposures are reasonably expected to exceed the Action Level on at least 30 calendar days per year; or
 - If employee personal exposures are reasonably expected to exceed the PEL on a least 10 calendar days per year.
- Periodic exams are required on an annual basis for employees who continue to meet the criteria listed above. Annual exams may be discontinued after the exam conducted the year after personal exposures fall below the limits stated above in this section.
- The specific medical exam requirements are explained in detail in ARCADIS SOP ARC HSGE010 - Medical Surveillance. In addition, ARCADIS will work with WorkCare to ensure the proper medical surveillance, testing and notification is completed related to exposure to lead. This includes timing of sampling (e.g., at least every 6 months to each covered employee; at least every two months for each employee whose last blood sampling and analysis indicated a blood lead level at or above 40 ug/100 g of whole blood; and at least monthly during the removal period), treatment if levels are elevated (e.g., temporary removal from the site), and employee notification (i.e., within 5 days of levels are not acceptable).
- The physician must be supplied a copy of the OSHA lead regulation 29 CFR 1910.1025 and a description of the employee's lead exposure.
- For employees exposed to lead from an emergency, ARCADIS will immediately call WorkCare and follow all instructions for treatment and testing

6. TRAINING

Initial lead training is required for all employees assigned to a work area suspected or known to contain lead. This training can be accomplished at the project orientation prior to the initiation of site work.

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Annual lead training is required at a minimum for all employees actually or potentially exposed to greater than the Action Level.

Initial and annual training shall consist of:

- The operations that involve lead exposure.
- The methods/observations that can be used to detect the presence or release of lead
- The physical and health hazards of lead.
- Methods used to protect against the hazards of lead including PPE and respiratory protection.
- The proper use of personal protective equipment in emergency situations.
- The meaning of a regulated area and how such are demarcated.
- A review of the applicable standard and where copies can be found.
- An explanation of the medical surveillance program and an employee's right to access medical and exposure records.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- OSHA 29 CFR 1910.1025 – Lead
- OSHA 29 CFR 1926.62 – Lead
- ACGIH 2006 TLVs and BEIs – Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices
- ARCADIS Medical Surveillance SOP – ARC HSGE006
- ARCADIS Respiratory Protection SOP – ARC HSGE017

8. RECORDS

- All exposure, medical, and training records shall be kept for 40 years or at least 20 years past the last date of employment.
- All exposure and medical records shall be made available to appropriate regulatory agencies upon written request.
- Employees who have been monitored for lead exposure shall be notified of the monitoring results within 15 working days of receipt of these results; a written request is not required.

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9. APPROVALS AND HISTORY OF CHANGE

Michael A. Thomas, CIH, Director H&S Environmental Division



History of Change

Revision Date	Revision Number	Reason for change
26 March 2007	01	Original Document
6 September 2007	02	Changing to new template format
12 February 2009	03	Changing to new template format

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EXECUTIVE SUMMARY

ARCADIS employs a wide range of heavy, mechanized equipment in various operations. Operating heavy equipment requires, at minimum, the policies set forth in this Standard. In addition to federally mandated requirements, each state may enforce more stringent standards related to training, licensure, inspection and documentation.

The requirements set forth in this policy provide direction in heavy equipment operations:

- Only authorized personnel will operate heavy equipment.
- If Operator training is required, it will occur under controlled conditions.
- Specific training for Powered Industrial Trucks (forklifts) will be in compliance with OSHA 29CFR 1910.178. Refer to ARCADIS Forklifts HS Procedure ARC HSSP006 for additional details and requirements.
- All employees involved in Heavy Equipment Operations shall read and understand documented hazard identification and risk assessments conducted using the Hazard Assessment and Risk Control (HARC) Process.
- ARCADIS Utility Location Standard shall be followed prior to beginning work which involves heavy or mechanized equipment. A minimum of 3 lines of evidence is required for subsurface activities.
- Preventative maintenance and pre-operation checks in accordance with the manufacturer's requirements shall be conducted prior to equipment usage.
- Understand and actively use TRACK and Stop Work Authority during heavy equipment operations.
- Supervisors shall verify clients' operating procedures and identify site hazards.
- PICs, PMs and TMs will be responsible for verifying operator training, maintaining equipment and operator documentation, identifying all operations which use heavy equipment in the work plan and researching and adhering to any additional policies required by the state in which the project operates.
- Maintain all current and applicable licensing, permits and project documentation as required by federal and state regulations. Required operation permits and checklists can be found in Exhibit 2.
- Work Practices associated with Heavy Equipment Operations such as PPE usage, illumination, equipment testing, travel path verification and maximum capacity rating adherence shall be strictly followed at all times. A complete list of Work Practices can be found in section 5.2.

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1. POLICY

It is ARCADIS-US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, it is ARCADIS' policy that our staff will be adequately trained and experienced before operating heavy and mechanized equipment. If it becomes necessary for ARCADIS employees to operate heavy or mechanized equipment, this procedure, at a minimum, will be strictly followed.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively mitigate or eliminate the hazards presented by working with or around heavy or mechanized equipment, i.e. back-hoes, track-hoes, bobcats, concrete crushers, etc.

2.2 Scope

This procedure Equipment Checklist, Operator Permit and Hazard Review apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to operate heavy or mechanized equipment.

3. DEFINITIONS

Definitions related to Heavy Equipment Operations can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

Review and update, as necessary, this standard and associated attachments.

Audit Business Unit documentation files of authorized equipment operators and Site Project Supervisors.

4.2 Principal in Charge (PIC), Project Manager (PM) and Task Manager (TM):

- Verify that all activities that require use of heavy or mechanized equipment are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Investigate the State and Local licensure and/or certification requirements for mechanized equipment operation and verify ARCADIS operators or subcontractors have required licenses and certifications.
- Verify that their divisional or project team employees have received the proper training and have the required experience and skills to operate heavy or mechanized equipment.

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- Verify that copies of the completed [Hazard Review and Evaluation for Heavy Equipment Operators form](#)(s) are maintained in the project files and maintained in a central file managed by the Business Unit.
- Verify that copies of the completed [Heavy Equipment Inspection Checklists](#) are submitted and retained with the project files.

4.3 Health and Safety Plan Writers and Reviewers

Use this procedure as guidance to ensure the appropriate identification, assessment and control of heavy and mechanical equipment operations are covered in the HASP.

Investigate the State and Local licensure and permit requirements for mechanized equipment operation and verify all ARCADIS operators or subcontractors have required licenses and certifications. A summary of state specific requirements is provided as an attachment. However, the latest regulations should be consulted.

4.4 Site Project Supervisors

Site Project Supervisors are responsible for evaluating, qualifying, monitoring and coaching/mentoring of Heavy Equipment Operators.

Site/Project Supervisors will have a minimum of 3 years construction management and/or hands-on operating experience and demonstrated proficiency with the skills required for heavy and mechanized equipment. A list of Site/Project Supervisors will be maintained by the Business Unit Management.

Specific job responsibilities include:

- Interface with the client representative to identify hazards associated with the client's project site.
- Review the client's equipment operating procedures and permit requirements, as applicable.
- Review and ensure compliance with the ARCADIS Utility Clearance Standard ARC HSFS019 before any heavy equipment operation.
- Evaluate prospective Authorized Operators using the attached [Hazard Review and Evaluation for Heavy Equipment Operators](#) and determine if an adequate level of hands-on skill has been demonstrated to safely operate the equipment.
- Upon completion of the Hazard Review and Evaluation for Heavy Equipment Operators form, complete the [Heavy Equipment Operator Permit](#) and retain a copy in the project files and maintain central file within Business Unit to document those employees evaluated and qualified as Heavy Equipment operators. In addition, the [Heavy Equipment Operator Permit](#) must be available on the project site for review.
- Verify that copies of the [Heavy Equipment Inspection Checklists](#) are being completed and retained with the project files, as specified in Section 8.0 – Records.

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- Monitor Authorized Operators and provide coaching and feedback as necessary.
- Revoke operating privileges as necessary, if required skill level is not maintained. Outline a specific Corrective Action Plan and discuss with employee and supervisor. Training Group must be notified and operator "Authorized" status revoked until necessary skill/competency is demonstrated and verified by Site Project Supervisor.

4.5 Authorized Operators

Must have adequate training and instruction in their duties and responsibilities regarding equipment operation, as documented in the [Hazard Review and Evaluation for Heavy Equipment Operators form](#).

Responsibilities include:

- Complete required daily preventive maintenance and pre-operation checks in accordance with the manufacturer's requirements and the attached Equipment Inspection Checklist (Equipment/Manufacturer Specific Checklists may be used in lieu of this form where appropriate to cover all required items).
- Conduct TRACK Assessment in order to identify, assess and control the hazards which may be faced during equipment operation as well as the signs and symptoms of exposure to the hazard(s) of the work environment.
- Review and comply with the ARCADIS above grade and subsurface utility clearance standard ARC HSFS019 before any heavy equipment operation.
- Above grade utilities in proximity to a heavy equipment work area must be marked with warning signs, shields or other protective measures, if the minimum required clearance distances cannot be maintained.
- Maintain visual contact and/or verbal communications with the spotters and other personnel in the area at all times.
- Use the PPE, air monitoring and testing equipment as specified in the HASP.
- Maintain an awareness of all barriers, operating limits and other warning devices required to protect from external hazards (e.g., traffic, pedestrians) and the proper use of those barriers.
- Obey "Stop Work" orders given by personnel in the area automatic alarm activation, or when self-perceived.

4.6 Affected Employees

- Conduct TRACK Assessment and monitor activities near areas where heavy and mechanized equipment is in operation.
- Maintain visual contact or verbal communication with all Authorized Operators and Designated Signal Person prior to approaching or when within the operating range of the equipment.

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- Order evacuation of the area if a hazard develops, either within or outside the operating area.
- Warn unauthorized persons away from the operating area.
- Summon rescue and other emergency services as necessary.
- Minimum Class II High visibility vests shall be worn by Affected Employees.

4.7 All ARCADIS Employees

Use the TRACK process described below regularly and frequently. In addition, employees read and understand all documented hazard identification and risk assessments conducted using the HARC process. ARCADIS employees will:

- Participate in entry operations only if trained and authorized to do so.
- Never enter an active work area without first getting acknowledgment and approval of the operator and Designated Signal Person, as applicable.
- Use STOP WORK Authority if unsafe or unexpected conditions arise during operation and immediately notify other personnel in the area.

5. PROCEDURE

Heavy and mechanized equipment operation can present a unique set of hazards. Only trained, qualified, authorized employees will be allowed to operate heavy or mechanized equipment in accordance with this standard. Prior to starting work with heavy or mechanized equipment all of the required permits, clearance and required project documentation will be in place. The ARCADIS Utility Location Procedure ARC HSFS 019 will be followed prior to starting work with heavy or mechanized equipment.

For work with Powered Industrial Trucks (Forklifts) refer to ARCADIS Standard ARC HSSP006 for details.

5.1 Operator Approval

Prior to operating any heavy or mechanized equipment including but not limited to:

- Track-hoes and Wheel Mounted Excavators
- Back-hoes
- Articulating Trucks
- Street Sweepers
- Compactors
- Tractors

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- Water trucks
- Hydro seeding and other truck or vehicle mounted equipment
- Concrete crushers
- Other Heavy Mechanized Equipment

All operators must be evaluated by a Site Project Supervisor and be observed on the specific equipment that will be in use. The Site Project Supervisor will complete the attached [Hazard Review and Evaluation for Heavy Equipment Operators](#) form and the [Heavy Equipment Operator Permit](#). Both documents must be maintained in the project files and copies maintained in a central file within Business Unit to document those employees evaluated and qualified as Heavy Equipment operators.

All equipment will be inspected daily prior to use using the attached [Equipment Inspection Form](#) or an equivalent inspection form provided by the manufacturer or vendor to address equipment specific items.

Note: **Gantry and Bridge Cranes and other equipment that require more formal certification or licensure are not covered by this procedure. Project managers are required to verify that selected contractors have the required training, certification and equipment maintenance programs in place.**

5.2 Heavy Equipment Requirements

All vehicles used in construction must have:

- brake lights;
- appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment;
- service, parking and emergency brakes;
- fenders on vehicles with rubber tires made after 1972;
- mud flaps on vehicles with rubber tires made before 1972;
- seats and compliant seat belts for the intended number of passengers;
- an audible warning system;
- an audible reverse alarm if the vehicle travels in reverse with an obstructed view;
- lights, if the vehicle operates in dimness or darkness;
- a defroster, if windshields fog;
- a windshield and wipers on vehicles with cabs; and
- *rollover protective structure (ROPS)*

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5.3 General Requirements

The following Work Practices must be followed for Heavy and Mechanized Equipment operations:

- Must be equipped with appropriate lights or reflectors.
- Controls must be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.
- Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.
- All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of equipment.
- Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- For power lines rated 50 kV or below, minimum clearance between the lines and any part of the equipment or load shall be 10 feet.
- In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV.
- Keep the vehicle on safe roadways and inclines. Do not move or cause to be moved construction equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicles involved.
- Maintain 3-points of contact with the steps and hand rails while getting on/into the equipment. Do not use the controls or steering wheel as a handhold.
- Operate equipment only in well ventilated areas.
- Select a gear that will prevent excessive speed when going downhill – Do not coast downhill.
- Lower all the hydraulic equipment before shutting down or getting off the machine.
- Adequate illumination in accordance with OSHA standards and work activities must be provided for all work areas. An approved type (explosion-proof as necessary) lighting device must be used.
- Rigging and lifts will only be made when the operator judges it a safe operation.
- Personnel in the vicinity of equipment will wear hard hats, safety-toe shoes, high visibility vests and safety glasses.
- Hoist hooks will have safety latches.

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- Equipment will only be used within the maximum rated capacity.
- Personnel will remain at a distance from overhead loads.
- Test directional and speed controls prior to operation.
- Test limit switches (as applicable) and the emergency stop.
- Not engage in practices that will divert attention while operating the equipment.
- Respond to signals only from the person who is directing the lift or appointed signal person.
- Not move a load over people.
- Avoid excessive force pulls.
- Determine the center of gravity and balance of the equipment and the load before moving it.
- Verify the stability of the structure or area that the equipment will be used on. When working on an elevated level a Professional Engineer or qualified building inspector must determine the adequacy of the work surface prior to placing equipment.
- Initially lift the load only a few inches to test the rigging and balance.
- Check the travel path in order to avoid personnel and obstructions.
- Center the sling over the load to keep the cables from slipping, and to prevent the load from swinging when it is lifted.
- Use a tag line when loads require precise control.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Choose a safe landing.
- Land the load when the move is finished.
- Never leave suspended loads unattended.

5.3.1 Motor Vehicle Specific Requirements

- Must be inspected at the beginning of each shift to ensure that the equipment and safety controls are in safe operating condition.
- Must have a service brake system, an emergency brake system, and a parking brake system.
- When working in areas of low visibility, motor vehicles must be equipped with at least two headlights and two taillights, which are operable.

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- If motor vehicle has an obstructed rear view, it must be equipped with reverse signal alarm that must be audible above the surrounding noise level or the vehicle is backed up only when an observer signals that it is safe to do so.
- Dumping, lifting and hauling vehicles must have overhead protection for the operator.
- Operating levers controlling hoisting or dumping devices on haulage bodies must be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.
- Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.
- Never exceed load capacities for the vehicle.
- Use the parking brake when parking and chock the wheels when needed to prevent rolling.
- Secure loose tools in the cab with workers.
- Dumping and lifting mechanisms must be secured when not in use.
- Verify that areas are clear before lifting, loading and unloading.
- All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise

5.3.2 Earthmoving Equipment

- Use seat belts and do not carry passengers where not intended on the vehicle. Seat belts need not be provided for equipment which is designed only for standup operation. Seat belts need not be provided for equipment which does not have roll-over protective structure (ROPS) or adequate canopy protection.
- All bidirectional machines, such as rollers, compactors, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Use the audible reverse alarm or signals from another worker when driving in reverse with an obstructed view.

5.3.3 Designated Signal Person

The site will use only Designated Signal Person(s) to direct heavy equipment.

Only persons who are competent and qualified by experience and/or training with the operations being directed shall be used as signal persons.

Where manual (hand) signals are used, only one person shall be designated to give signals to the operator. This signal person shall be located to see the load and be clearly visible to the operator at all times.

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Manual (hand) signals may be used when the distance between the operator and signal person is not more than 100 ft (30.4 m). Radio, telephone, or a visual and audible electrically operated system shall be used when the distance between operator and signal person is more than 100 ft (30.4 m) or when they cannot see each other.

Standard hand signals shall be posted at the operator's position, signal control points, and other points as necessary to inform those concerned.

Signal persons shall back one vehicle at a time. While under control of a signal person, the heavy equipment driver shall not back or maneuver until directed and the driver shall stop when visual contact with the signal person is lost.

The signal person shall have a warning device of clear range and penetrating sound to warn persons when the load is coming in so they have time to get in the clear.

Minimum Class II High visibility vests shall be worn by flag and signal persons.

5.3.4 Refueling

- If refueling on site, the fueling area must be clearly marked (NO SMOKING), ignition sources eliminated and spill kit available.
- Turn off the engine before refueling.
- If refueling could result in gasoline/diesel coming into contact with hot engine parts, shut off and cool the engine and any electrical equipment before refueling.
- Ensure the fueling area is well ventilated.
- Do not smoke while refueling. Keep open flames and sparks away from area.
- Ground the funnel or fuel nozzle against the filler neck to avoid sparks when refueling.
- Do not use gasoline or diesel fuel for cleaning parts.
- A dry chemical or carbon dioxide fire extinguisher (rated 6:BC or larger) is in a location accessible to the fueling area.

Diesel cold start systems contain ether which is explosive. Keep away from heat, sparks, and open flames. Work in a well-ventilated area.

- If swallowed, breathed or contacted on skin or eyes seek medical attention immediately. Follow recommendations on the Material Safety Data Sheets.
- Point the openings of the valve, tube or atomizer away from yourself and others while testing the diesel cold start system.
- Store replacement ether cylinders in a cool dry place away from direct sunlight. Do not keep them in the operator's compartment.

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6. TRAINING

Training, when required, will be provided by a qualified vendor or through supervised operation by a Site Project Supervisor under controlled conditions.

7. REFERENCES

ARCADIS Health and Safety Procedure ARC HSFS010 – Health and Safety Planning

ARCADIS Employee Field Health & Safety Handbook

[OSHA 29 CFR 1910 Subpart O](#) - Motor Vehicles, Mechanized Equipment and Marine Operations

8. RECORDS - DATA RECORDING AND MANAGEMENT

Certification and Training records will be kept by the individual employee with copies of such certificates kept by Corporate Training. Training dates and times will be kept by Corporate Training.

Operator evaluation and certification documentation will be maintained at the project site and retained with the project files. Operator certification will be valid for 1 year after the date of initial issue.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Anthony Tremblay, CSP – Infrastructure Division Director of Health & Safety



History of Change

Revision Date	Revision Number	Reason for change
22 November 2011	01	Original document

	<u>ARCADIS HS Standard Name</u> Heavy and Mechanized Equipment	<u>Revision Number</u> 01
<u>Implementation Date</u> 31 October 2011	<u>ARCADIS HS Procedure No.</u> ARC HSCS006	<u>Revision Date</u> 31 October 2011
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Exhibit 1 – Definitions

Affected Employees – Employees who are trained and authorized to work on projects where heavy or mechanized equipment is in use by either ARCADIS employees or subcontractors.

Authorized Operator – A trained, authorized individual with the experience, training, license (as applicable) and demonstrated skills to safely operate heavy or mechanized equipment in accordance with this procedure and applicable regulatory requirements.

Backhoe-Loader – As the name implies, it has a loader assembly on the front and a backhoe on the back.

Bulldozer – A powerful crawler (caterpillar tracked tractor) equipped with a blade.

Crane – A machine for hoisting and moving heavy objects by means of cables attached to a movable boom. Cranes can include the following types: overhead, gantry, locomotive and truck. Requirements for cranes are covered under ARCADIS standard ARCHSCS003. Cranes are not usually operated by ARCADIS employees; the PM is responsible for verifying proper qualifications and licensure for crane operation by subcontractors.

Earthmoving Equipment – Scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.

Excavator – An engineering vehicle consisting of a backhoe and cab mounted on a pivot (turntable is a more apt description) atop an undercarriage with tracks or wheels.

Heavy Equipment – includes excavators/track-hoes, back-hoes, bucket loaders, bulldozers, articulating all terrain trucks, graders, agricultural and industrial tractors, sweepers and other powered mechanical equipment.

Manlifts – includes boom lifts, scissor lifts and other powered equipment designed to provide an elevated work surface. Manlifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency that meets regulatory requirements and meets fall protection requirements. Refer to the ARCADIS Aerial Lifts Standard ARC HSFS017 for details.

Motor Vehicles (as referenced in this standard) – Vehicles that operate within an off-highway jobsite, not open to public traffic. The definition of Motor Vehicles does not include earthmoving equipment.

Powered Industrial Truck (Forklift) – includes fork trucks, tractors, platform lift trucks, motorized hand trucks and other specialized industrial trucks powered by electric motors or internal combustion engines. Forklifts require training by an authorized vendor or provider that includes a hands-on demonstration of competency and meets the regulatory requirements. Refer to the ARCADIS Powered Industrial Truck (Forklift) Standard ARC HSSP006 for details.

Site Project Supervisor – The employee responsible for reviewing the project scope and determining if an acceptable skill level has been achieved and demonstrated by an employee, prior to being considered an Authorized Operator.

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Skid Loader – Also called a skid steer, is a compact, low capacity machine used for pushing or lifting material and for digging. It is typically used for earth moving during construction and landscaping in limited spaces but is also used to move loose materials in farming and industry.

Skidder – A type of vehicle used in forestry for pulling cut down trees (timber) out of a forest (logging).

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Exhibit 2 – Permits, Operator Evaluation, Inspection Checklists and State Summary

[Equipment Operator Permit](#)

[Hazard Review and Evaluation for Heavy Equipment Operators](#)

[Heavy Equipment Inspection Checklist](#)

[State by State Summary of Equipment Operations Regulations](#)

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EXECUTIVE SUMMARY

This Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary and that an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.

Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.

All excavations over four feet in depth (or less than 4 feet in depth if deemed necessary by the Competent Person) shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.

Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.

Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.

Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades *when the excavations are not readily seen because of plant growth or other visual barrier*.

Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard requires use of a protective system.

All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

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1. POLICY

It is ARCADIS US policy to be proactive in the identification, assessment and control of health and safety hazards and associated risks. To those means, any work involving trenching and excavation that is under the control or direction of ARCADIS or an ARCADIS subcontractor will be accomplished following, at a minimum, this Standard.

It is ARCADIS' policy that ARCADIS staff will not enter excavations and trenches unless it is absolutely necessary. If there are no suitable alternatives and it becomes necessary to enter excavations or trenches, this standard, at a minimum will be strictly followed.

It is also the policy of ARCADIS to ensure an OSHA-defined Excavation Competent Person is on-site for all excavation work under ARCADIS contractual control. The competent person will be provided by the entity on site responsible for performing the excavation work unless otherwise required by the client. Thus, if an ARCADIS subcontractor is conducting the excavation work, that subcontractor will provide the competent person. If ARCADIS is self-performing the excavation services, then ARCADIS will provide a competent person whether a specialized subcontractor or authorized employee.

2. PURPOSE AND SCOPE

2.1 Purpose

To effectively control or eliminate the hazards presented by working near or entry into excavations or trenches, this Standard sets forth the accepted practice for and establishes the requirements for workplace safety near excavations and trenches and employee and subcontractor entry into such.

2.2 Scope

This standard along with associated checklists and the Utility Location Standard (ARC HSFS019) apply to all employees of ARCADIS-US. Only trained and authorized personnel are permitted to work near or enter excavations and trenches, perform rescue services, or act as the excavation competent person.

3. DEFINITIONS

Exhibit 1 includes relevant definitions to this Standard including that for competent person qualifications.

4. RESPONSIBILITIES

4.1 Corporate H&S with Division and Practice Experts

- On a routine basis, review and update, as necessary, this standard.
- As requested by Operations Leadership, review cancelled checklists periodically to ensure conformance to this standard.

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- Coordinate with the Training Group to ensure that the excavation competent person qualifications and training/retraining requirements are met.
- Conduct excavation competent person evaluations for nominated individuals as necessary, in order to approve and designate them as competent.
- Recommend qualified training provider for excavation awareness training for employees working in or around excavation/trenching operations.
- Provide technical assistance regarding excavation and trench protocol, atmospheric testing equipment, PPE, hazard assessment and research information on unusual hazards.
- Audit project-specific excavation sites for compliance with this standard.

4.2 Principal in Charge (PIC), Project Manager (PM), and/or Task Manager (TM)

- Verify that excavation and trench protocols are properly identified and addressed within the project work plan, project health & safety plan, and/or other project-related documents.
- Verify that their divisional or project team employees have received the proper training provided by Corporate Health & Safety or qualified training source prior to conducting excavation/trenching entry activities.
- Verify that any ARCADIS employee acting as the Excavation Competent person has been designated and authorized to do so per the requirements specified in section 4.4 of this standard.
- Verify that the proper entry equipment, including personal protective equipment (PPE), atmospheric testing equipment and safety equipment, is available for use by their divisional employees.
- Verify that copies of the completed checklists are available for Corporate Health and Safety review and retained with the project files.
- Request that Corporate Health and Safety review cancelled checklists as necessary and appropriate

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4.3 Health and Safety Plan Writers and Reviewers

Use this standard as guidance to ensure the appropriate identification, assessment and control of excavation and trenching hazards for documentation in project HASPs and development of task specific Job Safety Analysis (JSA).

4.4 Competent Person

Competent Person responsibilities include:

- Anticipation, identification and control of excavation and trenching hazards, as well as the signs and symptoms of exposure to the hazard(s), and the Authority to implement all corrective actions including Stopping Work.
- Note:** An excavation Competent Person must be involved in the excavation/trenching hazard assessment process. This will assist in determining the need for an engineering opinion when excavating near or adjacent to structures and determining the need and timing of inspections.
- Review existing soil sampling data (if any) or other pertinent hazard characterization information recorded by the client.
 - Investigate the client's excavation/trenching protocol, to verify that any identified hazards and previous experience with earthwork at the site is properly communicated.
 - Coordinate entry operations with the client's employees when both client and ARCADIS employees will be working in or near an excavation/trench.
 - Offer all entrants an opportunity to review the applicable control measures and testing results and an opportunity to request a reevaluation as necessary.
 - Design of structural ramps that are used solely by employees as a means of access or egress from excavations.
 - Monitoring of water removal equipment and operations, if water is controlled or prevented from accumulating by the use of water removal equipment,
 - Inspection of excavations subject to runoff from heavy rains.
 - Daily inspections of excavations, the adjacent areas, and protective systems when required.
 - If evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions are present, the Competent Person is responsible for ensuring that exposed employees are removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

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- Examining material or equipment used for protective systems that is damaged to evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.
- For excavations less than 5 feet (1.52 m) in depth, in which employees will be entering, a Competent Person must examine the ground to determine if there are indications of a potential cave-in hazard. If there are potential indicators of a cave-in hazard, the Competent Person will require some form of cave-in protection be implemented before employees can enter.
- Classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits.
- Soil and rock deposits shall be classified by a Competent Person as Stable Rock, Type A, Type B, or Type C based on the results of at least one visual and at least one manual analysis.
- If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a Competent Person. The deposit shall be reclassified as necessary to reflect the changed circumstances.
- When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved.
- Order evacuation of the excavation/trench if an uncontrolled hazard develops, either within or outside the space, or upon observing a behavioral effect of hazard exposure among excavation/trench entrants.
- Verify that all tests and precautionary measures identified on the Daily/Periodic Inspection Checklist located in Exhibit 2 and the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.

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ARCADIS employees must meet the following requirements to be a designated and approved Competent Person:

- Attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training; and
- Approval by Corporate Health and Safety through demonstration of practical field experience and/or knowledge of the subject matter.
 - o Documentation of the evaluation and approval of each excavation competent person will be completed using the form provided in Exhibit 3.
 - o This documentation and a listing of the approved ARCADIS excavation competent person will be maintained by the Training Group; and
- If on an Environmental project where HAZWOPER training is required by ARCADIS, the Competent Person must also have completed the 40 Hour HAZWOPER training, be current on their annual 8 Hour HAZWOPER refresher and it is recommended, but not required, that the Competent Person completed the HAZWOPER Supervisor training course.

4.5 Site Safety Officer (SSO)

When ARCADIS and/or our subcontractor is in control of an excavation project, the SSO will be responsible for the following:

- Interface with the client representative and Competent Person to identify and understand hazards associated with the client's excavation and trenching and/or work permit programs.
- Implement the ARCADIS Utility Clearance Policy and Procedure and complete the Daily/Periodic Excavation Inspection Checklist, when the excavation project is under the control of ARCADIS.
- Verify adequate training and experience of those ARCADIS employees working in and around excavations.
- Verify that the safety procedures identified in this Standard, the site specific HASP, and applicable regulatory requirements are used when required to protect employees during excavation activities.
- Verify that the client takes the necessary precautions in notifying their employees that our employees will be installing an excavation or trench.
- Review the lockout/tagout and isolation measures implemented by ARCADIS, our subcontractor and/or the client as necessary based on proximity of utilities or other energy sources in the area of the excavation/trench.

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- Immediately report any unusual or unplanned excavation or trenching hazards to both the Competent Person and the Project Manager or Task Manager.
- Keep unauthorized persons away from the excavation area.
- Confirm that the ARCADIS Utility Location Policy and Standard ARC HSFS019 has been performed prior to authorizing subsurface work or entry into an excavation or trench.
- Issue, authorize, and have the Utility Clearance and Daily/Periodic Inspection forms readily available for review
- Verify that copies of the completed clearance forms and checklists are properly disseminated to Corporate Health and Safety and retained with the project files, as specified in Section 8.0 – Records.

4.6 Employees

- Notify the PIC, PM, TM or SSO if they have not received appropriate training.
- Review the site specific HASP, task specific JSAs, and other written plans that are associated with their work.
- Use the TRACK process regularly and frequently to recognize the hazards which may be faced during work around or in excavation/trenches, as well as to understand the signs and symptoms of exposure to airborne hazard(s).
- Never enter an excavation/trench without verifying that the required Utility Location Procedure, Daily/Periodic Inspection Checklist and required air monitoring is conducted.
- Use Stop Work Authority if excavation/trenching hazard(s) have not been appropriately addressed. Immediately consult with SSO, Competent Person and ARCADIS Project/Task Manager.
- Use the PPE, air monitoring and testing equipment that has been provided or have access to the information documenting that results are within the defined Action Levels established within the HASP.
- Maintain an awareness of all required hazard controls and consult with the Competent Person as necessary.
- If unexpected conditions arise during entry, immediately notify other entrants, evacuate the space and inform the designated Competent Person
- Obey evacuation orders given by the Competent Person, SSO, automatic alarm activation, or when self-perceived.
- At least one person on site must maintain current certification in basic first aid and cardiopulmonary resuscitation (CPR).

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5. PROCEDURE

5.1 General Safety Requirements for all Excavations

- All surface obstructions must be moved or supported so as to protect employees and equipment.
- Prior to excavation, all underground installations (water, electric, telephone, gas, etc.) must be located and documented in accordance with ARCADIS Utility Clearance Policy and Standard ARC HSFS019.
- When excavating in areas near underground installations, proper precautions must be taken to determine the exact location of the installations and to adequately protect and support them. While an excavation is open, underground installations shall be protected, supported or removed as necessary to protect employees.
- Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person.
- Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.
- Ladders must extend at least 36" (3 feet) above the landing surface.
- All excavations over four feet in depth shall be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel. As deemed necessary by the competent person, excavations less than 4 feet in depth will be provided with a stairway, ladder, ramp, or other safe means of egress so as to require no more than 25 feet of lateral travel.
- If personnel are working in a location exposed to vehicular traffic they must be provided with and be required to wear reflective safety vests. Adequate, signs, barriers or other equivalent traffic controls must be used to protect employees.
- Personnel are not permitted to be beneath elevated loads handled by equipment or be in excavations when heavy equipment is digging in or near the excavation.
- Mobile equipment located near open excavations must be adequately protected from falling or rolling into excavations by the use of barricades or warning devices.
- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

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- Water must not be allowed to accumulate in open excavations where employees are working. When necessary, means such as diverting natural drainage around the excavation or actively pumping water must be used to prevent or control water accumulation.
- Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
- All structures adjacent to an open excavation must be supported, or a registered professional engineer (PE) must determine that the structure will not be affected by the excavation activities.
- Excavated materials (spoil) must be placed no closer than 2 feet from the edge of an open excavation, and otherwise retained to prevent loose material from falling into the excavation.
- Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier.
- Employees at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.
- Work tasks will be designed to limit the number of personnel required to enter any excavation. All tasks that can be completed remotely from outside the excavation (such as soil sampling) will be conducted in such a manner.
- Personnel will not be allowed to enter any excavation unless required protective systems and procedures are used to prevent accidents and injury.

Best Management Practice: *In some instances, an excavation will not have any protective systems in place when employees will not be entering into the excavation. Even if employees are not entering into this type of excavation, a competent person should be consulted to establish a safe zone distance away from the edge of any open excavation to minimize the hazard of falling into this type of excavation. Standing at the edge of an excavation places an employee at risk of falling into the excavation, thereby subjecting themselves to the hazard of excavation/trench collapse, which then triggers the requirement for protective system use as defined in this standard. General guidance would be for employees to remain 6 feet or more away from the edge of any excavation.*

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5.2 Excavations Requiring Protective Systems

This section defines excavations that require protective systems.

- All excavations into which employees will enter, regardless of depth, where the potential for cave-in exists.
- Any excavation over 5 feet in depth into which employees will enter that is not entirely in stable rock as defined in this Standard.
- Any excavation near a structure, (e.g. foundations, piers, footers, walls, sidewalks, tanks, roadways, etc.), as required by the registered professional engineer reviewing the stability of the excavation and the structure.
- All excavations over 20 feet in depth must be designed by a registered professional engineer regardless of whether personnel will enter it or not.
- All excavations that could potentially impact adjacent structures shall be reviewed by a registered professional engineer to determine if the stability of the structure will be affected by the excavation.
- Support systems for an adjacent structure must be designed by a registered professional engineer.

5.3 Selection and Use of Protective Systems

5.3.1 Shoring or Shielding

If shoring or shielding is selected as the protective system for an excavation, soil classification in accordance with 1926 Subpart P Appendix A is required.

One of the following options must be used for excavations which will be shored or shielded.

- Timber shoring as specified in 1926 Subpart P Appendix C must be utilized
- Hydraulic shoring, trench jacks, air shores, or shields as required in 1926.652 (c)(2) must be utilized following the system manufacturer's data
- A system which follows other tabulated data (approved by a registered professional engineer) must be utilized
- The excavation must be designed by a registered professional engineer

5.3.2 Sloping

If sloping is selected as the protective system for an excavation, the excavation sides must be sloped at a maximum of 34 degrees (1.5 Horizontal: 1 Vertical), unless the procedure listed above is followed.

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Soil classification is required for all excavations with sides which will be sloped greater than 34° (1.5 Horizontal: 1 Vertical). If it will be sloped greater than 34°, the one of the following options must be utilized:

- Option 1 - assume Type C and slope 1.5/1 - default sloping classification
- Option 2 - classify soil according to the standard and use Type A/B sloping requirements
- Option 3 – use other tabulated data with PE approval
- Option 4 – PE approval of sloping/benching design

5.4 Atmospheric Testing for Entry

All excavations over 4 feet in depth must be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency. Excavations less than 4 feet in depth must be evaluated by the competent person and at the competent person's discretion be tested for hazardous atmospheres whenever personnel are required to enter and a potential exists for the existence of hazardous contaminants or oxygen deficiency.

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

The site designated "Competent Person" and/or SSO will document initial and periodic air monitoring results for all activities requiring entry into the excavation. All atmospheric testing of excavations must be conducted in the following sequence and meet the following air quality criteria.

- Oxygen content must be between 19.5% to 23.5%
- Combustible gas or vapor less than (<) or equal to 5% of its lower explosive limit (LEL): Level D. Continue to monitor atmospheric conditions as detailed in project specific Health and Safety Plan.
- Combustible gas or vapor levels greater than (>) 5%, but < 10% of its LEL: Continuous atmospheric monitoring required; review use/implementation of engineering controls (ventilation, etc.) and PPE; evaluate potential source(s) of ignition and where feasible, remove from the area; fire extinguisher must be available; and use TRACK to assess condition/controls and proceed with caution.
- Combustible gas or vapor levels > or equal to 10% of its LEL: Stop Work; evacuate the excavation/trench; contact the Competent Person and SSO; and re-evaluate source/controls of combustible gas,

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- Carbon monoxide levels must not exceed 25 ppm as an 8-hour Time Weighted Average (TWA).
- Hydrogen sulfide must not exceed 5 ppm as a Short-Term Exposure Limit (STEL) value or 1 ppm as an 8-hour TWA.
- Toxic air contaminant levels must not exceed 50% of the PEL or the TLV for the specific contaminant (whichever is lower).

5.5 Location of Underground/Overhead Utilities

- The competent person and the project manager shall both verify that local underground facilities location/protection agencies are notified within the required time frame prior to the initiation of excavation activities and meet all requirements in the ARCADIS Utility Location Policy and Standard ARC HSFS019.
- Prior to initiation of excavation or trenching operations the competent person shall verify that all utilities have been located.

5.6 Daily/Periodic Inspections

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a Competent Person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the Competent Person:

- Prior to initiation of daily excavation or trenching operations the competent person shall complete a daily inspection of the excavation.
- During excavation or trenching operations the competent person shall complete a periodic inspection after any event (e.g., thunderstorm, vibration, excessive drying) that may affect excavation stability.

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Note: In order to correctly ascertain the soil types, the competent person must identify the locations and the limits of each type of soil, and must conduct visual and all appropriate manual tests to classify the initial (opening) soil types observed.

Note: These inspections are only required when employee exposure can be reasonably anticipated. Not just in-trench exposure, but also ANY hazardous condition in the area that an employee could be exposed to.

The competent person shall complete the daily/periodic inspection checklist (A copy of the checklist is attached to this Policy as Exhibit A) – Subcontractors must complete the ARCADIS checklist or an equivalent inspection form for each inspection of excavation and trenching activities.

5.7 Soil Classification for Selection of Protective Systems

5.7.1 Soil Classification

This section describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. This section contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

This section applies when a sloping, benching or shoring system is utilized as a method of protection for employees from cave-ins.

5.7.2 Soil Classification Definitions

5.7.2.1 Types/Classes of Soil

5.7.2.1.1 Type Class A Soils

Type/Class A Soils are cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if the following apply.

- The soil is fissured;
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects;
- The soil has been previously disturbed;
- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or greater;
- The material is subject to other factors that would require it to be classified as a less stable material

5.7.2.1.2 Type Class B Soils

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Type/Class B Soils are:

- Cohesive soils with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa)
- Granular cohesion-less soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam
- Previously disturbed soils except those which would otherwise be classed as Type C soil
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4 Horizontal:1 Vertical), but only if the material would otherwise be classified as Type B

5.7.2.1.3 Type/Class C Soils

Type/Class C Soils are:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less
- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4 Horizontal:1 Vertical) or steeper

5.7.2.2 Methods for Classifying Soils

Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in this section. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis conducted by a competent person using tests described below, or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

The visual and manual analyses, such as those noted as being acceptable in this section, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

Observe the following:

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- Samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine grained material is cohesive material. Soil composed primarily of coarse grained sand or gravel is granular material.
- Soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
- The side of the open excavation and the surface area adjacent to the excavation. Crack like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
- The area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
- The open side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
- The area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.
- The area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

5.7.2.3 Classifications

- **Plasticity.** Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8 inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two inch (50 mm) length of 1/8 inch thread can be held on one end without tearing, the soil is cohesive.
- **Dry strength.** If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

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- **Thumb penetration.** The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.
- **Other strength tests.** Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand operated shearvane.
- **Drying test.** The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick (2.54 cm) and six inches (15.24 cm) in diameter until it is thoroughly dry:
 1. If the sample develops cracks as it dries, significant fissures are indicated.
 2. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an unfissured cohesive material and the unconfined compressive strength should be determined by using the thumb penetration or other test.

5.7.2.4 Cohesive with Fissures vs Granular

If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

5.7.2.5 Layered system

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

5.7.2.6 Reclassifying Soils

A layered system shall be classified in accordance with its weakest layer. Each layer may be classified individually where a more stable layer lies under a less stable layer.

In most instances the ARCADIS designated Excavation/Trenching Competent person will assume Type C soil, unless they have conclusive data to validate Type A or B.

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5.7.2.7 Excavation Construction Based on Soil Type

The maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V). Short-term exposure means a period of time less than or equal to 24 hours that an excavation is open. Soil and rock deposits must be classified in accordance with Appendix A to Subpart P of Part 1926. The maximum allowable slope for a soil or rock deposit must be determined from the table provided below. The actual slope must not be steeper than the maximum allowable slope. The actual slope must be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope must be cut back to an actual slope which is at least horizontal to one vertical (1/2H:1V) less steep than the maximum allowable slope. When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person must determine the degree to which the actual slope must be reduced below the maximum allowable slope, and must assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 1926.651(I). Configurations of sloping and benching systems must be in accordance with 29 CFR 1926 Subpart P, Appendix B.

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EXCAVATION SLOPE INFORMATION FROM 29 CFR 1926 SUBPART P APPENDIX B MAXIMUM ALLOWABLE SLOPES	
Soil or Rock Type	Maximum Allowable Slopes (H:V)¹ for Excavations Less Than 20 Feet Deep²
Stable Rock	Vertical (90 degrees)
Type A ³	¾:1 (53 degrees)
Type B	1:1 (45 degrees)
Type C	1:½ (34 degrees)

1. Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal (H). Angles have been rounded off.
2. Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.
3. A short-term maximum allowable slope of 1/2H:1V (63 degrees) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth must be 3/4H:1V (53 degrees).

6. TRAINING

6.1 Project - Specific Orientation

All staff working on a site where trenching and excavation activities are being conducted by ARCADIS or its subcontractors will be provided with site orientation on excavation projects and participate in daily safety meetings that include a discussion of the following:

- Site excavation hazards and procedures;
- Requirements for conducting activities remotely whenever possible;
- Client requirements and procedures for excavation activities;
- Review of applicable federal, state and/or local excavation requirements; and
- This Excavation and Trenching Standard, as appropriate

6.2 Employee Training

Besides site orientation training, additional training will be provided as follows based on the employee's activities:

- All employees who work in the area of potential excavation/trenching sites will receive awareness level training as provided and/or approved by ARCADIS Corporate H&S in order to recognize and to understand the hazards associated with trenching/excavation work.

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- On an as needed basis, employees will receive site specific instruction regarding the excavation/trenching operation from the Competent Person and/or the SSO.

6.3 Competent Person Training

- Competent Persons will be provided training as follows:

In order for ARCADIS employees to be assigned duties as a competent person, with respect to excavation and trenching, in addition to the criteria noted in section 4.4, personnel must attend an Excavation Competent Person training course approved by Corporate Health and Safety or have equivalent training. The course shall include, but is not limited to the following:

- Introduction to and definition of trenches and excavations.
- General requirements of OSHA 29 CFR 1926 Subpart P.
- Responsibilities and requirements of a competent person.
- Hazards associated with trenches/excavations and Identification and Assessment of these hazards.
- Hazard controls
 - Soil analysis and testing (visual and manual;
 - Protective systems;
 - Personal protective equipment;
 - Utility location;
 - Atmospheric testing;
 - Water drainage and pumping;
 - Site housekeeping and management;
 - Communications;
 - Access and egress
- Emergency Procedures.
- Inspections.

All training provided must be reviewed and approved by Corporate Health & Safety and will be managed through the Training Team.

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Documentation of training certification received by attendance at any training course including externally provided training courses will be kept by the employee with copies provided to the Training Team.

7. REFERENCES

ARCADIS Health and Safety Standard ARC HSFS010– Health and Safety Planning

ARCADIS Health and Safety Standard ARC HSFS004 – Control of Hazardous Energy (Lockout/Tagout)

ARCADIS Utility Clearance Policy and Standard ARC HSF019

OSHA 29 CFR Part 1926 Subpart P - Excavations

8. RECORDS

- 8.1** Training records will be kept by the individual employee with copies of such certificates kept by the Training Team. Training dates and times will be kept by the Training Team.
- 8.2** Completed clearance forms and checklists will be kept in the project files with copies available for Corporate H&S review.
- 8.3** Copies of all HASPs that document excavation trenching procedures will be kept in the project files.

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9. APPROVALS AND HISTORY OF CHANGE

Approved By: Anthony Tremblay, CSP, CIAQP



History of Change

Revision Date	Revision Number	Reason for change
12 May 2008	01	Original document
13 June 2008	02	Modified Section 5.1 – 4 th bullet related to structural ramps. Modified Section 5.2 to designate a 6x factor for structural integrity of structures near the excavation. Revised Exhibit 1 to modify the definition of a Competent person
9 January 2009	03	Cleaned up definitions, deleted training requirements from Section 5.0 and moved them to Section 6.0, modified purpose statement
31 March 2011	04	Updated Competent Person training and qualification requirements in section 4.6, section 6.2 and definition in Exhibit 1.
27 March 2012	05	Section 4 competent person, SSO and employee responsibilities revised; Confined Space references eliminated; Training requirements clarified; use of ladders detailed; Fall prevention requirements clarified in section 5.1; depth of protective system requirement corrected to 5 feet; spoils pile must be minimum 2 feet from edge of excavation; Atmospheric Monitoring Action Levels revised; Employee Awareness Training and Competent Person Training requirements clarified
4 June 2012	06	Section 4.4 typo corrected; 8-hour HAZWOPER Supervisor course for competent person was made a recommended practice instead of a requirement; Section 4.5 SSO responsibilities revised to eliminate those responsibilities that belong with the Competent Person; Section 5 Best Management Guidance to maintain safe distance from the edge of excavation; checklists hyperlinked

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Exhibit 1 – Definitions

Attendant is a trained qualified individual stationed outside the excavation whose duty is to monitor authorized entrants inside the excavation or trench and have a means of communication with the designated rescue services.

Benching/Benching system means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury or otherwise injure and immobilize a person.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sides, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Competent person means one who, through education, training, and/or experience, is capable of identifying existing and predictable hazards or working conditions which are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.

Dry soil means soil that does not exhibit visible signs of moisture content.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal into which a person can bodily enter.

Entry constitutes the act by which an employee proceeds into an excavation or trench. Consideration of hazards, especially cave-ins and fall protection must still be considered and accounted for when equipment or personnel are near an excavation or trench, even if personnel will not be entering.

Entrants are employee's who are trained and authorized to enter a trench or excavation. Entrants must have attended a Qualified Excavation Training course offered or approved by Corporate Health and Safety.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

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Hazardous Atmosphere is an atmosphere which exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following:

- An atmospheric concentration of any substance in excess of 50% of its established permissible exposure limit (PEL); or its assigned threshold limit value (TLV) or other value listed on the Material Safety Data Sheet (MSDS) for the chemical constituent, whichever is lower.
- A flammable gas, vapor, or mist in excess of 10% of its lower explosive limit (LEL).
- An airborne combustible dust at a concentration that obscures vision at a distance of 5 feet or less.
- An atmospheric oxygen concentration below 19.5% (oxygen-deficient atmosphere) or above 23.5% (oxygen-enriched atmosphere).
- An atmosphere which is immediately dangerous to life and health.

Immediately Danger to Life and Health (IDLH) means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage, irritation, or other conditions which could impair escape from the space.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems and other systems that provide protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce. To oversee an excavation/trench activity the PE must have experience with and expertise in excavation, soil and stability considerations.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

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Shield (Shield system) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shield can be either pre-manufactured or job-built in accordance with 1926.652 (c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields".

Shoring (Shoring system) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sloping (Sloping system) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Soil classification system means, for the purpose of this procedure, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Submerged soil means soil which is underwater or is free seeping.

Support system means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench means a narrow excavation (in relation to its length) made below the surface of the ground to which a person can bodily enter. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 meters) or less (measured at the bottom of the excavation), the excavation is considered to be a trench.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

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Exhibit 2 – Daily / Periodic Excavation Inspection Checklist

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Exhibit 3 – Competent Person Evaluation Form for Excavation / Trenching

	<u>ARCADIS HS Standard Name</u> Emergency Response and Fire Safety	<u>Revision Number</u> 01
<u>Implementation Date</u> October 28, 2009	<u>ARCADIS HS Standard No.</u> ARC HSMS008	<u>Revision Date</u> October 28, 2009
<u>Author</u> Sue Byers	Page 1 of 7	<u>Approver</u> Pat Vollertsen

1. POLICY

It is the policy of ARCADIS to inform employees of evacuation, emergency response and fire safety procedures by means of a location-specific Emergency Response and Fire Safety Plan ("Plan").

2. PURPOSE AND SCOPE

2.1 Purpose

This standard provides guidelines so that ARCADIS office locations can ensure that an appropriate Emergency Response and Fire Prevention Plan ("Plan"), specific to the office location, is in place. The Plan includes response to emergency situations that can be reasonably expected, including fire, and notification and evacuation procedures, process by which employees will be accounted for, and where employees may go to for additional information or questions.

2.2 Scope

Ensuring that an appropriate Emergency Response and Fire Safety plan ("Plan") is in place is required of all ARCADIS office locations. ARCADIS offices may utilize a Plan provided by their property owner or Management Company, but must ensure that the Plan meets all requirements as outlined in this standard and, if it does not, amend the Plan so that requirements are met.

Offices with less than 10 employees may communicate this information verbally unless otherwise required by a local or state regulatory authority.

3. DEFINITIONS

Emergency Response "Buddy" – Employees who volunteer to aid personnel needing temporary or permanent assistance during an evacuation or other emergency situation.

Emergency Personnel – Ambulance, Fire Department, Police or other authority responding to an emergency.

Emergency Response Warden ("Warden") – Employees who volunteer and are trained to assist in an evacuation and other emergency response actions, and who can be contacted by any employee who needs more information about the Plan or their responsibilities under the plan.

Exit – Either the portion of an exit route that is generally separated from other areas to provide a protected way of travel to the exit discharge (e.g., a fire resistance-rated enclosed stairway that leads from one floor to another or to the outside), or the door or other means by which a room or building may be vacated in an emergency.

Meeting Area – That designated area where staff gathers following an evacuation alarm or announcement. May be a location inside or outside a building.

Lead Warden – One who oversees and assists the Emergency Wardens and Buddies in the event of an emergency.

Receptionist – Front desk personnel

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4. RESPONSIBILITIES

4.1 Director, Health and Safety (H&S) Administration

- Ensures that a review with necessary changes is done at least annually on this standard.
- Communicates the program to appropriate staff.
- Provides technical assistance as necessary.

4.2 Corporate H&S Assistant

- On annual basis reviews and, as necessary, updates this standard.
- Promotes this standard so that ARCADIS employees have access to relevant resources.

4.3 Health and Safety Coordinators

- When a written Plan is applicable to their office location, to ensure that the Plan is available to staff and reviewed at least annually and revised as necessary.
- To ensure completion of monthly fire extinguisher, housekeeping, and, where applicable, first aid kit and AED inspections.
- Assist in making training regarding the Plan available to new hires and assist in coordinating annual Emergency Response Warden training.
- Annually, at a minimum, distribute Plan reminder to office location staff as described in this standard.

4.4 Location Leads

Location leads are responsible for ensuring that:

- Resources are available to implement the Plan such as identification of Emergency Response Wardens and Buddies; and
- Training is held as defined in this standard.

4.5 Supervisors

Supervisors ensure that new hires for whom they are responsible are aware of the location of the Plan or if a written Plan is not required, that the Plan is described to them, and that the new hire completes the required training and quiz.

4.6 Emergency Response Wardens (“Wardens”)

Be aware of all persons within their assigned area and aware of those who may require assistance in an emergency, whether temporary or permanent in nature.

- Assist and direct employees and guests in an evacuation and other emergency response actions.
- Notify the Primary Warden of the need to assign an Emergency Response Buddies.

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- Notify the Primary Warden or H&S Coordinator of any concern regarding the Plan or any issue seen during an evacuation (real or drill).

4.7 Emergency Response Buddy (“Buddy”)

- Buddies are responsible for helping employees who need assistance in an evacuation or other emergency situation; assistance may be temporary or permanent in nature. In an evacuation, the buddy will do one of the following:
 - o If the employee needing assistance is able to safely navigate to the exit and assigned meeting location, the Buddy will escort him/her to the designated meeting location.
 - o If the employee needing assistance is not able to safely navigate to the exit and/or assigned meeting location, one Buddy will escort the employee to a designated area such as an enclosed **stairwell** and wait until Emergency personnel arrive to assist. The other Buddy will notify Emergency Personnel or a Warden of their location in the building.

4.8 Receptionist (at ARCADIS locations that have a receptionist)

Receptionists are responsible for understanding the overall Plan for their location and, as applicable, their role in case of emergency. Their role may include but is not limited to:

- Calling 911 or other authority.
- Making an overhead announcement with instructions for staff such as building evacuation, location of the emergency (e.g., fire, gas odor), weather warning, etc.
 - o Receptionists will make such announcements only if it is safe to do so.
- Directing Emergency Personnel to the location of the employee, client, or visitor who has been injured.
 - o If a location has given the Receptionist responsibilities in an emergency, their role will be outlined as suggested in [Exhibit 1](#) (Pg. E1 – E2).

4.9 ARCADIS employees:

- Employees are responsible for being knowledgeable of the Plan for their office location, including safe exits and location of their designated meeting area.
- Employees will follow the plan for their location or project site unless otherwise directed by Emergency Personnel, Warden or Primary Warden.

5. PROCEDURE

5.1 Emergency Response Plan

The primary purpose of the Emergency Response Plan is to inform employees on what to do in the event of an emergency, including how and where to evacuate. ARCADIS offices may utilize a Plan provided by their property owner or Management Company, but must ensure that the Plan meets all requirements as outlined in this standard and, if it does not, amend the Plan so that requirements are met. If no Plan is available via the property owner/management company, a Plan will be developed. [Exhibit 2](#) (Pg. E3 - E13) is a template plan that may be utilized.

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- Offices with less than 10 employees may communicate this information verbally unless otherwise required by a local or state regulatory authority.

Evacuation and meeting location maps should be posted in locations regularly used by employees, should include exit and alarm locations and may include designated meeting locations and Warden names/areas of responsibility.

As part of the plan, a sufficient number of persons will be designated and trained as Emergency Response Wardens, and a Lead Emergency Response Warden named. OSHA recommends one Warden for every 20 employees.

The Emergency Response Plan will include the following:

- Emergency evacuation procedures and evacuation route assignments:
 - o Evacuation maps will be posted in areas visible to all employees,
 - o Refuge or safe areas will be designated, both inside and outside the building, and
 - o Outside meeting locations and procedures to account for all employees will be designated.
- Employee notification procedures during an emergency.
- Preferred means of reporting fires and other emergencies.
 - o Emergency phone numbers should be posted in conspicuous locations when telephones serve as a means of reporting emergencies.
- Actions to be taken in an emergency.
 - o All location specific Plans will include actions to take:
 - In fire emergencies
 - In bomb threat situations
 - In the case of gas leak or noxious odors
 - In suspicious mail or threatening individual situations; and
 - In the event of a serious injury to an employee or visitor
 - o In addition, location specific Plans will include actions to take in emergencies specific to their geographical area, such as:
 - Tornadoes
 - Earthquakes
 - Hurricanes
 - Flooding
 - Blizzards, ice storms

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- Rescue and medical duties for those employees who are to perform them (details in section 5.3).
- Emergency Response Warden and Buddy names and responsibilities

Where applicable, the Plan will also include the procedures for employees who remain behind to operate critical equipment. (This is generally not applicable to ARCADIS offices. Critical equipment is equipment that would endanger lives or aggravate the emergency situation if it ceased to function.)

5.2 Fire Safety

The primary purpose of the Fire Safety Plan is to minimize the possibility of fires in the work place.

In the event of a fire, employees are required to immediately follow the evacuation process set forth in the office Plan. Fire extinguishers located at ARCADIS office locations are not intended for employee use.

The plan should include the following:

- A list of fire hazards in the work place. For each of these fire hazards, the plan should include:
 - o Proper handling and storage procedures,
 - o Potential ignition sources,
 - o Control procedures,
 - o Type of equipment that can control a fire involving the source, and
 - o Names or titles of personnel responsible for the control of fire hazards.
- Housekeeping procedures that will be followed to eliminate or reduce the accumulation of combustible materials in the work place. Monthly housekeeping inspections, done to help eliminate fire hazards and keep pathways clear, should be documented. [Exhibit 3](#) (Pg. E14) is a sample inspection form that can be used for this purpose.
- Explanation of alarm system in place at the office along with any fire suppression and/or smoke alarm systems.
 - o Alarm systems should provide warning for necessary emergency action and should be capable of being distinguished above ambient noise and light levels
 - o Alarm systems generally include an audible smoke and/or fire alarm and visual alarm (e.g., strobe lights), but alarm systems may vary depending on state and local fire codes and building age.
 - o For most offices, these systems are installed and maintained by the building property managers.
- Names or titles of personnel or vendors who are responsible for maintenance of equipment and systems installed to prevent or control fires.
- Presence or absence of fire extinguishers.

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- o Although ARCADIS employees are not designated to use fire extinguishers at office locations, if they are provided in the ARCADIS suite, monthly visual inspections are recommended unless done by building management. Names of those responsible for the inspection should be noted in the Plan.
- o Documentation of the inspection is maintained for each extinguisher and can be recorded on the extinguisher tag or on an inspection form such as the one found in [Exhibit 3](#) (Pg. E14) and should include the inspection date, who did the inspection, and any corrective action taken.

Check with building management in regard to fire extinguisher annual maintenance/service, and periodic testing, and note these completion dates on the inspection documentation form/tag.

5.3 First Aid/CPR

First Aid/Emergency Response personnel will be designated if medical/emergency facilities are not located in near proximity. Near proximity is defined emergency assistance is available within four (4) minutes.

Personnel designated to perform First Aid/Emergency Response will receive annual Bloodborne Pathogen training, biennial CPR/First Aid Training and be offered the Hepatitis B vaccination series.

6. Training

6.1 New Hires

New hires, regardless of job function or hours worked per week, will be trained on their location Plan. Training will include the following:

- Location of the written Plan (if location is required to have a written plan);
- Employee responsibilities under the Plan;
- Evacuation procedures and meeting location;
- Emergency procedures; and
- Identification and responsibilities of persons tasked with implementation of the Plan.

6.2 Current Employees

Annually, the H&S Coordinator at each location will send out a communication to all location staff highlighting significant points of the Plan. In addition, training will be provided whenever an employee's responsibilities or designated actions under the Plan or the Plan changes.

6.2.1 Wardens

Employees who have been identified as Emergency Response Wardens shall be trained on their responsibilities as follows:

- Upon assignment
- Annually, and

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- Whenever their responsibilities or designated actions under the Plan or the Plan changes.

[Exhibit 4](#) (Pg. E15) provides a sample agenda for this training.

7. REFERENCES

7.1 State Plans

Office locations must ensure that the Plan also meets any requirements set forth by an applicable state OSHA or local fire code. REFERENCES (regulation citation, technical links, publications, etc.)

OSHA Regulations (Standards – 29 CFR) Part 1910 Subpart E “Means of Egress”

OSHA Regulations (Standards – 29 CFR) Part 1910 Subpart L “Fire Protection”

8. RECORDS - DATA RECORDING AND MANAGEMENT

8.1 Fire Extinguisher Checks

Fire extinguisher check documentation should be maintained until the annual maintenance check is completed. All records will be kept locally by the Health and Safety Coordinator in the office.

8.2 Housekeeping Checks

A record of the housekeeping checks shall be maintained and kept by the H&S Coordinator.

8.3 Emergency Response and Fire Safety Plan

The Plan will be reviewed at least annually and revised as appropriate. When revised, the revision date/number will be documented under “History of Change” and the prior plan achieved per company policy.

9. APPROVALS AND HISTORY OF CHANGE

Patricia A. Vollertsen

History of Change

Revision Date	Revision Number	Reason for change
10-28-09	01	Original document

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Exhibit 1

RECEPTIONIST – EMERGENCY PROCEDURES

If you think a situation requires immediate emergency response, **call 911 first** and then notify your property management service and the Facilities Manager or H&S.

Emergency Numbers

Agency/Resource	Phone Number
Fire Rescue - Non-emergency.....	
Police Department - Non-emergency.....	
(Gas leaks)	
Elevator Services.....	
National Weather Service.....	
Poison Control Center.....	
Public Health Department.....	
(Water leaks)	

FIRE

- You may be asked to call the fire department **(911)**.
- You may be asked to make an overhead announcement. If so, and it is safe for you to do so:
 - Ask that all employees evacuate the building and proceed to their designated meeting locations (if possible, include the location of the fire); and
 - Evacuate and proceed to your meeting location.

BOMB THREAT

- If you receive a call, try to remain calm as you:
 - Try to wave someone down to **call 911** while you're on the phone.
 - Call 911** as soon as you are able to do so.
 - Notify you Property Management Service and the Location Lead or, if not available, H&S.
 - Fill out Bomb Threat Questionnaire.
- If someone else receives a call, you may be asked to contact 911 and/or do an overhead announcement.
- Follow instructions given by Police or Fire Department.

POSSIBLE NATURAL OCCURANCES FOR YOUR AREA (Tornado, Earthquake, etc.)

POWER FAILURE

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PERSON TRAPPED IN THE ELEVATOR

ACCIDENT OR ILLNESS

1. Call (911) FIRST* and report "a medical emergency." This will guarantee the quickest response.
2. Someone should meet the emergency unit in front of your building in order to direct them to the scene of the accident/illness.

The fire department will arrive and administer first aid, followed by paramedics and police. If necessary, an ambulance will then take the victim for further assistance.

SUSPICIOUS PERSON or PERSONS

- If you question the appearance of a visitor, contact the Facilities Manager or Property Management Services to verify the presence of contract workers.
- Solicitors or suspicious person(s) should be reported to your Property Management Services.
- If in doubt, contact the Facilities or Health & Safety Manager or the authorities.
- If you are alarmed, and it is safe to do so, call 911.

CHEMICAL SPILL OUTSIDE OF THE BUILDING

- If we are notified of a chemical spill outside of the building, we will follow the instructions of the authority in charge.
- You may need to make announcements as instructed by the authorities.
- You may be asked to contact your Property Management Services to shut down the ventilation system.

OTHER EMERGENCIES

You may be asked to make overhead announcements and/or call the authorities.

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Exhibit 2

**TEMPLATE FOR EMERGENCY RESPONSE PLAN
(Available in Word on APEX/H&S/Office H&S Program)**



EMERGENCY RESPONSE PLAN

TITLE PAGE

Your Office

Your address

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The following general information has been designed to assist you with the safe and efficient handling of an emergency situation. **Please read it carefully.** This information is in no way all-inclusive, and may be expanded, altered or revised periodically.

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EMERGENCY CONTACT PHONE NUMBERS

LOCAL EMERGENCY CONTACTS

Fire Rescue – Emergency.....

Fire Rescue - Non-emergency.....

Sheriff Department – Emergency.....

Sheriff Department - Non-emergency.....

NEAREST HOSPITAL

ADDRESS:

General Information.....

Emergency Services-24 hours.....

TDD Calls (Hearing Impaired).....

(Gas leaks)

Elevator Service Co.....

National Weather Service.....

Poison Control Center.....

Public Health Department.....

(Water leaks).....

OTHER CONTACTS

BUILDING MANAGEMENT EMERGENCY NUMBERS

24 Hour Emergency Line.....

ARCADIS Emergency Plan Contacts:

Facility Related Questions:

Emergency Plan Questions:

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1. EMERGENCY PREPAREDNESS

This manual has been prepared to provide an outline of responsibilities and action to take in the event of an emergency. However, not all emergency situations are covered in this manual.

As part of the overall safety and emergency preparedness program, employees will participate in an annual fire drill

Emergency Response Wardens will evaluate staff response during fire drills and during an actual emergency, the Fire/Emergency Wardens serve as liaison between ARCADIS staff and Emergency personnel, and provide invaluable assistance should an evacuation be necessary. Wardens will be trained annually on evacuation procedures

2. OVERVIEW OF LIFE SAFETY SYSTEMS

Provide overview of fire safety systems – should be provided by property management.

3. ELEVATOR EMERGENCY

If applicable, provide elevator services emergency procedures

4. EVACUATION PROCEDURES

- A. When an alarm sounds/is seen or an announcement made, evacuate immediately through the closest, safe exit and go to your predesignated meeting location.
 1. Before opening any door, check first for heat/smoke.
 2. Close the door to your office as you leave. Do not return for coats, purses, etc.
 3. If visitors are in your suite, please assume the responsibility for their evacuation. Visitors are to report to the re-assembly area that has been designed for the party whom they are visiting.
 4. Follow the predetermined procedures for evacuating any physically impaired personnel. (See Section 4.1 of the ARCADIS policy ARC HSMS008)
 5. Listen to the instructions of the Emergency Response Wardens and Emergency Response personnel
- B. Fire/Emergency Wardens should check for employees/visitors in the surrounding area as they evacuate.
 - Emergency Response Wardens account for staff at their designated area of re-assembly and will report any personnel unaccounted for (and/or location of personnel remaining in the building) to Emergency Response Agency Personnel or, if not yet on site, the Lead Warden.
- C. The last person exiting an area should close the doors behind them. **DO NOT** go back to close the doors.
- D. Use enclosed stairwells. **Do not use the elevators.**
- E. Keep talking to a minimum. Listen for instructions from authorized personnel and follow them.
- F. Keep calm. Walk; **do not run** – proceed single file down the stairs.
- G. **Do not** leave the evacuation area or re-enter your building/suite until the Fire Department or other Emergency Response Agency has authorized you to do so.

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4.1 INDIVIDUALS NEEDING ASSISTANCE:

Staff needing assistance in an emergency, whether temporary or permanent, should notify an Emergency Response Warden so that 1-2 Emergency Response Buddies can be assigned.

The name of the employee and assigned Buddies will be given to the Wardens.

If the employee NOT on the ground floor and:

- Is able to safely walk down the steps with assistance, the buddies will escort him/her to the stairs and to the designated meeting location.
- Is not able to safely walk down the stairs, one buddy will escort the employee to the closest **enclosed stairwell** and wait with the employee until the Fire Department arrives to assist. The other buddy will notify a Warden, H&S Administrator, Facilities Manager, or the Fire Department as to their location.

5. FIRE / LIFE SAFETY

No ARCADIS staff is designated to use fire extinguishers unless required at project sites.

Space heaters are serious fire hazards and should not be used unless specifically approved by property management service.

Candles are a serious fire hazards and are not allowed.

- **Do not** use unapproved extension cords
- **Do not** place items in the designated exit ways (paths of egress)

In the event of a fire:

- If possible and available, close off area in which fire is located by closing the door
- Pull the fire alarm manual pull if the fire alarm is not already sounding
- Follow evacuation procedures
 - **Do not** attempt to fight fire

6. ACCIDENT/ILLNESS – EMERGENCY MEDICINE

In the event that an employee or visitor should become seriously injured or ill:

- Call **(911) FIRST*** and report “a medical emergency.” This will guarantee the quickest response.

***If you have to dial a number to get an outside line, dial that number first + 911.**

- Be prepared to give the following information:
 - ✓ Your name
 - ✓ The company name
 - ✓ The address of the building
 - ✓ The location within the building where the medical emergency is taking place
 - ✓ The phone number from which you are calling
 - ✓ Do not hang up until asked to do so

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- Arrange to have someone meet the emergency unit in front of your building in order to direct them to the scene of the accident/illness.
- Do not attempt to move the injured or ill person. Try to make him/her comfortable.
- Someone should stay with the injured or ill person until arrival of emergency personnel.

7. PROCEDURES FOR POSSIBLE LOCAL PHENOMENON (Earthquake, Tornado, etc.)

8. GAS LEAK – NOXIOUS ODORS

If a natural gas or other noxious odor is present in the building:

- Exit to a safe area
- Call 911 *
- Call the receptionist or a Warden to report the situation and determine if evacuation is necessary

HAZARDS:

- Do not switch lights on/off or use electrical outlets, as sparks may be created
- Do not stop to turn off anything
- Refrain from smoking until the all clear is given
- Do not close or open anything
- If ordered to evacuate, do not return to the building/suite for any reason until told to do so by Emergency Response Agency Personnel

9. POWER OUTAGE

10. UNFORSEEN INCLEMENT WEATHER: BLIZZARDS, ICE STORMS, etc.

Please refer to Section 2.15 of the Employee Handbook on the HR page of APEX:

If conditions become so dangerous during the normal workday, local management may decide that it would be in the best interest and safety of the staff to send the staff home. Only the Overhead Manager, Location Lead or their designated representative can make the decision to close an office.

11. INTRUDERS AND SOLICITORS

Soliciting, selling, petitioning, and posting of signs is strictly prohibited. If you observe any of these activities in the building or parking lot, please notify property management service.

In general, any solicitor or suspicious person(s) should be reported to Property management service and, when in doubt, the authorities.

12. COPING WITH THREATS AND VIOLENCE

For an angry or hostile customer or coworker:

- Stay calm. Listen attentively.
- Maintain eye contact
- Be courteous. Be patient

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- Keep the situation in your control.

For a person shouting, swearing, and threatening

- Signal a coworker, or supervisor, that you need help. (Use a duress alarm system or prearranged code words.)
- Do not make any calls yourself.
- Have someone call the FPS, contract guard, or local police.

For someone threatening you with a gun, knife, or other weapon

- Stay calm. Quietly signal for help. (Use a duress alarm or code words.)
- Maintain eye contact.
- Stall for time.
- Keep talking -- but follow instructions from the person who has the weapon.
- Don't risk harm to yourself or others.
- Never try to grab a weapon.
- Watch for a safe chance to escape to a safe area.

Federal Protective Service

U. S. General Services Administration

http://www.opm.gov/Employment_and_Benefits/WorkLife/OfficialDocuments/handbooksguides/WorkplaceViolence

13. BOMB THEAT

In the unlikely event that you receive a bomb threat, it is important to remain calm.

Police or Fire Official authority exceeds that of ARCADIS and their instructions are to be followed.

If the decision is made to evacuate the building, Follow evacuation procedures.

- If a suspected device is found, **do not touch it**. Evacuate the area and contact the authority conducting the search.
- Two-way radios, cell phones, and pagers **should not be** used in the area of a suspected device.
- **Do not use the elevator**

Telephone Threats

When a bomb threat is received by telephone, keep your voice as calm as possible and gather as much of the information as you can that is noted on the Bomb Threat Questionnaire ([Exhibit 5](#)). As soon as possible, notify your supervisor or call 911.

- You or your supervisor should then call 911 and an Emergency Response Warden

Emergency Response Warden should also notify Building Management . If possible, while you are talking with the caller, signal someone so they can notify your supervisor. **Do not make statements to newspapers, radio, or television news.** As soon as possible, complete the Bomb Threat Questionnaire and give it to your supervisor or the Facilities Manager.

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Written Threats

Written threats must be dealt with just as carefully and if an item you receive looks suspicious **do not touch it**. Notify your supervisor.

- Supervisors should call 911 and an Emergency Response Warden
- Emergency Response Warden should also notify Building Management

Searching Procedures

It is the responsibility of the authorities to **decide how, when and who** is to search building areas. You may be asked to help them search your work area – this is voluntary and if you do not wish to do so, you should decline.

14. SUSPICIOUS MAIL

Identifying Suspicious Mail

- Excessive postage, or marked with restrictive endorsements such as “Personal” or “Confidential”.
- Handwritten or poorly typed addresses and/or misspelling of common words.
- Incorrect titles, a title with no name or a title with the wrong name.
- Addressed to someone no longer with our company or otherwise outdated.
- Unexpected or from someone unfamiliar to you.
- Postmarked or stamped from a foreign address that is unexpected, unknown or otherwise suspicious.
- Shows a city or state in the postmark that does not match the return address, or has no return address or one that can't be verified as legitimate.
- Oily stains, discolorations or crystallization appear on the wrapper or there is an odor.
- Excessive or unusual weight given the size of the parcel, or one that is lopsided, oddly shaped or uneven.
- Protruding wires or aluminum foil, and/or a ticking sound.
- Excessive security material such as masking tape or string, and other visual distractions.

If you receive or identify suspicious mail:

- Isolate the parcel and alert others who are nearby.
- Do not try to open it, pass it to others to look at, shake it or empty its contents.
- Place the parcel in a plastic bag or some other type of container to prevent leakage of contents or, if you do not have a container, cover the parcel with anything (e.g., clothing, paper, trash can, etc.) and do not remove this cover.
- If any substance has spilled from parcel, do not try to clean it up but cover it and do not remove the cover.
- Turn off local fans and contact Building Management to see if / ventilation units can/should be shut down.

	<u>ARCADIS HS Standard Name</u> Emergency Response Policy	<u>Revision Number</u> 01
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- Evacuate the immediate area and close all doors to the area gently.
- Wash your hands with soap and water to prevent spreading any powder.
- Contact 911 and an Emergency Response Warden. **Once authorities have been notified, they will determine the need for any further action.**
- If possible, list all people who were in the room or area, especially those who may have had contact with the parcel or powder.

15. ACTS OF TERRORISM

To report suspected illegal intelligence or terrorism activity against the interest of the United States, telephone the ANSIR coordinator at the Denver FBI Field Office, telephone 303-629-7171.

	<u>ARCADIS HS Standard Name</u> Emergency Response Policy	<u>Revision Number</u> 01
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Maps for your building defining Zones and listing Wardens

 Infrastructure, environment, facilities	<u>ARCADIS HS Standard Name</u> Emergency Response Policy	<u>Revision Number</u> 01
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BOMB THREAT QUESTIONNAIRE

All bomb threats must be taken seriously. If the caller is familiar with the building and specific about the location of the bomb, the call should be regarded with a high degree of urgency.

LISTEN CAREFULLY AND REMAIN CALM

DATE: _____ TIME CALL WAS RECEIVED: _____ TIME CALL TERMINATED: _____

EXACT WORDS OF CALLER: _____

QUESTIONS TO ASK:

- WHEN will the bomb go off? _____
- WHERE is the bomb located? _____
- WHAT kind of bomb is it? _____
- WHAT does it look like? _____
- WHAT will cause it to explode? _____
- DID the caller place the bomb? _____
- WHY did the caller place the bomb? _____

CHARACTERISTICS OF CALLER:

Male _____ Female _____ Race _____ Age _____ Other _____

VOICE/SPEECH:

Loud __ Soft __ High __ Low __ Fast __ Slow __ Distorted __ Clear __ Stutter __ Slurred __
Nervous __ Calm __ Nasal __ Accent __ Other _____

BACKGROUND NOISES:

Quiet __ Traffic __ Voices __ Music __ Machines __ Airplanes __ Other _____

ADDITIONAL INFORMATION:

Did the caller indicate knowledge of facility? If so, how? _____

Extension Called? _____ Local or long distance? _____

Police or Fire Department called? _____ Property Management notified? _____

Do not discuss the situation with anyone except your immediate supervisor, H&S Manager or the Police or Fire Department.

Name & Job Title: _____

Date and Time Questionnaire Completed: _____

Phone: (Office) _____ (Home) _____

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Exhibit 4

EMERGENCY RESPONSE WARDEN TRAINING – SAMPLE AGENDA

1. Overview of Importance of Emergency Preparedness
2. Emergency Warden Materials and Responsibilities
3. Life Safety Systems – Fire alarm, sprinklers, emergency lighting
4. Fire Drills
5. Evacuation Procedures
 - a. Individuals needing assistance
6. Fire/Life Safety
7. Accident/Illness
8. Severe Weather
9. Gas/Noxious Odors
10. Power Outage
11. Intruders
12. Threats and Violence
13. Bomb Threat
14. Suspicious Mail
15. Earthquake
16. Acts of Terrorism
17. Map of building – go over exits, fire alarm boxes, fire extinguisher locations, meeting areas and severe weather shelter locations.

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EXECUTIVE SUMMARY

Illness related to heat stress can be controlled and minimized through the use of engineering controls, safe work practices and PPE. This Standard identifies responsibilities, risk factors for heat illness, signs and symptoms, first aid procedures and ARCADIS training requirements.

Personal risk factors for heat illness include poor health, age, weight and pre-existing medical conditions, have not been acclimated to working in the heat and have experienced previous heat illness.

Environmental risk factors include workload severity and duration, high temperature and humidity, direct sun exposure and air movement.

Heat stroke is a life-threatening condition and emergency personnel should be contacted immediately.

Preventative safe work practices involve avoidance of working in the heat when possible, acclimatization, rotating personnel, and avoiding beverages containing caffeine or sugar, staying appropriately nourished and providing potable water access at all times.

Implementation of engineering controls such as monitoring and measuring temperature and heat index factors, designing appropriate work/rest cycles and choosing clothing that allows for wicking of perspiration.

Training for heat stress prevention shall be provided to all supervisory employees prior to project assignment. Topics will include the importance of acclimatizing, risk factors, signs and symptoms of various heat illnesses and procedures to follow in the event of an emergency.

PICs, PMs and TMs are responsible for addressing heat stress in project planning, ensuring personnel have proper training and that provisions for shade and adequate water are available at a job site.

Supervisory Personnel (e.g. Site Safety Officers, Project Managers or Task Managers, etc.) who are managing staff on site and are responsible for ensuring that affected personnel, who might reasonably be anticipated to have exposure to the risk of heat illness, have received the proper training on heat illness prevention and ensuring that the requirements in this Standard are followed. Staff working in California, Washington or other states with specific heat illness standards must receive documented training prior to assignment. Other affected employees not working in these states must be familiar with this Health and Safety Standard and the information detailed in the Field Health & Safety Handbook. Corporate H&S recommends that all staff who might be reasonably be anticipated to have exposure to the risk of heat illness complete the online heat stress training course.

Project Personnel are responsible for understanding the conditions, signs and symptoms that can lead to heat stress and adhere to the prescribed control and mitigation and methods. Personnel will report to the SSO and/or Project Manager any signs and symptoms of heat stress exhibited by themselves or by other personnel.

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1. POLICY

It is ARCADIS policy that employees who are required to work in hot, outdoor places of employment or in other areas at times when the environmental risk factors for heat illness are present, are at risk for developing heat illness if they do not protect themselves from the hazards.

Heat-related illness may be prevented through the use of safe work practices, engineering controls and/or personal protective equipment (PPE).

2. PURPOSE AND SCOPE

2.1 Purpose

The purpose of this procedure is to provide employee awareness regarding heat illness symptoms, direction on the controls and prevention of heat-related illnesses and provide guidance on appropriate response actions if symptoms do occur.

2.2 Scope

This procedure applies to ARCADIS projects which include, but not limited to: outdoor operations conducted in hot weather such as construction, refining, oil and gas extraction, asbestos removal, and hazardous waste site activities, especially those that require employees to wear semipermeable or impermeable protective clothing are likely to cause heat stress among the exposed. California and Washington enforce specific occupational heat illness prevention requirements, in addition to the policies set forth in this Standard. (See Exhibit 2 for links to additional resources).

3. DEFINITIONS

Definitions relating to Heat Stress Prevention can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Principals-In-Charge, Project and Task Managers

Are responsible for ensuring that heat stress is considered and addressed in project hazard, risk assessment and project planning.

Ensure that the project HASP addresses the need for adequate water, that provisions for shade are available at a job site, and that time is available for staff to eat when the environmental risk factors for heat illness are present.

Ensure that HASP addresses the need for affected employees to receive proper training on heat illness prevention.

4.2 Supervisory Personnel

Supervisory Personnel (e.g. Site Safety Officers, Project Managers and Task Managers, etc. that are supervising employees on site) must review this standard, and receive training in the prevention of heat related illnesses prior to supervising employees working in the heat (risk of heat illness). Supervisory Personnel will be trained in heat illness

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prevention and procedures to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures. Supervisory Personnel must ensure personal risk factors that contribute to heat related illness are taken into consideration before assigning a task where there is the possibility of a heat-related illness occurring (See section 5 for risk factors) and plan for and implement preventive measures and controls when heat advisories are issued for those areas in which staff will be working.

Ensure that affected employees working on site have received proper training on heat illness prevention.

Ensure that the requirements in this standard are followed.

4.3 Corporate Health and Safety

Responsible for keeping this standard up-to-date with best work practices.

As requested, provide training to potentially impacted employees and their supervisors on the risks and prevention of heat illness, including how to recognize symptoms and how to respond when they appear.

4.4 Affected Employees

Responsible for understanding the conditions, signs and symptoms that can lead to heat stress and utilize and adhere to the prescribed control and mitigation and methods. Personnel will report to the SSO and/or Project Manager any signs and symptoms of heat stress exhibited by themselves or by other personnel on the project site.

If Site Personnel have not received Heat Stress training, then Site Personnel will be educated on heat stress prevention through the site Health and Safety Plan and/or during the daily tailgate meeting.

Employees must review and comply with the provisions of this standard.

Ensure they have drinking water available at all times and that they eat prior to work starting and during the day when the environmental risk factors for heat illness are present.

Ensure they have access to a shaded area to prevent or recover from heat related symptoms.

5. PROCEDURE

5.1 Risk Factors for Heat Related Illnesses

The personal and environmental risk factors for heat related illness must be taken into consideration as part of the TRACK process before performing a task.

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Personal Risk Factors

- No recent exposure to hot workplaces.
- Individual susceptibilities such as age, weight, degree of physical fitness, use of medications and certain medical conditions such as hypertension and diabetes all affect the potential to experience a heat-related illness.
- A person is at greater risk for heat illness when they are in poor health, are dehydrated, have not eaten, have not been acclimated to working in the heat and have experienced previous heat illness.
- Working in a hot environment tends to lower the mental alertness and physical performance of an individual. Increased body temperature and physical discomfort promote irritability, anger and other emotional states which has the potential to cause personnel to overlook safety procedures or to divert attention from hazardous tasks.

Environmental Risk Factors

- High temperature and humidity, direct sun exposure, no breeze or wind.
- Radiant heat, air movement.
- Workload severity and duration.
- Heat tends to promote accidents due to the slipperiness of sweaty palms, dizziness or the fogging of safety glasses. The frequency of accidents, in general, appears to be higher in hot work environments than in more moderate environmental conditions.

5.2 Preventative Measures and Controls

5.2.1 Safe Work Practices

- Avoidance of working in the heat when possible – this can be accomplished by avoiding work in the hottest parts of the day, working in cooled enclosures or cooling units provided in the work area. Severe heat conditions can be cause for stopping or not starting work.
- Allowing personnel to acclimatize and adapt to the heat; especially those new to the project.
- Whenever possible, rotate personnel.
- Personnel shall have access to potable drinking water. Where the supply of water is not plumbed or otherwise continuously supplied, water shall be provided in sufficient quantity at the beginning of the work shift and for the shift duration.
- Thirst cannot be relied on as a guide for hydration. Drinking cool, fresh water throughout the day (four 8-oz cups per hour) during hot weather. Carbohydrate-electrolyte fluids may also be necessary.
- Knowing the location(s) of the closest drinking water supplies.

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- Choosing non-carbonated water over sodas and other beverages containing caffeine or sugar.
- Eating prior to work and then during the work rotation.
- Understanding of the individual, pre-disposing susceptibilities.
- Understanding the signs and symptoms of heat illness to watch for including: discomfort, excessive sweating, headache, poor concentration, muscle pain, cramping, dizziness, fatigue, irritability, loss of coordination, vomiting, blurry vision, confusion, lack of sweating, fainting and seizures.

5.2.2 Engineering Controls

- Monitoring and measurement of temperature and heat index factors so the magnitude of the heat hazard is understood. This can be accomplished with on-site instrumentation or by monitoring conditions through the internet, radio or local weather bureaus.
- Personnel choosing to wear appropriate clothing that allows for the wicking away of perspiration.
- Implementing appropriate work/rest cycles to allow for adequate cool-down periods.
- Employees suffering from heat illness or believing that a preventative recovery period is necessary, must be provided access to an area with shade that is either open to the air or provided with ventilation or cooling for a period of no less than 5 minutes. Access to shade shall be permitted at all times.

5.3 Heat Exhaustion and Heat Stroke Symptoms

5.3.1 Signs of Heat Exhaustion

- Cool, moist, pale, or flushed skin;
- Heavy sweating;
- Headache;
- Nausea, dizziness, and exhaustion;
- Normal or below normal body temperature.

5.3.2 Signs of Heat Stroke

- Hot, red skin which can be dry, or moist from exercise;
- Changes in consciousness;
- Rapid, weak pulse;
- Rapid, shallow breathing, vomiting.

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- A person experiencing heatstroke can have a very high body temperature—sometimes as high as 106°F (41° C).

5.4 Heat Exhaustion and Heat Stroke First Aid and Emergency Procedures

5.4.1 First Aid Procedures for Heat Exhaustion

1. Move the person to a cooler place.
2. Remove or loosen tight clothing and apply cool, wet cloths, such as towels or sheets soaked in water.
3. If the person is conscious, give him or her cool water to drink. Make sure the person drinks slowly. Give a half glass of cool water every 15 minutes.
4. Let the person rest in a comfortable position.
5. Watch carefully for changes in his or her condition.

Do not give liquids that contain alcohol or caffeine because they can cause further dehydration, making conditions worse.

5.4.2 First Aid and Emergency Procedures for Heat Stroke

Heatstroke is a life-threatening situation. If you suspect someone is suffering from heatstroke, call 9-1-1 or the local emergency number immediately:

1. Move the person to a cool place.
2. Loosen tight clothing.
3. Remove perspiration-soaked clothing.
4. Apply cool, wet cloths to the skin.
5. Fan the person.
6. If conscious, give small amounts of cool water to drink.
7. Place the person on his or her side.
8. Continue to cool the person by using ice or cold packs on the wrists, ankles, groin, and neck and in the armpits.
9. Continue to check breathing and circulation.

Do not give liquids that contain alcohol or caffeine because they can cause further dehydration, making conditions worse. Ensure 9-1-1 or the local emergency number is called if the person refuses water, vomits or starts to lose consciousness.

Emergency contact telephone numbers and hospital directions/map must be included in each site-specific Health and Safety Plan (HSP) for employee reference.

6. TRAINING

6.1 Supervisory Personnel

Supervisory Personnel that are supervising staff on site who might reasonably be anticipated to have exposure to the risk of heat illness shall be provided training in the following topics prior to assignment:

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- The environmental and personal risk factors for heat illness.
- The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
- The importance of staying appropriately nourished.
- The importance of acclimatizing.
- The different types of heat illness and the common signs and symptoms.
- The importance for employees to immediately report to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves or in co-workers.
- The procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.
- The procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.
- The procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

In addition, these supervisory personnel must review and understand:

- This Heat Stress Prevention Standard
- How to implement the emergency response procedures detailed in the site specific Health & Safety Plan when an employee exhibits symptoms consistent with possible heat illness
- Weather monitoring reports as detailed in the field Health & Safety Handbook
- How to monitor weather reports and how to plan for and respond to hot weather advisories.

This training will be documented with details on the subject matter covered and date of training recorded.

6.2 Affected Employees

For those employees who work in California and in other states with state-OSHA specified heat illness training requirements and might reasonably be anticipated to have exposure to the risk of heat illness, training in the following topics is required prior to assignment:

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- The environmental and personal risk factors for heat illness.
- The importance of frequent consumption of small quantities of water, up to 4 cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties.
- The importance of acclimatizing.
- The different types of heat illness and the common signs and symptoms.
- The importance for employees to immediately report to the employer, directly or through the employee's supervisor, symptoms or signs of heat illness in themselves or in co-workers.
- The procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary.
- The procedures for contacting emergency medical services, and if necessary, for transporting employees to a point where they can be reached by an emergency medical service provider.
- The procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site can and will be provided as needed to emergency responders.

This training will be documented with details on the subject matter covered and date of training recorded.

Note: For those staff who are not working in California or other states that have specified heat illness training requirements, staff who might reasonably be anticipated to have exposure to the risk of heat illness shall at a minimum review the information detailed in the Field Health & Safety Handbook and this standard. Corporate H&S recommends that all staff who might be reasonably be anticipated to have exposure to the risk of heat illness complete the online heat stress training course.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- OSHA Technical Manual – Section III Chapter 4
- NIOSH Publication Number 86-112
- ACGIH 1992
- American Red Cross 2007

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8. RECORDS - DATA RECORDING AND MANAGEMENT

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Mija A. Coppola, Corporate Director of Health & Safety



History of Change

Revision Date	Revision Number	Reason for change
31 August 2011	01	Original document
13 March 2012	02	Detailed Supervisory Personnel requirement to plan/detail preventive measures/controls when heat advisories are issued; clarified training requirements for staff and supervisory personnel; inserted heat advisory and excessive heat warning definitions
19 June 2012	03	Information added in regard to nourishment

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Exhibit 1 – Definitions

Acclimation – a physiological adaptation to heat exposure that allows the body to continue to function despite higher temperatures.

Excessive Heat Warning - Extreme heat index making it feel very hot, typically above 110 °F (43 °C) for 3 hours or more during the day for two consecutive days or above 110 °F (43 °C) at any time. Specific criteria varies over different county warning areas.

Heat Advisory - Issued when the "heat index" is expected to exceed 105 degrees Fahrenheit or 40 degrees Celsius during the day and 80 degrees Fahrenheit or 27 degrees Celsius during the night for at least two consecutive days.

Heat Cramps – normally caused by performing hard physical labor in a hot environment. These cramps have been attributed to an electrolyte imbalance caused by sweating. Salt tablets should not be taken.

Heat Collapse – (fainting) condition where the brain does not receive enough oxygen because blood pools in the extremities. To prevent heat collapse, the employee should gradually become acclimatized to the hot environment.

Heat Exhaustion – less severe than heat stroke, but the victim must be treated as soon as possible. Symptoms include clammy and moist skin, pale or flushed complexion, sweating along with extreme weakness or fatigue, giddiness, nausea or headache may occur and, in more serious cases, vomiting or loss of consciousness.

Heat Fatigue – The signs and symptoms of heat fatigue include impaired performance of skilled sensorimotor, mental or vigilance jobs. There is no treatment for heat fatigue except to remove the heat stress before a more serious heat-related condition develops.

Heat Index – an “apparent temperature” that is a measure of how hot it feels when relative humidity is added to the actual air temperature.

Heat Rashes – the most common problem in hot work environments. Prickly heat is manifested as red papules and usually appears in areas where the clothing is restrictive.

Heat Stress – a physiological condition induced when high temperatures and humidity compromise the body's ability to cool itself, resulting in heat-related illness.

Heat Stroke – the body's system of temperature regulation fails and body temperature rises to critical levels. This condition is caused by a combination of highly variable factors, and its occurrence is difficult to predict. **Heat stroke is a medical emergency.** The primary signs and symptoms of heat stroke include confusion, irrational behavior, loss of consciousness, convulsions, a lack of sweating (usually), hot, dry skin and an abnormally high body temperature.

Shade - the blockage of direct sunlight. Canopies, umbrellas and other temporary structures or devices may be used to provide shade. One indicator that blockage is sufficient is when objects do not cast a shadow in the area of blocked sunlight. Shade is not adequate when heat in the area of shade defeats the purpose of shade, which is to allow the body to cool.

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For example, a car sitting in direct sunlight does not provide acceptable shade to a person inside it, unless the car engine is operating with air conditioning on.

Transient Heat Fatigue – the temporary state of discomfort and mental or psychologic strain arising from prolonged heat exposure. Workers unaccustomed to the heat are particularly susceptible and can suffer, to varying degrees, a decline in task performance, coordination, alertness and vigilance.

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Exhibit 2 – Heat Stress Links

[Heat Illness Symptoms](#)

[Heat Illness Thermometer and PPE](#)

[OSHA Working Outdoors Fact Sheet](#)

[OSHA Worker Protection from Heat Stress](#)

[California Heat Illness Prevention Enforcement Q&A](#)

[Washington State Outdoor Heat Exposure Enforcement Procedures](#)

EMPLOYER SAMPLE PROCEDURES FOR HEAT ILLNESS PREVENTION



FEB 2010



California Employers with any outdoor places of employment must comply with the Heat Illness Prevention Standard T8 CCR 3395. These procedures have been created to assist the employer in crafting their heat illness prevention procedures, and to reduce the risk of work related heat illnesses among their employees.

These procedures are not intended to supersede or replace the application of any other Title 8 regulation, particularly T8 3203 Injury and Illness Prevention Program (IIPP). Title 8 CCR 3203 requires an employer to establish, implement, and maintain an effective IIPP. The measures listed here may be integrated into the Employer's Injury and Illness Prevention Program.

The employer must also be aware that other standards apply to Heat Illness Prevention such as the requirement to provide for drinking water, first aid and emergency response.

Please note: These procedures provide the minimal steps applicable to most outdoor work settings and are essential to reducing the incidence of heat related illnesses. In working environments with a higher risk for heat illness (e.g., during a heat wave, or other severe working or environmental conditions), it is the employer's duty to exercise greater caution and additional protective measures beyond what is listed in this document, as needed to protect their employees.

To effectively establish your company procedures, carefully review the key elements listed on this document, as well as the examples provided, then select and fill out the procedures applicable to your workplace. Please use additional paper when necessary. Implement and train employees and supervisors on your company procedures and follow-up to ensure your procedures are fulfilled.

Furthermore, to successfully tailor these procedures to your work activities, evaluate and consider the individual conditions present at your site (such as, but not limited to): (1) size of the crew, (2) the length of the work-shift, (3) the ambient temperature (which can be taken either with the aid of a simple thermometer or by monitoring the weather) and (4) the presence of personal protective equipment or additional sources of heat. Again, these sample procedures do not include every workplace scenario, so it is crucial that your company evaluate and take into account conditions found in your individual workplace that are likely to cause a heat illness.

Your written procedures should also:

1. Identify the designated person(s) that has been assigned the applicable task(s) (e.g. supervisor, foreman, safety coordinator, crew leader).
2. Provide specific details required to carry out the task and ensure that the task is accomplished successfully (e.g. how many water containers/shade structures, of what size, distance to placement, frequency of water-level replenishment/weather-tracking/water breaks/reminders, etc). [For additional information, see the Enforcement Q&A: <http://www.dir.ca.gov/DOSH/heatIllnessQA.html>]
3. Specify how these procedures will be communicated to your employees and in particular to the persons assigned these responsibilities (e.g. via training, meeting), and how it will be ascertained that these company instructions and procedures are followed.

Sample Procedures for Provision of Water include but are not limited to the following:

- ☐ The [Designated person] will bring [XX No. of] drinking water containers (of 5 to 10 gallons each) to the site, so that at least 2 quarts per employee are available at the start of the shift.
- ☐ The [Designated person] will bring [XX No. of] paper cone rims or bags of disposable cups and the necessary cup dispensers to ensure that enough disposable cups are made available for each worker and are kept clean until used.
- ☐ As part of [Designated person] Effective Replenishment Procedures, the [Designated person] will check the water level of all containers every [30 mins], and more frequently when the temperature exceeds 90°F. When the water level within a container drops below 50%, water containers will be refilled with cool water. To accomplish this task, the [Designated person] will carry [1-2] additional water containers (i.e. 5 gallon bottles) to replace water as needed.
- ☐ When the temperature exceeds 90 degrees, the [Designated person] will carry ice in separate containers, so that when necessary, it will be added to the drinking water to keep it cool.
- ☐ The [Designated person] will check the work site and place the water as close as possible to the workers (i.e. no more than [50] feet from the workers). If field terrain prevents the water from being placed as close as possible to the workers, the [Designated person] will bring bottled water or individual containers (in addition to disposable cups and water containers), so that workers can have drinking water readily accessible.
- ☐ The [Designated person] will ensure that the water containers are relocated to follow along as the crew moves, so drinking water will be readily accessible.
- ☐ The [Designated person] will be responsible for cleaning the water containers and ensuring that they are kept in sanitary condition (all necessary cleaning supplies are provided by the company).
- ☐ The company will reimburse the supervisors for any cost incurred for them to fill up their water containers as needed on a daily basis or to purchase necessary disposable cups or cleaning supplies. The [Designated person] will be given a per diem of [XXX] per week for the purchase of water and/or drinking water supplies.
- ☐ The [Designated person] will point out daily the location of the water coolers to the workers and remind them to drink water frequently. When the temperature exceeds or is expected to exceed 90 degrees F, the [Designated person] will hold a brief 'tailgate' meeting each morning to review with employees the importance of drinking water, the number and schedule of water and rest breaks and the signs and symptoms of heat illness.
- ☐ The [Designated person] will use audible devices (such as whistles or air horns) to remind employees to drink water.

- ☐ When the temperature equals or exceeds 95 °F or during a heat wave, the [Designated person] will increase the number of water breaks, and will remind workers throughout the work shift to drink water.
- ☐ During employee training, the importance of frequent drinking of water will be stressed.

Sample Procedures for Access to Shade include but are not limited to the following:

Note: Follow the general guidance provided above, under the Provisions for Water (identify the person assigned the task and list the specific tasks that have to be carried out).

- ☐ Each [Designated person] will bring [XX No. of] shade structures to the site, to accommodate at least 25 percent of the employees on the shift and either chairs, benches, sheets, towels or any other items to allow employees to sit and rest without contacting the bare ground. However, chairs, benches, etc. are not required for acceptable sources of shade such as trees.
- ☐ The [Designated person] will ensure that [XX No. of] shade structures are opened and placed as close as practical to the workers, when the temperature equals or exceeds 85°F. When the temperature is below 85°F, the shade structures will be brought to the site, but will be opened and set in place upon worker(s) request. Note: The interior of a vehicle may not be used to provide shade unless the vehicle is air-conditioned and the air conditioner is on.
- ☐ The [Designated person] will point out the daily location of the shade structures to the workers as well as allow and encourage employees to take a 5 min cool-down rest in the shade, when they feel the need to do so to protect themselves from overheating.
- ☐ The [Designated person] will ensure that the shade structures are relocated to follow along with the crew and double-check that they are as close as practical to the employees, so that access to shade is provided at all times.
- ☐ In situations where trees or other vegetation are used to provide shade (such as in orchards), the [Designated person] will evaluate the thickness and shape of the shaded area (given the changing angles of the sun during the entire shift), before assuming that sufficient shadow is being cast to protect employees.
- ☐ In situations where it is not safe to provide shade (example winds of more than 40 mph), the [Designated person] will document how this determination was made, and what steps will be taken to provide shade upon request.
- ☐ For non-agricultural employers, in situations where it is not safe or feasible to provide shade, the [Designated person] will document how this determination was made, and what steps will be taken to provide shade upon request or other alternative cooling measures with equivalent protection.

Sample Procedures for Monitoring the Weather include but are not limited to:

- ☐ 2 weeks in advance (or with as many days in advance as possible), the Employer, Farm Labor Contractor or Superintendent will go on the internet (www.nws.noaa.gov), call the National Weather Service Phone Numbers (see CA numbers attached) or check the Weather Channel TV Network to view the extended weather forecast in order to plan in advance the work schedule, know whether a heat wave is expected and if additional schedule modifications will be necessary. This type of advance planning should take place all summer long.

CALIFORNIA Dial-A-Forecast

Eureka 707-443-7062
 Hanford 559-584-8047
 Los Angeles 805-988-6610(#1)

Sacramento 916-979-3051
 San Diego 858-297-2107(#1)
 San Francisco 831-656-1725(#1)

- ☐ Prior to each workday, the [Designated person] will review the forecasted temperature and humidity for the worksite and compare it against the National Weather service Heat Index to evaluate the risk level for heat illness, for instance whether or not workers will be exposed at a temperature and humidity characterized as either "extreme caution" or "extreme danger" for heat illnesses such as heat stroke. It is important to keep in mind that the temperature at which these warnings occur must be lowered as much as 15 degrees if the workers under consideration are in direct sunlight.
- ☐ Prior to each workday, the [Designated person] will be responsible for monitoring the weather (using www.nws.noaa.gov or with the aid of a simple thermometer) at the worksite. This critical weather information will be taken into consideration, to determine when it will be necessary to make modifications to the work schedule (such as stopping work early, rescheduling the job, working at night or during the cooler hours of the day, increasing the number of water and rest breaks).
- ☐ The [Designated person] will be responsible for using a thermometer at the jobsite and checking the temperature every [60 mins] to monitor for sudden increases in temperature, to ensure that once the temperature exceeds 85 °F, the shade structures are opened and accessible to the workers and to make certain that once the temperature equals or exceeds 95 °F additional preventive measures such as the High Heat Procedures are implemented.

Handling a Heat Wave:

- ☐ During a heat wave or heat spike (e.g., a sudden increase in daytime temperature of 9 degrees or more), the work day will be cut short (example 12 PM), will be rescheduled (example conducted at night or during cooler hours) or if possible cease for the day.
- ☐ If schedule modifications are not possible and workers have to work during a heat wave, the [Designated person] will provide a tailgate meeting to reinforce heat illness prevention with emergency response procedures and review the weather forecast with the workers. In addition, the [Designated person] will institute alternative preventive measures such as provide workers with an increase number of water and rest breaks every [(X) Hour], supervise workers to ensure that they do stop work and take these breaks, and observe closely all workers for signs and symptoms of heat illness.
- ☐ During a heat wave or heat spike (e.g., a sudden increase in daytime temperature of 9 degrees or more), and the start of the workday, the [Designated person] will hold a tailgate meeting with the workers to review the company heat illness prevention procedures, the weather forecast and emergency response.
- ☐ The [Designated person] will assign each employee a "buddy" to be on the lookout for signs and symptoms of heat illness and ensure that emergency procedures are initiated when someone displays possible signs or symptoms of heat illness.

Sample High Heat Procedures include but are not limited to:

[High Heat Procedures are additional preventive measures that this company will use when the temperature equals or exceeds 95 degrees Fahrenheit].

- ☐ The [Designated person] will ensure that effective communication by voice, observation, or electronic means is maintained so that employees at the worksite can contact a supervisor when necessary. If the [Designated person] is unable to be near the workers to observe them or communicate with them, then an electronic device, such as a cell phone or text messaging device, may be used for this purpose only if reception in the area is reliable.
- ☐ The [Designated person] will observe employees for alertness and signs and symptoms of heat illness.
- ☐ The [Designated person] will remind employees throughout the work shift to drink plenty of water.
- ☐ The [Designated person] will closely supervise a new employee, or assign a "buddy" or more

experienced coworker for the first 14 days of the employee's employment by the employer, unless the employee indicates at the time of hire that he or she has been doing similar outdoor work for at least 10 of the past 30 days for 4 or more hours per day.

Sample Procedures for Acclimatization include but are not limited to:

Acclimatization is the temporary and gradual physiological change in the body that occurs when the environmentally induced heat load to which the body is accustomed is significantly and suddenly exceeded by sudden environmental changes. In more common terms, the body needs time to adapt when temperatures rise suddenly, and an employee risks heat illness by not taking it easy when a heat wave strikes or when starting a new job that exposes the employee to heat to which the employee's body hasn't yet adjusted.

Inadequate acclimatization can imperil anyone exposed to conditions of heat and physical stress significantly more intense than what they are used to. Employers are responsible for the working conditions of their employees, and they must act effectively when conditions result in sudden exposure to heat their employees are not used to.

- ☐ [XYZ's Company's] will monitor the weather and in particular be on the look out for sudden heat wave(s), or increases in temperatures to which employees haven't been exposed to for several weeks or longer.
- ☐ **During a heat wave or heat spike (e.g., a sudden increase in daytime temperature of 9 degrees or more), the work day will be cut short (example 12 PM), will be rescheduled (example conducted at night or during cooler hours) or if possible cease for the day.**
- ☐ During the hot summer months, the work shift will start [(X) Hour] earlier in the day or later in the evening.
- ☐ For new employees, the [Designated person] will try to find ways to lessen the intensity of the employees work during a two-week break-in period (such as scheduling slower paced, less physically demanding work during the hot parts of the day and the heaviest work activities during the cooler parts of the day (early-morning or evening)). Steps taken to lessen the intensity of the workload for new employees will be documented.
- ☐ The [Designated person] will be extra-vigilant with new employees and stay alert to the presence of heat related symptoms.
- ☐ The [Designated person] will assign new employees a "buddy" or experienced coworker to watch each other closely for discomfort or symptoms of heat illness.
- ☐ During a heat wave, the [Designated person] will observe all employees closely (or maintain frequent communication via phone or radio) and be on the look out for possible symptoms of heat illness.
- ☐ [XYZ's Company's] training for employees and supervisors will include the importance of acclimatization, how it is developed and how these company procedures address it.

Sample Procedures for Emergency Response include but are not limited to:

- ☐ Prior to assigning a crew to a particular worksite, the [Designated person] will provide workers and the foreman a map along with clear and precise directions (such as streets or road names, distinguishing features and distances to major roads) of the site, to avoid a delay of emergency medical services.

- ☐ Prior to assigning a crew to a particular worksite, the [Designated person] will ensure that a qualified, appropriately trained and equipped person will be available at the site, to render first aid if necessary.
- ☐ Prior to the start of the shift, the [Designated person] will determine if a language barrier is present at the site and take steps (such as assigning the responsibility to call emergency medical services to the foreman or an English speaking worker) to ensure that emergency medical services can be immediately called in the event of an emergency.
- ☐ All foremen and supervisors will carry cell phones or other means of communication, to ensure that emergency medical services can be called and check that these are functional at the worksite prior to each shift.
- ☐ When an employee is showing symptoms of possible heat illness, [Designated person] will take immediate steps to keep the stricken employee cool and comfortable once emergency service responders have been called (to reduce the progression to more serious illness).
- ☐ At remote locations such as rural farms, lots or undeveloped areas, the [Designated person] will designate an employee or employees to physically go to the nearest road or highway where emergency responders can see them. If daylight is diminished, the designated employee(s) shall be given reflective vest or flashlights in order to direct emergency personnel to the location of the work-site, which may not be visible from the road or highway.
- ☐ During a heat wave or hot temperatures, workers will be reminded and encouraged to immediately report to their supervisor any signs or symptoms they are experiencing.
- ☐ [XYZ's Company's] training for employees and supervisors will include every detail of these written emergency procedures.

Handling a Sick Employee:

- ☐ When an employee displays possible signs or symptoms of heat illness, a trained first aid worker or supervisor will check the sick employee and determine whether resting in the shade and drinking cool water will suffice or if emergency service providers will need to be called. Do not leave a sick worker alone in the shade, as he or she can take a turn for the worse!
- ☐ When an employee displays possible signs or symptoms of heat illness and no trained first aid worker or supervisor is available at the site, call emergency service providers.
- ☐ Call emergency service providers immediately if an employee displays signs or symptoms of heat illness (loss of consciousness, incoherent speech, convulsions, red and hot face), does not look OK or does not get better after drinking cool water and resting in the shade. While the ambulance is in route, initiate first aid (cool the worker: place in the shade, remove excess layers of clothing, place ice pack in the armpits and groin area and fan the victim). Do not let a sick worker leave the site, as they can get lost or die (when not being transported by ambulance and treatment has not been started by paramedics) before reaching a hospital!
- ☐ If an employee does not look OK and displays signs or symptoms of severe heat illness (loss of consciousness, incoherent speech, convulsions, red and hot face), and the worksite is located more than 20 min away from a hospital, call emergency service providers, communicate the signs and symptoms of the victim and request Air Ambulance.

Sample Procedures for Employee and Supervisory Training include but are not limited to:

- ☐ [XYZ's Company's] will ensure that all supervisors are trained prior to being assigned to supervise other workers. Training will include this company's written procedures and what steps supervisors will follow when employees' exhibit symptoms consisted with heat illness.
- ☐ [XYZ's Company's] will ensure that all employees and supervisors are trained prior to working outside. Training will include the company's written prevention procedures.
- ☐ [Designated person] will train employees on the steps that will be followed for contacting emergency medical services, including how they are to proceed when there are non-English speaking workers, how clear and precise directions to the site will be provided as well as stress the need to make visual contact with emergency responders at the nearest road or landmark to direct them to their worksite.
- ☐ When the temperature exceeds 75 degrees °F, the [Designated person] will hold short 'tailgate' meetings to review the weather report, reinforce heat illness prevention with all workers and provide reminders to drink water frequently, to be on the lookout for signs and symptoms of heat illness and inform them that shade can be made available upon request.
- ☐ The [Designated person] will assign new employees a "buddy" or experienced coworker to ensure that they understood the training and follow company procedures.

Utilities and Structures Checklist

Project: _____
Project Number: _____
Date: _____
Work locations applicable to this clearance checklist: _____

Pre-Field Work

One Call or "811" notified 48-72 hours in advance of work? ☐ Yes ☐ No
Utility companies notified during the One Call process ☐ See attached ticket

List any other utilities requiring notification: ☐ None

Client provided utility maps or "as built" drawings showing utilities? ☐ Yes ☐ No

Field Work

Markings present: ☐ Paint ☐ Pin flags/stakes ☐ Other ☐ None

Subsurface Utility Lines of Evidence Used (3 Minimum):

☐ One Call/"811"

☐ Client Provided Maps/Drawings

☐ Client Clearance

☐ Interviews: Name(s)/Affiliation(s) _____

Did persons interviewed indicate depths of any utilities in the subsurface?

☐ Yes, depths provided:

☐ Did not know or refused to answer

Comments:

- ☒ Site Inspection
- ☐ GPR
- ☐ Air-Knife
- ☐ Hydro-Knife
- ☐ Public Records/Maps
- ☐ Radiofrequency
- ☐ Metal Detector
- ☐ Handauger
- ☐ Potholing
- ☐ Probing
- ☐ Private Locator:
- ☐ Marine Locator:
- ☐ Other:

Tips for Successful Utility Location:

1. No excessive turning or downward force of handaugers/shovels, etc.
2. No hammering- no pickaxes-no digging bars-no hurrying or shortcutting
3. Select alternate/backup locations for clearance
4. Utilities may run directly under asphalt/concrete or be > 5 ft depth
5. Be on site when utilizing private utility locators

Name and Company: _____
Name and Company: _____



Site Inspection

During inspections look for the following ("YES" requires follow up investigation):

	Utility color codes			
a) Natural gas line present (evidence of a gas meter)?	Yellow	☐	Yes	☐ No
b) Evidence of subsurface electric lines :	Red			
i) Conduits to ground from electric meter?		☐	Yes	☐ No
ii) Overhead electric lines absent		☐	Yes	☐ No
iii) Light poles, electric devices with no overhead lines?		☐	Yes	☐ No
c) Evidence of water lines:	Blue			
i) Water meter on site?		☐	Yes	☐ No
ii) Fire hydrants in vicinity of work?		☐	Yes	☐ No
iii) Irrigation systems?		☐	Yes	☐ No
d) Evidence of sewers or storm drains:	Green			
i) Restrooms or kitchen on site?		☐	Yes	☐ No
ii) Gutter down spouts going into ground		☐	Yes	☐ No
iii) Grates in ground in work area		☐	Yes	☐ No
e) Evidence of telecommunication lines:	Orange			
i) Fiber optic warning signs in areas?		☐	Yes	☐ No
ii) Lines from cable boxes running into ground?		☐	Yes	☐ No
iii) Conduits from power poles running into ground?		☐	Yes	☐ No
iv) Aboveground boxes or housings in work area?		☐	Yes	☐ No
f) Underground storage tanks:				
i) Tank pit present?		☐	Yes	☐ No
ii) Product lines running to dispensers/buildings?		☐	Yes	☐ No
iii) Vent present away from tank pit?		☐	Yes	☐ No
g) Proposed excavation markings in work area?	White	☐	Yes	☐ No
h) Other:				
i) Evidence of linear asphalt or concrete repair		☐	Yes	☐ No
ii) Evidence of linear ground subsidence or change in vegetation?		☐	Yes	☐ No
iii) Manholes or valve covers in work area?		☐	Yes	☐ No
iv) Warning signs ("Call Before you Dig", etc) on or adjacent to site?		☐	Yes	☐ No
v) Utility color markings not illustrated in this checklist?		☐	Yes	☐ No
i) Aboveground lines in or near the work area:				
i) < 50 kV within 10 ft of work area?		☐	Yes	☐ No
ii) >50 - 200 kV within 15 ft of work area?		☐	Yes	☐ No
iii) >200-350 kV within 20 ft of work area?		☐	Yes	☐ No
iv) >350-500 kV within 25 ft of work area?		☐	Yes	☐ No
v) >500-750 kV within 35 ft or work area?		☐	Yes	☐ No
vi) >750-1000 kV within 45 ft of work area?		☐	Yes	☐ No

Comments:

Do not initiate intrusive work if utilities are suspected to be present in area and are not located, markings are over 14 days old, or if clearance methods provide incomplete or conflicting information. Do not perform intrusive work within 30 inches of a utility marking without hand clearing.

Name and signature of person completing the checklist:

Name:

Signature:

Date:



TAILGATE HEALTH & SAFETY MEETING FORM

This form documents the tailgate meeting conducted in accordance with the Project HASP. Personnel who perform work operations on-site during the day are required to attend this meeting and to acknowledge their attendance, at least daily.

Project Name:			Project Location:
Date:	Time:	Conducted by:	Signature/Title:
Client:		Client Contact:	Subcontractor companies:

TRACKing the Tailgate Meeting

Think through the Tasks (list the tasks for the day):

1 _____	3 _____	5 _____
2 _____	4 _____	6 _____

Other Hazardous Activities - Check the box if there are any other ARCADIS, Client or other party activities that may pose hazards to ARCADIS operations

☐

If there are none, write "None" here: _____

If yes, describe them here: _____

How will they be controlled? _____

Pework Authorization - check activities to be conducted that require permit issuance or completion of a checklist or similar before work begins:

Doc #

Doc #

☐ Not applicable	<u>Doc #</u>	☐ Working at Height	<u>Doc #</u>	☐ Confined Space	<u>Doc #</u>
☐ Energy Isolation (LOTO)	<u>Doc #</u>	☐ Excavation/Trenching	<u>Doc #</u>	☐ Hot Work	<u>Doc #</u>
☐ Mechanical Lifting Ops	<u>Doc #</u>	☐ Overhead & Buried Utilities	<u>Doc #</u>	☐ Other permit	<u>Doc #</u>

Discuss following questions (for some review previous day's post activities). **Check if yes :**

☐ Topics from Corp H&S to cover?

☐ Incidents from day before to review?	☐ Lessons learned from the day before?	☐ Any Stop Work Interventions yesterday?
☐ Any corrective actions from yesterday?	☐ Will any work deviate from plan?	☐ If deviations, notify PM & client
☐ JLAs or procedures are available?	☐ Field teams to "dirty" JLAs, as needed?	☐ All equipment checked & OK?
☐ Staff has appropriate PPE?	☐ Staff knows Emergency Plan (EAP)?	☐ Staff knows gathering points?

Comments: _____

Recognize the hazards (check all those that are discussed) (Examples are provided) and **Assess** the Risks (Low, Medium, High - circle risk level) - Provide an overall assessment of hazards to be encountered today and briefly list them under the hazard category.

☐ Gravity (i.e., ladder, scaffold, trips) (L M H)	☐ Motion (i.e., traffic, moving water) (L M H)	☐ Mechanical (i.e., augers, motors) (L M H)
☐ Electrical (i.e., utilities, lightning) (L M H)	☐ Pressure (i.e., gas cylinders, wells) (L M H)	☐ Environment (i.e., heat, cold, ice) (L M H)
☐ Chemical (i.e., fuel, acid, paint) (L M H)	☐ Biological (i.e., ticks, poison ivy) (L M H)	☐ Radiation (i.e., alpha, sun, laser) (L M H)
☐ Sound (i.e., machinery, generators) (L M H)	☐ Personal (i.e. alone, night, not fit) (L M H)	☐ Driving (i.e. car, ATV, boat, dozer) (L M H)

Continue TRACK Process on Page 2

TAILGATE HEALTH & SAFETY MEETING FORM - Pg. 2

Control the hazards (Check all and discuss those methods to control the hazards that will be implemented for the day): Review the HASP, applicable JLAs, and other control processes. Discuss and document any additional control processes.

☒ **STOP WORK AUTHORITY** (Must be addressed in every Tailgate meeting - (See statements below)

☐ Elimination ☐ Engineering controls ☐ General PPE Usage ☐ Personal Hygiene ☐ Emergency Action Plan (EAP) ☐ JLA to be developed/used (<u>specify</u>) ☐ ☐	☐ Substitution ☐ Administrative controls ☐ Hearing Conservation ☐ Exposure Guidelines ☐ Fall Protection ☐ LPO conducted (<u>specify job/JLA</u>) ☐ ☐	☐ Isolation ☐ Monitoring ☐ Respiratory Protection ☐ Decon Procedures ☐ Work Zones/Site Control ☐ Traffic Control ☐ Other (<u>specify</u>) ☐ ☐

Signature and Certification Section - Site Staff and Visitors

Name/Company/Signature	Initial & Sign in Time	Initial & Sign out Time	I have read and understand the

Important Information and Numbers	Visitor Name/Co - not involved in work	I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.								
All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns. In the event of an injury, employees will call WorkCare at 1.800.455.6155 and then notify the field supervisor who will, in turn, notify Corp H&S at 1.720.344.3844. In the event of a motor vehicle accident, employees will notify the field supervisor who will then notify Corp H&S at 1.720.344.3844 and then Corp Legal at 1.720.344.3756. In the event of a utility strike or other damage to property of a client or 3rd party, employees will immediately notify the field supervisor, who will then immediately notify Corp Legal at 1.678.373.9556 and Corp H&S at	<table style="width: 100%;"> <tr> <td style="border-bottom: 1px solid black; width: 50%;">In</td> <td style="border-bottom: 1px solid black; width: 50%;">Out</td> </tr> <tr> <td style="border-bottom: 1px solid black;">In</td> <td style="border-bottom: 1px solid black;">Out</td> </tr> <tr> <td style="border-bottom: 1px solid black;">In</td> <td style="border-bottom: 1px solid black;">Out</td> </tr> <tr> <td style="border-bottom: 1px solid black;">In</td> <td style="border-bottom: 1px solid black;">Out</td> </tr> </table>	In	Out	In	Out	In	Out	In	Out	I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments. If it is necessary to STOP THE JOB, I will perform TRACK; and then amend the hazard assessments or the HASP as needed. I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.
In	Out									
In	Out									
In	Out									
In	Out									

Post Daily Activities Review - Review at end of day or before next day's work (Check those applicable and explain:)

☐	Lessons learned and best practices learned today:	
☐	Incidents that occurred today:	
☐	Any Stop Work interventions today?	
☐	Corrective/Preventive Actions needed for future work:	
☐	Any other H&S issues:	

Keep H&S 1st in all things

WorkCare - 1.800.455.6155

Real Time Exposure Monitoring Data Collection Form

Document all air monitoring conducted on the Site below. Keep this form with the project file.

Site Name: _____ Date: _____

Instrument: _____ Model: _____ Serial #: _____

Calibration Method: (Material used settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds/Hazards Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why (does it match Table 5-1):

Employee Signature Form

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

[illegible]

Subcontractor Acknowledgement: Receipt of HASP Signature Form

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this site. To this end, health and safety becomes the inherent responsibility of personnel working at the site.

[illegible]

Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release and discharge the owner of the site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

[illegible]

Hazardous Materials Transportation Form

	Vehicle (place X in box)	Type (pick-up, car, box truck, etc.)
Personal		
Rental		
ARCADIS owned/leased		
Government owned		
Trailer		
Materials Transported	Quantity	Storage/Transport Container

List Trained Drivers:

Hazardous Materials Shipment Form

Material Description and Proper Shipping Name (per DOT or IATA)	Shipment Quantity	DOT Hazard Classification	Shipment Method (air/ground)

List Shipper (i.e., who we are offering the shipment to):

List Trained Employee(s):



Issue Date: 2007-08

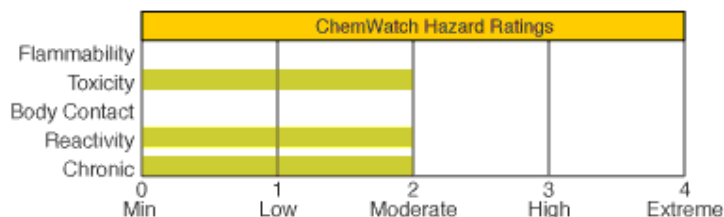
**Bismuth Subnitrate
BIS7490****Section 1 - Chemical Product and Company Identification 63****Material Name:** Bismuth Subnitrate**CAS Number:** 1304-85-4**Chemical Formula:** $\text{Bi}_5\text{H}_9\text{N}_4\text{O}_{22}$ **EINECS Number:** 215-136-8**ACX Number:** X1002167-9

Synonyms: BASIC BISMUTH NITRATE; BISMUTH MAGISTERY; BISMUTH NITRATE,BASIC; BISMUTH OXYNITRATE; BISMUTH PAINT; BISMUTH SUBNITRATE; BISMUTH SUBNITRICUM; BISMUTH WHITE; BISMUTHYL NITRATE; BLANC DE FARD; C.I. 77169; C.I. PIGMENT WHITE 17; COMPD WITH NITROGEN OXIDE (N_2O_5) (6:5),OCTAHYDRATE; COSMETIC WHITE; FLAKE WHITE; MAGISTERY OF BISMUTH; NOVISMUTH; PAINT WHITE; SNOWCAL 5 SW; SNOWCAL 5SW; SPANISH WHITE; VICALIN; VIKALINE

General Use: manufacture bismuth fluxes for enamels; in cosmetics; antacid; (vet) as gastrointestinal protectant; x-ray contrast medium; dusting powder for lesions; in prepn of milk of bismuth; as astringent, adsorbent, & protectant; coating agent in preparations for gastritis; in bleaching creams

Section 2 - Composition / Information on Ingredients

Name	CAS	%
bismuth subnitrate	1304-85-4	>98

[OSHA PEL](#)[NIOSH REL](#)[ACGIH TLV](#)**Section 3 - Hazards Identification**

ANSI Signal Word

Caution!◆◆◆◆ **Emergency Overview** ◆◆◆◆

White, heavy, microcrystalline powder; odorless. Irritating. Other Acute Effects: may be harmful; GI disturbances, cyanosis, anorexia, headache, malaise, skin reactions, discoloration of mucous membranes, mild jaundice.

Potential Health Effects**Target Organs:** eyes, skin, respiratory system, blood**Primary Entry Routes:** accidental skin and eye contact, inhalation of generated dusts**Acute Effects**

Inhalation: The dust may be discomforting to the upper respiratory tract and may be harmful if inhaled. Persons with impaired respiratory function, airway diseases, or conditions such as emphysema or chronic bronchitis may incur further disability if excessive concentrations of particulate are inhaled.

Eye: The material is moderately discomforting to the eyes and is capable of causing a mild, temporary redness of the conjunctiva (similar to wind-burn), temporary impairment of vision and/ or other transient eye damage/ ulceration.

Skin: The material may be mildly discomforting to the skin. Solution of material in moisture on the skin or in perspiration may increase irritant effects. Open cuts and abraded or irritated skin should not be exposed to this material.

Ingestion: The material is moderately discomforting to the gastrointestinal tract and may be harmful if swallowed in large quantity. Ingestion may result in nausea, abdominal irritation, pain and vomiting. Absorbed bismuth salts permeate the body fluids and tissues and

are excreted mainly in the urine but some bismuth is retained in tissues. It is deposited in the metaphyses of young bones and can pass the placenta into the fetus. Effects of acute bismuth intoxication are gastrointestinal disturbance, anorexia, headache, malaise, skin reactions, discoloration of mucous membranes and mild jaundice. Albuminuria (albumin in the urine) is an indication of kidney damage. Bismuth may cause a reverse encephalopathy (brain disease) that takes 2 to 10 weeks to reverse spontaneously.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Chronic Effects:

Symptoms of chronic bismuth toxicity in humans consist of decreased appetite, weakness, rheumatic pain, diarrhea, fever, foul breathe, gingivitis and dermatitis. A blue line of the gums, the "bismuth line", may persist for years after exposure has ceased. Jaundice and conjunctival hemorrhage are rare, but have been reported. Bismuth neuropathy (kidney damage), with proteinuria may occur. The kidney is the site of highest concentration with liver concentrations being significantly lower. Renal failure may be reversible if treated early but anuria and death have occurred.

Section 4 - First Aid Measures

Inhalation: • If dust is inhaled, remove to fresh air.

- Encourage patient to blow nose to ensure clear breathing passages.
- Rinse mouth with water. Consider drinking water to remove dust from throat.
- Seek medical attention if irritation or discomfort persist.

Eye Contact: • Immediately hold the eyes open and flush continuously for at least 15 minutes with fresh running water.

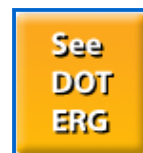
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin Contact: • Immediately remove all contaminated clothing, including footwear (after rinsing with water).

- Wash affected areas thoroughly with water (and soap if available).
- Seek medical attention in event of irritation.

Ingestion: Contact a Poison Control Center. If more than 15 minutes from a hospital:

- INDUCE vomiting with IPECAC SYRUP, or fingers down the back of the throat, ONLY IF CONSCIOUS. Lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. NOTE: Wear a protective glove when inducing vomiting by mechanical means.
- SEEK MEDICAL ATTENTION WITHOUT DELAY.
- In the meantime, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.



After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: The toxicity of nitrates and nitrites result from their vasodilating properties and their propensity to form methemoglobin.

- Most produce a peak effect within 30 minutes.
- Clinical signs of cyanosis appear before other symptoms because of the dark pigmentation of methemoglobin.
- Initial attention should be directed towards improving oxygen delivery, with assisted ventilation, if necessary. Hyperbaric oxygen has not demonstrated conclusive benefits.
- Institute cardiac monitoring, especially in patients with coronary artery or pulmonary disease.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Naloxone, glucose and thiamine should be given if a multiple ingestion is suspected.
- Decontaminate using Ipecac Syrup for alert patients or lavage for obtunded patients who present within 2-4 hours of ingestion.
- Symptomatic patients with methemoglobin levels over 30% should receive methylene blue. (Cyanosis alone is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/mL) IV over 5 minutes; repeat, using the same dose if symptoms of hypoxia fail to subside within 1 hour.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comments
Methemoglobin in blood	1.5% of hemoglobin	During or end of shift	B,NS,SQ

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - Fire-Fighting Measures

Extinguishing Media: Jets of water. Water spray or fog. Foam. Dry chemical powder. BCF (where regulations permit). Carbon dioxide.

General Fire Hazards/Hazardous Combustion Products: • Will not burn but increases intensity of fire.

- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Heat affected containers remain hazardous.

- Contact with combustibles such as wood, paper, oil or finely divided metal may cause ignition, combustion or violent decomposition.
- May emit irritating, poisonous or corrosive fumes. Decomposes on heating and produces toxic fumes of nitrogen oxides (NO_x).



See
DOT
ERG

Fire Incompatibility: Avoid contact with organic materials, strong reducing agents, combustible materials and metals such as iron and copper and their alloys.

Fire-Fighting Instructions: • Contact fire department and tell them location and nature of hazard.

- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or waterways.
- Fight fire from a safe distance, with adequate cover.
- Extinguishers should be used only by trained personnel.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- Do not approach containers suspected to be hot.
- Cool fire-exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- If fire gets out of control withdraw personnel and warn against entry.
- Equipment should be thoroughly decontaminated after use.

Section 6 - Accidental Release Measures

Small Spills: • Clean up all spills immediately.

- No smoking, bare lights, ignition sources.
- Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
- Avoid breathing dust or vapors and all contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with dry sand, earth, inert material or vermiculite
- Do not use sawdust as fire may result.
- Scoop up solid residues and seal in labeled drums for disposal.
- Neutralize/decontaminate area.



See
DOT
ERG

Large Spills: • Clear area of personnel and move upwind.

- Contact fire department and tell them location and nature of hazard.
- Wear breathing apparatus and protective gloves.
- Prevent, by any means available, spillage from entering drains or waterways.
- No smoking, flames or ignition sources.
- Increase ventilation.
- Contain spill with sand, earth or other clean, inert materials.
- Never use organic absorbents such as sawdust, paper or cloth.
- Use spark-free and explosion-proof equipment.
- Collect any recoverable product into labeled containers for possible recycling.
- Avoid contamination with organic matter to prevent subsequent fire and explosion.
- Do not mix fresh with recovered material.
- Collect residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- Decontaminate equipment and launder all protective clothing before storage and reuse.
- If contamination of drains or waterways occurs advise emergency services.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: • Avoid personal contact and inhalation of dust, mist or vapors.

- Always wear protective equipment and wash off any spillage on clothing.
- Use in well ventilated areas, prevent accumulation of vapors.
- Keep material away from light, heat, ignition sources, flammables or combustibles.
- Keep dry and away from incompatible materials.
- Keep cool and below defined Control Temperature.
- Avoid friction, shock or containment.
- Use non-sparking equipment.
- Avoid physical damage to containers
- Do not repack or return unused portions to original container.
- Withdraw only sufficient material for immediate use.
- Contamination can cause VIOLENT DECOMPOSITION with intense heat and fire.
- Ensure proper rotation of stocks to limit decomposition and instability which may occur on long storage.
- When handling, NEVER smoke, eat or drink.
- Always wash hands with soap and water after handling.
- Use only good occupational work practices.
- Observe manufacturer's storage and handling directions.

Recommended Storage Methods: Glass container. Plastic container. Plastic drum. Polylined drum. Check that containers are clearly labeled.

Regulatory Requirements: Follow applicable OSHA regulations.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear NIOSH-approved respirator. Provide adequate ventilation in warehouses and enclosed storage areas.

Personal Protective Clothing/Equipment:

Eyes: Safety glasses with side shields or, as required, chemical goggles. Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

Hands/Feet: Wear chemical protective gloves, e.g. PVC. Wear safety footwear.

Other: • Overalls.

- Eyewash unit.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Heavy, white crystalline powder. Hygroscopic. No odor. Soluble in acids.

Physical State: white, heavy, microcrystalline powder

Formula Weight: 1462

Specific Gravity (H₂O=1, at 4 °C): 4.928

pH: Shows acid to moistened litmus

Freezing / Melting Point: Decomposes at 260 °C (500 °F)

Volatile Component (% Vol): 0

Decomposition Temperature (°C): >260 °C

Water Solubility: Practically Insoluble in Water

Section 10 - Stability and Reactivity

Stability / Polymerization / Conditions to Avoid: Product is considered stable under normal handling and storage conditions. Hazardous polymerization will not occur.

Storage Incompatibilities: Oxidizing agents as a class are not necessarily combustible themselves, but can increase the risk and intensity of fire in many other substances. Avoid storage with organic materials, reducing agents, combustible materials and metals such as iron and copper and their alloys.

Section 11 - Toxicological Information

Toxicity

Oral (infant) TD_{Lo}: 259 mg/kg

Oral (infant) LD_{Lo}: 1 g/kg

Irritation

Nil reported

See [RTECS EB2977000](#) for additional data.

Section 12 - Ecological Information

Environmental Fate: No data found.

Ecotoxicity: No data found.

Section 13 - Disposal Considerations

Disposal:

- Recycle wherever possible. Special hazard may exist - specialist advice may be required.
- Consult manufacturer for recycling options.
- Follow applicable local, state, and federal regulations.
- Bury or incinerate residue at an approved site.
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
- Puncture containers to prevent reuse and bury at an authorized landfill.

Section 14 - Transport Information

DOT Hazardous Materials Table Data (49 CFR 172.101):

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Nitrates, inorganic, n.o.s.

ID: UN1477

Hazard Class: 5.1 - Oxidizer

Packing Group: II - Medium Danger

Symbols:

Label Codes: 5.1 - Oxidizer

Special Provisions: IB8, IP2, IP4

Packaging:

Exceptions: 152

Non-bulk: 212

Bulk: 240

Quantity Limitations:

Passenger aircraft/rail: 5 kg

Cargo aircraft only: 25 kg

Vessel Stowage:

Location: A

Other: 46

**Shipping Name and Description:** Nitrates, inorganic, n.o.s.**ID:** UN1477**Hazard Class:** 5.1 - Oxidizer**Packing Group:** III - Minor Danger**Symbols:****Label Codes:** 5.1 - Oxidizer**Special Provisions:** IB8, IP3**Packaging:**

Exceptions: 152

Non-bulk: 213

Bulk: 240

Quantity Limitations:

Passenger aircraft/rail: 25 kg

Cargo aircraft only: 100 kg

Vessel Stowage:

Location: A

Other:



Section 15 - Regulatory Information

EPA Regulations:**RCRA 40 CFR:** Not listed**CERCLA 40 CFR 302.4:** Not listed**SARA 40 CFR 372.65:** Not listed**SARA EHS 40 CFR 355:** Not listed**TSCA:** Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

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MATERIAL SAFETY DATA SHEET (MSDS)

MSDS: L2785

This MSDS should be attached or kept with the respective product with which it is associated.

MATERIAL SAFETY DATA SHEET - L2785

MATERIAL DATA SAFETY SHEET

HMIS RATINGS:
HEALTH 0
FLAMMABILITY 0
REACTIVITY 0

IDENTITY:

STERILE EYESALINE(R*) SOLUTION - PRODUCT #S:
32-ST1050, 32-ST2050, 32-000440, 32-000445, 32-00446, 32-000448,
32-000449, 32-000451, 32-000452, 32-000454, 32-000455, 32-000457,
32-000458, 32-000460, 32-000461, 32-000462, 32-000463, 32-000470,
32-000471, 32-000494, 32-000497, 32-000498

SECTION I

MANUFACTURER: FENDALL, INC.

ADDRESS:
825 EAST HIGHWAY 151
PLATTEVILLE, WI 53818
USA

EMERGENCY TELEPHONE: 1-800-FENDALL (1-800-336-3255)

INFORMATION TELEPHONE: 800-543-4842

DATE PREPARED: 11/30/06

SECTION II - HAZARDOUS INGREDIENTS/IDENTIFY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY; COMMON NAME(S))	OSHA PEL	ACGIH TLV	OTHER LIMITS & (OPTIONAL) RECOMMENDED
NONE	NONE	NONE	N/A

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 200 DEG. F (93.3 DEG. C)

VAPOR PRESSURE (MMHg.): 760

VAPOR DENSITY (AIR = 1): NOT DETERMINED.

SOLUBILITY IN WATER: 100%

SPECIFIC GRAVITY (H2O)=1: NOT DETERMINED

MELTING POINT: N/A

EVAPORATION RATE (BUTYL ACETATE = 1): NOT DETERMINED

APPEARANCE AND ODOR: COLORLESS LIQUID WITH NO DISCERNABLE ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMITS:

LEL: N/A

UEL: N/A

EXTINGUISHING MEDIA: THIS IS A NONFLAMMABLE AQUEOUS SOLUTION.

SPECIAL FIRE FIGHTING PROCEDURES: N/A

UNUSUAL FIRE AND EXPLOSION HAZARDS: N/A

SECTION V - REACTIVITY DATA

STABILITY:

UNSTABLE: NO

STABLE: YES

CONDITIONS TO AVOID:

THIS PRODUCT IS STABLE AND CONSIDERED NON-REACTIVE UNDER NORMAL CONDITIONS OF STORAGE AND USAGE.

INCOMPATIBILITY (MATERIALS TO AVOID): NONE KNOWN

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: NONE

HAZARDOUS POLYMERIZATION:

MAY OCCUR: NO

WILL NOT OCCUR: YES

CONDITIONS TO AVOID: NONE

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY:

INHALATION?: NO

SKIN?: NO

INGESTION?: YES

HEALTH HAZARDS (ACUTE AND CHRONIC):

INGESTION OF VOLUMES IN EXCESS OF 20 LITERS MAY CAUSE GASTRIC IRRITATION.

CARCINOGENICITY:

NTP?: NO

IARC MONOGRAPHS?: NO

OSHA REGULATED?: NO

SIGNS AND SYMPTOMS OF EXPOSURE: N/A

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: N/A

EMERGENCY FIRST AID PROCEDURES:

NOTES TO PHYSICIAN:

IN THE UNLIKELY EVENT OF RAPID INGESTION OF LARGE VOLUMES OF THE SOLUTION, INDUCE VOMITING AND OBSERVE THE PATIENT FOR GASTRIC IRRITATION.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
FLUSH AREA WITH WATER. THE SOLUTION IS NOT RCRA HAZARDOUS WASTE.

WASTE DISPOSAL METHOD: N/A

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING:
DO NOT FREEZE OR EXPOSE TO TEMPERATURES IN EXCESS OF 110 DEG. F (43 DEG. C) FOR EXTENDED PERIODS.

OTHER PRECAUTIONS: N/A

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION: N/A

VENTILATION:

LOCAL EXHAUST: N/A

MECHANICAL: N/A

SPECIAL: N/A

OTHER: N/A

PROTECTIVE GLOVES: N/A

OTHER PROTECTIVE CLOTHING: N/A

WORK HYGIENIC PRACTICES: N/A

EYE PROTECTION: N/A

PART: #32-005591

REV.: A

Issue Date: 2006-06

Section 1 - Chemical Product and Company Identification

61

Material Name: Methanol

CAS Number: 67-56-1

Chemical Formula: CH₄O

Structural Chemical Formula: CH₃OH

EINECS Number: 200-659-6

ACX Number: X1001287-2

Synonyms: ALCOHOL,METHYL; ALCOOL METHYLIQUE; ALCOOL METILICO; CARBINOL; X-CIDE 402 INDUSTRIAL BACTERICIDE; COAT-B1400; COLONIAL SPIRIT; COLONIAL SPIRITS; COLUMBIAN SPIRIT; COLUMBIAN SPIRITS; EPA PESTICIDE CHEMICAL CODE 053801; EUREKA PRODUCTS CRIOSINE DISINFECTANT; EUREKA PRODUCTS,CRIOSINE; FREERS ELM ARRESTER; IDEAL CONCENTRATED WOOD PRESERVATIVE; METANOL; METANOLO; METHANOL; METHYL ALCOHOL; METHYL HYDRATE; METHYL HYDROXIDE; METHYLALKOHOL; METHYLOL; METYLOWY ALKOHOL; MONOHYDROXYMETHANE; PMC REJEX-IT F-40ME; PYROLIGNEOUS SPIRIT; PYROXYLIC SPIRIT; PYROXYLIC SPIRITS; SURFLO-B17; WILBUR-ELLIS SMUT-GUARD; WOOD ALCOHOL; WOOD NAPHTHA; WOOD SPIRIT

Derivation: Prepared by wood pyrolysis; non-catalytic oxidation of hydrocarbons; as a by-product in the fisher-tropsch synthesis; or by reduction of carbon monoxide.

General Use: Used as an industrial solvent; starting material for organic synthesis; antifreeze for windshield washer fluid; in fuel antifreezes; gasoline octane booster; fuel for stoves; extractant for oils; denaturing ethanol; softening agent; food additive; in paint, varnish removers, and embalming fluids; in the manufacture of photographic film, celluloid, textile soap, wood stains, coated fabrics, shatterproof glass, paper coating, waterproofing formulations, artificial leather, dyes.

Section 2 - Composition / Information on Ingredients

Name	CAS	%
Methanol	67-56-1	ca 100% vol

Trace Impurities: (Grade A): Acetone and aldehydes < 30 ppm, acetic acid < 30 ppm

OSHA PEL

TWA: 200 ppm; 260 mg/m³.

NIOSH REL

TWA: 200 ppm (260 mg/m³);
 STEL: 250 ppm (325 mg/m³);
 skin.

DFG (Germany) MAK

TWA: 200 ppm; PEAK: 800 ppm;
 skin.

ACGIH TLV

TWA: 200 ppm; STEL: 250 ppm;
 skin.

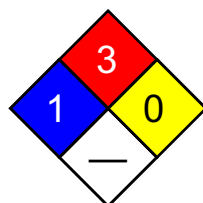
IDLH Level

6000 ppm.

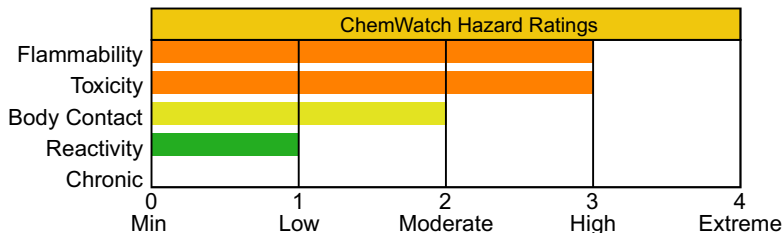
EU OEL

TWA: 260 mg/m³ (200 ppm).

Section 3 - Hazards Identification

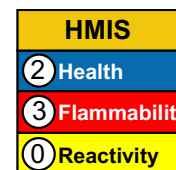


Fire Diamond



ANSI Signal Word

Warning!



Flammable

☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

Colorless liquid; slight alcohol odor when pure or disagreeably pungent odor. Irritating to eyes/skin/respiratory tract. Other Acute Effects: headache, visual disturbance, blindness, respiratory failure. Chronic Effects: reproductive effects reported in animal testing. Flammable; moderate explosion hazard.

Potential Health Effects

Target Organs: Eyes, skin, central nervous system (CNS), gastrointestinal (GI) tract, respiratory system

Primary Entry Routes: Inhalation, ingestion, skin and/or eye contact/absorption

Acute Effects

Inhalation: Irritation, breathing difficulty, headache, drowsiness, vertigo, light-headedness, nausea, vomiting, acidosis (decreased blood alkalinity), visual disturbance, and at high concentrations, CNS damage, convulsions, circulatory collapse, respiratory failure, coma and blindness can result from inhalation of methanol vapor. Concentration ≥ 200 ppm may cause headache; 50,000 ppm can cause death within 1-2 hrs.

Eye: Contact with liquid may result in irritation, inflamed lids, light sensitization, and superficial lesions.

Skin: Contact may cause irritation, dermatitis, swelling, scaling, and systemic effects.

Ingestion: GI irritation and systemic effects. Symptoms may be delayed 18-48 hours. Fatal dose - 2 to 8 ounces.

Carcinogenicity: NTP - Not listed; IARC - Not listed; OSHA - Not listed; NIOSH - Not listed; ACGIH - Not listed; EPA - Not listed; MAK - Not listed.

Medical Conditions Aggravated by Long-Term Exposure: None reported.

Chronic Effects: Exposure to methanol vapors has caused conjunctivitis, headache, giddiness, insomnia, GI disturbance, impaired vision. CNS damage is also likely. Methanol is slowly eliminated from the body; exposure is considered cumulative over the short term.

Section 4 - First Aid Measures

Inhalation: Remove exposed person to fresh air and support breathing as needed.

Eye Contact: *Do not* allow victim to rub or keep eyes tightly shut. Gently lift eyelids and flush immediately and continuously with flooding amounts of water for at least 15 minutes. Consult a physician or ophthalmologist if pain or irritation develops.

Skin Contact: *Quickly* remove contaminated clothing. Rinse with flooding amounts of water for at least 15 min. Wash exposed area with soap and water. For reddened or blistered skin, consult a physician.

Ingestion: Never give anything by mouth to an unconscious or convulsing person. Contact a poison control center. Unless the poison control center advises otherwise, have the *conscious and alert* person drink 1 to 2 glasses of water, then induce vomiting.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Note to Physicians: Follow emesis with rehydration, correction of acidosis, and folate to enhance formate oxidation. Consider IV administration of ethanol (if blood methanol >20 mg/dL) to show metabolic oxidation of methanol. Assay formic acid in urine, blood pH and plasma bicarbonate.

See
DOT
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Section 5 - Fire-Fighting Measures

Flash Point: 54 °F (12 °C), Closed Cup

Burning Rate: 1.7 mm/min

Autoignition Temperature: 867 °F (464 °C)

LEL: 6.0% v/v

UEL: 36% v/v

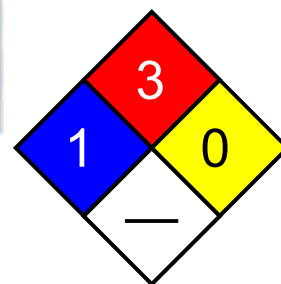
Flammability Classification: OSHA Class IB Flammable Liquid.

Extinguishing Media: Use dry chemical, carbon dioxide, water spray, fog or alcohol-resistant foam. A water spray may be used to cool fire-exposed containers, and flush spills away from ignition sources.

General Fire Hazards/Hazardous Combustion Products: Heating methanol to decomposition can produce carbon oxides (CO_x), formaldehyde, acrid smoke, and irritating fumes. Can form explosive mixtures in the air. The heavier-than-air vapors of methanol may travel along low-lying surfaces to distant sources of ignition and flash back to the material source. Containers may explode in heat of fire.

Fire-Fighting Instructions: *Do not* scatter material with any more water than needed to extinguish fire. *Do not* release runoff from fire control methods to sewers or waterways. Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

See
DOT
ERG



Fire Diamond

Section 6 - Accidental Release Measures

Spill/Leak Procedures: Isolate spill area for at least 330-660 feet (100-200 m) in all directions. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Ground all equipment used when handling this product. *Do not* touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors.

Small Spills: Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.

See
DOT
ERG

Use clean non-sparking tools to collect absorbed material.

Large Spills: Dike far ahead of liquid spill for later disposal. *Do not* release into sewers or waterways. Ground all equipment. Use non-sparking tools.

Regulatory Requirements: Follow applicable OSHA regulations (29 CFR 1910.120).

Section 7 - Handling and Storage

Handling Precautions: Avoid vapor inhalation, and skin and eye contact. Use only with ventilation sufficient to reduce airborne concentrations to non-hazardous levels (see Sec. 2). Wear protective gloves, goggles, and clothing (see Sec. 8). Keep away from heat and ignition sources. Ground and bond all containers during transfers to prevent static sparks. Use non-sparking tools to open and close containers.

Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Recommended Storage Methods: Store in tightly closed container in cool, well-ventilated area, away from heat, ignition sources and incompatibles (see Sec. 10). Equip drums with self-closing valves, pressure vacuum bungs, and flame arrestors.

Regulatory Requirements: Follow applicable OSHA regulations. Also 29 CFR 1910.106 for Class 1B Flammable Liquids.

Section 8 - Exposure Controls / Personal Protection

Engineering Controls: To prevent static sparks, electrically ground and bond all containers and equipment used in shipping, receiving, or transferring operations. Provide general or local exhaust ventilation systems to maintain airborne concentrations as low as possible. Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Administrative Controls: Enclose operations and/or provide local explosion-proof exhaust ventilation at the site of chemical release. Where possible, transfer methanol from drums or other storage containers to process containers. Minimize sources of ignition in surrounding areas.

Personal Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets of butyl rubber, Teflon, Viton, Saranex, 4H, Responder, Trelchem HPS, or Tychem 10000 (Breakthrough Time (BT) >8 hr) to prevent skin contact. Natural rubber, neoprene, nitrile rubber, polyethylene, polyvinyl alcohol and CPF 3 may degrade after contact and are not recommended. Wear splash-proof chemical safety goggles, and face shield, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. For concentrations ≤ 2000 ppm, use a supplied air respirator; ≤ 5000 ppm, supplied air (SA) respirator in continuous flow mode; ≤ 6000 ppm, SA respirator with tight-fitting face mask operated in continuous flow mode, or SCBA with full facepiece, or SA respirator with full facepiece; > IDLH/unknown/emergency, SCBA with full facepiece operated in pressure-demand or other positive-pressure mode, or SA respirator with full facepiece operated in pressure-demand or other positive-pressure mode in combination with auxiliary SCBA operated in pressure-demand or other positive-pressure mode. For escape, use an appropriate escape-type SCBA. *Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Other: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment. Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Section 9 - Physical and Chemical Properties

Appearance/General Info: Colorless; slight alcohol odor when pure, disagreeably pungent odor when crude.

Physical State: Liquid

Odor Threshold: 13.1150 to 26840 mg/m³

Vapor Pressure (kPa): 127 mm Hg at 77 °F (25 °C)

Vapor Density (Air=1): 1.11

Bulk Density: 6.59 lbs/gal at 68 F (20 °C)

Formula Weight: 32.04

Density: 0.796 g/mL at 59 °F (15 °C)

Specific Gravity (H₂O=1, at 4 °C): 0.81 at 0 °C/4 °C

Refractive Index: 1.3292 at 68 °F (20 °C)

pH: Slightly acidic

Boiling Point: 148 °F (64.7 °C) at 760 mm Hg

Freezing/Melting Point: -144.04 °F (-97.8 °C)

Viscosity: 0.614 mPa sec

Surface Tension: 22.61 dynes/cm

Ionization Potential (eV): 10.84 eV

Water Solubility: Miscible

Other Solubilities: Ethanol, acetone, benzene, chloroform, DMSO, ether, ketones, most organic solvents.

Section 10 - Stability and Reactivity

Stability/Polymerization/Conditions to Avoid: Methanol is stable at room temperature in closed containers under normal storage and handling conditions. Hazardous polymerization cannot occur. Vapor inhalation, oxidizers.

Storage Incompatibilities: Include beryllium dihydride, metals (potassium, magnesium), oxidants (barium perchlorate, bromine, chlorine, hydrogen peroxide, sodium hypochlorite, phosphorus trioxide), potassium tertbutoxide, carbon tetrachloride and metals, chloroform and heat, diethyl zinc, alkyl aluminum salts, acetyl bromide, chloroform and sodium hydroxide, cyanuric chloride, nitric acid, chromic anhydride, lead perchlorate.

Hazardous Decomposition Products: Thermal oxidative decomposition of methanol can produce carbon oxides (CO_x), formaldehyde, acrid smoke, and irritating fumes.

Section 11 - Toxicological Information

Acute Oral Effects:

Rat, oral, LD₅₀: 5628 mg/kg.

Human, oral, LD_{Lo}: 428 mg/kg produced toxic effects: behavioral - headache; lungs, thorax, or respiration - other changes.

Human, oral, LD_{Lo}: 143 mg/kg produced optic nerve neuropathy, dyspnea, nausea or vomiting.

Acute Inhalation Effects:

Rat, inhalation, LC₅₀: 64000 ppm/4 hr.

Human, inhalation, TC_{Lo}: 300 ppm produced visual field changes, headache; lungs, thorax, or respiration - other changes.

Acute Skin Effects:

Rabbit, skin, LD₅₀: 15800 mg/kg.

Monkey, skin, LD_{Lo}: 393 mg/kg.

Irritation Effects:

Rabbit, standard Draize test: 100 mg/24 hr resulted in moderate irritation.

Rabbit, standard Draize test: 20 mg/24 hr resulted in moderate irritation.

Other Effects:

Rat, oral: 10 µmol/kg resulted in DNA damage.

Rat, inhalation: 50 mg/m³/12 hr/13 weeks intermittently produced degenerative changes to brain and coverings; muscle contraction or spasticity.

Rat, inhalation: 2610 ppm/6 hr/4 weeks intermittently produced toxic effects: endocrine - changes in spleen weight.

Multiple Dose Toxicity Effects - Rat, oral: 12 g/kg/8 weeks intermittently produced toxic effects: behavioral - ataxia; behavioral - alteration of operant conditioning.

Human, lymphocyte: 300 mmol/L resulted in DNA inhibition.

Rat (female), oral: 7500 mg/kg, administered during gestational days 17-19 produced effects on newborn - behavioral.

Rat (female), oral: 35295 mg/kg administered during gestational days 1-15 produced effects on the fertility index; pre implantation mortality; and post-implantation mortality.

Rat (female), inhalation: 20000 ppm/7 hr, administered during gestational days 1-22 produced specific developmental abnormalities - musculoskeletal system; cardiovascular (circulatory) system; urogenital system.

Rat (male), oral: 200 ppm/20 hr, 78 weeks prior to mating produced paternal effects - testes, epididymis, sperm duct.

See RTECS PC1400000, for additional data.

Section 12 - Ecological Information

Environmental Fate: Bioconcentration (BCF, estimated at 0.2) is not expected to be significant. Physical removal from air can occur via rainfall. Relatively rapid evaporation from dry surfaces is likely to occur. If released to the atmosphere, it degrades via reaction with photochemically produced hydroxyl radicals with an approximate half-life of 17.8 days. If released to water or soil, biodegradation is expected to occur. A low K_{oc} indicates little sorption and high mobility in the soil column.

Ecotoxicity: Trout, LC₅₀: 8,000 mg/L/48 hr; *Pimephales promelas* (fathead minnow) LC₅₀: 29.4 g/L/96 hr.

Henry's Law Constant: 4.55 x 10⁻⁶ atm-m³/mole at 77 °F (25 °C)

Octanol/Water Partition Coefficient: log K_{ow} = -0.77

Soil Sorption Partition Coefficient: K_{oc} = 0.44

Section 13 - Disposal Considerations

Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

Section 14 - Transport Information**DOT Hazardous Materials Table Data (49 CFR 172.101):**

Note: This material has multiple possible HMT entries. Choose the appropriate one based on state and condition of specific material when shipped.

Shipping Name and Description: Methanol

ID: UN1230

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: II - Medium Danger

Symbols: + I

Label Codes: 3 - Flammable Liquid, 6.1 - Poison *or* Poison Inhalation Hazard *if inhalation hazard, Zone A or B*

Special Provisions: IB2, T7, TP2

Packaging: Exceptions: 150 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: Passenger aircraft/rail: 1 L **Cargo aircraft only:** 60 L

Vessel Stowage: Location: B **Other:** 40



Shipping Name and Description: Methanol

ID: UN1230

Hazard Class: 3 - Flammable and combustible liquid

Packing Group: II - Medium Danger

Symbols: D - Domestic transportation

Label Codes: 3 - Flammable Liquid

Special Provisions: IB2, T7, TP2

Packaging: Exceptions: 150 **Non-bulk:** 202 **Bulk:** 242

Quantity Limitations: Passenger aircraft/rail: 1 L **Cargo aircraft only:** 60 L

Vessel Stowage: Location: B **Other:**

**Section 15 - Regulatory Information****EPA Regulations:**

RCRA 40 CFR: Listed U154 Ignitable Waste

CERCLA 40 CFR 302.4: Listed per RCRA Section 3001 5000 lb (2268 kg)

SARA 40 CFR 372.65: Listed

SARA EHS 40 CFR 355: Not listed

TSCA: Listed

Section 16 - Other Information

Disclaimer: Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Genium Group, Inc. extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.

Appendix **D**

Quality Assurance Project Plan

Marysville Joint Unified School District

Quality Assurance Project Plan

Hammonton Smartsville Property
Yuba County, California

March 2014



A handwritten signature in blue ink, appearing to read "Scott Hackman".

Scott Hackman
Project Manager

A handwritten signature in black ink, appearing to read "Lyndi Mott".

Lyndi Mott
ARCADIS Quality Assurance Officer

Quality Assurance Project Plan

Hammonton Smartsville Property
Yuba County, California

Prepared for:
MJUSD

Prepared by:
ARCADIS U.S., Inc.
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Our Ref.:
RV009363.0015

Date:
March 2014

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Certification

ARCADIS U.S., Inc., has prepared this Quality Assurance Project Plan on behalf of the Marysville Joint Unified School District (MJUSD) in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists.

A handwritten signature in black ink, appearing to read "Lyndi Mott", written over a light gray rectangular background.

March 11, 2014

Lyndi Mott
Project Chemist/Data Quality Specialist

Date

Distribution List

Company/ Organization	Role	Name	Contact Information
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ARCADIS	Project Manager	Scott Hackman	scott.hackman@arcadis-us.com
	Quality Assurance Officer	Lyndi Mott	lyndi.mott@arcadis-us.com
PACE Analytical (Minneapolis)	Laboratory Project Manager	Jennifer Gross	jennifer.gross@pacelabs.com

Acronyms and Abbreviations

ARCADIS	ARCADIS U.S., Inc.
°C	degrees Celsius
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
CSDOH	California State Department of Health
DTSC	California Department of Toxic Substances Control
DQO	data quality objective
ELAP	Environmental Laboratory Accreditation Program
ft bgs	feet below ground surface
HASP	health and safety plan
IDL	instrument detection limit
MDL	method detection limit
PAT	(NVLAP) proficiency unknown testing
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
QAPP	Quality Assurance Project Plan
SQL	sample quantitation limit
USEPA	United States Environmental Protection Agency



1. Introduction

This Quality Assurance Project Plan (QAPP) has been prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Marysville Joint Unified School District (MJUSD) for the Hammonton Smartsville property located on the southwestern corner of the intersection of Dantoni and Hammonton Smartsville Roads in Yuba County, California (the Site; Figure 1). This document has been prepared to be included with the *Removal Action Work Plan* (RAW) for the site as requested by the California Department of Toxic Substances Control (DTSC) in accordance with United States Environmental Protection Agency (USEPA) QAPP guidance.

Environmental investigations have shown that delineated (in accordance with DTSC concurrence), select and shallow site soil has been affected by low-levels of organochlorine pesticides (OCPs), arsenic and lead. These contaminants of potential concern (COPCs) have been adequately delineated as part of the Preliminary Environmental Assessment (PEA) and Supplemental Site Investigation (SSI) process under the oversight of and based on guidance by the DTSC.

In December 2013, ARCADIS submitted a *Revised Supplemental Site Investigation Report*, (SSI; ARCADIS 2013) proposing a remedy to address COPCs in shallow site soil: to excavate OCP, lead and/or arsenic-affected soils. The SSI was approved by the DTSC in their letter to MJUSD dated January 8, 2014 (DTSC 2014).

The purpose of this QAPP is to describe the quality assurance (QA) and quality control (QC) methods that will be employed during the implementation of the remedy described in the RAW.

1.1 Site Description

The approximately 50-acre property is located on Yuba County Assessor's Office (YCAO) Assessor Parcel Number (APN) 021-150-062. The Site's EnviroStor identification number is 60001233; the DTSC site code is 104674-11.

1.2 Background

A PEA and SSI were initially completed on the Site to evaluate whether a release or threatened release of hazardous substances, which pose a threat to human health or the environment, existed at the Site, to delineate the potentially affected area of

concern (AOC) caused by the release, and to evaluate that potential risk, if any, to human health or the environment.

Based on findings during the PEA/SSI process, residual pesticides, arsenic and lead were detected in shallow site soils at concentrations above their respective cleanup goals. The likely affected soil sources in the AOCs include pesticides due to the historical application of termite and/or other insect control chemicals, lead due to the historical use of lead based paint on select structures, and arsenic due to the improper storage of fertilizer (ARCADIS 2013).

For the AOC discussed in the SSI report (ARCADIS 2013) and the RAW, site conditions do appear to pose a health threat under unrestricted use redevelopment; therefore, to remediate this health threat, affected soil will be removed from the site during the removal action process. The AOC and scope of work to be implemented to remediate the health threat under unrestricted use redevelopment are summarized in the RAW.

1.3 Purpose and Objectives

The purpose of the QAPP is to identify the methods to be employed to establish technical accuracy, precision, and validity of data generated at the Site during the proposed remediation activities. This QAPP details QA and QC procedures to be used during RAW implementation to provide for the collection of representative data during verification sampling.

The QA program is designed to ensure that data precision, accuracy, completeness, comparability, and representativeness meet defined data quality objectives (DQOs). The QC program includes the routine application of procedures for achieving prescribed performance standards (in monitoring and measurement) during project planning, field activities, sample analysis, sample and data handling, and data evaluation and interpretation.

The verification sample program described in the RAW has been designed to include sufficient data through adequate numbers of samples and proper quality control procedures. The procedures presented in this QAPP will establish the quality of the data used for this purpose.

Decisions will be based on data obtained from the sampling and analysis program. It is intended that data collected through implementation of this QAPP will satisfy local,

state, and federal data quality requirements. However, if the evaluation indicates unacceptable risk of exposure, then the data can be used by the DTSC for consideration of further action.

1.4 Informational Sources

This QAPP has been prepared using information from the following USEPA documents:

- Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A. EPA/540/1-89/002. USEPA Office of Emergency and Remedial Response, Washington, D.C. Interim Final. December, 1989.
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, Office of Solid Waste and Emergency Response U.S. Environmental Protection Agency. Washington, D.C. 1996.
- Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA540/R-99/008. Office of Emergency and Remedial Response. Washington, D.C. 1999.
- Requirements for Quality Assurance Project Plans for Environmental Data Operations, Final, EPA QA/R-5. Washington, D.C. 2001.
- Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-01/008. 2002.
- Guidance for Quality Assurance Project Plans, EPA QA/G-5. Office of Research and Development. U.S. Environmental Protection Agency. Washington, D.C. 2002.
- Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4. Office of Research and Development U.S. Environmental Protection Agency. Washington, D.C. 2006.

2. Project Organization and Responsibility

Company/ Organization	Role	Name	Contact Information
Department of Toxic Substances Control	Project Manager	Mellan Songco	mellan.songco@dtsc.ca.gov
ARCADIS	Project Manager	Scott Hackman	scott.hackman@arcadis-us.com
	Field Personnel	To be determined	
	Corporate Health and Safety Officer	Denis Balcer	denis.balcer@arcadis-us.com
	Quality Assurance Officer	Lyndi Mott	lyndi.mott@arcadis-us.com
PACE Analytical (Minneapolis)	Laboratory Project Manager	Jennifer Gross	Jennifer.gross@pacelabs.com
	Laboratory Quality Manager	Melanie Ollila	Melanie.ollila@pacelabs.com

Responsibilities of the key personnel working on the project are as follows:

DTSC Project Manager: Ms. Mellan Sangco

Ms. Songco will manage the project on behalf of the DTSC and will provide oversight of ARCADIS activities, including review of deliverables. She will also act as the liaison to keep interested parties informed and involved in the project. Ms. Songco's direct contact at ARCADIS is Mr. Scott Hackman.

ARCADIS Project Manager: Mr. Scott Hackman

Mr. Hackman will coordinate and manage the entire project and will work closely with the project geologist, Mr. Steve Beadle (P.G.) to manage the technical scope, project budget, and schedule. Mr. Hackman and/or Mr. Beadle will assist the project team to



Quality Assurance Project Plan

Hammonton Smartsville
Property

understand DTSC guidelines and regulations as they apply to the project site and will develop sampling strategy, perform analytical evaluation, and work closely with the ARCADIS team to provide technical direction.

ARCADIS Corporate Health and Safety Officer: Mr. Denis Balcer

Mr. Balcer will assist in the review of the Health and Safety Plan (HASP; included in the RAW) and advise on health and safety procedures.

ARCADIS Quality Assurance Officer (QA Officer): Mr. Dennis Capria, Principal Scientist and/or Ms. Lyndi Mott, Project Chemist/Data Quality Specialist

The QA officer will implement the project quality assurance/quality control (QA/QC) program and make recommendations to the ARCADIS team on QA/QC issues. He/she will not be involved in the collection/analysis/interpretation/reporting process except in a review capacity and will ensure that the data quality objectives are met.

ARCADIS Field Personnel: To Be Determined

Field personnel will provide services including subcontractor oversight and sampling. The field personnel will work directly with Mr. Hackman and subcontractors. The project team will select staff members with extensive field experience and who are adept at interpreting work plans and RAWs. The field geologists will act as the Site Safety Officers while performing and overseeing fieldwork.

California Department of Public Health Certified Subcontractor Laboratory: PACE Analytical Services, Inc. (PACE), or other qualified laboratory

PACE (Minneapolis) will analyze environmental media samples using appropriate methods. An equivalent laboratory may be substituted for this facility based on availability and costs of the analyses.

Laboratory: Pace Analytical

General responsibilities and duties of the analytical laboratories include:

- Perform sample analyses and associated laboratory QA/QC procedures.
- Supply sample bottles and coolers.
- Maintain laboratory custody of sample.

- Strictly adhere to all protocols in the QAPP.

Laboratory Project Manager: Jennifer Gross

Responsibilities and duties include:

- Serve as primary communication link between environmental consultant and laboratory technical staff.
- Monitor workloads and maintain availability of resources.
- Oversee preparation of analytical reports.
- Supervise in-house chain-of-custody (COC).

Laboratory Quality Assurance Manager: Melanie Ollila

Responsibilities and duties include:

- Supervise personnel reviewing and inspecting all project-related laboratory activities.
- Conduct audits of all laboratory activities.

3. Quality Assurance/Quality Control Objectives

The QA objective is to evaluate the appropriateness of data generated during the project (i.e., precision, accuracy, completeness, comparability, and representativeness). Before data appropriateness can be evaluated, the potential uses of the data and corresponding analytical method levels must be identified. This is accomplished by defining DQOs, as discussed below.

The QC objective is to evaluate the quality of data collected before they are included in reports or used in evaluations or analyses. Before data quality can be evaluated, QC procedures, including data reduction and acceptance criteria, must be defined and followed for field and laboratory activities.

3.1 Data Quality Objectives

DQOs have been specified for each data collection activity, and the work will be conducted and documented so that the data collected are of sufficient quality for their

intended use (USEPA 2006). DQOs specify the data type, quality, quantity, and uses needed to make decisions, and are the basis for designing data collection activities. The DQOs have been used to design the data collection activities. The DQOs for this project are discussed in the following sections.

3.1.1 Data Quality Objective Process

The project DQOs developed specifically for the planned sampling and analysis program have been established based on the USEPA seven-step DQO process (USEPA 2006). The ARCADIS Project Manager will evaluate the project DQOs to determine whether the quantitative and qualitative needs of the sampling and analysis program have been met. The project definition associated with each step of the DQO process can be summarized as follows.

State the Problem: Identify the potential sources of OCP, lead and arsenic contamination at the Site. The sources are identified in the SSI report (ARCADIS 2013).

Identify the Goal of the Study: The data obtained from the verification sampling and/or from sampled soil assessed and left in place following the SSI, will be used to evaluate the potential need for additional excavation or cover placement in representative areas of the bottom and sidewalls of excavation areas.

Identify Inputs to the Decision: Inputs to the decision will include results of analytical testing of the soils collected from the bottom and sidewalls of excavation areas.

Define Boundaries of the Study: Excavation boundaries will be based on confirmation soil sampling results and/or from sampled soil assessed and left in place following the SSI, but will not extend beyond the Site boundaries.

Develop a Decision Rule: Decisions regarding Site characterization will be based on laboratory results using appropriate detection/reporting limits analyzed by USEPA methods. The decision on whether data can be used will be based on the validation results. Following validation, the data will be flagged, as appropriate, and any use restrictions will be noted. The media-specific sampling plans have been devised so that the loss of any single data point will not hinder description of the distribution of constituents or the development of a remediation plan. Given this, a reasonable decision rule would be that 90 percent of the data points not be rejected or deemed unusable.

Specify Performance or Acceptance Criteria: The results of analytical testing will be subjected to data evaluation and validation. Data are considered valid if the specified limits on precision, accuracy, representativeness, comparability, and completeness are achieved. Specifications for this step call for: 1) giving forethought to corrective actions to improve data usability; and 2) understanding the representative nature of the sampling design. This QAPP has been designed to meet both specifications for this step. The sampling and analysis programs have been developed based on a review of previous site data and knowledge of present Site conditions. The representative nature of the sampling design has been facilitated by discussions among professionals familiar with the Site and the appropriate government agencies.

Develop the Plan for Obtaining Data: The overall QA objective is to develop and implement procedures for field sampling; COC, laboratory analysis, and reporting that will provide results to support the evaluation of the Site data consistent with RAW requirements. Specific procedures for sampling, COC, laboratory instrument calibration, laboratory analysis, data reporting, internal QC, audits, preventive maintenance of field equipment, and corrective action are described in other sections of this QAPP

3.1.2 Analytical Method Levels

Analytical levels are defined as follows:

Level I: Field Testing. Level I methods include the use of handheld instruments. Data QA/QC includes proper calibration of instruments and appropriate data interpretation.

Level II: Tentative Identification of Compounds. Under Level II, compound identification is presented as a range. This level usually includes screening by a mobile laboratory with variable data QA/QC, depending on the report format. The use of a mobile laboratory is not anticipated during remediation activities.

Level III: Organic and Inorganic Analysis Using USEPA Procedures. Level III methods involve the use of USEPA procedures generally taken from *Test Methods for Evaluating Solid Waste* (USEPA 2006) and other recognized laboratory method manuals, except those that include the USEPA Contract Laboratory Program (CLP). Level III results have quantitation limits similar to those obtained from CLP analyses; under Level III, data QA/QC can be performed to provide data of the same quality as Levels IV and V.

Level IV: Hazardous Substance List Analyses. This level covers organic and inorganic analyses for compounds on the Hazardous Substance List, as defined by the USEPA CLP Statement of Work, which is issued periodically and detailed in each contract year's description of routine analytical services. These analyses are conducted exclusively by USEPA CLP laboratories, which are under (sub)contract to the federal government or its contractor. Data QA/QC is rigorous; raw data are generally validated by a data-validation contractor.

Level V: Nonconventional Parameters. Level V methods identify nonconventional parameters using analyses that are developed or modified for the particular parameter(s) being analyzed. Significant lead time is generally needed, and data QA/QC is method specific.

3.1.3 Data Uses and Project Data Quality Objectives

In defining DQOs, general factors to be considered include potential uses of the data (e.g., site characterization, health risk assessment, engineering and design, remediation, monitoring, material characterization for disposal); cost limitations; the schedule of the project; and overall levels of concern (health risk assessment-based criteria) for the project.

The DQOs for this project are:

1. To generate field data (for use in sample screening and health and safety monitoring) and laboratory data (for use in site characterization, material characterization for disposal purposes, and monitoring of remedial activities) of a quality appropriate for the data's use
2. To evaluate the quality of the data

The quality of the field data, which will be generated using portable instruments that must be calibrated following the procedures described in Section 6, must be sufficient to allow proper evaluation of the results.

3.1.4 Analytical Method Levels to Be Used During the Project

On the basis of the DQOs and known Site conditions (from previously generated data), Level I and Level III analytical methods have been selected for this project. Level I methods will be implemented in the field to achieve health and safety objectives. They

include the use of a miniature real-time aerosol monitor (mini-RAM) if dust is generated.

Level III reporting will be applied to soil samples submitted to PACE (Minneapolis) (or comparable laboratory) for analysis, so that after the data have been reviewed and validated, they will be suitable for use in site characterization and monitoring during remedial-action implementation (if necessary). Level III analyses will be conducted by PACE (or comparable laboratory) under subcontract to ARCADIS. The level of QA/QC and associated documentation will comply with the requirements of California Department of Health Services' Environmental Laboratory Accreditation Program (ELAP). QA/QC procedures and requirements in addition to the ELAP requirements are detailed in this QAPP. Sample detection limit goals for OCPs, lead and arsenic (listed in Appendix A), if achieved, will provide results sufficient for the potential uses identified. The target lists for OCPs (U.S. EPA Method 8081A) are also presented in Appendix A.

3.2 Data Acceptance Criteria

In addition to being evaluated against the sample quantitation limit goals outlined in Section 7, laboratory data generated during the project will be evaluated for precision, accuracy, completeness, comparability, and representativeness. Precision and accuracy are the primary parameters used in evaluating the quality of the data.

3.2.1 Precision and Accuracy Criteria

Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the site assessment. To maximize precision, sampling and analytical procedures will be strictly followed; work will adhere to established protocols presented in the QAPP and sampling plans. Checks for analytical precision will include the analysis of matrix spike/matrix spike duplicates pairs, laboratory duplicates, and field duplicates. Field measurement precision will be monitored by obtaining duplicate field measurements. Data precision is measured by calculating relative percent differences (RPDs; see Section 11.0) of the analytical results for field and laboratory splits.

Accuracy is a measure of how close a measured result is to the true value. Recovery of reference standards, matrix spikes, laboratory control standards, and surrogate standards will be used to assess the accuracy of the analytical data.

Laboratory data acceptance criteria for precision and accuracy will be based on laboratory generated control limits. PACE laboratory control limits are included in Appendix B.

If laboratory data precision and accuracy do not meet the data acceptance criteria, the reason will be noted in an ARCADIS data validation summary report. Corrective action to be taken if precision and accuracy data acceptance criteria are not met may include additional sampling and/or reanalysis.

3.2.2 Completeness, Comparability, and Representativeness Criteria

Data completeness will be evaluated using the following calculation:

Number of valid sample results generated to the total number of results generated.

$$\text{Completeness} = \frac{\text{Number valid results}}{\text{Total number of results generated}} \times 100$$

Although 100 percent data completeness is theoretically ideal, 90 percent data completeness is generally associated with Level III, IV, and V analyses and accounts for unforeseen incidents associated with the data collection.

To ensure that the data collected are comparable to both previous and subsequent data, standardized procedures will be followed during field sampling, laboratory analysis, and data evaluation. Whenever procedures change from one sampling round to another, or within a sampling episode, historical data will be compared to recent data before data are validated and reduced.

To obtain representative data, strict technical and management procedures (as detailed below) will be followed, including careful planning of sample collection procedures and analytical methodologies. These procedures will be audited as described in Section 10.

4. Field Activities

This section describes routine procedures designed to ensure quality data acquisition, the collection of representative samples, and minimal sample contamination.

4.1 Soil Sampling

Soil sampling will be conducted during excavation activities to provide verification that OCP, lead and arsenic affected soil above the cleanup goals has been removed from the AOC. Soil sampling methodology is discussed in the soil sampling and analysis plan included in the RAW.

Soil samples will be analyzed for a combination of the following analytes:

- OCPs using USEPA Method SW-846 8081A
- Lead and/or Arsenic using USEPA Method SW-846 6020.

Soil samples will be delivered to PACE (Minneapolis) (or equivalent laboratory) under strict chain-of-custody protocol.

4.2 Decontamination

Equipment that comes into contact with potentially contaminated soil will be decontaminated consistently to assure the quality of samples collected. Before and after each use, reusable sampling equipment or containers will be properly decontaminated. All sampling devices used will be decontaminated using the following procedures:

1. Alconox or Liquinox and tap water wash, using a brush if necessary
2. Tap water rinse
3. Initial deionized/distilled water rinse
4. Final deionized/distilled water rinse
5. Set on clean plastic sheeting to air dry

Disposable equipment intended for one time use will not be decontaminated, but will be packaged for appropriate disposal.

5. Sample Containment, Logging, Handling, and Custody

5.1 Sample Containers, Preservation, and Holding Times

Soil samples will be collected in appropriate laboratory-supplied containers and stored in an ice-chilled cooler for transportation to the laboratory. The analytical laboratory will supply appropriate sample containers and preservatives, as necessary. The bottles will be purchased pre-cleaned to USEPA Office of Solid Waste and Emergency Response Directive 9240.05A requirements.

Appendix A lists appropriate preservation method, sample container, and holding times.

Containers will not be reused. Soil samples will be placed in coolers with ice and chilled to less than 6 degrees Celsius (°C). Regular ice used in the cooler will be sealed in a plastic bag other than the one in which it was purchased. Reusable “blue ice” packets may also be used.

5.2 Documentation and Sample Custody

Sample custody and documentation procedures link each reported datum with its associated sample. Documentation and custody procedures cover field, office, and laboratory activities. Chain-of-custody forms, which are central to these procedures, will travel with the samples and their associated data throughout the tracking process.

Field documentation consists of sample labels, sampling information forms, a field activities logbook, and chain-of-custody forms. These documents will be completed using indelible ink. Corrections to a document will be made by drawing a line through the error and entering the correct value, without obliterating the original entry. Authorized personnel correcting an original document will initial and date changes.

5.2.1 Sample Labels

Sample labels will be completed and attached to the sample container for every sample collected. Labels are made of a waterproof material backed with a water-resistant adhesive. Labels will be filled out using waterproof ink and will include (at least) the sample name, the sampling date and time, sampler, and the sampling location.

5.2.2 Field Activities Logbook

Entries in the field logbook will include (at a minimum) the following for each day:

- Site name and address
- Recorder's name
- Team members and their responsibilities
- Time of arrival/entry at the Site and time of Site departure
- Other personnel present at the Site
- A summary of on-site meetings
- Deviations from sampling plans or Site safety plans
- Levels of safety protection
- Calibration readings for equipment used and equipment model and serial number

At a minimum, the following information will be recorded during the collection of each sample:

- Sample identification number
- Sample location and soil description
- Site sketch showing sample location and note that global positioning system information was documented
- Sampler name(s)
- Date and time of sample collection
- Type of sample (i.e., matrix)
- Field observations and details important to analysis or integrity of samples (e.g., heavy rains, odors, colors)
- Chain-of-custody form numbers
- Shipping arrangements (e.g., delivery by overnight courier, including company name and air bill number, or laboratory pickup including name of personnel and time of departure)
- Recipient laboratory

5.2.3 Chain-of-Custody Forms

Chain-of-custody forms will be prepared for groups of samples collected at a given location on a given day. Each chain-of-custody form will be prepared in triplicate. Two of the three copies will accompany each shipment of samples to the laboratory. The third copy will be kept in the ARCADIS Project file or electronically in the project file. The chain-of-custody forms identify the personnel involved in sample transfer and accompany the samples from the time of collection until received by the laboratory. Information entered on the chain-of-custody forms consists of the following:

- Project name and number
- Field activities logbook number
- Chain-of-custody serial number
- Project location
- Sample identification
- Signature of the sampler/recorder
- Date and time of collection
- Number of containers
- Sample matrix
- Analyses requested
- Inclusive dates of possession
- Name of person receiving the sample
- Date and time of receipt of sample
- Miscellaneous remarks

Samples will be shipped such that no more than 24 hours elapse from the time of shipment to the time the laboratory receives the samples. The method of shipment may be hand delivery by field personnel, laboratory courier, or commercial shipping services (such as United Parcel Service® or FedEx®). The method of sample shipment will be noted on the chain-of-custody form. Standard chain-of-custody procedures will be maintained during sample handling.

The condition of the samples upon arrival at the laboratory will be documented on the chain-of-custody forms or similar forms. A copy of the completed chain-of-custody forms and other pertinent forms will be provided by the laboratory along with the analytical results.

5.2.4 Project Documentation

Samples will be tracked and data will be archived at the ARCADIS office in Roseville, California. The ARCADIS QA Officer will be responsible for ensuring that documentation is in order and that the results are obtained for the analyses requested on the chain-of-custody form and that sample identifications on the laboratory reports match those on the chain-of-custody form. The project file will be used in data tracking and documentation, as discussed below.

The electronic project file is the common location for information required in data evaluation and report preparation. It contains documents including work plans, sampling plans, assessment reports, correspondence, field activities logbooks, chain-of-custody forms, and sampling information forms. The file is organized for easy retrieval and long-term storage of information (2 years or more). The ARCADIS Project Manager will direct the maintenance of the project file.

5.2.5 Laboratory Custody

The laboratory will designate a sample custodian who will accept custody of the shipped samples and check that the information on the sample labels matches that on the chain-of-custody form. The custodian, or designee will then enter the appropriate data into the laboratory's sample tracking system. The custodian will use the sample number on the sample label or will assign a unique laboratory number to each sample. As a record of sample receipt, the analytical laboratory will return a copy of the chain-of-custody form with the assigned laboratory numbers to the sampler. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) under refrigeration until they are analyzed.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or disposed of. Disposal of unused samples must comply with applicable local, state, and federal environmental regulations. Data sheets and laboratory records will be retained as permanent documentation.

The laboratory will immediately notify the ARCADIS Project Manager if conditions or problems are identified that require immediate resolution. Such conditions include container breakage, missing or improper chain-of-custody forms, exceeding holding times, missing or illegible sample labeling, or temperature excursions.

5.3 Sample Packaging and Transport

All samples will be packaged and transported according to the following procedure:

1. Attach completed label to each sample.
2. Properly seal and package sample containers (package samples so the potential for shipping damage is minimized).
3. Wrap glass sample containers in bubble wrap or other cushioning material.
4. Place 1 to 2 inches of cushioning material at the bottom of the cooler.
5. Place the sealed sample containers into the cooler.
6. Place ice in plastic bags, seal the bags, and place the bags loosely in the cooler.
7. Fill the remaining space in the cooler with cushioning material.
8. Complete chain-of-custody forms. NOTE: If the designated sampler relinquishes the samples to other sampling or field personnel for packing or other purposes, the sampler will complete the COC prior to this transfer. The appropriate personnel will sign and date the COC form to document the sample custody transfer.
9. Seal the top two copies of the chain-of-custody forms inside a resealable plastic bag. Tape the forms to the inside of the cooler lid.
10. Seal the shipping container with several strips of strapping tape.
11. Mark the cooler on the outside with the shipping address and return address, affix "Fragile" labels, and draw (or affix) arrows indicating "this side up." Cover the labels with clear plastic tape. If the samples are being delivered directly to the laboratory or will be picked up by the lab's courier service, this step is eliminated.



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12. Place a signed custody seal over the sample cooler lid.
13. Arrange for appropriate shipment to the analytical laboratory.

Samples will be transported to the laboratory by ARCADIS or by courier pickup, following the chain-of-custody and documentation protocols outlined above. The laboratory shipping address is:

Pace MN, Sample Receiving
1700 Elm Street, Suite 200
Minneapolis, MN 55414
Tel. (612) 607-1700

6. Equipment Maintenance and Calibration

Field and laboratory personnel will follow the protocols described below to ensure that equipment is in good working condition and that field measurements made by different individuals or at different times are consistent and reproducible.

6.1 Maintenance

Prior to field sampling, each piece of field equipment will be calibrated (if necessary) and inspected to confirm that it is operational. If the equipment is not operational, it will be serviced prior to use. All meters that require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, the appropriate TM or field personnel will be responsible for following the maintenance schedule and arranging for timely service. Field instruments will be maintained according to the manufacturers' instructions

6.2 Field Calibration

Calibration of field instruments is necessary to ensure that they are operating correctly and are adjusted so that they yield accurate measurements. Adjustments made to field equipment will be recorded in each instrument dedicated logbook that is kept with the instrument. Air monitoring during field activities will be conducted in accordance with the HASP (included in the RAW).

6.3 Laboratory Maintenance and Calibration

Laboratory instrument and equipment documentation procedures include details of any observed problems, corrective measure(s), routine maintenance and instrument repair (including information regarding the repair and the individual who performed the repair).

Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

Maintenance schedules for laboratory equipment adhere to each manufacturer's recommendations. Records reflect the complete history of each instrument and specify the time frame for future maintenance. Major repairs or maintenance procedures are performed through service contracts with the manufacturer or qualified contractors.



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Paperwork associated with service calls and preventive maintenance calls will be kept on file by the laboratory.

Instrument calibration will follow the specifications provided by the instrument manufacturer or specific analytical method used. The analytical methods for chemical constituents are identified in Appendix A.

When analyses are conducted according to USEPA methods, the calibration procedures and frequencies specified in the applicable method will be followed. For analyses governed by SOPs, see the appropriate laboratory SOP for the required calibration procedures and frequencies. Records of calibrations will be filed and maintained by the laboratory. These records will be subject to QA audit. For all instruments, the laboratory will maintain trained repair staff with in-house spare parts or will maintain service contracts with vendors.

All standards used to calibrate equipment are traceable, directly or indirectly, to the National Institute of Standards and Technology. All standards received will be logged into standard receipt logs maintained by the individual analytical groups. Each group will maintain a standards log that tracks the preparation of standards used for calibration and QC purposes

7. Laboratory Analysis

7.1 Methods

The primary sources for methods used in this RAW is provided in *Test Methods for Evaluating Solid Waste, SW-846 Third Edition*, Update 4, USEPA, December 1996. All samples will be analyzed by PACE Analytical at their Minneapolis location (or comparable laboratory). Analytical methods, reporting limits, and screening levels for OCPs, lead and arsenic are presented in Appendix A.

7.2 QA/QC Procedures

The laboratory will follow its internal QA/QC procedures during routine operations and will base its analytical QA/QC on USEPA Method manuals, and California Environmental Laboratory Approval Program (ELAP) requirements. Internal laboratory QC checks will be used to monitor data integrity. These checks will include method blanks, laboratory control samples, matrix spike/matrix spike duplicates, laboratory duplicates, internal standards, surrogate samples and calibration standards, as appropriate. Laboratory control charts will be used to determine long-term instrument trends.

Samples will be analyzed at the laboratory within specific holding times; the laboratory will not analyze a sample that has exceeded its holding time without permission of ARCADIS.

Calculations for reporting analyte concentrations will be performed by the laboratory according to the procedures specified for each referenced method of analysis. Calculations conducted by the analytical laboratory in converting raw data to reported results will be readily available for inspection. The accuracy and correctness of data reported by the laboratory will be checked by senior laboratory personnel before the laboratory reports its results.

7.3 Sensitivity

Sensitivity is defined as the ability of the method or instrument to detect the contaminant of concern and other target compounds at the level of interest. Method detection limit (MDL) is defined as the minimum concentration of a substance that can be identified, measured, and reported with a 99 percent confidence that the analyte concentration is greater than zero and is determined from repeated analysis of a



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sample in a given matrix containing the analyte. MDLs have been determined as required in Title 40 of the Code of Federal Regulation (CFR) Part 136B. The reporting limit (RL) is greater than or equal to the lowest standard used to establish the calibration curve. The RLs for this investigation are generally at least 3 times greater than the MDL. Results greater than the MDL and less than the RL will be qualified estimated (J) by the laboratory. Expected sample quantitation limits, assuming no dilutions, are presented in Appendix A.

8. Data Reduction and Validation

Data collected during the project will be reduced and evaluated before being included in reports. Copies of laboratory reports will be stored in the project file.

8.1 Reduction

Data reduction will be conducted as follows: If laboratory data are received in electronic form, they will be transferred into a spreadsheet database program. Data for relevant compounds reported at concentrations above sample quantitation limits will be presented in summary tables. The tables may also contain the laboratory name, sample number, laboratory number, sampling date, field measurement, and QC analytical data.

8.2 Field Data Validation

ARCADIS will validate data obtained from field measurements before the data are included in reports or used in calculations. Field data will be validated by checking procedures used in the field to ensure they were conducted in accordance with the RAW.

8.3 Laboratory Analytical Data Validation

Laboratory personnel will verify that the measurement process was “in control” (i.e., specified DQOs were met or acceptable deviations explained) for each batch of samples before proceeding with the analysis of a subsequent batch. In addition, each laboratory will establish a system for detecting and reducing transcription and/or calculation errors prior to reporting data.

Only data that have met DQOs or data whose acceptable deviations have been explained will be submitted by the laboratory. When QA requirements have not been met, the samples will be reanalyzed when possible and both the initial and reanalysis results will be submitted. Analytical data will be provided in an electronic deliverable such as PDF file format.

Calculations performed by the laboratory in converting raw data to reported results will be readily available for inspection. The accuracy of analytical results must be checked by senior laboratory personnel before the laboratory reports the results.



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If laboratory performance is suspect, the following steps may be taken:

- The ARCADIS QA Officer will evaluate the laboratory records.
- The laboratory will be notified and the laboratory will take appropriate corrective action, such as reanalyzing samples or conducting a detailed review of internal QC.
- The ARCADIS QA Officer may make recommendations to the ARCADIS Project Manager on additional actions ARCADIS should take, such as re-sampling or modification of the sampling or analytical protocol.

9. Quality Control Check Samples

Field and laboratory QC check samples will be analyzed as required by regulatory agencies and will consist of introducing various control samples into the sample analysis stream to help evaluate the accuracy and precision of analytical results.

9.1 Field

Equipment rinsate blanks, field blanks and field duplicates are proposed during this investigation.

9.1.1 Equipment Rinsate Blanks (for Soil Sampling)

A field equipment rinsate blank is a sample that is prepared in the field by pouring de-ionized or distilled (for inorganics) water through and over cleaned sampling equipment. The water is then collected and analyzed as a sample. The field equipment rinsate blank gives an indication of contamination from field procedures (e.g., improperly cleaned sampling equipment or cross-contamination).

A field equipment rinsate blank will be collected at a minimum frequency of one per set of sampling equipment per sample matrix per day that non-dedicated sampling equipment is used. The field equipment rinsate blanks will be analyzed for the same analytes as the soil samples collected with the sampling equipment. The analytical goal for field equipment rinsate blanks is to have no detectable analytes. In addition, a sample of the provided rinsate water will be sent to the laboratory for analysis to confirm the water has no elevated analytes (i.e. Field Blank). Equipment blank QC samples will be identified in the field activities logbook according to type.

9.1.2 Field Blanks (for soil sampling)

Field blanks are collected by pouring distilled water into appropriate sample containers. Their purpose is to evaluate the presence of chemicals for which environmental samples are being analyzed in the water used for equipment decontamination. The field blank samples are stored and processed in the same manner as the other aqueous samples.

Field blanks will be collected at a minimum frequency of one per field event that non-dedicated sampling equipment is used. The field blanks will be analyzed for the same

analytes as the soil samples collected with the sampling equipment. The analytical goal for field blanks is to have no detectable analytes.

9.1.3 Field Duplicates

A minimum of one field duplicate sample per analysis method per every ten field samples (at least 10 percent of the number of samples) will be collected and analyzed for the same analytes as the primary sample.

9.2 Laboratory

9.2.1 Method Blanks

Sources of contamination in the analytical process, whether specific analyses or interferences, must be identified, isolated, and corrected. The method blank is useful in identifying possible sources of contamination within the analytical process. For this reason, it is necessary that the method blank be initiated at the beginning of the analytical process and encompasses all aspects of the analytical work. As such, the method blank would assist in accounting for any potential contamination attributable to glassware, reagents, instrumentation, or other sources that could affect sample analysis. One method blank will be analyzed with each analytical series associated with no more than 20 samples.

9.2.2 Laboratory Control Samples

Laboratory Control Samples (LCS) are standards of known concentration and are independent in origin from the calibration standards. The intent of LCS analysis is to provide insight into the analytical proficiency within an analytical series. This includes preparation of calibration standards, validity of calibration, sample preparation, instrument set-up, and the premises inherent in quantitation. Reference standards will be analyzed at the frequencies specified within the analytical methods.

9.2.3 Duplicates

Laboratory duplicates are samples used to assess data precision as affected by laboratory sources of variation. To measure precision, the laboratory will analyze matrix spikes in duplicate.

9.2.4 Matrix Spike/Matrix Spike Duplicates (MS/MSDs)

MS/MSDs will be used to measure the accuracy of analyte recovery from the sample matrices and will be Site-specific. MS/MSD pairs will be analyzed at a 5 percent frequency (every 20 samples).

When MS/MSD recoveries are outside quality control limits, associated control sample and surrogate spike recoveries will be evaluated, as applicable, to attempt to verify the reason for the deviation and determine the effect on the reported sample results.

9.2.5 Surrogate Spikes

Surrogates are compounds that are unlikely to occur under natural conditions but that have properties similar to the analytes of interest. This type of control is primarily used for organic samples analyzed by gas chromatography/mass spectrometry (GC/MS) and GC methods and is added to the samples prior to purging or extraction. The surrogate spike is utilized to provide broader insight into the proficiency and efficiency of an analytical method on a sample-specific basis. This control reflects analytical conditions that may not be attributable to sample matrix.

If surrogate spike recoveries exceed specified QC limits, the analytical results must be evaluated thoroughly in conjunction with other control measures. In the absence of other control measures, the integrity of the data may not be verifiable, and reanalysis of the samples with additional control may be necessary.

Surrogate spike compounds will be selected utilizing the guidance provided in the analytical methods.

9.2.6 Calibration Standards

Calibration check standards analyzed within a particular analytical series provide insight regarding instrument stability. A calibration check standard will be analyzed at the beginning and end of an analytical series, or periodically throughout a series containing a large number of samples.

In general, calibration check standards will be analyzed after every 12 hours or more frequently, as specified in the applicable analytical method. If results of the calibration check standard exceed specified tolerances, samples analyzed since the last acceptable calibration check standard will be re-analyzed.

Laboratory instrument calibration standards will be selected utilizing the guidance provided in the analytical methods.

10. Audit Procedures

Internal and external QA/QC audits will be performed and documented in the project file, as discussed below.

10.1 Internal Audits

Field personnel will participate in periodic internal performance and system audits conducted by the Project Manager and/or QA Officer. The QA Officer's internal audit will include evaluating the data collected during the project to ensure it is collected in accordance with the RAW. Internal laboratory performance and system audits will also be conducted by the analytical laboratory, according to its own specifications.

10.1.1 Field Personnel Performance

The Project Manager, or their designated representative will randomly observe field staff or review field notes to ensure that field procedures described in this QAPP are being followed. Deviation from the procedures contained in this QAPP that may compromise the quality of data obtained in the field will be reported by the Project Manager or QA Officer, who will decide on appropriate corrective action.

Additionally, the RAW will be audited once for each new phase of work to determine whether the procedures described in this QAPP have been followed. The Project Manager, or their designated representative will observe the work and/or review selected documentation of the fieldwork.

10.1.2 System Audits

Systems audits comparing scheduled QA/QC activities from this QAPP with actual QA/QC activities completed will be performed. The appropriate Task Manager and QAO will periodically confirm that work is being performed consistent with this QAPP and the RAW.

10.1.3 Quality Control Check Programs

ARCADIS is responsible for validating data according to the evaluation steps described in Section 11. The comprehensive data validation requirements are to be fulfilled

before data are included in the reports. Where appropriate, each report will contain QC and QA sections.

10.1.4 Laboratory Performance Audits

Internal laboratory audits are conducted by the Laboratory QA Manager. As part of the audit, the overall performance of the laboratory staff is evaluated and compared to the performance criteria outlined in the laboratory QA manual and SOPs. The results of the audits are summarized and issued to each department supervisor, the Laboratory Manager, and the Laboratory Director. A systems audit of each laboratory may be performed by the QA Manager to determine whether the procedures implemented by each laboratory are in compliance with the QA manual and SOPs.

10.2 External Audits

As a participant in state and federal certification programs, the laboratory is audited by representatives of the regulatory agency issuing certification in addition to the laboratory's internal audits. Audits are usually conducted on an annual basis and focus on laboratory conformance to the specific program protocols for which the laboratory is seeking certification. The auditor reviews sample handling and tracking documentation, analytical methodologies, analytical supportive documentation, and final reports. The audit findings are formally documented and submitted to the laboratory for corrective action, if necessary.

ARCADIS reserves the right to conduct an on-site audit of the laboratory prior to the start of analyses for the project. Additional audits may be performed during the course of the project, as deemed necessary. This possible audit will include inspection of control charts associated with the instruments used and for the compounds analyzed. Control samples and raw data related to the samples analyzed will also be examined. The contract laboratory will undergo auditing through mandatory blind sample analyses, as required by regulatory agencies.

11. Data Validation Procedures

ARCADIS will perform a review of laboratory QC data to evaluate analytical data for samples using quantitative tests, qualitative assessment, and professional judgment to ensure that the data reported by the laboratory are representative of actual field conditions. Analytical results first will be checked for completeness, using the criteria described in Section 8, including the analytical method sensitivity (reported sample

quantitation limit). If the laboratory's rationale for elevated sample quantitation limits is not appropriate, corrective action will be implemented. QC samples will be evaluated for data precision and accuracy.

Data will be validated using the most recent versions of the USEPA's National Functional Guidelines (USEPA 1999; 2002) and USEPA Region 9 Data Validation Guidance for data validation available at the time of project initiation, where appropriate. These procedures and criteria may be modified, as necessary, to address project-specific and method-specific criteria, control limits, and procedures. Data validation will consist of data screening, checking, reviewing, and editing to document analytical data quality and to determine whether the quality is sufficient to meet the DQOs. The data validator will verify that reduction of laboratory measurements and laboratory reporting of analytical parameters is in accordance with the procedures specified for each analytical method and/or as specified in this QAPP.

The completion of analyses requested on the chain-of-custody form will be verified by tracking the status of each sample being analyzed. Tracking will be maintained until the samples have been analyzed and the results have been reported by the analytical laboratory. Analytical data will be reduced and compiled into summary tables as described in Section 8.

12. Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP or the RAW. Corrective actions include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for the assessment are described below.

12.1.1 Field Procedures

If, during field work, a condition is noted by the field crew that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause, and corrective action implemented by the Field Manager or a designee will be documented on a Corrective Action Form and reported to the PM and QAO. The QAO or his designee will be responsible for follow-up and acceptance of corrective actions.

Examples of situations that would require corrective actions are provided below:

- Protocols as defined by the QAPP, SAPs and/or RAW have not been followed;
- Equipment is not in proper working order or properly calibrated;
- QC requirements have not been met; and
- Issues resulting from performance or systems audits.

Project personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

12.1.2 Laboratory Procedures

In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause, and corrective action to be taken will be documented, and reported to the appropriate project manager and QAO.

Corrective action may be initiated, at a minimum, under the following conditions:

- Protocols as defined by this QAPP have not been followed;
- Predetermined data acceptance standards are not obtained;
- Equipment is not in proper working order or calibrated;
- Sample and test results are not completely traceable;
- QC requirements have not been met; and
- Issues resulting from performance or systems audits.

Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities. Corrective action will be initiated upon identification of the problem. At whatever level this occurs (analyst, supervisor, data review or QC), it will be brought to the attention of the Laboratory QAM and, ultimately, the Laboratory Director. Final approval of any action deemed necessary is subject to the approval of the Laboratory Director. If previously reported data are affected by a situation requiring correction or if the corrective action impacts a project budget or schedule, the action will directly involve the Project Manager.

Any corrective action deemed necessary based on system or performance audits, the analytical results of split samples, or the results of data review will be implemented.

The corrective action may include sample re-extraction, re-preparation, reanalysis, cleanup, dilution, matrix modification or other activities.

13. QA Reporting

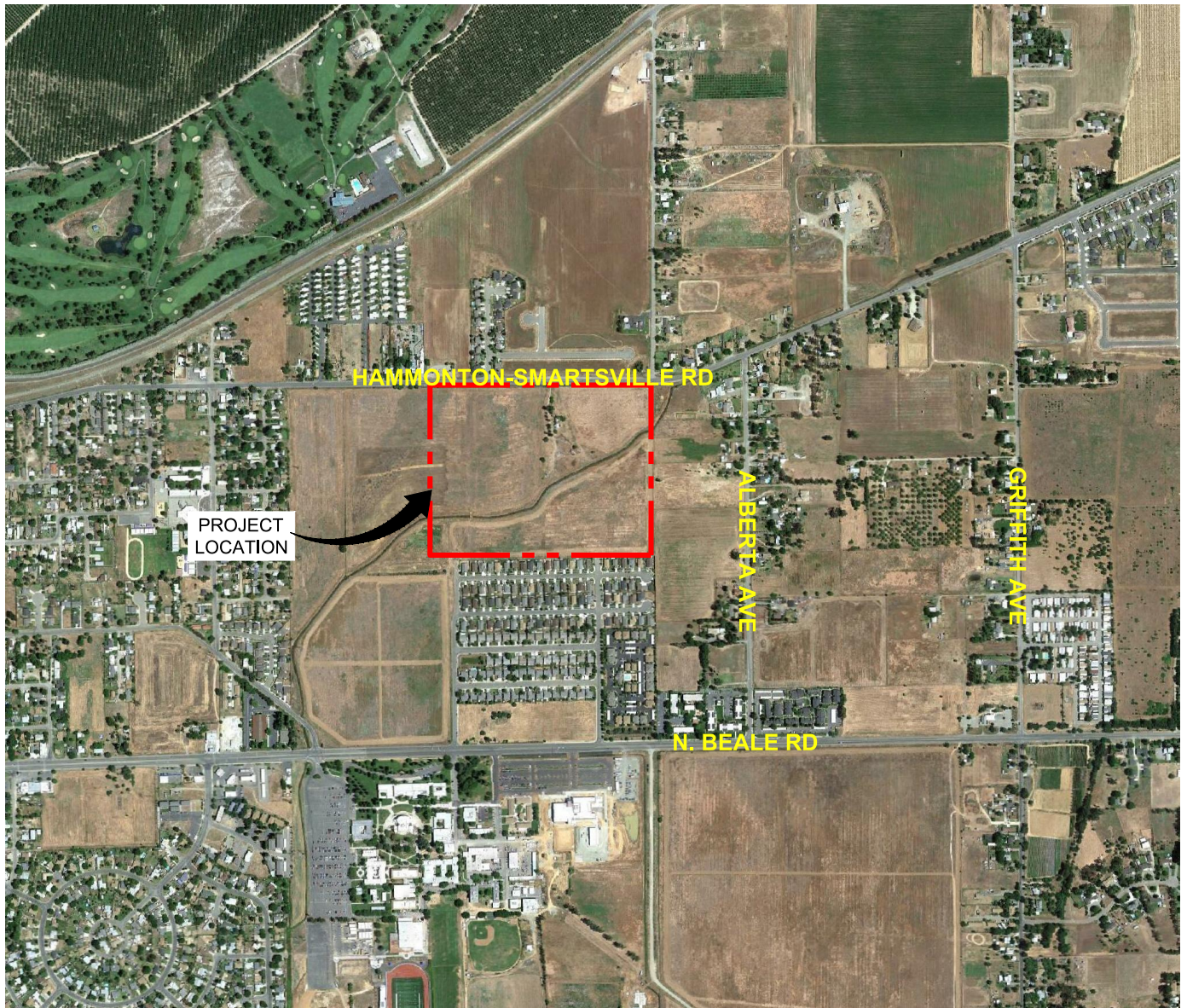
The QAO will audit the implementation of the QAPP. Each project component will result in some type of QA report or, by its absence, will indicate that no significant QA or QC deviations occurred. Items that may result in a QA report include:

- changes or updates to the QAPP
- deviations from QAPP or RAW specification
- results of system and performance audits
- significant QA/QC problems, recommended solutions and results of corrective actions
- limitations on the use of measurement data

14. References

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- Department of Toxic Substances Control (DTSC). 2014. Approval of Revised Supplemental Site Investigation Report, Hammonton Smartsville Property, 2176 Hammonton Smartsville Road, Yuba County (Site Code: 10674). Letter to MJUSD. January 8.
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- 3/4. 2001. Requirements for Quality Assurance Project Plans for Environmental Data Operations, Final, EPA QA/R-5. Washington, D.C.
- 3/4. 2002a. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-01/008.
- 3/4. 2002b. Guidance for Quality Assurance Project Plans, EPA QA/G-5. Office of Research and Development. U.S. Environmental Protection Agency. Washington, D.C.
- 3/4. 2006. Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4. Office of Research and Development U.S. Environmental Protection Agency. Washington, D.C.

Figure

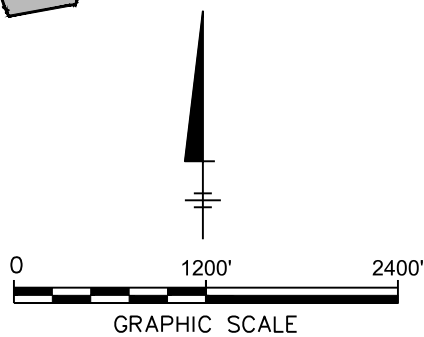


MAP SOURCE: Google Earth Pro™ 2011, 39°08'04.32"N, 121°32'08.12"W



LEGEND:

--- PROPERTY BOUNDARY



HAMMONTON SMARTSVILLE PROPERTY
APN 021-150-062
YUBA COUNTY, CALIFORNIA

SITE LOCATION MAP



FIGURE
1



Appendix A

Analytical Detection Limit, Method,
Preservation, Sample Weight, and
Hold Time

Appendix A
Analytical Detection Limit, Method, Preservation, Sample Weight, and Hold Time
Hammonton Smartsville Property
Yuba County, California

Parameter	Analytical Method	Preservation	Sample Container/ Minimum Sample	Holding Time ¹
Soil				
Pesticides (OCPs)	USEPA SW-846 8081A	Cool to < 6°C	1 x 8 oz glass jar/50 g	14 days to extraction; 40 days to analysis
Lead and Arsenic	USEPA SW-846 6020	Cool to < 6°C	1 x 4 oz glass jar/10 g	180 days to analysis
Water				
Pesticides (OCPs)	USEPA SW-846 8081A	Cool to < 6°C	1 Liter amber glass bottles/1 Liter	7 days to extraction; 40 days to analysis
Lead and Arsenic	USEPA SW-846 6020	HNO3 to pH <2; Cool to < 6°C	1 x 250 ml plastic bottle/250 ml	180 days to analysis

1. All hold times are from date of collection.

Organochlorine Pesticides 8081 (Soil)			
Parameter	RDL (ug/kg)	MDL (ug/kg)	California Human Health Screening Level - Residential (ug/kg)
Aldrin	1.7	0.244	33
Alpha BHC	1.7	0.283	--
Beta BHC	1.7	0.356	--
Delta BHC	1.7	0.419	--
Gamma BHC (Lindane)	1.7	0.309	500
Technical Chlordane	1.7	0.449	430
4,4-DDD	3.3	0.961	2300
4,4-DDE	3.3	1.08	1600
4,4-DDT	3.3	1.209	1600
Dieldrin	3.3	0.881	35
Endosulfan I	1.67	0.469	--
Endosulfan II	3.3	1.111	--
Endosulfan sulfate	3.3	1.107	--
Endrin	3.3	1.031	21000
Endrin aldehyde	3.3	0.976	--
Endrin ketone	3.3	1.131	--
Heptachlor	1.7	0.312	130
Heptachlor epoxide	1.7	0.488	--
Methoxychlor	17	6.36	340000
Toxaphene	50	21.3	460

Metals 6020 (Soil)			
Parameter	RDL (mg/kg)	MDL (mg/kg)	Clean Up Goal (mg/kg)
Lead	0.1	0.028	160
Arsenic	0.5	0.14	12

Notes:

OCPs = Organochlorine Pesticides
ug/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
USEPA = United States Environmental Protection Agency
g= gram (dry weight)
MDL = method detection limit
RDL = reporting detection limit



Appendix B

Laboratory Quality Control Limits



Minnesota Department of Health
Environmental Laboratory Accreditation Program



Issues accreditation to

State Laboratory ID: 027-053-137

Pace Analytical Services, Inc - Mpls
1700 Elm Street SE, Suite 200
Minneapolis, MN 55414

for fields of testing listed on the laboratory's accompanying Scope of Certification
in accordance with the provisions in Minnesota Laws and Rules.

Continued accreditation is contingent upon successful on-going compliance with Minnesota Statutes 144.97 to 144.98, 2003 NELAC Standard and applicable Minnesota Rules 4740.2010 to 4740.2120. The laboratory's Scope of Certification cites the specific programs, methods, analytes and matrices (i.e. fields of testing) for which MDH issues this accreditation.

This certificate is valid proof of accreditation only when associated with its accompanying Scope of Certification.

The Scope of Certification and reports of on-site inspections are on file at the Minnesota Department of Health, 601 Robert Street North, Saint Paul, Minnesota. Customers may verify the laboratory's accreditation status in Minnesota by contacting MN-ELAP at (651) 201-5200.

Effective Date: 01/23/2014

Expires: 12/31/2014

A handwritten signature in black ink, reading "Susan R. Wyatt", is positioned above a horizontal line.

Susan R. Wyatt, MN-ELAP Supervisor

Certificate Number: 670665



Environmental Laboratory Certification Program
Scope of Certification
Certified Minnesota Environmental Laboratories

**THIS LISTING OF CERTIFIED FIELDS OF TESTING MUST BE
ACCOMPANIED BY CERTIFICATE NUMBER: 670665**

State Laboratory ID: 027-053-137

EPA Lab Code: MN00064

Expiration Date: 12/31/2014

Issue Date: 1/23/2014

Pace Analytical Services, Inc - Mpls
1700 Elm Street SE, Suite 200
Minneapolis, MN 55414

Clean Air Act

EPA 3C

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA 3C	Carbon dioxide	AIR	MN	
CAA	EPA 3C	Carbon monoxide	AIR	MN	
CAA	EPA 3C	Methane	AIR	MN	
CAA	EPA 3C	Nitrogen	AIR	MN	
CAA	EPA 3C	Oxygen	AIR	MN	

EPA Method 23

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA Method 23	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	AIR	MN	
CAA	EPA Method 23	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	AIR	MN	
CAA	EPA Method 23	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	AIR	MN	
CAA	EPA Method 23	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA Method 23	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	AIR	MN	
CAA	EPA Method 23	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	AIR	MN	
CAA	EPA Method 23	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	AIR	MN	
CAA	EPA Method 23	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	AIR	MN	
CAA	EPA Method 23	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	AIR	MN	
CAA	EPA Method 23	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	AIR	MN	
CAA	EPA Method 23	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	AIR	MN	
CAA	EPA Method 23	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	AIR	MN	
CAA	EPA Method 23	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	AIR	MN	
CAA	EPA Method 23	2,3,4,6,7,8-Hexachlorodibenzofuran	AIR	MN	
CAA	EPA Method 23	2,3,4,7,8-Pentachlorodibenzofuran	AIR	MN	
CAA	EPA Method 23	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	AIR	MN	
CAA	EPA Method 23	2,3,7,8-Tetrachlorodibenzofuran	AIR	MN	

EPA RSK-175 (GC/FID)

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA RSK-175 (GC/FID)	Ethane	AIR	MN	
CAA	EPA RSK-175 (GC/FID)	Ethene	AIR	MN	
CAA	EPA RSK-175 (GC/FID)	Methane	AIR	MN	
CAA	EPA RSK-175 (GC/FID)	n-Propane	AIR	MN	

EPA TO-13A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-13A	2-Methylnaphthalene	AIR	MN	
CAA	EPA TO-13A	Acenaphthene	AIR	MN	
CAA	EPA TO-13A	Acenaphthylene	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-13A	Anthracene	AIR	MN	
CAA	EPA TO-13A	Benzo(a)anthracene	AIR	MN	
CAA	EPA TO-13A	Benzo(a)pyrene	AIR	MN	
CAA	EPA TO-13A	Benzo(e)pyrene	AIR	MN	
CAA	EPA TO-13A	Benzo(g,h,i)perylene	AIR	MN	
CAA	EPA TO-13A	Benzo(k)fluoranthene	AIR	MN	
CAA	EPA TO-13A	Benzo[b]fluoranthene	AIR	MN	
CAA	EPA TO-13A	Chrysene	AIR	MN	
CAA	EPA TO-13A	Dibenz(a,h) anthracene	AIR	MN	
CAA	EPA TO-13A	Fluoranthene	AIR	MN	
CAA	EPA TO-13A	Fluorene	AIR	MN	
CAA	EPA TO-13A	Indeno(1,2,3-cd) pyrene	AIR	MN	
CAA	EPA TO-13A	Naphthalene	AIR	MN	
CAA	EPA TO-13A	Phenanthrene	AIR	MN	
CAA	EPA TO-13A	Pyrene	AIR	MN	

EPA TO-14A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-14A	1,1,1-Trichloroethane	AIR	MN	
CAA	EPA TO-14A	1,1,2,2-Tetrachloroethane	AIR	MN	
CAA	EPA TO-14A	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	AIR	MN	
CAA	EPA TO-14A	1,1,2-Trichloroethane	AIR	MN	
CAA	EPA TO-14A	1,1-Dichloroethane	AIR	MN	
CAA	EPA TO-14A	1,1-Dichloroethylene	AIR	MN	
CAA	EPA TO-14A	1,2,4-Trichlorobenzene	AIR	MN	
CAA	EPA TO-14A	1,2,4-Trimethylbenzene	AIR	MN	
CAA	EPA TO-14A	1,2-Dibromoethane (EDB, Ethylene dibromide)	AIR	MN	
CAA	EPA TO-14A	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon-114)	AIR	MN	
CAA	EPA TO-14A	1,2-Dichlorobenzene	AIR	MN	
CAA	EPA TO-14A	1,2-Dichloroethane (Ethylene dichloride)	AIR	MN	
CAA	EPA TO-14A	1,2-Dichloroethene (total)	AIR	MN	
CAA	EPA TO-14A	1,2-Dichloropropane	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-14A	1,3-Dichlorobenzene	AIR	MN	
CAA	EPA TO-14A	1,4-Dichlorobenzene	AIR	MN	
CAA	EPA TO-14A	Benzene	AIR	MN	
CAA	EPA TO-14A	Benzyl chloride	AIR	MN	
CAA	EPA TO-14A	Bromomethane	AIR	MN	
CAA	EPA TO-14A	Carbon tetrachloride	AIR	MN	
CAA	EPA TO-14A	Chlorobenzene	AIR	MN	
CAA	EPA TO-14A	Chloroethane (Ethyl chloride)	AIR	MN	
CAA	EPA TO-14A	Chloroform	AIR	MN	
CAA	EPA TO-14A	cis-1,2-Dichloroethylene	AIR	MN	
CAA	EPA TO-14A	cis-1,3-Dichloropropene	AIR	MN	
CAA	EPA TO-14A	Dichlorodifluoromethane (Freon-12)	AIR	MN	
CAA	EPA TO-14A	Ethylbenzene	AIR	MN	
CAA	EPA TO-14A	Hexachloro-1,3-butadiene	AIR	MN	
CAA	EPA TO-14A	m+p-xylene	AIR	MN	
CAA	EPA TO-14A	Methyl chloride (Chloromethane)	AIR	MN	
CAA	EPA TO-14A	Methyl tert-butyl ether (MTBE)	AIR	MN	
CAA	EPA TO-14A	Methylene chloride (Dichloromethane)	AIR	MN	
CAA	EPA TO-14A	n-Hexane	AIR	MN	
CAA	EPA TO-14A	o-Xylene	AIR	MN	
CAA	EPA TO-14A	Styrene	AIR	MN	
CAA	EPA TO-14A	Tetrachloroethene	AIR	MN	
CAA	EPA TO-14A	THC as Gas	AIR	MN	
CAA	EPA TO-14A	Toluene	AIR	MN	
CAA	EPA TO-14A	trans-1,2-Dichloroethylene	AIR	MN	
CAA	EPA TO-14A	trans-1,3-Dichloropropylene	AIR	MN	
CAA	EPA TO-14A	Trichloroethene (Trichloroethylene)	AIR	MN	
CAA	EPA TO-14A	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	AIR	MN	
CAA	EPA TO-14A	Vinyl chloride	AIR	MN	
CAA	EPA TO-14A	Xylene (total)	AIR	MN	

EPA TO-17

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-17	1,1,1-Trichloroethane	AIR	MN	
CAA	EPA TO-17	1,1,2,2-Tetrachloroethane	AIR	MN	
CAA	EPA TO-17	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	AIR	MN	
CAA	EPA TO-17	1,1,2-Trichloroethane	AIR	MN	
CAA	EPA TO-17	1,1-Dichloroethane	AIR	MN	
CAA	EPA TO-17	1,1-Dichloroethylene	AIR	MN	
CAA	EPA TO-17	1,2,4-Trichlorobenzene	AIR	MN	
CAA	EPA TO-17	1,2,4-Trimethylbenzene	AIR	MN	
CAA	EPA TO-17	1,2-Dibromoethane (EDB, Ethylene dibromide)	AIR	MN	
CAA	EPA TO-17	1,2-Dichlorobenzene	AIR	MN	
CAA	EPA TO-17	1,2-Dichloroethane (Ethylene dichloride)	AIR	MN	
CAA	EPA TO-17	1,2-Dichloropropane	AIR	MN	
CAA	EPA TO-17	1,3,5-Trimethylbenzene	AIR	MN	
CAA	EPA TO-17	1,3-Butadiene	AIR	MN	
CAA	EPA TO-17	1,3-Dichlorobenzene	AIR	MN	
CAA	EPA TO-17	1,4-Dichlorobenzene	AIR	MN	
CAA	EPA TO-17	1,4-Dioxane (1,4- Diethyleneoxide)	AIR	MN	
CAA	EPA TO-17	1-Propene	AIR	MN	
CAA	EPA TO-17	2-Butanone (Methyl ethyl ketone, MEK)	AIR	MN	
CAA	EPA TO-17	2-Hexanone	AIR	MN	
CAA	EPA TO-17	4-Ethyltoluene	AIR	MN	
CAA	EPA TO-17	4-Methyl-2-pentanone (MIBK)	AIR	MN	
CAA	EPA TO-17	Acetone	AIR	MN	
CAA	EPA TO-17	Acrylonitrile	AIR	MN	
CAA	EPA TO-17	Benzene	AIR	MN	
CAA	EPA TO-17	Benzyl chloride	AIR	MN	
CAA	EPA TO-17	Bromodichloromethane	AIR	MN	
CAA	EPA TO-17	Bromoform	AIR	MN	
CAA	EPA TO-17	Bromomethane	AIR	MN	
CAA	EPA TO-17	Carbon disulfide	AIR	MN	
CAA	EPA TO-17	Carbon tetrachloride	AIR	MN	
CAA	EPA TO-17	Chlorobenzene	AIR	MN	
CAA	EPA TO-17	Chloroethane (Ethyl chloride)	AIR	MN	
CAA	EPA TO-17	Chloroform	AIR	MN	
CAA	EPA TO-17	cis-1,2-Dichloroethylene	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-17	cis-1,3-Dichloropropene	AIR	MN	
CAA	EPA TO-17	Cyclohexane	AIR	MN	
CAA	EPA TO-17	Dibromochloromethane	AIR	MN	
CAA	EPA TO-17	Dichlorodifluoromethane (Freon-12)	AIR	MN	
CAA	EPA TO-17	Dichlorotetrafluoroethane	AIR	MN	
CAA	EPA TO-17	Ethyl acetate	AIR	MN	
CAA	EPA TO-17	Ethylbenzene	AIR	MN	
CAA	EPA TO-17	Hexachloro-1,3-butadiene	AIR	MN	
CAA	EPA TO-17	Isopropyl alcohol (2-Propanol, Isopropanol)	AIR	MN	
CAA	EPA TO-17	Isopropylbenzene	AIR	MN	
CAA	EPA TO-17	m+p-xylene	AIR	MN	
CAA	EPA TO-17	Methyl chloride (Chloromethane)	AIR	MN	
CAA	EPA TO-17	Methyl tert-butyl ether (MTBE)	AIR	MN	
CAA	EPA TO-17	Methylene chloride (Dichloromethane)	AIR	MN	
CAA	EPA TO-17	n-Butylbenzene	AIR	MN	
CAA	EPA TO-17	n-Heptane	AIR	MN	
CAA	EPA TO-17	n-Hexane	AIR	MN	
CAA	EPA TO-17	n-Propylbenzene	AIR	MN	
CAA	EPA TO-17	Naphthalene	AIR	MN	
CAA	EPA TO-17	o-Xylene	AIR	MN	
CAA	EPA TO-17	sec-Butylbenzene	AIR	MN	
CAA	EPA TO-17	Styrene	AIR	MN	
CAA	EPA TO-17	Tetrachloroethene	AIR	MN	
CAA	EPA TO-17	Tetrahydrofuran (THF)	AIR	MN	
CAA	EPA TO-17	Toluene	AIR	MN	
CAA	EPA TO-17	trans-1,2-Dichloroethylene	AIR	MN	
CAA	EPA TO-17	trans-1,3-Dichloropropylene	AIR	MN	
CAA	EPA TO-17	Trichloroethene (Trichloroethylene)	AIR	MN	
CAA	EPA TO-17	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	AIR	MN	
CAA	EPA TO-17	Vinyl acetate	AIR	MN	
CAA	EPA TO-17	Vinyl chloride	AIR	MN	

EPA TO-3

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-3	1,2,4-Trimethylbenzene	AIR	MN	
CAA	EPA TO-3	1,3,5-Trichlorobenzene	AIR	MN	
CAA	EPA TO-3	Benzene	AIR	MN	
CAA	EPA TO-3	Ethane	AIR	MN	
CAA	EPA TO-3	Ethene	AIR	MN	
CAA	EPA TO-3	Ethylbenzene	AIR	MN	
CAA	EPA TO-3	m+p-xylene	AIR	MN	
CAA	EPA TO-3	Methane	AIR	MN	
CAA	EPA TO-3	Methyl tert-butyl ether (MTBE)	AIR	MN	
CAA	EPA TO-3	n-Hexane	AIR	MN	
CAA	EPA TO-3	o-Xylene	AIR	MN	
CAA	EPA TO-3	THC as C1-C4	AIR	MN	
CAA	EPA TO-3	THC as Gas	AIR	MN	
CAA	EPA TO-3	Toluene	AIR	MN	
CAA	EPA TO-3	Total BTEX	AIR	MN	
CAA	EPA TO-3	Xylene (total)	AIR	MN	

EPA TO-9A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-9A	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	AIR	MN	
CAA	EPA TO-9A	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	AIR	MN	
CAA	EPA TO-9A	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	AIR	MN	
CAA	EPA TO-9A	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	AIR	MN	
CAA	EPA TO-9A	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	EPA TO-9A	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	AIR	MN	
CAA	EPA TO-9A	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	AIR	MN	
CAA	EPA TO-9A	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	AIR	MN	
CAA	EPA TO-9A	2,3,4,6,7,8-Hexachlorodibenzofuran	AIR	MN	
CAA	EPA TO-9A	2,3,4,7,8-Pentachlorodibenzofuran	AIR	MN	
CAA	EPA TO-9A	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	AIR	MN	
CAA	EPA TO-9A	2,3,7,8-Tetrachlorodibenzofuran	AIR	MN	

Modified EPA TO-17 Passive Tube

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CAA	Modified EPA TO-17 Passive Tube	1,1-Dichloroethane	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	1,1-Dichloroethylene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	1,2,4-Trimethylbenzene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	1,3,5-Trimethylbenzene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Benzene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Carbon tetrachloride	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Chloroform	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	cis-1,2-Dichloroethylene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Ethylbenzene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Isopropylbenzene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	m-Xylene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Methyl tert-butyl ether (MTBE)	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Naphthalene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	o-Xylene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	p-Xylene	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CAA	Modified EPA TO-17 Passive Tube	Tetrachloroethene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Toluene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	trans-1,2-Dichloroethylene	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Trichloroethene (Trichloroethylene)	AIR	MN	
CAA	Modified EPA TO-17 Passive Tube	Vinyl chloride	AIR	MN	

Clean Water Program

ASTM D516-90

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	ASTM D516-90	Sulfate	NPW	MN	

EPA 120.1

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 120.1	Conductivity	NPW	MN	

EPA 160.4

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 160.4	Residue-volatile	NPW	MN	

EPA 1613B

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, solid phase (SPE); Extraction, automated soxhlet;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	NPW	MN	
CWP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	NPW	MN	
CWP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	NPW	MN	
CWP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	NPW	MN	
CWP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	NPW	MN	
CWP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	NPW	MN	
CWP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	NPW	MN	
CWP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	NPW	MN	
CWP	EPA 1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	NPW	MN	
CWP	EPA 1613B	2,3,4,7,8-Pentachlorodibenzofuran	NPW	MN	
CWP	EPA 1613B	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	NPW	MN	
CWP	EPA 1613B	2,3,7,8-Tetrachlorodibenzofuran	NPW	MN	
CWP	EPA 1613B	Total HpCDD	NPW	MN	
CWP	EPA 1613B	Total HpCDF	NPW	MN	
CWP	EPA 1613B	Total HxCDD	NPW	MN	
CWP	EPA 1613B	Total HxCDF	NPW	MN	
CWP	EPA 1613B	Total PeCDD	NPW	MN	
CWP	EPA 1613B	Total PeCDF	NPW	MN	
CWP	EPA 1613B	Total TCDD	NPW	MN	
CWP	EPA 1613B	Total TCDF	NPW	MN	

EPA 1664A (HEM)

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1664A (HEM)	Oil & Grease	NPW	MN	

EPA 1664A (SGT-HEM)

Preparation Techniques: Extraction, solid phase (SPE);

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1664A (SGT-HEM)	Oil & Grease	NPW	MN	

EPA 1668A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-177)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5',6'-Octachlorobiphenyl (BZ-201)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	NPW	MN	
CWP	EPA 1668A	2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	NPW	MN	
CWP	EPA 1668A	2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	NPW	MN	
CWP	EPA 1668A	2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	NPW	MN	
CWP	EPA 1668A	2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	NPW	MN	
CWP	EPA 1668A	2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	NPW	MN	
CWP	EPA 1668A	2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	NPW	MN	
CWP	EPA 1668A	2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	NPW	MN	
CWP	EPA 1668A	2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	NPW	MN	
CWP	EPA 1668A	2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	NPW	MN	
CWP	EPA 1668A	2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	NPW	MN	
CWP	EPA 1668A	2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	NPW	MN	
CWP	EPA 1668A	2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	NPW	MN	
CWP	EPA 1668A	2,2',3-Trichlorobiphenyl (BZ-16)	NPW	MN	
CWP	EPA 1668A	2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	NPW	MN	
CWP	EPA 1668A	2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	NPW	MN	
CWP	EPA 1668A	2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	NPW	MN	
CWP	EPA 1668A	2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	NPW	MN	
CWP	EPA 1668A	2,2',4,5-Tetrachlorobiphenyl (BZ-48)	NPW	MN	
CWP	EPA 1668A	2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	NPW	MN	
CWP	EPA 1668A	2,2',4-Trichlorobiphenyl (BZ-17)	NPW	MN	
CWP	EPA 1668A	2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	NPW	MN	
CWP	EPA 1668A	2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	NPW	MN	
CWP	EPA 1668A	2,2',6-Trichlorobiphenyl (BZ-19)	NPW	MN	
CWP	EPA 1668A	2,2'-Dichlorobiphenyl (BZ-4)	NPW	MN	
CWP	EPA 1668A	2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	NPW	MN	
CWP	EPA 1668A	2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	NPW	MN	
CWP	EPA 1668A	2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	NPW	MN	
CWP	EPA 1668A	2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	NPW	MN	
CWP	EPA 1668A	2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	NPW	MN	
CWP	EPA 1668A	2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	NPW	MN	
CWP	EPA 1668A	2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	NPW	MN	
CWP	EPA 1668A	2,3',4,5-Tetrachlorobiphenyl (BZ-67)	NPW	MN	
CWP	EPA 1668A	2,3',4-Trichlorobiphenyl (BZ-25)	NPW	MN	
CWP	EPA 1668A	2,3',5'-Trichlorobiphenyl (BZ-34)	NPW	MN	
CWP	EPA 1668A	2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	NPW	MN	
CWP	EPA 1668A	2,3',6-Trichlorobiphenyl (BZ-27)	NPW	MN	
CWP	EPA 1668A	2,3'-Dichlorobiphenyl (BZ-6)	NPW	MN	
CWP	EPA 1668A	2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	NPW	MN	
CWP	EPA 1668A	2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	NPW	MN	
CWP	EPA 1668A	2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	NPW	MN	
CWP	EPA 1668A	2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	NPW	MN	
CWP	EPA 1668A	2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	NPW	MN	
CWP	EPA 1668A	2,3,3',4-Tetrachlorobiphenyl (BZ-55)	NPW	MN	
CWP	EPA 1668A	2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	NPW	MN	
CWP	EPA 1668A	2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	NPW	MN	
CWP	EPA 1668A	2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	NPW	MN	
CWP	EPA 1668A	2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	NPW	MN	
CWP	EPA 1668A	2,3,3',5-Tetrachlorobiphenyl (BZ-57)	NPW	MN	
CWP	EPA 1668A	2,3,4',5-Tetrachlorobiphenyl (BZ-63)	NPW	MN	
CWP	EPA 1668A	2,3,4',6-Tetrachlorobiphenyl (BZ-64)	NPW	MN	
CWP	EPA 1668A	2,3,4'-Trichlorobiphenyl (BZ-22)	NPW	MN	
CWP	EPA 1668A	2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	NPW	MN	
CWP	EPA 1668A	2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	NPW	MN	
CWP	EPA 1668A	2,3,5-Trichlorobiphenyl (BZ-23)	NPW	MN	
CWP	EPA 1668A	2,3,6-Trichlorobiphenyl (BZ-24)	NPW	MN	
CWP	EPA 1668A	2,3-Dichlorobiphenyl (BZ-5)	NPW	MN	
CWP	EPA 1668A	2,4',5-Trichlorobiphenyl (BZ-31)	NPW	MN	
CWP	EPA 1668A	2,4',6-Trichlorobiphenyl (BZ-32)	NPW	MN	
CWP	EPA 1668A	2,4'-Dichlorobiphenyl (BZ-8)	NPW	MN	
CWP	EPA 1668A	2,4-Dichlorobiphenyl (BZ-7)	NPW	MN	
CWP	EPA 1668A	2,5-Dichlorobiphenyl (BZ-9)	NPW	MN	
CWP	EPA 1668A	2,6-Dichlorobiphenyl (BZ-10)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	2-Chlorobiphenyl (BZ-1)	NPW	MN	
CWP	EPA 1668A	3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	NPW	MN	
CWP	EPA 1668A	3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	NPW	MN	
CWP	EPA 1668A	3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	NPW	MN	
CWP	EPA 1668A	3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	NPW	MN	
CWP	EPA 1668A	3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	NPW	MN	
CWP	EPA 1668A	3,3',4,5-Tetrachlorobiphenyl (BZ-78)	NPW	MN	
CWP	EPA 1668A	3,3',4-Trichlorobiphenyl (BZ-35)	NPW	MN	
CWP	EPA 1668A	3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	NPW	MN	
CWP	EPA 1668A	3,3',5-Trichlorobiphenyl (BZ-36)	NPW	MN	
CWP	EPA 1668A	3,3'-Dichlorobiphenyl (BZ-11)	NPW	MN	
CWP	EPA 1668A	3,4',5-Trichlorobiphenyl (BZ-39)	NPW	MN	
CWP	EPA 1668A	3,4,4',5-Tetrachlorobiphenyl (BZ-81)	NPW	MN	
CWP	EPA 1668A	3,4,4'-Trichlorobiphenyl (BZ-37)	NPW	MN	
CWP	EPA 1668A	3,4,5-Trichlorobiphenyl (BZ-38)	NPW	MN	
CWP	EPA 1668A	3,5-Dichlorobiphenyl (BZ-14)	NPW	MN	
CWP	EPA 1668A	3-Chlorobiphenyl (BZ-2)	NPW	MN	
CWP	EPA 1668A	4,4'-Dichlorobiphenyl (BZ-15)	NPW	MN	
CWP	EPA 1668A	4-Chlorobiphenyl (BZ-3)	NPW	MN	
CWP	EPA 1668A	Decachlorobiphenyl (BZ-209)	NPW	MN	
CWP	EPA 1668A	PCB-(100/93/102/98)	NPW	MN	
CWP	EPA 1668A	PCB-(107/124)	NPW	MN	
CWP	EPA 1668A	PCB-(108/119/86/97/125/87)	NPW	MN	
CWP	EPA 1668A	PCB-(110/115)	NPW	MN	
CWP	EPA 1668A	PCB-(113/90/101)	NPW	MN	
CWP	EPA 1668A	PCB-(117/116/85)	NPW	MN	
CWP	EPA 1668A	PCB-(128/166)	NPW	MN	
CWP	EPA 1668A	PCB-(13/12)	NPW	MN	
CWP	EPA 1668A	PCB-(134/143)	NPW	MN	
CWP	EPA 1668A	PCB-(138/163/129)	NPW	MN	
CWP	EPA 1668A	PCB-(139/140)	NPW	MN	
CWP	EPA 1668A	PCB-(147/149)	NPW	MN	
CWP	EPA 1668A	PCB-(151/135)	NPW	MN	
CWP	EPA 1668A	PCB-(153/168)	NPW	MN	
CWP	EPA 1668A	PCB-(156/157)	NPW	MN	
CWP	EPA 1668A	PCB-(171/173)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 1668A	PCB-(180/193)	NPW	MN	
CWP	EPA 1668A	PCB-(183/185)	NPW	MN	
CWP	EPA 1668A	PCB-(197/200)	NPW	MN	
CWP	EPA 1668A	PCB-(198/199)	NPW	MN	
CWP	EPA 1668A	PCB-(21/33)	NPW	MN	
CWP	EPA 1668A	PCB-(26/29)	NPW	MN	
CWP	EPA 1668A	PCB-(28/20)	NPW	MN	
CWP	EPA 1668A	PCB-(30/18)	NPW	MN	
CWP	EPA 1668A	PCB-(41/40/71)	NPW	MN	
CWP	EPA 1668A	PCB-(44/47/65)	NPW	MN	
CWP	EPA 1668A	PCB-(45/51)	NPW	MN	
CWP	EPA 1668A	PCB-(50/53)	NPW	MN	
CWP	EPA 1668A	PCB-(59/62/75)	NPW	MN	
CWP	EPA 1668A	PCB-(61/70/74/76)	NPW	MN	
CWP	EPA 1668A	PCB-(69/49)	NPW	MN	
CWP	EPA 1668A	PCB-(73/43)	NPW	MN	
CWP	EPA 1668A	PCB-(88/91)	NPW	MN	

EPA 180.1

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 180.1	Turbidity	NPW	MN	

EPA 200.7

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.7	Aluminum	NPW	MN	
CWP	EPA 200.7	Antimony	NPW	MN	
CWP	EPA 200.7	Arsenic	NPW	MN	
CWP	EPA 200.7	Barium	NPW	MN	
CWP	EPA 200.7	Beryllium	NPW	MN	
CWP	EPA 200.7	Boron	NPW	MN	
CWP	EPA 200.7	Cadmium	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.7	Calcium	NPW	MN	
CWP	EPA 200.7	Cobalt	NPW	MN	
CWP	EPA 200.7	Copper	NPW	MN	
CWP	EPA 200.7	Iron	NPW	MN	
CWP	EPA 200.7	Lead	NPW	MN	
CWP	EPA 200.7	Magnesium	NPW	MN	
CWP	EPA 200.7	Manganese	NPW	MN	
CWP	EPA 200.7	Molybdenum	NPW	MN	
CWP	EPA 200.7	Nickel	NPW	MN	
CWP	EPA 200.7	Potassium	NPW	MN	
CWP	EPA 200.7	Selenium	NPW	MN	
CWP	EPA 200.7	Silver	NPW	MN	
CWP	EPA 200.7	Sodium	NPW	MN	
CWP	EPA 200.7	Thallium	NPW	MN	
CWP	EPA 200.7	Tin	NPW	MN	
CWP	EPA 200.7	Total chromium	NPW	MN	
CWP	EPA 200.7	Vanadium	NPW	MN	
CWP	EPA 200.7	Zinc	NPW	MN	

EPA 200.7

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.7	Total hardness as CaCO ₃	NPW	MN	

EPA 200.8

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.8	Aluminum	NPW	MN	
CWP	EPA 200.8	Antimony	NPW	MN	
CWP	EPA 200.8	Arsenic	NPW	MN	
CWP	EPA 200.8	Barium	NPW	MN	
CWP	EPA 200.8	Beryllium	NPW	MN	
CWP	EPA 200.8	Bismuth	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.8	Boron	NPW	MN	
CWP	EPA 200.8	Cadmium	NPW	MN	
CWP	EPA 200.8	Calcium	NPW	MN	
CWP	EPA 200.8	Chromium	NPW	MN	
CWP	EPA 200.8	Cobalt	NPW	MN	
CWP	EPA 200.8	Copper	NPW	MN	
CWP	EPA 200.8	Iron	NPW	MN	
CWP	EPA 200.8	Lead	NPW	MN	
CWP	EPA 200.8	Lithium	NPW	MN	
CWP	EPA 200.8	Magnesium	NPW	MN	
CWP	EPA 200.8	Manganese	NPW	MN	
CWP	EPA 200.8	Molybdenum	NPW	MN	
CWP	EPA 200.8	Nickel	NPW	MN	
CWP	EPA 200.8	Palladium	NPW	MN	
CWP	EPA 200.8	Platinum	NPW	MN	
CWP	EPA 200.8	Potassium	NPW	MN	
CWP	EPA 200.8	Selenium	NPW	MN	
CWP	EPA 200.8	Silicon	NPW	MN	
CWP	EPA 200.8	Silver	NPW	MN	
CWP	EPA 200.8	Sodium	NPW	MN	
CWP	EPA 200.8	Strontium	NPW	MN	
CWP	EPA 200.8	Thallium	NPW	MN	
CWP	EPA 200.8	Tin	NPW	MN	
CWP	EPA 200.8	Titanium	NPW	MN	
CWP	EPA 200.8	Total chromium	NPW	MN	
CWP	EPA 200.8	Vanadium	NPW	MN	
CWP	EPA 200.8	Zinc	NPW	MN	

EPA 200.8

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 200.8	Mercury	NPW	MN	

EPA 245.1

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 245.1	Mercury	NPW	MN	

EPA 300.0

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 300.0	Bromide	NPW	MN	
CWP	EPA 300.0	Chloride	NPW	MN	
CWP	EPA 300.0	Fluoride	NPW	MN	
CWP	EPA 300.0	Nitrate as N	NPW	MN	
CWP	EPA 300.0	Nitrite as N	NPW	MN	
CWP	EPA 300.0	Sulfate	NPW	MN	

EPA 350.1

Preparation Techniques: Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 350.1	Ammonia as N	NPW	MN	

EPA 353.2

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 353.2	Nitrate-nitrite	NPW	MN	
CWP	EPA 353.2	Nitrite as N	NPW	MN	

EPA 353.2 (calc.)

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 353.2 (calc.)	Nitrate as N	NPW	MN	

EPA 410.4

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 410.4	Chemical oxygen demand	NPW	MN	

EPA 420.1

Preparation Techniques: Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 420.1	Total Phenolics	NPW	MN	

EPA 420.4

Preparation Techniques: Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 420.4	Total Phenolics	NPW	MN	

EPA 624

Preparation Techniques: Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 624	1,1,1-Trichloroethane	NPW	MN	
CWP	EPA 624	1,1,2,2-Tetrachloroethane	NPW	MN	
CWP	EPA 624	1,1,2-Trichloroethane	NPW	MN	
CWP	EPA 624	1,1-Dichloroethane	NPW	MN	
CWP	EPA 624	1,1-Dichloroethylene	NPW	MN	
CWP	EPA 624	1,2,4-Trichlorobenzene	NPW	MN	
CWP	EPA 624	1,2-Dichlorobenzene	NPW	MN	
CWP	EPA 624	1,2-Dichloroethane (Ethylene dichloride)	NPW	MN	
CWP	EPA 624	1,2-Dichloropropane	NPW	MN	
CWP	EPA 624	1,3-Dichlorobenzene	NPW	MN	
CWP	EPA 624	1,4-Dichlorobenzene	NPW	MN	
CWP	EPA 624	2-Chloroethyl vinyl ether	NPW	MN	
CWP	EPA 624	Acrolein (Propenal)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 624	Acrylonitrile	NPW	MN	
CWP	EPA 624	Benzene	NPW	MN	
CWP	EPA 624	Bromodichloromethane	NPW	MN	
CWP	EPA 624	Bromoform	NPW	MN	
CWP	EPA 624	Carbon tetrachloride	NPW	MN	
CWP	EPA 624	Chlorobenzene	NPW	MN	
CWP	EPA 624	Chlorodibromomethane	NPW	MN	
CWP	EPA 624	Chloroethane (Ethyl chloride)	NPW	MN	
CWP	EPA 624	Chloroform	NPW	MN	
CWP	EPA 624	cis-1,3-Dichloropropene	NPW	MN	
CWP	EPA 624	Ethylbenzene	NPW	MN	
CWP	EPA 624	Isopropylbenzene	NPW	MN	
CWP	EPA 624	Methyl bromide (Bromomethane)	NPW	MN	
CWP	EPA 624	Methyl chloride (Chloromethane)	NPW	MN	
CWP	EPA 624	Methylene chloride (Dichloromethane)	NPW	MN	
CWP	EPA 624	Tetrachloroethylene (Perchloroethylene)	NPW	MN	
CWP	EPA 624	Toluene	NPW	MN	
CWP	EPA 624	trans-1,2-Dichloroethylene	NPW	MN	
CWP	EPA 624	trans-1,3-Dichloropropylene	NPW	MN	
CWP	EPA 624	Trichloroethene (Trichloroethylene)	NPW	MN	
CWP	EPA 624	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	NPW	MN	
CWP	EPA 624	Vinyl chloride	NPW	MN	

EPA 625

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, continuous liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 625	1,2,4-Trichlorobenzene	NPW	MN	
CWP	EPA 625	2,4,5-Trichlorophenol	NPW	MN	
CWP	EPA 625	2,4,6-Trichlorophenol	NPW	MN	
CWP	EPA 625	2,4-Dichlorophenol	NPW	MN	
CWP	EPA 625	2,4-Dimethylphenol	NPW	MN	
CWP	EPA 625	2,4-Dinitrophenol	NPW	MN	
CWP	EPA 625	2,4-Dinitrotoluene (2,4-DNT)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 625	2,6-Dinitrotoluene (2,6-DNT)	NPW	MN	
CWP	EPA 625	2-Chloronaphthalene	NPW	MN	
CWP	EPA 625	2-Chlorophenol	NPW	MN	
CWP	EPA 625	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NPW	MN	
CWP	EPA 625	2-Nitrophenol	NPW	MN	
CWP	EPA 625	3,3'-Dichlorobenzidine	NPW	MN	
CWP	EPA 625	4-Bromophenyl phenyl ether	NPW	MN	
CWP	EPA 625	4-Chloro-3-methylphenol	NPW	MN	
CWP	EPA 625	4-Chlorophenyl phenylether	NPW	MN	
CWP	EPA 625	4-Nitrophenol	NPW	MN	
CWP	EPA 625	Acenaphthene	NPW	MN	
CWP	EPA 625	Acenaphthylene	NPW	MN	
CWP	EPA 625	Anthracene	NPW	MN	
CWP	EPA 625	Benzidine	NPW	MN	
CWP	EPA 625	Benzo(a)anthracene	NPW	MN	
CWP	EPA 625	Benzo(a)pyrene	NPW	MN	
CWP	EPA 625	Benzo(g,h,i)perylene	NPW	MN	
CWP	EPA 625	Benzo(k)fluoranthene	NPW	MN	
CWP	EPA 625	Benzo[b]fluoranthene	NPW	MN	
CWP	EPA 625	bis(2-Chloroethoxy)methane	NPW	MN	
CWP	EPA 625	bis(2-Chloroethyl) ether	NPW	MN	
CWP	EPA 625	bis(2-Chloroisopropyl) ether	NPW	MN	
CWP	EPA 625	Butyl benzyl phthalate	NPW	MN	
CWP	EPA 625	Chrysene	NPW	MN	
CWP	EPA 625	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	NPW	MN	
CWP	EPA 625	Di-n-butyl phthalate	NPW	MN	
CWP	EPA 625	Di-n-octyl phthalate	NPW	MN	
CWP	EPA 625	Dibenz(a,h) anthracene	NPW	MN	
CWP	EPA 625	Diethyl phthalate	NPW	MN	
CWP	EPA 625	Dimethyl phthalate	NPW	MN	
CWP	EPA 625	Fluoranthene	NPW	MN	
CWP	EPA 625	Fluorene	NPW	MN	
CWP	EPA 625	Hexachlorobenzene	NPW	MN	
CWP	EPA 625	Hexachlorobutadiene	NPW	MN	
CWP	EPA 625	Hexachlorocyclopentadiene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
CWP	EPA 625	Hexachloroethane	NPW	MN	
CWP	EPA 625	Indeno(1,2,3-cd) pyrene	NPW	MN	
CWP	EPA 625	Isophorone	NPW	MN	
CWP	EPA 625	n-Nitrosodi-n-propylamine	NPW	MN	
CWP	EPA 625	n-Nitrosodimethylamine	NPW	MN	
CWP	EPA 625	n-Nitrosodiphenylamine	NPW	MN	
CWP	EPA 625	Naphthalene	NPW	MN	
CWP	EPA 625	Nitrobenzene	NPW	MN	
CWP	EPA 625	Pentachlorophenol	NPW	MN	
CWP	EPA 625	Phenanthrene	NPW	MN	
CWP	EPA 625	Phenol	NPW	MN	
CWP	EPA 625	Pyrene	NPW	MN	

Hach 10360

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	Hach 10360	Biochemical oxygen demand	NPW	MN	
CWP	Hach 10360	Carbonaceous BOD, CBOD	NPW	MN	
CWP	Hach 10360	Oxygen, dissolved	NPW	MN	

SM 2320 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2320 B-97	Alkalinity as CaCO ₃	NPW	MN	

SM 2340 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2340 B-97	Total hardness as CaCO ₃	NPW	MN	

SM 2510 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2510 B-97	Conductivity	NPW	MN	

SM 2540 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2540 B-97	Residue-total	NPW	MN	

SM 2540 C-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2540 C-97	Residue-filterable (TDS)	NPW	MN	

SM 2540 D-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2540 D-97	Residue-nonfilterable (TSS)	NPW	MN	

SM 2540 F-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 2540 F-97	Residue-settleable	NPW	MN	

SM 3500-Cr B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 3500-Cr B-97	Chromium VI	NPW	MN	

SM 4500-Cl G-93

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-Cl G-93	Total residual chlorine	NPW	MN	

SM 4500-Cl⁻ E-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-Cl ⁻ E-97	Chloride	NPW	MN	

SM 4500-CN⁻ E-97

Preparation Techniques: Distillation, macro; Distillation, micro; Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-CN ⁻ E-97	Total Cyanide	NPW	MN	

SM 4500-CN⁻ G-97

Preparation Techniques: Distillation, macro; Distillation, micro; Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-CN ⁻ G-97	Free cyanide	NPW	MN	

SM 4500-F⁻ C-97

Preparation Techniques: N/A;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-F ⁻ C-97	Fluoride	NPW	MN	

SM 4500-H+ B-96

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-H+ B-96	pH	NPW	MN	

SM 4500-NO₂⁻ B-93

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-NO ₂ ⁻ B-93	Nitrite as N	NPW	MN	

SM 4500-NO₃⁻ H-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-NO ₃ ⁻ H-97	Nitrate-nitrite	NPW	MN	

SM 4500-P E-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 4500-P E-97	Orthophosphate as P	NPW	MN	
CWP	SM 4500-P E-97	Total Phosphorus	NPW	MN	

SM 5220 D-97

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 5220 D-97	Chemical oxygen demand	NPW	MN	

SM 9222 B (M-Endo)-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 9222 B (M-Endo)-97	Total coliforms	NPW	MN	

SM 9222 D (m-FC)-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 9222 D (m-FC)-97	Fecal coliforms	NPW	MN	

SM 9223 B (Colilert® Quanti-Tray®)-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
CWP	SM 9223 B (Colilert® Quanti-Tray®)-97	Escherichia coli	NPW	MN	

Resource Conservation Recovery Program

EPA 1613B

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, solid phase (SPE); Extraction, automated soxhlet;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpCDF)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCdd)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-HxCdd)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCdf)	SCM	MN	
RCRP	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-HxCdf)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzo-p- dioxin(1,2,3,6,7,8-HxCdd)	SCM	MN	
RCRP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzo-p- dioxin(1,2,3,6,7,8-HxCdd)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCdf)	SCM	MN	
RCRP	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-HxCdf)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCdd)	SCM	MN	
RCRP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-HxCdd)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCdf)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-HxCdf)	SCM	MN	
RCRP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	SCM	MN	
RCRP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	TISSUE	MN	
RCRP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	SCM	MN	
RCRP	EPA 1613B	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	TISSUE	MN	
RCRP	EPA 1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	SCM	MN	
RCRP	EPA 1613B	2,3,4,6,7,8-Hexachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 1613B	2,3,4,7,8-Pentachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 1613B	2,3,4,7,8-Pentachlorodibenzofuran	SCM	MN	
RCRP	EPA 1613B	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	TISSUE	MN	
RCRP	EPA 1613B	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	SCM	MN	
RCRP	EPA 1613B	2,3,7,8-Tetrachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 1613B	2,3,7,8-Tetrachlorodibenzofuran	SCM	MN	
RCRP	EPA 1613B	Total HpCDD	TISSUE	MN	
RCRP	EPA 1613B	Total HpCDD	SCM	MN	
RCRP	EPA 1613B	Total HpCDF	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1613B	Total HpCDF	TISSUE	MN	
RCRP	EPA 1613B	Total HxCDD	TISSUE	MN	
RCRP	EPA 1613B	Total HxCDD	SCM	MN	
RCRP	EPA 1613B	Total HxCDF	SCM	MN	
RCRP	EPA 1613B	Total HxCDF	TISSUE	MN	
RCRP	EPA 1613B	Total PeCDD	TISSUE	MN	
RCRP	EPA 1613B	Total PeCDD	SCM	MN	
RCRP	EPA 1613B	Total PeCDF	SCM	MN	
RCRP	EPA 1613B	Total PeCDF	TISSUE	MN	
RCRP	EPA 1613B	Total TCDD	SCM	MN	
RCRP	EPA 1613B	Total TCDD	TISSUE	MN	
RCRP	EPA 1613B	Total TCDF	TISSUE	MN	
RCRP	EPA 1613B	Total TCDF	SCM	MN	

EPA 1668A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (BZ-206)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,5'-Octachlorobiphenyl (BZ-194)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6'-Octachlorobiphenyl (BZ-196)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl (BZ-207)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5,6-Octachlorobiphenyl (BZ-195)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,4',5-Heptachlorobiphenyl (BZ-170)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5',6'-Heptachlorobiphenyl (BZ-177)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ-201)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5',6-Heptachlorobiphenyl (BZ-175)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5'-Hexachlorobiphenyl (BZ-130)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,5',6,6'-Nonachlorobiphenyl (BZ-208)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,5'-Heptachlorobiphenyl (BZ-172)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,5,6'-Heptachlorobiphenyl (BZ-174)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,6'-Hexachlorobiphenyl (BZ-132)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4,6,6'-Heptachlorobiphenyl (BZ-176)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4,6-Hexachlorobiphenyl (BZ-131)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',4-Pentachlorobiphenyl (BZ-82)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',5,5',6,6'-Octachlorobiphenyl (BZ-202)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,2',3,3',5,5',6-Heptachlorobiphenyl (BZ-178)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5,5'-Hexachlorobiphenyl (BZ-133)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5,6,6'-Heptachlorobiphenyl (BZ-179)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',5-Pentachlorobiphenyl (BZ-83)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	SCM	MN	
RCRP	EPA 1668A	2,2',3,3',6,6'-Hexachlorobiphenyl (BZ-136)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,3',6-Pentachlorobiphenyl (BZ-84)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4',5,5'-Hexachlorobiphenyl (BZ-146)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4',5,6'-Hexachlorobiphenyl (BZ-148)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4',5,6,6'-Heptachlorobiphenyl (BZ-188)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4',6,6'-Hexachlorobiphenyl (BZ-150)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4'-Tetrachlorobiphenyl (BZ-42)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,5',6-Octachlorobiphenyl (BZ-203)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,6'-Heptachlorobiphenyl (BZ-182)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,6,6'-Octachlorobiphenyl (BZ-204)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,4',5,6-Heptachlorobiphenyl (BZ-181)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,4',5-Hexachlorobiphenyl (BZ-137)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,4',6,6'-Heptachlorobiphenyl (BZ-184)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,5',6-Hexachlorobiphenyl (BZ-144)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,5,5'-Hexachlorobiphenyl (BZ-141)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,5,6,6'-Heptachlorobiphenyl (BZ-186)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,5,6-Hexachlorobiphenyl (BZ-142)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,6'-Pentachlorobiphenyl (BZ-89)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	SCM	MN	
RCRP	EPA 1668A	2,2',3,4,6,6'-Hexachlorobiphenyl (BZ-145)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,5',6-Pentachlorobiphenyl (BZ-95)	SCM	MN	
RCRP	EPA 1668A	2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,5,5'-Pentachlorobiphenyl (BZ-92)	SCM	MN	
RCRP	EPA 1668A	2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	SCM	MN	
RCRP	EPA 1668A	2,2',3,5,6'-Pentachlorobiphenyl (BZ-94)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	SCM	MN	
RCRP	EPA 1668A	2,2',3,5,6,6'-Hexachlorobiphenyl (BZ-152)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3,6'-Tetrachlorobiphenyl (BZ-46)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	SCM	MN	
RCRP	EPA 1668A	2,2',3,6,6'-Pentachlorobiphenyl (BZ-96)	TISSUE	MN	
RCRP	EPA 1668A	2,2',3-Trichlorobiphenyl (BZ-16)	SCM	MN	
RCRP	EPA 1668A	2,2',3-Trichlorobiphenyl (BZ-16)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	SCM	MN	
RCRP	EPA 1668A	2,2',4,4',5,6'-Hexachlorobiphenyl (BZ-154)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,4',5-Pentachlorobiphenyl (BZ-99)	SCM	MN	
RCRP	EPA 1668A	2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,4',6,6'-Hexachlorobiphenyl (BZ-155)	SCM	MN	
RCRP	EPA 1668A	2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,5',6-Pentachlorobiphenyl (BZ-103)	SCM	MN	
RCRP	EPA 1668A	2,2',4,5-Tetrachlorobiphenyl (BZ-48)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4,5-Tetrachlorobiphenyl (BZ-48)	SCM	MN	
RCRP	EPA 1668A	2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	SCM	MN	
RCRP	EPA 1668A	2,2',4,6,6'-Pentachlorobiphenyl (BZ-104)	TISSUE	MN	
RCRP	EPA 1668A	2,2',4-Trichlorobiphenyl (BZ-17)	SCM	MN	
RCRP	EPA 1668A	2,2',4-Trichlorobiphenyl (BZ-17)	TISSUE	MN	
RCRP	EPA 1668A	2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	SCM	MN	
RCRP	EPA 1668A	2,2',5,5'-Tetrachlorobiphenyl (BZ-52)	TISSUE	MN	
RCRP	EPA 1668A	2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	TISSUE	MN	
RCRP	EPA 1668A	2,2',6,6'-Tetrachlorobiphenyl (BZ-54)	SCM	MN	
RCRP	EPA 1668A	2,2',6-Trichlorobiphenyl (BZ-19)	TISSUE	MN	
RCRP	EPA 1668A	2,2',6-Trichlorobiphenyl (BZ-19)	SCM	MN	
RCRP	EPA 1668A	2,2'-Dichlorobiphenyl (BZ-4)	TISSUE	MN	
RCRP	EPA 1668A	2,2'-Dichlorobiphenyl (BZ-4)	SCM	MN	
RCRP	EPA 1668A	2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	NPW	MN	
RCRP	EPA 1668A	2,3',4,4',5'-Pentachlorobiphenyl (BZ-123)	SCM	MN	
RCRP	EPA 1668A	2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	NPW	MN	
RCRP	EPA 1668A	2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	SCM	MN	
RCRP	EPA 1668A	2,3',4,4',5,5'-Hexachlorobiphenyl (BZ-167)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	NPW	MN	
RCRP	EPA 1668A	2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	SCM	MN	
RCRP	EPA 1668A	2,3',4,4',5-Pentachlorobiphenyl (BZ-118)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	SCM	MN	
RCRP	EPA 1668A	2,3',4,4'-Tetrachlorobiphenyl (BZ-66)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	SCM	MN	
RCRP	EPA 1668A	2,3',4,5',6-Pentachlorobiphenyl (BZ-121)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,5'-Tetrachlorobiphenyl (BZ-68)	SCM	MN	
RCRP	EPA 1668A	2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,5,5'-Pentachlorobiphenyl (BZ-120)	SCM	MN	
RCRP	EPA 1668A	2,3',4,5-Tetrachlorobiphenyl (BZ-67)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4,5-Tetrachlorobiphenyl (BZ-67)	SCM	MN	
RCRP	EPA 1668A	2,3',4-Trichlorobiphenyl (BZ-25)	TISSUE	MN	
RCRP	EPA 1668A	2,3',4-Trichlorobiphenyl (BZ-25)	SCM	MN	
RCRP	EPA 1668A	2,3',5'-Trichlorobiphenyl (BZ-34)	SCM	MN	
RCRP	EPA 1668A	2,3',5'-Trichlorobiphenyl (BZ-34)	TISSUE	MN	
RCRP	EPA 1668A	2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	SCM	MN	
RCRP	EPA 1668A	2,3',5,5'-Tetrachlorobiphenyl (BZ-72)	TISSUE	MN	
RCRP	EPA 1668A	2,3',6-Trichlorobiphenyl (BZ-27)	SCM	MN	
RCRP	EPA 1668A	2,3',6-Trichlorobiphenyl (BZ-27)	TISSUE	MN	
RCRP	EPA 1668A	2,3'-Dichlorobiphenyl (BZ-6)	TISSUE	MN	
RCRP	EPA 1668A	2,3'-Dichlorobiphenyl (BZ-6)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4',5',6-Hexachlorobiphenyl (BZ-164)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4',5'-Pentachlorobiphenyl (BZ-122)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4',5,5'-Hexachlorobiphenyl (BZ-162)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4'-Tetrachlorobiphenyl (BZ-56)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,4',5',6-Heptachlorobiphenyl (BZ-191)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5'-Hexachlorobiphenyl (BZ-157)	NPW	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,5',6-Octachlorobiphenyl (BZ-205)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	NPW	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,5'-Heptachlorobiphenyl (BZ-189)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,4',5,6-Heptachlorobiphenyl (BZ-190)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',5-Hexachlorobiphenyl (BZ-156)	NPW	MN	
RCRP	EPA 1668A	2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4',6-Hexachlorobiphenyl (BZ-158)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	NPW	MN	
RCRP	EPA 1668A	2,3,3',4,4'-Pentachlorobiphenyl (BZ-105)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,5',6-Hexachlorobiphenyl (BZ-161)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,5,5',6-Heptachlorobiphenyl (BZ-192)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,5,5'-Hexachlorobiphenyl (BZ-159)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,5,6-Hexachlorobiphenyl (BZ-160)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4,5-Pentachlorobiphenyl (BZ-106)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,3,3',4,6-Pentachlorobiphenyl (BZ-109)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',4-Tetrachlorobiphenyl (BZ-55)	SCM	MN	
RCRP	EPA 1668A	2,3,3',4-Tetrachlorobiphenyl (BZ-55)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	SCM	MN	
RCRP	EPA 1668A	2,3,3',5'-Tetrachlorobiphenyl (BZ-58)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	SCM	MN	
RCRP	EPA 1668A	2,3,3',5,5',6-Hexachlorobiphenyl (BZ-165)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',5,5'-Pentachlorobiphenyl (BZ-111)	SCM	MN	
RCRP	EPA 1668A	2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	SCM	MN	
RCRP	EPA 1668A	2,3,3',5,6-Pentachlorobiphenyl (BZ-112)	TISSUE	MN	
RCRP	EPA 1668A	2,3,3',5-Tetrachlorobiphenyl (BZ-57)	SCM	MN	
RCRP	EPA 1668A	2,3,3',5-Tetrachlorobiphenyl (BZ-57)	TISSUE	MN	
RCRP	EPA 1668A	2,3,4',5-Tetrachlorobiphenyl (BZ-63)	TISSUE	MN	
RCRP	EPA 1668A	2,3,4',5-Tetrachlorobiphenyl (BZ-63)	SCM	MN	
RCRP	EPA 1668A	2,3,4',6-Tetrachlorobiphenyl (BZ-64)	SCM	MN	
RCRP	EPA 1668A	2,3,4',6-Tetrachlorobiphenyl (BZ-64)	TISSUE	MN	
RCRP	EPA 1668A	2,3,4'-Trichlorobiphenyl (BZ-22)	SCM	MN	
RCRP	EPA 1668A	2,3,4'-Trichlorobiphenyl (BZ-22)	TISSUE	MN	
RCRP	EPA 1668A	2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	TISSUE	MN	
RCRP	EPA 1668A	2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	SCM	MN	
RCRP	EPA 1668A	2,3,4,4',5-Pentachlorobiphenyl (BZ-114)	NPW	MN	
RCRP	EPA 1668A	2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	SCM	MN	
RCRP	EPA 1668A	2,3,4,4'-Tetrachlorobiphenyl (BZ-60)	TISSUE	MN	
RCRP	EPA 1668A	2,3,5-Trichlorobiphenyl (BZ-23)	SCM	MN	
RCRP	EPA 1668A	2,3,5-Trichlorobiphenyl (BZ-23)	TISSUE	MN	
RCRP	EPA 1668A	2,3,6-Trichlorobiphenyl (BZ-24)	SCM	MN	
RCRP	EPA 1668A	2,3,6-Trichlorobiphenyl (BZ-24)	TISSUE	MN	
RCRP	EPA 1668A	2,3-Dichlorobiphenyl (BZ-5)	SCM	MN	
RCRP	EPA 1668A	2,3-Dichlorobiphenyl (BZ-5)	TISSUE	MN	
RCRP	EPA 1668A	2,4',5-Trichlorobiphenyl (BZ-31)	SCM	MN	
RCRP	EPA 1668A	2,4',5-Trichlorobiphenyl (BZ-31)	TISSUE	MN	
RCRP	EPA 1668A	2,4',6-Trichlorobiphenyl (BZ-32)	SCM	MN	
RCRP	EPA 1668A	2,4',6-Trichlorobiphenyl (BZ-32)	TISSUE	MN	
RCRP	EPA 1668A	2,4'-Dichlorobiphenyl (BZ-8)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	2,4'-Dichlorobiphenyl (BZ-8)	SCM	MN	
RCRP	EPA 1668A	2,4-Dichlorobiphenyl (BZ-7)	SCM	MN	
RCRP	EPA 1668A	2,4-Dichlorobiphenyl (BZ-7)	TISSUE	MN	
RCRP	EPA 1668A	2,5-Dichlorobiphenyl (BZ-9)	SCM	MN	
RCRP	EPA 1668A	2,5-Dichlorobiphenyl (BZ-9)	TISSUE	MN	
RCRP	EPA 1668A	2,6-Dichlorobiphenyl (BZ-10)	TISSUE	MN	
RCRP	EPA 1668A	2,6-Dichlorobiphenyl (BZ-10)	SCM	MN	
RCRP	EPA 1668A	2-Chlorobiphenyl (BZ-1)	TISSUE	MN	
RCRP	EPA 1668A	2-Chlorobiphenyl (BZ-1)	SCM	MN	
RCRP	EPA 1668A	3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	SCM	MN	
RCRP	EPA 1668A	3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4,4',5,5'-Hexachlorobiphenyl (BZ-169)	NPW	MN	
RCRP	EPA 1668A	3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	SCM	MN	
RCRP	EPA 1668A	3,3',4,4',5-Pentachlorobiphenyl (BZ-126)	NPW	MN	
RCRP	EPA 1668A	3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	NPW	MN	
RCRP	EPA 1668A	3,3',4,4'-Tetrachlorobiphenyl (BZ-77)	SCM	MN	
RCRP	EPA 1668A	3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	SCM	MN	
RCRP	EPA 1668A	3,3',4,5'-Tetrachlorobiphenyl (BZ-79)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4,5,5'-Pentachlorobiphenyl (BZ-127)	SCM	MN	
RCRP	EPA 1668A	3,3',4,5-Tetrachlorobiphenyl (BZ-78)	SCM	MN	
RCRP	EPA 1668A	3,3',4,5-Tetrachlorobiphenyl (BZ-78)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4-Trichlorobiphenyl (BZ-35)	TISSUE	MN	
RCRP	EPA 1668A	3,3',4-Trichlorobiphenyl (BZ-35)	SCM	MN	
RCRP	EPA 1668A	3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	SCM	MN	
RCRP	EPA 1668A	3,3',5,5'-Tetrachlorobiphenyl (BZ-80)	TISSUE	MN	
RCRP	EPA 1668A	3,3',5-Trichlorobiphenyl (BZ-36)	SCM	MN	
RCRP	EPA 1668A	3,3',5-Trichlorobiphenyl (BZ-36)	TISSUE	MN	
RCRP	EPA 1668A	3,3'-Dichlorobiphenyl (BZ-11)	TISSUE	MN	
RCRP	EPA 1668A	3,3'-Dichlorobiphenyl (BZ-11)	SCM	MN	
RCRP	EPA 1668A	3,4',5-Trichlorobiphenyl (BZ-39)	SCM	MN	
RCRP	EPA 1668A	3,4',5-Trichlorobiphenyl (BZ-39)	TISSUE	MN	
RCRP	EPA 1668A	3,4,4',5-Tetrachlorobiphenyl (BZ-81)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	3,4,4',5-Tetrachlorobiphenyl (BZ-81)	TISSUE	MN	
RCRP	EPA 1668A	3,4,4',5-Tetrachlorobiphenyl (BZ-81)	NPW	MN	
RCRP	EPA 1668A	3,4,4'-Trichlorobiphenyl (BZ-37)	SCM	MN	
RCRP	EPA 1668A	3,4,4'-Trichlorobiphenyl (BZ-37)	TISSUE	MN	
RCRP	EPA 1668A	3,4,5-Trichlorobiphenyl (BZ-38)	TISSUE	MN	
RCRP	EPA 1668A	3,4,5-Trichlorobiphenyl (BZ-38)	SCM	MN	
RCRP	EPA 1668A	3,5-Dichlorobiphenyl (BZ-14)	TISSUE	MN	
RCRP	EPA 1668A	3,5-Dichlorobiphenyl (BZ-14)	SCM	MN	
RCRP	EPA 1668A	3-Chlorobiphenyl (BZ-2)	TISSUE	MN	
RCRP	EPA 1668A	3-Chlorobiphenyl (BZ-2)	SCM	MN	
RCRP	EPA 1668A	4,4'-Dichlorobiphenyl (BZ-15)	TISSUE	MN	
RCRP	EPA 1668A	4,4'-Dichlorobiphenyl (BZ-15)	SCM	MN	
RCRP	EPA 1668A	4-Chlorobiphenyl (BZ-3)	TISSUE	MN	
RCRP	EPA 1668A	4-Chlorobiphenyl (BZ-3)	SCM	MN	
RCRP	EPA 1668A	Decachlorobiphenyl (BZ-209)	SCM	MN	
RCRP	EPA 1668A	Decachlorobiphenyl (BZ-209)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(100/93/102/98)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(100/93/102/98)	SCM	MN	
RCRP	EPA 1668A	PCB-(107/124)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(107/124)	SCM	MN	
RCRP	EPA 1668A	PCB-(108/119/86/97/125/87)	SCM	MN	
RCRP	EPA 1668A	PCB-(108/119/86/97/125/87)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(110/115)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(110/115)	SCM	MN	
RCRP	EPA 1668A	PCB-(113/90/101)	SCM	MN	
RCRP	EPA 1668A	PCB-(113/90/101)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(117/116/85)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(117/116/85)	SCM	MN	
RCRP	EPA 1668A	PCB-(128/166)	SCM	MN	
RCRP	EPA 1668A	PCB-(128/166)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(13/12)	SCM	MN	
RCRP	EPA 1668A	PCB-(13/12)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(134/143)	SCM	MN	
RCRP	EPA 1668A	PCB-(134/143)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(138/163/129)	SCM	MN	
RCRP	EPA 1668A	PCB-(138/163/129)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	PCB-(139/140)	SCM	MN	
RCRP	EPA 1668A	PCB-(139/140)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(147/149)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(147/149)	SCM	MN	
RCRP	EPA 1668A	PCB-(151/135)	SCM	MN	
RCRP	EPA 1668A	PCB-(151/135)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(153/168)	SCM	MN	
RCRP	EPA 1668A	PCB-(153/168)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(156/157)	SCM	MN	
RCRP	EPA 1668A	PCB-(156/157)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(171/173)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(171/173)	SCM	MN	
RCRP	EPA 1668A	PCB-(180/193)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(180/193)	SCM	MN	
RCRP	EPA 1668A	PCB-(183/185)	SCM	MN	
RCRP	EPA 1668A	PCB-(183/185)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(197/200)	SCM	MN	
RCRP	EPA 1668A	PCB-(197/200)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(198/199)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(198/199)	SCM	MN	
RCRP	EPA 1668A	PCB-(21/33)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(21/33)	SCM	MN	
RCRP	EPA 1668A	PCB-(26/29)	SCM	MN	
RCRP	EPA 1668A	PCB-(26/29)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(28/20)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(28/20)	SCM	MN	
RCRP	EPA 1668A	PCB-(30/18)	SCM	MN	
RCRP	EPA 1668A	PCB-(30/18)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(41/40/71)	SCM	MN	
RCRP	EPA 1668A	PCB-(41/40/71)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(44/47/65)	SCM	MN	
RCRP	EPA 1668A	PCB-(44/47/65)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(45/51)	SCM	MN	
RCRP	EPA 1668A	PCB-(45/51)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(50/53)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(50/53)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 1668A	PCB-(59/62/75)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(59/62/75)	SCM	MN	
RCRP	EPA 1668A	PCB-(61/70/74/76)	SCM	MN	
RCRP	EPA 1668A	PCB-(61/70/74/76)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(69/49)	SCM	MN	
RCRP	EPA 1668A	PCB-(69/49)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(73/43)	TISSUE	MN	
RCRP	EPA 1668A	PCB-(73/43)	SCM	MN	
RCRP	EPA 1668A	PCB-(88/91)	SCM	MN	
RCRP	EPA 1668A	PCB-(88/91)	TISSUE	MN	

EPA 6010B

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Digestion, hotplate or HotBlock; Extraction, EPA 1312 SPLP, non-volatiles;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6010B	Aluminum	NPW	MN	
RCRP	EPA 6010B	Aluminum	SCM	MN	
RCRP	EPA 6010B	Antimony	SCM	MN	
RCRP	EPA 6010B	Antimony	NPW	MN	
RCRP	EPA 6010B	Arsenic	NPW	MN	
RCRP	EPA 6010B	Arsenic	SCM	MN	
RCRP	EPA 6010B	Barium	SCM	MN	
RCRP	EPA 6010B	Barium	NPW	MN	
RCRP	EPA 6010B	Beryllium	SCM	MN	
RCRP	EPA 6010B	Beryllium	NPW	MN	
RCRP	EPA 6010B	Boron	NPW	MN	
RCRP	EPA 6010B	Boron	SCM	MN	
RCRP	EPA 6010B	Cadmium	SCM	MN	
RCRP	EPA 6010B	Cadmium	NPW	MN	
RCRP	EPA 6010B	Calcium	NPW	MN	
RCRP	EPA 6010B	Calcium	SCM	MN	
RCRP	EPA 6010B	Chromium	SCM	MN	
RCRP	EPA 6010B	Cobalt	SCM	MN	
RCRP	EPA 6010B	Cobalt	NPW	MN	
RCRP	EPA 6010B	Copper	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6010B	Copper	SCM	MN	
RCRP	EPA 6010B	Iron	SCM	MN	
RCRP	EPA 6010B	Iron	NPW	MN	
RCRP	EPA 6010B	Lead	NPW	MN	
RCRP	EPA 6010B	Lead	SCM	MN	
RCRP	EPA 6010B	Magnesium	SCM	MN	
RCRP	EPA 6010B	Magnesium	NPW	MN	
RCRP	EPA 6010B	Manganese	SCM	MN	
RCRP	EPA 6010B	Manganese	NPW	MN	
RCRP	EPA 6010B	Molybdenum	SCM	MN	
RCRP	EPA 6010B	Molybdenum	NPW	MN	
RCRP	EPA 6010B	Nickel	SCM	MN	
RCRP	EPA 6010B	Nickel	NPW	MN	
RCRP	EPA 6010B	Potassium	NPW	MN	
RCRP	EPA 6010B	Potassium	SCM	MN	
RCRP	EPA 6010B	Selenium	SCM	MN	
RCRP	EPA 6010B	Selenium	NPW	MN	
RCRP	EPA 6010B	Silver	NPW	MN	
RCRP	EPA 6010B	Silver	SCM	MN	
RCRP	EPA 6010B	Sodium	SCM	MN	
RCRP	EPA 6010B	Sodium	NPW	MN	
RCRP	EPA 6010B	Thallium	NPW	MN	
RCRP	EPA 6010B	Thallium	SCM	MN	
RCRP	EPA 6010B	Tin	SCM	MN	
RCRP	EPA 6010B	Tin	NPW	MN	
RCRP	EPA 6010B	Titanium	SCM	MN	
RCRP	EPA 6010B	Titanium	NPW	MN	
RCRP	EPA 6010B	Total chromium	NPW	MN	
RCRP	EPA 6010B	Vanadium	SCM	MN	
RCRP	EPA 6010B	Vanadium	NPW	MN	
RCRP	EPA 6010B	Zinc	SCM	MN	
RCRP	EPA 6010B	Zinc	NPW	MN	

EPA 6010C

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Digestion, hotplate or HotBlock; Extraction, EPA 1312 SPLP, non-volatiles;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6010C	Aluminum	NPW	MN	
RCRP	EPA 6010C	Aluminum	SCM	MN	
RCRP	EPA 6010C	Antimony	NPW	MN	
RCRP	EPA 6010C	Antimony	SCM	MN	
RCRP	EPA 6010C	Arsenic	SCM	MN	
RCRP	EPA 6010C	Arsenic	NPW	MN	
RCRP	EPA 6010C	Barium	SCM	MN	
RCRP	EPA 6010C	Barium	NPW	MN	
RCRP	EPA 6010C	Beryllium	SCM	MN	
RCRP	EPA 6010C	Beryllium	NPW	MN	
RCRP	EPA 6010C	Boron	SCM	MN	
RCRP	EPA 6010C	Boron	NPW	MN	
RCRP	EPA 6010C	Cadmium	NPW	MN	
RCRP	EPA 6010C	Cadmium	SCM	MN	
RCRP	EPA 6010C	Calcium	NPW	MN	
RCRP	EPA 6010C	Calcium	SCM	MN	
RCRP	EPA 6010C	Chromium	SCM	MN	
RCRP	EPA 6010C	Chromium	NPW	MN	
RCRP	EPA 6010C	Cobalt	SCM	MN	
RCRP	EPA 6010C	Cobalt	NPW	MN	
RCRP	EPA 6010C	Copper	NPW	MN	
RCRP	EPA 6010C	Copper	SCM	MN	
RCRP	EPA 6010C	Iron	NPW	MN	
RCRP	EPA 6010C	Iron	SCM	MN	
RCRP	EPA 6010C	Lead	NPW	MN	
RCRP	EPA 6010C	Lead	SCM	MN	
RCRP	EPA 6010C	Magnesium	NPW	MN	
RCRP	EPA 6010C	Magnesium	SCM	MN	
RCRP	EPA 6010C	Manganese	NPW	MN	
RCRP	EPA 6010C	Manganese	SCM	MN	
RCRP	EPA 6010C	Molybdenum	SCM	MN	
RCRP	EPA 6010C	Molybdenum	NPW	MN	
RCRP	EPA 6010C	Nickel	NPW	MN	
RCRP	EPA 6010C	Nickel	SCM	MN	
RCRP	EPA 6010C	Potassium	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6010C	Potassium	NPW	MN	
RCRP	EPA 6010C	Selenium	NPW	MN	
RCRP	EPA 6010C	Selenium	SCM	MN	
RCRP	EPA 6010C	Silver	SCM	MN	
RCRP	EPA 6010C	Silver	NPW	MN	
RCRP	EPA 6010C	Sodium	NPW	MN	
RCRP	EPA 6010C	Sodium	SCM	MN	
RCRP	EPA 6010C	Thallium	SCM	MN	
RCRP	EPA 6010C	Thallium	NPW	MN	
RCRP	EPA 6010C	Tin	SCM	MN	
RCRP	EPA 6010C	Tin	NPW	MN	
RCRP	EPA 6010C	Titanium	SCM	MN	
RCRP	EPA 6010C	Titanium	NPW	MN	
RCRP	EPA 6010C	Vanadium	SCM	MN	
RCRP	EPA 6010C	Vanadium	NPW	MN	
RCRP	EPA 6010C	Zinc	SCM	MN	
RCRP	EPA 6010C	Zinc	NPW	MN	

EPA 6020

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Digestion, hotplate or HotBlock; Extraction, EPA 1312 SPLP, non-volatiles;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020	Aluminum	SCM	MN	
RCRP	EPA 6020	Aluminum	NPW	MN	
RCRP	EPA 6020	Antimony	NPW	MN	
RCRP	EPA 6020	Antimony	SCM	MN	
RCRP	EPA 6020	Arsenic	SCM	MN	
RCRP	EPA 6020	Arsenic	NPW	MN	
RCRP	EPA 6020	Barium	NPW	MN	
RCRP	EPA 6020	Barium	SCM	MN	
RCRP	EPA 6020	Beryllium	SCM	MN	
RCRP	EPA 6020	Beryllium	NPW	MN	
RCRP	EPA 6020	Bismuth	NPW	MN	
RCRP	EPA 6020	Bismuth	SCM	MN	
RCRP	EPA 6020	Boron	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020	Boron	SCM	MN	
RCRP	EPA 6020	Cadmium	SCM	MN	
RCRP	EPA 6020	Cadmium	NPW	MN	
RCRP	EPA 6020	Calcium	NPW	MN	
RCRP	EPA 6020	Calcium	SCM	MN	
RCRP	EPA 6020	Chromium	SCM	MN	
RCRP	EPA 6020	Chromium	NPW	MN	
RCRP	EPA 6020	Cobalt	NPW	MN	
RCRP	EPA 6020	Cobalt	SCM	MN	
RCRP	EPA 6020	Copper	NPW	MN	
RCRP	EPA 6020	Copper	SCM	MN	
RCRP	EPA 6020	Iron	NPW	MN	
RCRP	EPA 6020	Iron	SCM	MN	
RCRP	EPA 6020	Lead	NPW	MN	
RCRP	EPA 6020	Lead	SCM	MN	
RCRP	EPA 6020	Lithium	SCM	MN	
RCRP	EPA 6020	Lithium	NPW	MN	
RCRP	EPA 6020	Magnesium	SCM	MN	
RCRP	EPA 6020	Magnesium	NPW	MN	
RCRP	EPA 6020	Manganese	NPW	MN	
RCRP	EPA 6020	Manganese	SCM	MN	
RCRP	EPA 6020	Molybdenum	NPW	MN	
RCRP	EPA 6020	Molybdenum	SCM	MN	
RCRP	EPA 6020	Nickel	SCM	MN	
RCRP	EPA 6020	Nickel	NPW	MN	
RCRP	EPA 6020	Palladium	SCM	MN	
RCRP	EPA 6020	Palladium	NPW	MN	
RCRP	EPA 6020	Platinum	SCM	MN	
RCRP	EPA 6020	Platinum	NPW	MN	
RCRP	EPA 6020	Potassium	NPW	MN	
RCRP	EPA 6020	Potassium	SCM	MN	
RCRP	EPA 6020	Selenium	NPW	MN	
RCRP	EPA 6020	Selenium	SCM	MN	
RCRP	EPA 6020	Silicon	SCM	MN	
RCRP	EPA 6020	Silicon	NPW	MN	
RCRP	EPA 6020	Silver	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020	Silver	NPW	MN	
RCRP	EPA 6020	Sodium	NPW	MN	
RCRP	EPA 6020	Sodium	SCM	MN	
RCRP	EPA 6020	Strontium	SCM	MN	
RCRP	EPA 6020	Strontium	NPW	MN	
RCRP	EPA 6020	Thallium	SCM	MN	
RCRP	EPA 6020	Thallium	NPW	MN	
RCRP	EPA 6020	Tin	SCM	MN	
RCRP	EPA 6020	Tin	NPW	MN	
RCRP	EPA 6020	Titanium	NPW	MN	
RCRP	EPA 6020	Titanium	SCM	MN	
RCRP	EPA 6020	Total chromium	NPW	MN	
RCRP	EPA 6020	Vanadium	NPW	MN	
RCRP	EPA 6020	Vanadium	SCM	MN	
RCRP	EPA 6020	Zinc	SCM	MN	
RCRP	EPA 6020	Zinc	NPW	MN	

EPA 6020A

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Digestion, hotplate or HotBlock; Extraction, EPA 1312 SPLP, non-volatiles;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020A	Aluminum	SCM	MN	
RCRP	EPA 6020A	Aluminum	NPW	MN	
RCRP	EPA 6020A	Antimony	NPW	MN	
RCRP	EPA 6020A	Antimony	SCM	MN	
RCRP	EPA 6020A	Arsenic	NPW	MN	
RCRP	EPA 6020A	Arsenic	SCM	MN	
RCRP	EPA 6020A	Barium	SCM	MN	
RCRP	EPA 6020A	Barium	NPW	MN	
RCRP	EPA 6020A	Beryllium	NPW	MN	
RCRP	EPA 6020A	Beryllium	SCM	MN	
RCRP	EPA 6020A	Bismuth	NPW	MN	
RCRP	EPA 6020A	Bismuth	SCM	MN	
RCRP	EPA 6020A	Boron	NPW	MN	
RCRP	EPA 6020A	Boron	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020A	Cadmium	NPW	MN	
RCRP	EPA 6020A	Cadmium	SCM	MN	
RCRP	EPA 6020A	Calcium	SCM	MN	
RCRP	EPA 6020A	Calcium	NPW	MN	
RCRP	EPA 6020A	Chromium	SCM	MN	
RCRP	EPA 6020A	Chromium	NPW	MN	
RCRP	EPA 6020A	Cobalt	SCM	MN	
RCRP	EPA 6020A	Cobalt	NPW	MN	
RCRP	EPA 6020A	Copper	NPW	MN	
RCRP	EPA 6020A	Copper	SCM	MN	
RCRP	EPA 6020A	Iron	SCM	MN	
RCRP	EPA 6020A	Iron	NPW	MN	
RCRP	EPA 6020A	Lead	SCM	MN	
RCRP	EPA 6020A	Lead	NPW	MN	
RCRP	EPA 6020A	Lithium	SCM	MN	
RCRP	EPA 6020A	Lithium	NPW	MN	
RCRP	EPA 6020A	Magnesium	SCM	MN	
RCRP	EPA 6020A	Magnesium	NPW	MN	
RCRP	EPA 6020A	Manganese	SCM	MN	
RCRP	EPA 6020A	Manganese	NPW	MN	
RCRP	EPA 6020A	Molybdenum	NPW	MN	
RCRP	EPA 6020A	Molybdenum	SCM	MN	
RCRP	EPA 6020A	Nickel	NPW	MN	
RCRP	EPA 6020A	Nickel	SCM	MN	
RCRP	EPA 6020A	Palladium	NPW	MN	
RCRP	EPA 6020A	Palladium	SCM	MN	
RCRP	EPA 6020A	Platinum	SCM	MN	
RCRP	EPA 6020A	Platinum	NPW	MN	
RCRP	EPA 6020A	Potassium	NPW	MN	
RCRP	EPA 6020A	Potassium	SCM	MN	
RCRP	EPA 6020A	Selenium	NPW	MN	
RCRP	EPA 6020A	Selenium	SCM	MN	
RCRP	EPA 6020A	Silicon	NPW	MN	
RCRP	EPA 6020A	Silicon	SCM	MN	
RCRP	EPA 6020A	Silver	SCM	MN	
RCRP	EPA 6020A	Silver	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 6020A	Sodium	NPW	MN	
RCRP	EPA 6020A	Sodium	SCM	MN	
RCRP	EPA 6020A	Strontium	NPW	MN	
RCRP	EPA 6020A	Strontium	SCM	MN	
RCRP	EPA 6020A	Thallium	NPW	MN	
RCRP	EPA 6020A	Thallium	SCM	MN	
RCRP	EPA 6020A	Tin	NPW	MN	
RCRP	EPA 6020A	Tin	SCM	MN	
RCRP	EPA 6020A	Titanium	NPW	MN	
RCRP	EPA 6020A	Titanium	SCM	MN	
RCRP	EPA 6020A	Vanadium	SCM	MN	
RCRP	EPA 6020A	Vanadium	NPW	MN	
RCRP	EPA 6020A	Zinc	NPW	MN	
RCRP	EPA 6020A	Zinc	SCM	MN	

EPA 7470A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 7470A	Mercury	NPW	MN	

EPA 7471A

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 7471A	Mercury	SCM	MN	

EPA 7471B

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 7471B	Mercury	SCM	MN	

EPA 8011

Preparation Techniques: Extraction, micro;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8011	1,2-Dibromo-3-chloropropane (DBCP)	NPW	MN	
RCRP	EPA 8011	1,2-Dibromoethane (EDB, Ethylene dibromide)	NPW	MN	

EPA 8015B

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic; Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8015B	Diesel range organics (DRO)	SCM	MN	
RCRP	EPA 8015B	Diesel range organics (DRO)	NPW	MN	
RCRP	EPA 8015B	Gasoline range organics (GRO)	SCM	MN	
RCRP	EPA 8015B	Gasoline range organics (GRO)	NPW	MN	

EPA 8015C

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic; Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8015C	Diesel range organics (DRO)	SCM	MN	
RCRP	EPA 8015C	Diesel range organics (DRO)	NPW	MN	
RCRP	EPA 8015C	Gasoline range organics (GRO)	SCM	MN	
RCRP	EPA 8015C	Gasoline range organics (GRO)	NPW	MN	

EPA 8021B

Preparation Techniques: Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8021B	1,2,4-Trimethylbenzene	NPW	MN	
RCRP	EPA 8021B	1,2,4-Trimethylbenzene	SCM	MN	
RCRP	EPA 8021B	1,3,5-Trimethylbenzene	NPW	MN	
RCRP	EPA 8021B	1,3,5-Trimethylbenzene	SCM	MN	
RCRP	EPA 8021B	Benzene	SCM	MN	
RCRP	EPA 8021B	Benzene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8021B	Ethylbenzene	NPW	MN	
RCRP	EPA 8021B	Ethylbenzene	SCM	MN	
RCRP	EPA 8021B	m+p-xylene	SCM	MN	
RCRP	EPA 8021B	m+p-xylene	NPW	MN	
RCRP	EPA 8021B	Methyl tert-butyl ether (MTBE)	NPW	MN	
RCRP	EPA 8021B	Methyl tert-butyl ether (MTBE)	SCM	MN	
RCRP	EPA 8021B	o-Xylene	SCM	MN	
RCRP	EPA 8021B	o-Xylene	NPW	MN	
RCRP	EPA 8021B	Toluene	SCM	MN	
RCRP	EPA 8021B	Toluene	NPW	MN	

EPA 8081B

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8081B	4,4'-DDD	NPW	MN	
RCRP	EPA 8081B	4,4'-DDD	SCM	MN	
RCRP	EPA 8081B	4,4'-DDE	SCM	MN	
RCRP	EPA 8081B	4,4'-DDE	NPW	MN	
RCRP	EPA 8081B	4,4'-DDT	SCM	MN	
RCRP	EPA 8081B	4,4'-DDT	NPW	MN	
RCRP	EPA 8081B	Aldrin	NPW	MN	
RCRP	EPA 8081B	Aldrin	SCM	MN	
RCRP	EPA 8081B	alpha-BHC (alpha-Hexachlorocyclohexane)	SCM	MN	
RCRP	EPA 8081B	alpha-BHC (alpha-Hexachlorocyclohexane)	NPW	MN	
RCRP	EPA 8081B	alpha-Chlordane	SCM	MN	
RCRP	EPA 8081B	alpha-Chlordane	NPW	MN	
RCRP	EPA 8081B	beta-BHC (beta-Hexachlorocyclohexane)	SCM	MN	
RCRP	EPA 8081B	beta-BHC (beta-Hexachlorocyclohexane)	NPW	MN	
RCRP	EPA 8081B	Chlordane (tech.)	NPW	MN	
RCRP	EPA 8081B	Chlordane (tech.)	SCM	MN	
RCRP	EPA 8081B	delta-BHC	NPW	MN	
RCRP	EPA 8081B	delta-BHC	SCM	MN	
RCRP	EPA 8081B	Dieldrin	NPW	MN	
RCRP	EPA 8081B	Dieldrin	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8081B	Endosulfan I	SCM	MN	
RCRP	EPA 8081B	Endosulfan I	NPW	MN	
RCRP	EPA 8081B	Endosulfan II	NPW	MN	
RCRP	EPA 8081B	Endosulfan II	SCM	MN	
RCRP	EPA 8081B	Endosulfan sulfate	NPW	MN	
RCRP	EPA 8081B	Endosulfan sulfate	SCM	MN	
RCRP	EPA 8081B	Endrin	NPW	MN	
RCRP	EPA 8081B	Endrin	SCM	MN	
RCRP	EPA 8081B	Endrin aldehyde	SCM	MN	
RCRP	EPA 8081B	Endrin aldehyde	NPW	MN	
RCRP	EPA 8081B	Endrin ketone	NPW	MN	
RCRP	EPA 8081B	Endrin ketone	SCM	MN	
RCRP	EPA 8081B	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	NPW	MN	
RCRP	EPA 8081B	gamma-BHC (Lindane, gamma-HexachlorocyclohexanE)	SCM	MN	
RCRP	EPA 8081B	gamma-Chlordane	SCM	MN	
RCRP	EPA 8081B	gamma-Chlordane	NPW	MN	
RCRP	EPA 8081B	Heptachlor	SCM	MN	
RCRP	EPA 8081B	Heptachlor	NPW	MN	
RCRP	EPA 8081B	Heptachlor epoxide	NPW	MN	
RCRP	EPA 8081B	Heptachlor epoxide	SCM	MN	
RCRP	EPA 8081B	Isodrin	NPW	MN	
RCRP	EPA 8081B	Isodrin	SCM	MN	
RCRP	EPA 8081B	Methoxychlor	SCM	MN	
RCRP	EPA 8081B	Methoxychlor	NPW	MN	
RCRP	EPA 8081B	Toxaphene (Chlorinated camphene)	SCM	MN	
RCRP	EPA 8081B	Toxaphene (Chlorinated camphene)	NPW	MN	

EPA 8082

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8082	Aroclor-1016 (PCB-1016)	SCM	MN	
RCRP	EPA 8082	Aroclor-1016 (PCB-1016)	NPW	MN	
RCRP	EPA 8082	Aroclor-1221 (PCB-1221)	SCM	MN	
RCRP	EPA 8082	Aroclor-1221 (PCB-1221)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8082	Aroclor-1232 (PCB-1232)	NPW	MN	
RCRP	EPA 8082	Aroclor-1232 (PCB-1232)	SCM	MN	
RCRP	EPA 8082	Aroclor-1242 (PCB-1242)	NPW	MN	
RCRP	EPA 8082	Aroclor-1242 (PCB-1242)	SCM	MN	
RCRP	EPA 8082	Aroclor-1248 (PCB-1248)	NPW	MN	
RCRP	EPA 8082	Aroclor-1248 (PCB-1248)	SCM	MN	
RCRP	EPA 8082	Aroclor-1254 (PCB-1254)	SCM	MN	
RCRP	EPA 8082	Aroclor-1254 (PCB-1254)	NPW	MN	
RCRP	EPA 8082	Aroclor-1260 (PCB-1260)	NPW	MN	
RCRP	EPA 8082	Aroclor-1260 (PCB-1260)	SCM	MN	
RCRP	EPA 8082	PCBs	SCM	MN	

EPA 8082A

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8082A	Aroclor-1016 (PCB-1016)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1016 (PCB-1016)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1221 (PCB-1221)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1221 (PCB-1221)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1232 (PCB-1232)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1232 (PCB-1232)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1242 (PCB-1242)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1242 (PCB-1242)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1248 (PCB-1248)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1248 (PCB-1248)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1254 (PCB-1254)	SCM	MN	
RCRP	EPA 8082A	Aroclor-1254 (PCB-1254)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1260 (PCB-1260)	NPW	MN	
RCRP	EPA 8082A	Aroclor-1260 (PCB-1260)	SCM	MN	

EPA 8260B

Preparation Techniques: Extraction, EPA 1312 SPLP, zero headspace (ZHE); Extraction, EPA 1311 TCLP, zero headspace (ZHE);
Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	1,1,1,2-Tetrachloroethane	SCM	MN	
RCRP	EPA 8260B	1,1,1,2-Tetrachloroethane	NPW	MN	
RCRP	EPA 8260B	1,1,1-Trichloroethane	NPW	MN	
RCRP	EPA 8260B	1,1,1-Trichloroethane	SCM	MN	
RCRP	EPA 8260B	1,1,2,2-Tetrachloroethane	NPW	MN	
RCRP	EPA 8260B	1,1,2,2-Tetrachloroethane	SCM	MN	
RCRP	EPA 8260B	1,1,2-Trichloroethane	SCM	MN	
RCRP	EPA 8260B	1,1,2-Trichloroethane	NPW	MN	
RCRP	EPA 8260B	1,1-Dichloroethane	NPW	MN	
RCRP	EPA 8260B	1,1-Dichloroethane	SCM	MN	
RCRP	EPA 8260B	1,1-Dichloroethylene	NPW	MN	
RCRP	EPA 8260B	1,1-Dichloroethylene	SCM	MN	
RCRP	EPA 8260B	1,1-Dichloropropene	NPW	MN	
RCRP	EPA 8260B	1,1-Dichloropropene	SCM	MN	
RCRP	EPA 8260B	1,2,3-Trichlorobenzene	SCM	MN	
RCRP	EPA 8260B	1,2,3-Trichlorobenzene	NPW	MN	
RCRP	EPA 8260B	1,2,3-Trichloropropane	SCM	MN	
RCRP	EPA 8260B	1,2,3-Trichloropropane	NPW	MN	
RCRP	EPA 8260B	1,2,4-Trichlorobenzene	SCM	MN	
RCRP	EPA 8260B	1,2,4-Trichlorobenzene	NPW	MN	
RCRP	EPA 8260B	1,2,4-Trimethylbenzene	SCM	MN	
RCRP	EPA 8260B	1,2,4-Trimethylbenzene	NPW	MN	
RCRP	EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP)	NPW	MN	
RCRP	EPA 8260B	1,2-Dibromo-3-chloropropane (DBCP)	SCM	MN	
RCRP	EPA 8260B	1,2-Dibromoethane (EDB, Ethylene dibromide)	SCM	MN	
RCRP	EPA 8260B	1,2-Dibromoethane (EDB, Ethylene dibromide)	NPW	MN	
RCRP	EPA 8260B	1,2-Dichlorobenzene	NPW	MN	
RCRP	EPA 8260B	1,2-Dichlorobenzene	SCM	MN	
RCRP	EPA 8260B	1,2-Dichloroethane (Ethylene dichloride)	SCM	MN	
RCRP	EPA 8260B	1,2-Dichloroethane (Ethylene dichloride)	NPW	MN	
RCRP	EPA 8260B	1,2-Dichloropropane	SCM	MN	
RCRP	EPA 8260B	1,2-Dichloropropane	NPW	MN	
RCRP	EPA 8260B	1,3,5-Trimethylbenzene	NPW	MN	
RCRP	EPA 8260B	1,3,5-Trimethylbenzene	SCM	MN	
RCRP	EPA 8260B	1,3-Dichlorobenzene	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	1,3-Dichlorobenzene	NPW	MN	
RCRP	EPA 8260B	1,3-Dichloropropane	SCM	MN	
RCRP	EPA 8260B	1,3-Dichloropropane	NPW	MN	
RCRP	EPA 8260B	1,4-Dichlorobenzene	SCM	MN	
RCRP	EPA 8260B	1,4-Dichlorobenzene	NPW	MN	
RCRP	EPA 8260B	1,4-Dioxane (1,4- Diethyleneoxide)	SCM	MN	
RCRP	EPA 8260B	1,4-Dioxane (1,4- Diethyleneoxide)	NPW	MN	
RCRP	EPA 8260B	2,2-Dichloropropane	NPW	MN	
RCRP	EPA 8260B	2,2-Dichloropropane	SCM	MN	
RCRP	EPA 8260B	2-Butanone (Methyl ethyl ketone, MEK)	NPW	MN	
RCRP	EPA 8260B	2-Butanone (Methyl ethyl ketone, MEK)	SCM	MN	
RCRP	EPA 8260B	2-Chloroethyl vinyl ether	NPW	MN	
RCRP	EPA 8260B	2-Chloroethyl vinyl ether	SCM	MN	
RCRP	EPA 8260B	2-Chlorotoluene	NPW	MN	
RCRP	EPA 8260B	2-Chlorotoluene	SCM	MN	
RCRP	EPA 8260B	2-Hexanone	NPW	MN	
RCRP	EPA 8260B	2-Hexanone	SCM	MN	
RCRP	EPA 8260B	2-Nitropropane	NPW	MN	
RCRP	EPA 8260B	2-Nitropropane	SCM	MN	
RCRP	EPA 8260B	4-Chlorotoluene	NPW	MN	
RCRP	EPA 8260B	4-Chlorotoluene	SCM	MN	
RCRP	EPA 8260B	4-Isopropyltoluene (p-Cymene)	SCM	MN	
RCRP	EPA 8260B	4-Isopropyltoluene (p-Cymene)	NPW	MN	
RCRP	EPA 8260B	4-Methyl-2-pentanone (MIBK)	SCM	MN	
RCRP	EPA 8260B	4-Methyl-2-pentanone (MIBK)	NPW	MN	
RCRP	EPA 8260B	Acetone	SCM	MN	
RCRP	EPA 8260B	Acetone	NPW	MN	
RCRP	EPA 8260B	Acetonitrile	NPW	MN	
RCRP	EPA 8260B	Acetonitrile	SCM	MN	
RCRP	EPA 8260B	Acrolein (Propenal)	NPW	MN	
RCRP	EPA 8260B	Acrolein (Propenal)	SCM	MN	
RCRP	EPA 8260B	Acrylonitrile	SCM	MN	
RCRP	EPA 8260B	Acrylonitrile	NPW	MN	
RCRP	EPA 8260B	Allyl chloride (3-Chloropropene)	NPW	MN	
RCRP	EPA 8260B	Allyl chloride (3-Chloropropene)	SCM	MN	
RCRP	EPA 8260B	Benzene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	Benzene	SCM	MN	
RCRP	EPA 8260B	Bromobenzene	NPW	MN	
RCRP	EPA 8260B	Bromobenzene	SCM	MN	
RCRP	EPA 8260B	Bromochloromethane	NPW	MN	
RCRP	EPA 8260B	Bromochloromethane	SCM	MN	
RCRP	EPA 8260B	Bromodichloromethane	NPW	MN	
RCRP	EPA 8260B	Bromodichloromethane	SCM	MN	
RCRP	EPA 8260B	Bromoform	SCM	MN	
RCRP	EPA 8260B	Bromoform	NPW	MN	
RCRP	EPA 8260B	Carbon disulfide	SCM	MN	
RCRP	EPA 8260B	Carbon disulfide	NPW	MN	
RCRP	EPA 8260B	Carbon tetrachloride	NPW	MN	
RCRP	EPA 8260B	Carbon tetrachloride	SCM	MN	
RCRP	EPA 8260B	Chlorobenzene	NPW	MN	
RCRP	EPA 8260B	Chlorobenzene	SCM	MN	
RCRP	EPA 8260B	Chlorodibromomethane	NPW	MN	
RCRP	EPA 8260B	Chlorodibromomethane	SCM	MN	
RCRP	EPA 8260B	Chloroethane (Ethyl chloride)	SCM	MN	
RCRP	EPA 8260B	Chloroethane (Ethyl chloride)	NPW	MN	
RCRP	EPA 8260B	Chloroform	SCM	MN	
RCRP	EPA 8260B	Chloroform	NPW	MN	
RCRP	EPA 8260B	Chloroprene (2-Chloro-1,3-butadiene)	NPW	MN	
RCRP	EPA 8260B	Chloroprene (2-Chloro-1,3-butadiene)	SCM	MN	
RCRP	EPA 8260B	cis-1,2-Dichloroethylene	NPW	MN	
RCRP	EPA 8260B	cis-1,2-Dichloroethylene	SCM	MN	
RCRP	EPA 8260B	cis-1,3-Dichloropropene	NPW	MN	
RCRP	EPA 8260B	cis-1,3-Dichloropropene	SCM	MN	
RCRP	EPA 8260B	cis-1,4-Dichloro-2-butene	SCM	MN	
RCRP	EPA 8260B	cis-1,4-Dichloro-2-butene	NPW	MN	
RCRP	EPA 8260B	Dibromomethane (Methylene bromide)	NPW	MN	
RCRP	EPA 8260B	Dibromomethane (Methylene bromide)	SCM	MN	
RCRP	EPA 8260B	Dichlorodifluoromethane (Freon-12)	SCM	MN	
RCRP	EPA 8260B	Dichlorodifluoromethane (Freon-12)	NPW	MN	
RCRP	EPA 8260B	Diethyl ether	SCM	MN	
RCRP	EPA 8260B	Diethyl ether	NPW	MN	
RCRP	EPA 8260B	Ethanol	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	Ethanol	NPW	MN	
RCRP	EPA 8260B	Ethyl acetate	NPW	MN	
RCRP	EPA 8260B	Ethyl acetate	SCM	MN	
RCRP	EPA 8260B	Ethyl methacrylate	NPW	MN	
RCRP	EPA 8260B	Ethyl methacrylate	SCM	MN	
RCRP	EPA 8260B	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	SCM	MN	User Defined S-MN-O-521 Rev. 27
RCRP	EPA 8260B	Ethyl-t-butylether (ETBE) (2-Ethoxy-2-methylpropane)	NPW	MN	User Defined S-MN-O-521 Rev. 27
RCRP	EPA 8260B	Ethylbenzene	NPW	MN	
RCRP	EPA 8260B	Ethylbenzene	SCM	MN	
RCRP	EPA 8260B	Hexachlorobutadiene	SCM	MN	
RCRP	EPA 8260B	Hexachlorobutadiene	NPW	MN	
RCRP	EPA 8260B	Iodomethane (Methyl iodide)	NPW	MN	
RCRP	EPA 8260B	Iodomethane (Methyl iodide)	SCM	MN	
RCRP	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)	SCM	MN	
RCRP	EPA 8260B	Isobutyl alcohol (2-Methyl-1-propanol)	NPW	MN	
RCRP	EPA 8260B	Isopropyl alcohol (2-Propanol, Isopropanol)	SCM	MN	
RCRP	EPA 8260B	Isopropyl alcohol (2-Propanol, Isopropanol)	NPW	MN	
RCRP	EPA 8260B	Isopropylbenzene	SCM	MN	
RCRP	EPA 8260B	Isopropylbenzene	NPW	MN	
RCRP	EPA 8260B	m+p-xylene	NPW	MN	
RCRP	EPA 8260B	m+p-xylene	SCM	MN	
RCRP	EPA 8260B	Methacrylonitrile	NPW	MN	
RCRP	EPA 8260B	Methacrylonitrile	SCM	MN	
RCRP	EPA 8260B	Methyl bromide (Bromomethane)	NPW	MN	
RCRP	EPA 8260B	Methyl bromide (Bromomethane)	SCM	MN	
RCRP	EPA 8260B	Methyl chloride (Chloromethane)	NPW	MN	
RCRP	EPA 8260B	Methyl chloride (Chloromethane)	SCM	MN	
RCRP	EPA 8260B	Methyl methacrylate	NPW	MN	
RCRP	EPA 8260B	Methyl methacrylate	SCM	MN	
RCRP	EPA 8260B	Methyl tert-butyl ether (MTBE)	SCM	MN	
RCRP	EPA 8260B	Methyl tert-butyl ether (MTBE)	NPW	MN	
RCRP	EPA 8260B	Methylene chloride (Dichloromethane)	NPW	MN	
RCRP	EPA 8260B	Methylene chloride (Dichloromethane)	SCM	MN	
RCRP	EPA 8260B	n-Butylbenzene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	n-Butylbenzene	SCM	MN	
RCRP	EPA 8260B	n-Propylbenzene	NPW	MN	
RCRP	EPA 8260B	n-Propylbenzene	SCM	MN	
RCRP	EPA 8260B	Naphthalene	SCM	MN	
RCRP	EPA 8260B	Naphthalene	NPW	MN	
RCRP	EPA 8260B	o-Xylene	NPW	MN	
RCRP	EPA 8260B	o-Xylene	SCM	MN	
RCRP	EPA 8260B	Propionitrile (Ethyl cyanide)	NPW	MN	
RCRP	EPA 8260B	sec-Butylbenzene	NPW	MN	
RCRP	EPA 8260B	sec-Butylbenzene	SCM	MN	
RCRP	EPA 8260B	Styrene	SCM	MN	
RCRP	EPA 8260B	Styrene	NPW	MN	
RCRP	EPA 8260B	T-amylmethylether (TAME)	NPW	MN	User Defined S-MN-O-521 Rev. 27
RCRP	EPA 8260B	T-amylmethylether (TAME)	SCM	MN	User Defined S-MN-O-521 Rev. 27
RCRP	EPA 8260B	tert-Butyl alcohol	SCM	MN	
RCRP	EPA 8260B	tert-Butyl alcohol	NPW	MN	
RCRP	EPA 8260B	tert-Butylbenzene	NPW	MN	
RCRP	EPA 8260B	tert-Butylbenzene	SCM	MN	
RCRP	EPA 8260B	Tetrachloroethylene (Perchloroethylene)	SCM	MN	
RCRP	EPA 8260B	Tetrachloroethylene (Perchloroethylene)	NPW	MN	
RCRP	EPA 8260B	Toluene	SCM	MN	
RCRP	EPA 8260B	Toluene	NPW	MN	
RCRP	EPA 8260B	trans-1,2-Dichloroethylene	SCM	MN	
RCRP	EPA 8260B	trans-1,2-Dichloroethylene	NPW	MN	
RCRP	EPA 8260B	trans-1,3-Dichloropropylene	NPW	MN	
RCRP	EPA 8260B	trans-1,3-Dichloropropylene	SCM	MN	
RCRP	EPA 8260B	trans-1,4-Dichloro-2-butene	SCM	MN	
RCRP	EPA 8260B	trans-1,4-Dichloro-2-butene	NPW	MN	
RCRP	EPA 8260B	Trichloroethene (Trichloroethylene)	SCM	MN	
RCRP	EPA 8260B	Trichloroethene (Trichloroethylene)	NPW	MN	
RCRP	EPA 8260B	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	NPW	MN	
RCRP	EPA 8260B	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	SCM	MN	
RCRP	EPA 8260B	Vinyl acetate	SCM	MN	
RCRP	EPA 8260B	Vinyl acetate	NPW	MN	
RCRP	EPA 8260B	Vinyl chloride	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8260B	Vinyl chloride	SCM	MN	

EPA 8270C

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic; Extraction, EPA 1312 SPLP, non-volatiles; Extraction, continuous liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C	1,2,4-Trichlorobenzene	SCM	MN	
RCRP	EPA 8270C	1,2,4-Trichlorobenzene	NPW	MN	
RCRP	EPA 8270C	1,2-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270C	1,2-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270C	1,2-Diphenylhydrazine	SCM	MN	
RCRP	EPA 8270C	1,2-Diphenylhydrazine	NPW	MN	
RCRP	EPA 8270C	1,3-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270C	1,3-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270C	1,4-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270C	1,4-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270C	2,4,5-Trichlorophenol	NPW	MN	
RCRP	EPA 8270C	2,4,5-Trichlorophenol	SCM	MN	
RCRP	EPA 8270C	2,4,6-Trichlorophenol	NPW	MN	
RCRP	EPA 8270C	2,4,6-Trichlorophenol	SCM	MN	
RCRP	EPA 8270C	2,4-Dichlorophenol	SCM	MN	
RCRP	EPA 8270C	2,4-Dichlorophenol	NPW	MN	
RCRP	EPA 8270C	2,4-Dimethylphenol	SCM	MN	
RCRP	EPA 8270C	2,4-Dimethylphenol	NPW	MN	
RCRP	EPA 8270C	2,4-Dinitrophenol	NPW	MN	
RCRP	EPA 8270C	2,4-Dinitrophenol	SCM	MN	
RCRP	EPA 8270C	2,4-Dinitrotoluene (2,4-DNT)	SCM	MN	
RCRP	EPA 8270C	2,4-Dinitrotoluene (2,4-DNT)	NPW	MN	
RCRP	EPA 8270C	2,6-Dinitrotoluene (2,6-DNT)	NPW	MN	
RCRP	EPA 8270C	2,6-Dinitrotoluene (2,6-DNT)	SCM	MN	
RCRP	EPA 8270C	2-Chloronaphthalene	SCM	MN	
RCRP	EPA 8270C	2-Chloronaphthalene	NPW	MN	
RCRP	EPA 8270C	2-Chlorophenol	NPW	MN	
RCRP	EPA 8270C	2-Chlorophenol	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	SCM	MN	
RCRP	EPA 8270C	2-Methyl-4,6-dinitrophenol (4,6-Dinitro-2-methylphenol)	NPW	MN	
RCRP	EPA 8270C	2-Methylnaphthalene	SCM	MN	
RCRP	EPA 8270C	2-Methylnaphthalene	NPW	MN	
RCRP	EPA 8270C	2-Methylphenol (o-Cresol)	SCM	MN	
RCRP	EPA 8270C	2-Methylphenol (o-Cresol)	NPW	MN	
RCRP	EPA 8270C	2-Nitroaniline	SCM	MN	
RCRP	EPA 8270C	2-Nitroaniline	NPW	MN	
RCRP	EPA 8270C	2-Nitrophenol	NPW	MN	
RCRP	EPA 8270C	2-Nitrophenol	SCM	MN	
RCRP	EPA 8270C	3,3'-Dichlorobenzidine	NPW	MN	
RCRP	EPA 8270C	3,3'-Dichlorobenzidine	SCM	MN	
RCRP	EPA 8270C	3-Methylphenol (m-Cresol)	SCM	MN	
RCRP	EPA 8270C	3-Methylphenol (m-Cresol)	NPW	MN	
RCRP	EPA 8270C	3-Nitroaniline	NPW	MN	
RCRP	EPA 8270C	3-Nitroaniline	SCM	MN	
RCRP	EPA 8270C	4-Bromophenyl phenyl ether	SCM	MN	
RCRP	EPA 8270C	4-Bromophenyl phenyl ether	NPW	MN	
RCRP	EPA 8270C	4-Chloro-3-methylphenol	SCM	MN	
RCRP	EPA 8270C	4-Chloro-3-methylphenol	NPW	MN	
RCRP	EPA 8270C	4-Chloroaniline	NPW	MN	
RCRP	EPA 8270C	4-Chloroaniline	SCM	MN	
RCRP	EPA 8270C	4-Chlorophenyl phenylether	SCM	MN	
RCRP	EPA 8270C	4-Chlorophenyl phenylether	NPW	MN	
RCRP	EPA 8270C	4-Methylphenol (p-Cresol)	NPW	MN	
RCRP	EPA 8270C	4-Methylphenol (p-Cresol)	SCM	MN	
RCRP	EPA 8270C	4-Nitroaniline	NPW	MN	
RCRP	EPA 8270C	4-Nitroaniline	SCM	MN	
RCRP	EPA 8270C	4-Nitrophenol	NPW	MN	
RCRP	EPA 8270C	4-Nitrophenol	SCM	MN	
RCRP	EPA 8270C	Acenaphthene	NPW	MN	
RCRP	EPA 8270C	Acenaphthene	SCM	MN	
RCRP	EPA 8270C	Acenaphthylene	SCM	MN	
RCRP	EPA 8270C	Acenaphthylene	NPW	MN	
RCRP	EPA 8270C	Anthracene	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C	Anthracene	NPW	MN	
RCRP	EPA 8270C	Benzidine	NPW	MN	
RCRP	EPA 8270C	Benzidine	SCM	MN	
RCRP	EPA 8270C	Benzo(a)anthracene	NPW	MN	
RCRP	EPA 8270C	Benzo(a)anthracene	SCM	MN	
RCRP	EPA 8270C	Benzo(a)pyrene	SCM	MN	
RCRP	EPA 8270C	Benzo(a)pyrene	NPW	MN	
RCRP	EPA 8270C	Benzo(g,h,i)perylene	NPW	MN	
RCRP	EPA 8270C	Benzo(g,h,i)perylene	SCM	MN	
RCRP	EPA 8270C	Benzo(k)fluoranthene	SCM	MN	
RCRP	EPA 8270C	Benzo(k)fluoranthene	NPW	MN	
RCRP	EPA 8270C	Benzo[b]fluoranthene	SCM	MN	
RCRP	EPA 8270C	Benzo[b]fluoranthene	NPW	MN	
RCRP	EPA 8270C	Benzoic acid	NPW	MN	
RCRP	EPA 8270C	Benzoic acid	SCM	MN	
RCRP	EPA 8270C	Benzyl alcohol	NPW	MN	
RCRP	EPA 8270C	Benzyl alcohol	SCM	MN	
RCRP	EPA 8270C	bis(2-Chloroethoxy)methane	SCM	MN	
RCRP	EPA 8270C	bis(2-Chloroethoxy)methane	NPW	MN	
RCRP	EPA 8270C	bis(2-Chloroethyl) ether	NPW	MN	
RCRP	EPA 8270C	bis(2-Chloroethyl) ether	SCM	MN	
RCRP	EPA 8270C	bis(2-Chloroisopropyl) ether	NPW	MN	
RCRP	EPA 8270C	bis(2-Chloroisopropyl) ether	SCM	MN	
RCRP	EPA 8270C	Butyl benzyl phthalate	SCM	MN	
RCRP	EPA 8270C	Butyl benzyl phthalate	NPW	MN	
RCRP	EPA 8270C	Chrysene	NPW	MN	
RCRP	EPA 8270C	Chrysene	SCM	MN	
RCRP	EPA 8270C	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	SCM	MN	
RCRP	EPA 8270C	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	NPW	MN	
RCRP	EPA 8270C	Di-n-butyl phthalate	SCM	MN	
RCRP	EPA 8270C	Di-n-butyl phthalate	NPW	MN	
RCRP	EPA 8270C	Di-n-octyl phthalate	NPW	MN	
RCRP	EPA 8270C	Di-n-octyl phthalate	SCM	MN	
RCRP	EPA 8270C	Dibenz(a,h) anthracene	NPW	MN	
RCRP	EPA 8270C	Dibenz(a,h) anthracene	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C	Dibenzofuran	SCM	MN	
RCRP	EPA 8270C	Dibenzofuran	NPW	MN	
RCRP	EPA 8270C	Diethyl phthalate	SCM	MN	
RCRP	EPA 8270C	Diethyl phthalate	NPW	MN	
RCRP	EPA 8270C	Dimethyl phthalate	NPW	MN	
RCRP	EPA 8270C	Dimethyl phthalate	SCM	MN	
RCRP	EPA 8270C	Fluoranthene	NPW	MN	
RCRP	EPA 8270C	Fluoranthene	SCM	MN	
RCRP	EPA 8270C	Fluorene	SCM	MN	
RCRP	EPA 8270C	Fluorene	NPW	MN	
RCRP	EPA 8270C	Hexachlorobenzene	NPW	MN	
RCRP	EPA 8270C	Hexachlorobenzene	SCM	MN	
RCRP	EPA 8270C	Hexachlorobutadiene	SCM	MN	
RCRP	EPA 8270C	Hexachlorobutadiene	NPW	MN	
RCRP	EPA 8270C	Hexachlorocyclopentadiene	SCM	MN	
RCRP	EPA 8270C	Hexachlorocyclopentadiene	NPW	MN	
RCRP	EPA 8270C	Hexachloroethane	NPW	MN	
RCRP	EPA 8270C	Hexachloroethane	SCM	MN	
RCRP	EPA 8270C	Indeno(1,2,3-cd) pyrene	NPW	MN	
RCRP	EPA 8270C	Indeno(1,2,3-cd) pyrene	SCM	MN	
RCRP	EPA 8270C	Isophorone	NPW	MN	
RCRP	EPA 8270C	Isophorone	SCM	MN	
RCRP	EPA 8270C	n-Nitrosodi-n-propylamine	SCM	MN	
RCRP	EPA 8270C	n-Nitrosodi-n-propylamine	NPW	MN	
RCRP	EPA 8270C	n-Nitrosodimethylamine	SCM	MN	
RCRP	EPA 8270C	n-Nitrosodimethylamine	NPW	MN	
RCRP	EPA 8270C	n-Nitrosodiphenylamine	SCM	MN	
RCRP	EPA 8270C	n-Nitrosodiphenylamine	NPW	MN	
RCRP	EPA 8270C	Naphthalene	SCM	MN	
RCRP	EPA 8270C	Naphthalene	NPW	MN	
RCRP	EPA 8270C	Nitrobenzene	NPW	MN	
RCRP	EPA 8270C	Nitrobenzene	SCM	MN	
RCRP	EPA 8270C	Pentachlorophenol	NPW	MN	
RCRP	EPA 8270C	Pentachlorophenol	SCM	MN	
RCRP	EPA 8270C	Phenanthrene	NPW	MN	
RCRP	EPA 8270C	Phenanthrene	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C	Phenol	SCM	MN	
RCRP	EPA 8270C	Phenol	NPW	MN	
RCRP	EPA 8270C	Pyrene	NPW	MN	
RCRP	EPA 8270C	Pyrene	SCM	MN	
RCRP	EPA 8270C	Pyridine	NPW	MN	
RCRP	EPA 8270C	Pyridine	SCM	MN	

EPA 8270C SIM

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270C SIM	Benzo(a)anthracene	SCM	MN	
RCRP	EPA 8270C SIM	Benzo(a)anthracene	NPW	MN	
RCRP	EPA 8270C SIM	Benzo(a)pyrene	NPW	MN	
RCRP	EPA 8270C SIM	Benzo(a)pyrene	SCM	MN	
RCRP	EPA 8270C SIM	Benzo(j)fluoranthene	SCM	MN	
RCRP	EPA 8270C SIM	Benzo(j)fluoranthene	NPW	MN	
RCRP	EPA 8270C SIM	Benzo(k)fluoranthene	NPW	MN	
RCRP	EPA 8270C SIM	Benzo(k)fluoranthene	SCM	MN	
RCRP	EPA 8270C SIM	Benzo[b]fluoranthene	NPW	MN	
RCRP	EPA 8270C SIM	Benzo[b]fluoranthene	SCM	MN	
RCRP	EPA 8270C SIM	Dibenz(a,h) anthracene	NPW	MN	
RCRP	EPA 8270C SIM	Dibenz(a,h) anthracene	SCM	MN	
RCRP	EPA 8270C SIM	Fluoranthene	SCM	MN	
RCRP	EPA 8270C SIM	Fluoranthene	NPW	MN	
RCRP	EPA 8270C SIM	Indeno(1,2,3-cd) pyrene	NPW	MN	
RCRP	EPA 8270C SIM	Indeno(1,2,3-cd) pyrene	SCM	MN	
RCRP	EPA 8270C SIM	Pyrene	SCM	MN	
RCRP	EPA 8270C SIM	Pyrene	NPW	MN	

EPA 8270D

Preparation Techniques: Extraction, EPA 1311 TCLP, non-volatiles; Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic; Extraction, EPA 1312 SPLP, non-volatiles; Extraction, continuous liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D	1,2,4-Trichlorobenzene	SCM	MN	
RCRP	EPA 8270D	1,2,4-Trichlorobenzene	NPW	MN	
RCRP	EPA 8270D	1,2-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D	1,2-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D	1,2-Diphenylhydrazine	NPW	MN	
RCRP	EPA 8270D	1,2-Diphenylhydrazine	SCM	MN	
RCRP	EPA 8270D	1,3-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D	1,3-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D	1,4-Dichlorobenzene	NPW	MN	
RCRP	EPA 8270D	1,4-Dichlorobenzene	SCM	MN	
RCRP	EPA 8270D	2,4,5-Trichlorophenol	SCM	MN	
RCRP	EPA 8270D	2,4,5-Trichlorophenol	NPW	MN	
RCRP	EPA 8270D	2,4,6-Trichlorophenol	NPW	MN	
RCRP	EPA 8270D	2,4,6-Trichlorophenol	SCM	MN	
RCRP	EPA 8270D	2,4-Dichlorophenol	SCM	MN	
RCRP	EPA 8270D	2,4-Dichlorophenol	NPW	MN	
RCRP	EPA 8270D	2,4-Dimethylphenol	NPW	MN	
RCRP	EPA 8270D	2,4-Dimethylphenol	SCM	MN	
RCRP	EPA 8270D	2,4-Dinitrophenol	NPW	MN	
RCRP	EPA 8270D	2,4-Dinitrophenol	SCM	MN	
RCRP	EPA 8270D	2,4-Dinitrotoluene (2,4-DNT)	SCM	MN	
RCRP	EPA 8270D	2,4-Dinitrotoluene (2,4-DNT)	NPW	MN	
RCRP	EPA 8270D	2,6-Dinitrotoluene (2,6-DNT)	SCM	MN	
RCRP	EPA 8270D	2,6-Dinitrotoluene (2,6-DNT)	NPW	MN	
RCRP	EPA 8270D	2-Chloronaphthalene	NPW	MN	
RCRP	EPA 8270D	2-Chloronaphthalene	SCM	MN	
RCRP	EPA 8270D	2-Chlorophenol	SCM	MN	
RCRP	EPA 8270D	2-Chlorophenol	NPW	MN	
RCRP	EPA 8270D	2-Methylnaphthalene	NPW	MN	
RCRP	EPA 8270D	2-Methylnaphthalene	SCM	MN	
RCRP	EPA 8270D	2-Methylphenol (o-Cresol)	SCM	MN	
RCRP	EPA 8270D	2-Methylphenol (o-Cresol)	NPW	MN	
RCRP	EPA 8270D	2-Nitroaniline	SCM	MN	
RCRP	EPA 8270D	2-Nitroaniline	NPW	MN	
RCRP	EPA 8270D	2-Nitrophenol	SCM	MN	
RCRP	EPA 8270D	2-Nitrophenol	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D	3,3'-Dichlorobenzidine	NPW	MN	
RCRP	EPA 8270D	3,3'-Dichlorobenzidine	SCM	MN	
RCRP	EPA 8270D	3-Methylcholanthrene	SCM	MN	
RCRP	EPA 8270D	3-Methylcholanthrene	NPW	MN	
RCRP	EPA 8270D	3-Methylphenol (m-Cresol)	SCM	MN	
RCRP	EPA 8270D	3-Methylphenol (m-Cresol)	NPW	MN	
RCRP	EPA 8270D	3-Nitroaniline	NPW	MN	
RCRP	EPA 8270D	3-Nitroaniline	SCM	MN	
RCRP	EPA 8270D	4,6-Dinitro-2-methylphenol	NPW	MN	
RCRP	EPA 8270D	4,6-Dinitro-2-methylphenol	SCM	MN	
RCRP	EPA 8270D	4-Bromophenyl phenyl ether	SCM	MN	
RCRP	EPA 8270D	4-Bromophenyl phenyl ether	NPW	MN	
RCRP	EPA 8270D	4-Chloro-3-methylphenol	SCM	MN	
RCRP	EPA 8270D	4-Chloro-3-methylphenol	NPW	MN	
RCRP	EPA 8270D	4-Chloroaniline	SCM	MN	
RCRP	EPA 8270D	4-Chloroaniline	NPW	MN	
RCRP	EPA 8270D	4-Chlorophenyl phenylether	NPW	MN	
RCRP	EPA 8270D	4-Chlorophenyl phenylether	SCM	MN	
RCRP	EPA 8270D	4-Methylphenol (p-Cresol)	SCM	MN	
RCRP	EPA 8270D	4-Methylphenol (p-Cresol)	NPW	MN	
RCRP	EPA 8270D	4-Nitroaniline	NPW	MN	
RCRP	EPA 8270D	4-Nitroaniline	SCM	MN	
RCRP	EPA 8270D	4-Nitrophenol	NPW	MN	
RCRP	EPA 8270D	4-Nitrophenol	SCM	MN	
RCRP	EPA 8270D	7,12-Dimethylbenz(a) anthracene	SCM	MN	
RCRP	EPA 8270D	7,12-Dimethylbenz(a) anthracene	NPW	MN	
RCRP	EPA 8270D	Acenaphthene	NPW	MN	
RCRP	EPA 8270D	Acenaphthene	SCM	MN	
RCRP	EPA 8270D	Acenaphthylene	SCM	MN	
RCRP	EPA 8270D	Acenaphthylene	NPW	MN	
RCRP	EPA 8270D	Anthracene	SCM	MN	
RCRP	EPA 8270D	Anthracene	NPW	MN	
RCRP	EPA 8270D	Benzidine	NPW	MN	
RCRP	EPA 8270D	Benzidine	SCM	MN	
RCRP	EPA 8270D	Benzo(a)anthracene	SCM	MN	
RCRP	EPA 8270D	Benzo(a)anthracene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D	Benzo(a)pyrene	NPW	MN	
RCRP	EPA 8270D	Benzo(a)pyrene	SCM	MN	
RCRP	EPA 8270D	Benzo(g,h,i)perylene	NPW	MN	
RCRP	EPA 8270D	Benzo(g,h,i)perylene	SCM	MN	
RCRP	EPA 8270D	Benzo(k)fluoranthene	SCM	MN	
RCRP	EPA 8270D	Benzo(k)fluoranthene	NPW	MN	
RCRP	EPA 8270D	Benzo[b]fluoranthene	SCM	MN	
RCRP	EPA 8270D	Benzo[b]fluoranthene	NPW	MN	
RCRP	EPA 8270D	Benzoic acid	SCM	MN	
RCRP	EPA 8270D	Benzoic acid	NPW	MN	
RCRP	EPA 8270D	Benzyl alcohol	SCM	MN	
RCRP	EPA 8270D	Benzyl alcohol	NPW	MN	
RCRP	EPA 8270D	bis(2-Chloroethoxy)methane	SCM	MN	
RCRP	EPA 8270D	bis(2-Chloroethoxy)methane	NPW	MN	
RCRP	EPA 8270D	bis(2-Chloroethyl) ether	SCM	MN	
RCRP	EPA 8270D	bis(2-Chloroethyl) ether	NPW	MN	
RCRP	EPA 8270D	bis(2-Chloroisopropyl) ether	SCM	MN	
RCRP	EPA 8270D	bis(2-Chloroisopropyl) ether	NPW	MN	
RCRP	EPA 8270D	Butyl benzyl phthalate	SCM	MN	
RCRP	EPA 8270D	Butyl benzyl phthalate	NPW	MN	
RCRP	EPA 8270D	Carbazole	SCM	MN	
RCRP	EPA 8270D	Carbazole	NPW	MN	
RCRP	EPA 8270D	Chrysene	SCM	MN	
RCRP	EPA 8270D	Chrysene	NPW	MN	
RCRP	EPA 8270D	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	SCM	MN	
RCRP	EPA 8270D	Di(2-ethylhexyl) phthalate (bis(2-Ethylhexyl)phthalate, DEHP)	NPW	MN	
RCRP	EPA 8270D	Di-n-butyl phthalate	SCM	MN	
RCRP	EPA 8270D	Di-n-butyl phthalate	NPW	MN	
RCRP	EPA 8270D	Di-n-octyl phthalate	SCM	MN	
RCRP	EPA 8270D	Di-n-octyl phthalate	NPW	MN	
RCRP	EPA 8270D	Dibenz(a, j) acridine	NPW	MN	
RCRP	EPA 8270D	Dibenz(a, j) acridine	SCM	MN	
RCRP	EPA 8270D	Dibenz(a,h) anthracene	NPW	MN	
RCRP	EPA 8270D	Dibenz(a,h) anthracene	SCM	MN	
RCRP	EPA 8270D	Dibenzo(a,e) pyrene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D	Dibenzo(a,e) pyrene	SCM	MN	
RCRP	EPA 8270D	Dibenzofuran	NPW	MN	
RCRP	EPA 8270D	Dibenzofuran	SCM	MN	
RCRP	EPA 8270D	Diethyl phthalate	SCM	MN	
RCRP	EPA 8270D	Diethyl phthalate	NPW	MN	
RCRP	EPA 8270D	Dimethyl phthalate	SCM	MN	
RCRP	EPA 8270D	Dimethyl phthalate	NPW	MN	
RCRP	EPA 8270D	Fluoranthene	SCM	MN	
RCRP	EPA 8270D	Fluoranthene	NPW	MN	
RCRP	EPA 8270D	Fluorene	NPW	MN	
RCRP	EPA 8270D	Fluorene	SCM	MN	
RCRP	EPA 8270D	Hexachlorobenzene	NPW	MN	
RCRP	EPA 8270D	Hexachlorobenzene	SCM	MN	
RCRP	EPA 8270D	Hexachlorobutadiene	SCM	MN	
RCRP	EPA 8270D	Hexachlorobutadiene	NPW	MN	
RCRP	EPA 8270D	Hexachlorocyclopentadiene	SCM	MN	
RCRP	EPA 8270D	Hexachlorocyclopentadiene	NPW	MN	
RCRP	EPA 8270D	Hexachloroethane	SCM	MN	
RCRP	EPA 8270D	Hexachloroethane	NPW	MN	
RCRP	EPA 8270D	Indeno(1,2,3-cd) pyrene	SCM	MN	
RCRP	EPA 8270D	Indeno(1,2,3-cd) pyrene	NPW	MN	
RCRP	EPA 8270D	Isophorone	NPW	MN	
RCRP	EPA 8270D	Isophorone	SCM	MN	
RCRP	EPA 8270D	n-Nitrosodi-n-propylamine	SCM	MN	
RCRP	EPA 8270D	n-Nitrosodi-n-propylamine	NPW	MN	
RCRP	EPA 8270D	n-Nitrosodimethylamine	NPW	MN	
RCRP	EPA 8270D	n-Nitrosodimethylamine	SCM	MN	
RCRP	EPA 8270D	n-Nitrosodiphenylamine	SCM	MN	
RCRP	EPA 8270D	n-Nitrosodiphenylamine	NPW	MN	
RCRP	EPA 8270D	Naphthalene	NPW	MN	
RCRP	EPA 8270D	Naphthalene	SCM	MN	
RCRP	EPA 8270D	Nitrobenzene	NPW	MN	
RCRP	EPA 8270D	Nitrobenzene	SCM	MN	
RCRP	EPA 8270D	Pentachlorophenol	SCM	MN	
RCRP	EPA 8270D	Pentachlorophenol	NPW	MN	
RCRP	EPA 8270D	Phenanthrene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D	Phenanthrene	SCM	MN	
RCRP	EPA 8270D	Phenol	SCM	MN	
RCRP	EPA 8270D	Phenol	NPW	MN	
RCRP	EPA 8270D	Pyrene	SCM	MN	
RCRP	EPA 8270D	Pyrene	NPW	MN	
RCRP	EPA 8270D	Pyridine	NPW	MN	
RCRP	EPA 8270D	Pyridine	SCM	MN	
RCRP	EPA 8270D	Quinoline	NPW	MN	
RCRP	EPA 8270D	Quinoline	SCM	MN	

EPA 8270D SIM

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE); Extraction, ultrasonic;

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D SIM	1-Methylnaphthalene	SCM	MN	
RCRP	EPA 8270D SIM	1-Methylnaphthalene	NPW	MN	
RCRP	EPA 8270D SIM	2-Chloronaphthalene	SCM	MN	
RCRP	EPA 8270D SIM	2-Chloronaphthalene	NPW	MN	
RCRP	EPA 8270D SIM	2-Methylnaphthalene	SCM	MN	
RCRP	EPA 8270D SIM	2-Methylnaphthalene	NPW	MN	
RCRP	EPA 8270D SIM	Acenaphthene	SCM	MN	
RCRP	EPA 8270D SIM	Acenaphthene	NPW	MN	
RCRP	EPA 8270D SIM	Acenaphthylene	SCM	MN	
RCRP	EPA 8270D SIM	Acenaphthylene	NPW	MN	
RCRP	EPA 8270D SIM	Anthracene	NPW	MN	
RCRP	EPA 8270D SIM	Anthracene	SCM	MN	
RCRP	EPA 8270D SIM	Benzo(a)anthracene	NPW	MN	
RCRP	EPA 8270D SIM	Benzo(a)anthracene	SCM	MN	
RCRP	EPA 8270D SIM	Benzo(a)pyrene	NPW	MN	
RCRP	EPA 8270D SIM	Benzo(a)pyrene	SCM	MN	
RCRP	EPA 8270D SIM	Benzo(g,h,i)perylene	NPW	MN	
RCRP	EPA 8270D SIM	Benzo(g,h,i)perylene	SCM	MN	
RCRP	EPA 8270D SIM	Benzo(k)fluoranthene	SCM	MN	
RCRP	EPA 8270D SIM	Benzo(k)fluoranthene	NPW	MN	
RCRP	EPA 8270D SIM	Benzo[b]fluoranthene	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8270D SIM	Benzo[b]fluoranthene	SCM	MN	
RCRP	EPA 8270D SIM	Chrysene	NPW	MN	
RCRP	EPA 8270D SIM	Chrysene	SCM	MN	
RCRP	EPA 8270D SIM	Dibenz(a,h) anthracene	SCM	MN	
RCRP	EPA 8270D SIM	Dibenz(a,h) anthracene	NPW	MN	
RCRP	EPA 8270D SIM	Dibenzofuran	SCM	MN	
RCRP	EPA 8270D SIM	Dibenzofuran	NPW	MN	
RCRP	EPA 8270D SIM	Fluoranthene	SCM	MN	
RCRP	EPA 8270D SIM	Fluoranthene	NPW	MN	
RCRP	EPA 8270D SIM	Fluorene	SCM	MN	
RCRP	EPA 8270D SIM	Fluorene	NPW	MN	
RCRP	EPA 8270D SIM	Indeno(1,2,3-cd) pyrene	NPW	MN	
RCRP	EPA 8270D SIM	Indeno(1,2,3-cd) pyrene	SCM	MN	
RCRP	EPA 8270D SIM	Naphthalene	NPW	MN	
RCRP	EPA 8270D SIM	Naphthalene	SCM	MN	
RCRP	EPA 8270D SIM	Phenanthrene	SCM	MN	
RCRP	EPA 8270D SIM	Phenanthrene	NPW	MN	
RCRP	EPA 8270D SIM	Pyrene	NPW	MN	
RCRP	EPA 8270D SIM	Pyrene	SCM	MN	
RCRP	EPA 8270D SIM	Quinoline	SCM	MN	
RCRP	EPA 8270D SIM	Quinoline	NPW	MN	

EPA 8280B

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8280B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NPW	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NPW	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8280B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8280B	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8280B	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8280B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8280B	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8280B	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	SCM	MN	
RCRP	EPA 8280B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	NPW	MN	
RCRP	EPA 8280B	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	SCM	MN	
RCRP	EPA 8280B	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	NPW	MN	
RCRP	EPA 8280B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	SCM	MN	
RCRP	EPA 8280B	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	NPW	MN	
RCRP	EPA 8280B	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	SCM	MN	
RCRP	EPA 8280B	2,3,4,6,7,8-Hexachlorodibenzofuran	SCM	MN	
RCRP	EPA 8280B	2,3,4,6,7,8-Hexachlorodibenzofuran	NPW	MN	
RCRP	EPA 8280B	2,3,4,7,8-Pentachlorodibenzofuran	NPW	MN	
RCRP	EPA 8280B	2,3,4,7,8-Pentachlorodibenzofuran	SCM	MN	
RCRP	EPA 8280B	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	NPW	MN	
RCRP	EPA 8280B	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8280B	2,3,7,8-Tetrachlorodibenzofuran	NPW	MN	
RCRP	EPA 8280B	2,3,7,8-Tetrachlorodibenzofuran	SCM	MN	
RCRP	EPA 8280B	Total HpCDD	NPW	MN	
RCRP	EPA 8280B	Total HpCDD	SCM	MN	
RCRP	EPA 8280B	Total HpCDF	SCM	MN	
RCRP	EPA 8280B	Total HpCDF	NPW	MN	
RCRP	EPA 8280B	Total HxCDD	NPW	MN	
RCRP	EPA 8280B	Total HxCDD	SCM	MN	
RCRP	EPA 8280B	Total HxCDF	SCM	MN	
RCRP	EPA 8280B	Total HxCDF	NPW	MN	
RCRP	EPA 8280B	Total PeCDD	NPW	MN	
RCRP	EPA 8280B	Total PeCDD	SCM	MN	
RCRP	EPA 8280B	Total PeCDF	NPW	MN	
RCRP	EPA 8280B	Total PeCDF	SCM	MN	
RCRP	EPA 8280B	Total TCDD	SCM	MN	
RCRP	EPA 8280B	Total TCDD	NPW	MN	
RCRP	EPA 8280B	Total TCDF	NPW	MN	
RCRP	EPA 8280B	Total TCDF	SCM	MN	

EPA 8290

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin(1,2,3,6,7,8-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	SCM	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	NPW	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	NPW	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	SCM	MN	
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	NPW	MN	
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	TISSUE	MN	
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	SCM	MN	
RCRP	EPA 8290	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	NPW	MN	
RCRP	EPA 8290	2,3,4,6,7,8-Hexachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290	2,3,4,6,7,8-Hexachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290	2,3,4,6,7,8-Hexachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290	2,3,4,7,8-Pentachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290	2,3,4,7,8-Pentachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290	2,3,4,7,8-Pentachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	SCM	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	NPW	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	TISSUE	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290	2,3,7,8-Tetrachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290	Total Heptachlorodibenzo-p- dioxin (HpCDD, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Heptachlorodibenzofuran (HpCDF, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Hexachlorodibenzo-p- dioxin (HxCDD, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Hexachlorodibenzofuran (HxCDF, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Hpcdd	NPW	MN	
RCRP	EPA 8290	Total Hpcdd	SCM	MN	
RCRP	EPA 8290	Total Hpcdf	SCM	MN	
RCRP	EPA 8290	Total Hpcdf	NPW	MN	
RCRP	EPA 8290	Total Hxcdd	SCM	MN	
RCRP	EPA 8290	Total Hxcdd	NPW	MN	
RCRP	EPA 8290	Total Hxcdf	SCM	MN	
RCRP	EPA 8290	Total Hxcdf	NPW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290	Total Pecdd	SCM	MN	
RCRP	EPA 8290	Total Pecdd	NPW	MN	
RCRP	EPA 8290	Total Pecdf	SCM	MN	
RCRP	EPA 8290	Total Pecdf	NPW	MN	
RCRP	EPA 8290	Total Pentachlorodibenzo-p-dioxin (PeCDD, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Pentachlorodibenzofuran (PeCDF, Total)	TISSUE	MN	
RCRP	EPA 8290	Total TCDD	SCM	MN	
RCRP	EPA 8290	Total TCDD	NPW	MN	
RCRP	EPA 8290	Total TCDF	SCM	MN	
RCRP	EPA 8290	Total TCDF	NPW	MN	
RCRP	EPA 8290	Total Tetrachlorodibenzo-p-dioxin (TCDD, Total)	TISSUE	MN	
RCRP	EPA 8290	Total Tetrachlorodibenzofuran (TCDF, Total)	TISSUE	MN	

EPA 8290A

Preparation Techniques: Extraction, soxhlet; Extraction, separatory funnel liquid-liquid (LLE);

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (1,2,3,4,6,7,8-hpcdd)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290A	1,2,3,4,6,7,8-Heptachlorodibenzofuran (1,2,3,4,6,7,8-hpcdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,7,8,9-Heptachlorodibenzofuran (1,2,3,4,7,8,9-hpcdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,4,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,4,7,8-Hexachlorodibenzofuran (1,2,3,4,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	NPW	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (1,2,3,6,7,8-Hxcdd)	SCM	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,6,7,8-Hexachlorodibenzofuran (1,2,3,6,7,8-Hxcdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	SCM	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	NPW	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (1,2,3,7,8,9-Hxcdd)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,7,8,9-Hexachlorodibenzofuran (1,2,3,7,8,9-Hxcdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	NPW	MN	
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	TISSUE	MN	
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (1,2,3,7,8-Pecdd)	SCM	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	SCM	MN	
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	NPW	MN	
RCRP	EPA 8290A	1,2,3,7,8-Pentachlorodibenzofuran (1,2,3,7,8-Pecdf)	TISSUE	MN	
RCRP	EPA 8290A	2,3,4,6,7,8-Hexachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290A	2,3,4,6,7,8-Hexachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290A	2,3,4,6,7,8-Hexachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290A	2,3,4,7,8-Pentachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290A	2,3,4,7,8-Pentachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290A	2,3,4,7,8-Pentachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	SCM	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	TISSUE	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	NPW	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzofuran	SCM	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzofuran	TISSUE	MN	
RCRP	EPA 8290A	2,3,7,8-Tetrachlorodibenzofuran	NPW	MN	
RCRP	EPA 8290A	Total Heptachlorodibenzo-p-dioxin (HpCDD, Total)	NPW	MN	
RCRP	EPA 8290A	Total Heptachlorodibenzo-p-dioxin (HpCDD, Total)	SCM	MN	
RCRP	EPA 8290A	Total Heptachlorodibenzofuran (HpCDF, Total)	NPW	MN	
RCRP	EPA 8290A	Total Heptachlorodibenzofuran (HpCDF, Total)	SCM	MN	
RCRP	EPA 8290A	Total Hexachlorodibenzo-p-dioxin (HxCDD, Total)	NPW	MN	
RCRP	EPA 8290A	Total Hexachlorodibenzo-p-dioxin (HxCDD, Total)	SCM	MN	
RCRP	EPA 8290A	Total Hexachlorodibenzofuran (HxCDF, Total)	SCM	MN	
RCRP	EPA 8290A	Total Hexachlorodibenzofuran (HxCDF, Total)	NPW	MN	
RCRP	EPA 8290A	Total HpCDD	TISSUE	MN	
RCRP	EPA 8290A	Total HpCDF	TISSUE	MN	
RCRP	EPA 8290A	Total HxCDD	TISSUE	MN	
RCRP	EPA 8290A	Total HxCDF	TISSUE	MN	
RCRP	EPA 8290A	Total PeCDD	TISSUE	MN	
RCRP	EPA 8290A	Total PeCDF	TISSUE	MN	

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 8290A	Total Pentachlorodibenzo-p-dioxin (PeCDD, Total)	NPW	MN	
RCRP	EPA 8290A	Total Pentachlorodibenzo-p-dioxin (PeCDD, Total)	SCM	MN	
RCRP	EPA 8290A	Total Pentachlorodibenzofuran (PeCDF, Total)	NPW	MN	
RCRP	EPA 8290A	Total Pentachlorodibenzofuran (PeCDF, Total)	SCM	MN	
RCRP	EPA 8290A	Total TCDD	TISSUE	MN	
RCRP	EPA 8290A	Total TCDF	TISSUE	MN	
RCRP	EPA 8290A	Total Tetrachlorodibenzo-p-dioxin (TCDD, Total)	SCM	MN	
RCRP	EPA 8290A	Total Tetrachlorodibenzo-p-dioxin (TCDD, Total)	NPW	MN	
RCRP	EPA 8290A	Total Tetrachlorodibenzofuran (TCDF, Total)	NPW	MN	
RCRP	EPA 8290A	Total Tetrachlorodibenzofuran (TCDF, Total)	SCM	MN	

EPA 9045D

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 9045D	pH	SCM	MN	

EPA 9071B

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 9071B	n-Hexane Extractable Material (O&G)	SCM	MN	
RCRP	EPA 9071B	Oil & Grease	SCM	MN	

EPA 9095B

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA 9095B	Paint Filter Liquids Test	SCM	MN	

EPA RSK-175 (GC/FID)

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
RCRP	EPA RSK-175 (GC/FID)	Ethane	NPW	MN	
RCRP	EPA RSK-175 (GC/FID)	Ethene	NPW	MN	
RCRP	EPA RSK-175 (GC/FID)	Methane	NPW	MN	

Safe Drinking Water Program

ASTM D516-90

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	ASTM D516-90	Sulfate	DW	MN	

EPA 1613

Preparation Techniques: Extraction, separatory funnel liquid-liquid (LLE); Extraction, solid phase (SPE); Extraction, automated soxhlet;

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 1613	2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD)	DW	MN	

EPA 180.1

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 180.1	Turbidity	DW	MN	

EPA 200.8

Preparation Techniques: Digestion, hotplate or HotBlock;

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 200.8	Aluminum	DW	MN	
SDWP	EPA 200.8	Antimony	DW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 200.8	Arsenic	DW	MN	
SDWP	EPA 200.8	Barium	DW	MN	
SDWP	EPA 200.8	Beryllium	DW	MN	
SDWP	EPA 200.8	Cadmium	DW	MN	
SDWP	EPA 200.8	Chromium	DW	MN	
SDWP	EPA 200.8	Copper	DW	MN	
SDWP	EPA 200.8	Lead	DW	MN	
SDWP	EPA 200.8	Manganese	DW	MN	
SDWP	EPA 200.8	Mercury	DW	MN	
SDWP	EPA 200.8	Nickel	DW	MN	
SDWP	EPA 200.8	Selenium	DW	MN	
SDWP	EPA 200.8	Silver	DW	MN	
SDWP	EPA 200.8	Thallium	DW	MN	
SDWP	EPA 200.8	Zinc	DW	MN	

EPA 245.1

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 245.1	Mercury	DW	MN	

EPA 300.0

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 300.0	Chloride	DW	MN	
SDWP	EPA 300.0	Fluoride	DW	MN	
SDWP	EPA 300.0	Nitrate	DW	MN	
SDWP	EPA 300.0	Nitrite	DW	MN	
SDWP	EPA 300.0	Sulfate	DW	MN	

EPA 353.2

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 353.2	Nitrate	DW	MN	
SDWP	EPA 353.2	Nitrite	DW	MN	

EPA 524.2

Preparation Techniques: Purge and trap;

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 524.2	1,1,1,2-Tetrachloroethane	DW	MN	
SDWP	EPA 524.2	1,1,1-Trichloroethane	DW	MN	
SDWP	EPA 524.2	1,1,2,2-Tetrachloroethane	DW	MN	
SDWP	EPA 524.2	1,1,2-Trichloroethane	DW	MN	
SDWP	EPA 524.2	1,1-Dichloroethane	DW	MN	
SDWP	EPA 524.2	1,1-Dichloroethylene	DW	MN	
SDWP	EPA 524.2	1,1-Dichloropropene	DW	MN	
SDWP	EPA 524.2	1,2,3-Trichlorobenzene	DW	MN	
SDWP	EPA 524.2	1,2,3-Trichloropropane	DW	MN	
SDWP	EPA 524.2	1,2,4-Trichlorobenzene	DW	MN	
SDWP	EPA 524.2	1,2,4-Trimethylbenzene	DW	MN	
SDWP	EPA 524.2	1,2-Dichlorobenzene	DW	MN	
SDWP	EPA 524.2	1,2-Dichloroethane (Ethylene dichloride)	DW	MN	
SDWP	EPA 524.2	1,2-Dichloropropane	DW	MN	
SDWP	EPA 524.2	1,3,5-Trichlorobenzene	DW	MN	
SDWP	EPA 524.2	1,3-Dichlorobenzene	DW	MN	
SDWP	EPA 524.2	1,4-Dichlorobenzene	DW	MN	
SDWP	EPA 524.2	2,2-Dichloropropane	DW	MN	
SDWP	EPA 524.2	2-Chlorotoluene	DW	MN	
SDWP	EPA 524.2	4-Chlorotoluene	DW	MN	
SDWP	EPA 524.2	Benzene	DW	MN	
SDWP	EPA 524.2	Bromobenzene	DW	MN	
SDWP	EPA 524.2	Bromochloromethane	DW	MN	
SDWP	EPA 524.2	Bromodichloromethane	DW	MN	
SDWP	EPA 524.2	Bromoform	DW	MN	
SDWP	EPA 524.2	Bromomethane	DW	MN	
SDWP	EPA 524.2	Carbon tetrachloride	DW	MN	
SDWP	EPA 524.2	Chlorobenzene	DW	MN	

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	EPA 524.2	Chlorodibromomethane	DW	MN	
SDWP	EPA 524.2	Chloroethane (Ethyl chloride)	DW	MN	
SDWP	EPA 524.2	Chloroform	DW	MN	
SDWP	EPA 524.2	cis-1,2-Dichloroethylene	DW	MN	
SDWP	EPA 524.2	cis-1,3-Dichloropropene	DW	MN	
SDWP	EPA 524.2	Dibromomethane (Methylene bromide)	DW	MN	
SDWP	EPA 524.2	Dichlorodifluoromethane (Freon-12)	DW	MN	
SDWP	EPA 524.2	Ethylbenzene	DW	MN	
SDWP	EPA 524.2	Hexachlorobutadiene	DW	MN	
SDWP	EPA 524.2	Isopropylbenzene	DW	MN	
SDWP	EPA 524.2	Methyl chloride (Chloromethane)	DW	MN	
SDWP	EPA 524.2	Methyl tert-butyl ether (MTBE)	DW	MN	
SDWP	EPA 524.2	Methylene chloride (Dichloromethane)	DW	MN	
SDWP	EPA 524.2	n-Butylbenzene	DW	MN	
SDWP	EPA 524.2	n-Propylbenzene	DW	MN	
SDWP	EPA 524.2	Naphthalene	DW	MN	
SDWP	EPA 524.2	sec-Butylbenzene	DW	MN	
SDWP	EPA 524.2	Styrene	DW	MN	
SDWP	EPA 524.2	tert-Butylbenzene	DW	MN	
SDWP	EPA 524.2	Tetrachloroethylene (Perchloroethylene)	DW	MN	
SDWP	EPA 524.2	Toluene	DW	MN	
SDWP	EPA 524.2	Total Trihalomethanes	DW	MN	
SDWP	EPA 524.2	trans-1,2-Dichloroethylene	DW	MN	
SDWP	EPA 524.2	trans-1,3-Dichloropropylene	DW	MN	
SDWP	EPA 524.2	Trichloroethene (Trichloroethylene)	DW	MN	
SDWP	EPA 524.2	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	DW	MN	
SDWP	EPA 524.2	Vinyl chloride	DW	MN	
SDWP	EPA 524.2	Xylene (total)	DW	MN	

SM 2320 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 2320 B-97	Alkalinity as CaCO ₃	DW	MN	

SM 2340 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 2340 B-97	Hardness	DW	MN	

SM 2510 B-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 2510 B-97	Conductivity	DW	MN	

SM 2540 C-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 2540 C-97	Residue-filterable (TDS)	DW	MN	

SM 4500-Cl G-93

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-Cl G-93	Total chlorine	DW	MN	

SM 4500-CN⁻ E-97

Preparation Techniques: Distillation, macro; Distillation, micro; Distillation, MIDI;

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-CN ⁻ E-97	Cyanide	DW	MN	

SM 4500-F⁻ C-97

Preparation Techniques: N/A;

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-F ⁻ C-97	Fluoride	DW	MN	

SM 4500-H+ B-96

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-H+ B-96	pH	DW	MN	

SM 4500-NO₂⁻ B-93

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-NO ₂ ⁻ B-93	Nitrite	DW	MN	

SM 4500-P E-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 4500-P E-97	Orthophosphate as P	DW	MN	

SM 9215 B (R2A)-94

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 9215 B (R2A)-94	Heterotrophic plate count	DW	MN	

SM 9223 B (Colilert® Quanti-Tray®)-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 9223 B (Colilert® Quanti-Tray®)-97	Escherichia coli	DW	MN	
SDWP	SM 9223 B (Colilert® Quanti-Tray®)-97	Total coliforms	DW	MN	

SM 9223 B (Colilert®)-97

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
SDWP	SM 9223 B (Colilert®)-97	Escherichia coli	DW	MN	
SDWP	SM 9223 B (Colilert®)-97	Total coliforms	DW	MN	

Underground Storage Tank Program**EPA TO-15**

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
USTP	EPA TO-15	1,1,1-Trichloroethane	AIR	MN	
USTP	EPA TO-15	1,1,2,2-Tetrachloroethane	AIR	MN	
USTP	EPA TO-15	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	AIR	MN	
USTP	EPA TO-15	1,1,2-Trichloroethane	AIR	MN	
USTP	EPA TO-15	1,1-Dichloroethane	AIR	MN	
USTP	EPA TO-15	1,1-Dichloroethylene	AIR	MN	
USTP	EPA TO-15	1,2,4-Trichlorobenzene	AIR	MN	
USTP	EPA TO-15	1,2,4-Trimethylbenzene	AIR	MN	
USTP	EPA TO-15	1,2-Dibromoethane (EDB, Ethylene dibromide)	AIR	MN	
USTP	EPA TO-15	1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon-114)	AIR	MN	
USTP	EPA TO-15	1,2-Dichlorobenzene	AIR	MN	
USTP	EPA TO-15	1,2-Dichloroethane (Ethylene dichloride)	AIR	MN	
USTP	EPA TO-15	1,2-Dichloropropane	AIR	MN	
USTP	EPA TO-15	1,3,5-Trimethylbenzene	AIR	MN	
USTP	EPA TO-15	1,3-Butadiene	AIR	MN	
USTP	EPA TO-15	1,3-Dichlorobenzene	AIR	MN	
USTP	EPA TO-15	1,4-Dichlorobenzene	AIR	MN	
USTP	EPA TO-15	1-Propene	AIR	MN	
USTP	EPA TO-15	2-Butanone (Methyl ethyl ketone, MEK)	AIR	MN	
USTP	EPA TO-15	2-Hexanone	AIR	MN	
USTP	EPA TO-15	4-Ethyltoluene	AIR	MN	
USTP	EPA TO-15	4-Methyl-2-pentanone (MIBK)	AIR	MN	
USTP	EPA TO-15	Acetone	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
USTP	EPA TO-15	Benzene	AIR	MN	
USTP	EPA TO-15	Benzyl chloride	AIR	MN	
USTP	EPA TO-15	Bromodichloromethane	AIR	MN	
USTP	EPA TO-15	Bromoform	AIR	MN	
USTP	EPA TO-15	Carbon disulfide	AIR	MN	
USTP	EPA TO-15	Carbon tetrachloride	AIR	MN	
USTP	EPA TO-15	Chlorobenzene	AIR	MN	
USTP	EPA TO-15	Chlorodibromomethane	AIR	MN	
USTP	EPA TO-15	Chloroethane (Ethyl chloride)	AIR	MN	
USTP	EPA TO-15	Chloroform	AIR	MN	
USTP	EPA TO-15	cis-1,2-Dichloroethylene	AIR	MN	
USTP	EPA TO-15	cis-1,3-Dichloropropene	AIR	MN	
USTP	EPA TO-15	Cyclohexane	AIR	MN	
USTP	EPA TO-15	Dichlorodifluoromethane (Freon-12)	AIR	MN	
USTP	EPA TO-15	Ethanol	AIR	MN	
USTP	EPA TO-15	Ethyl acetate	AIR	MN	
USTP	EPA TO-15	Ethylbenzene	AIR	MN	
USTP	EPA TO-15	Hexachlorobutadiene	AIR	MN	
USTP	EPA TO-15	Isopropyl alcohol (2-Propanol, Isopropanol)	AIR	MN	
USTP	EPA TO-15	m+p-xylene	AIR	MN	
USTP	EPA TO-15	Methyl bromide (Bromomethane)	AIR	MN	
USTP	EPA TO-15	Methyl chloride (Chloromethane)	AIR	MN	
USTP	EPA TO-15	Methyl tert-butyl ether (MTBE)	AIR	MN	
USTP	EPA TO-15	Methylene chloride (Dichloromethane)	AIR	MN	
USTP	EPA TO-15	n-Heptane	AIR	MN	
USTP	EPA TO-15	n-Hexane	AIR	MN	
USTP	EPA TO-15	Naphthalene	AIR	MN	
USTP	EPA TO-15	o-Xylene	AIR	MN	
USTP	EPA TO-15	Styrene	AIR	MN	
USTP	EPA TO-15	Tetrachloroethylene (Perchloroethylene)	AIR	MN	
USTP	EPA TO-15	Tetrahydrofuran (THF)	AIR	MN	
USTP	EPA TO-15	Toluene	AIR	MN	
USTP	EPA TO-15	trans-1,2-Dichloroethylene	AIR	MN	
USTP	EPA TO-15	trans-1,3-Dichloropropylene	AIR	MN	
USTP	EPA TO-15	Trichloroethene (Trichloroethylene)	AIR	MN	

Program	Method	Analyte	Matrix	Primary	SOP
USTP	EPA TO-15	Trichlorofluoromethane (Fluorotrichloromethane, Freon 11)	AIR	MN	
USTP	EPA TO-15	Vinyl acetate	AIR	MN	
USTP	EPA TO-15	Vinyl chloride	AIR	MN	

WI(95) DRO

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
USTP	WI(95) DRO	Diesel range organics (DRO)	NPW	MN	
USTP	WI(95) DRO	Diesel range organics (DRO)	SCM	MN	

WI(95) GRO

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
USTP	WI(95) GRO	Gasoline range organics (GRO)	NPW	MN	
USTP	WI(95) GRO	Gasoline range organics (GRO)	SCM	MN	

WI(95) GRO

Preparation Techniques: N/A

Program	Method	Analyte	Matrix	Primary	SOP
USTP	WI(95) GRO	Petroleum Volatile Organic Compounds (PVOC)	NPW	MN	
USTP	WI(95) GRO	Petroleum Volatile Organic Compounds (PVOC)	SCM	MN	

Note: Method beginning with "SM" refer to the approved editions of Standard methods for the Examination of Water and Wastes. Approved methods are listed in the applicable parts of Title 40 of the Code of Federal Regulations (including its subsequent Federal Register updates), MN Statutes and Rules, and state-issued permits.



RON CHAPMAN, MD, MPH
Director & State Health Officer

State of California—Health and Human Services Agency
California Department of Public Health



EDMUND G. BROWN JR.
Governor

September 13, 2013

Sarah Cherney
Pace Analytical Services, Inc.- Minneapolis
1700 Elm Street, SE, Suite 200
Minneapolis, MN 55414

Dear Sarah Cherney:

Certificate No 01155CA

Enclosed is an updated copy of your certificate.

If you have any questions, please contact our office at (510) 620-3155.

Sincerely,

David Mazzera, Ph.D., Assistant Division Chief
Division of Drinking Water and Environmental Management

Enclosure



NELAP RECOGNIZED

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
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1700 Elm Street SE, Suite 200
Minneapolis, MN 55414
Phone: (612) 607-1700

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Renew Date: 8/31/2014

Primary AA: MN 027053137

102 - Inorganic Chemistry of Drinking Water

102.020	001	EPA 180.1	Turbidity
102.030	003	EPA 300.0	Chloride
102.030	005	EPA 300.0	Fluoride
102.030	006	EPA 300.0	Nitrate
102.030	007	EPA 300.0	Nitrite
102.030	010	EPA 300.0	Sulfate
102.060	001	EPA 353.2	Nitrate calc.
102.061	001	EPA 353.2	Nitrite
102.100	001	SM2320B	Alkalinity
102.120	001	SM2340B	Hardness
102.130	001	SM2510B	Conductivity
102.140	001	SM2540C	Total Dissolved Solids
102.163	001	SM4500-Cl G	Chlorine, Free and Total
102.190	001	SM4500-CN E	Cyanide, Total
102.200	001	SM4500-F C	Fluoride
102.210	001	SM4500-H+ B	pH
102.220	001	SM4500-NO2 B	Nitrite
102.240	001	SM4500-P E	Phosphate, Ortho

103 - Toxic Chemical Elements of Drinking Water

103.140	001	EPA 200.8	Aluminum
103.140	002	EPA 200.8	Antimony
103.140	003	EPA 200.8	Arsenic
103.140	004	EPA 200.8	Barium
103.140	005	EPA 200.8	Beryllium
103.140	006	EPA 200.8	Cadmium
103.140	007	EPA 200.8	Chromium
103.140	008	EPA 200.8	Copper
103.140	009	EPA 200.8	Lead
103.140	010	EPA 200.8	Manganese
103.140	011	EPA 200.8	Mercury
103.140	012	EPA 200.8	Nickel
103.140	013	EPA 200.8	Selenium
103.140	014	EPA 200.8	Silver

As of 9/13/2013, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

103.140	015	EPA 200.8	Thallium
103.140	016	EPA 200.8	Zinc
103.160	001	EPA 245.1	Mercury

104 - Volatile Organic Chemistry of Drinking Water

104.040	001	EPA 524.2	Benzene
104.040	002	EPA 524.2	Bromobenzene
104.040	003	EPA 524.2	Bromochloromethane
104.040	006	EPA 524.2	Bromomethane
104.040	007	EPA 524.2	n-Butylbenzene
104.040	008	EPA 524.2	sec-Butylbenzene
104.040	009	EPA 524.2	tert-Butylbenzene
104.040	010	EPA 524.2	Carbon Tetrachloride
104.040	011	EPA 524.2	Chlorobenzene
104.040	012	EPA 524.2	Chloroethane
104.040	014	EPA 524.2	Chloromethane
104.040	015	EPA 524.2	2-Chlorotoluene
104.040	016	EPA 524.2	4-Chlorotoluene
104.040	018	EPA 524.2	Dibromomethane
104.040	019	EPA 524.2	1,3-Dichlorobenzene
104.040	020	EPA 524.2	1,2-Dichlorobenzene
104.040	021	EPA 524.2	1,4-Dichlorobenzene
104.040	022	EPA 524.2	Dichlorodifluoromethane
104.040	023	EPA 524.2	1,1-Dichloroethane
104.040	024	EPA 524.2	1,2-Dichloroethane
104.040	025	EPA 524.2	1,1-Dichloroethene
104.040	026	EPA 524.2	cis-1,2-Dichloroethene
104.040	027	EPA 524.2	trans-1,2-Dichloroethene
104.040	028	EPA 524.2	Dichloromethane
104.040	029	EPA 524.2	1,2-Dichloropropane
104.040	031	EPA 524.2	2,2-Dichloropropane
104.040	032	EPA 524.2	1,1-Dichloropropene
104.040	033	EPA 524.2	cis-1,3-Dichloropropene
104.040	034	EPA 524.2	trans-1,3-Dichloropropene
104.040	035	EPA 524.2	Ethylbenzene
104.040	036	EPA 524.2	Hexachlorobutadiene
104.040	037	EPA 524.2	Isopropylbenzene
104.040	039	EPA 524.2	Naphthalene
104.040	041	EPA 524.2	N-propylbenzene
104.040	042	EPA 524.2	Styrene
104.040	043	EPA 524.2	1,1,1,2-Tetrachloroethane
104.040	044	EPA 524.2	1,1,2,2-Tetrachloroethane

104.040	045	EPA 524.2	Tetrachloroethene
104.040	046	EPA 524.2	Toluene
104.040	047	EPA 524.2	1,2,3-Trichlorobenzene
104.040	048	EPA 524.2	1,2,4-Trichlorobenzene
104.040	049	EPA 524.2	1,1,1-Trichloroethane
104.040	050	EPA 524.2	1,1,2-Trichloroethane
104.040	051	EPA 524.2	Trichloroethene
104.040	052	EPA 524.2	Trichlorofluoromethane
104.040	053	EPA 524.2	1,2,3-Trichloropropane
104.040	054	EPA 524.2	1,2,4-Trimethylbenzene
104.040	055	EPA 524.2	1,3,5-Trimethylbenzene
104.040	056	EPA 524.2	Vinyl Chloride
104.040	057	EPA 524.2	Xylenes, Total
104.045	001	EPA 524.2	Bromodichloromethane
104.045	002	EPA 524.2	Bromoform
104.045	003	EPA 524.2	Chloroform
104.045	004	EPA 524.2	Dibromochloromethane
104.045	005	EPA 524.2	Trihalomethanes
104.050	002	EPA 524.2	Methyl tert-butyl Ether (MTBE)

105 - Semi-volatile Organic Chemistry of Drinking Water

105.230	001	EPA 1613	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

108 - Inorganic Chemistry of Wastewater

108.020	001	EPA 120.1	Conductivity
108.090	001	EPA 160.4	Residue, Volatile
108.110	001	EPA 180.1	Turbidity
108.112	001	EPA 200.7	Boron
108.112	002	EPA 200.7	Calcium
108.112	003	EPA 200.7	Hardness (calculation)
108.112	004	EPA 200.7	Magnesium
108.112	005	EPA 200.7	Potassium
108.112	007	EPA 200.7	Sodium
108.113	001	EPA 200.8	Boron
108.113	002	EPA 200.8	Calcium
108.113	003	EPA 200.8	Magnesium
108.113	004	EPA 200.8	Potassium
108.113	006	EPA 200.8	Sodium
108.120	001	EPA 300.0	Bromide
108.120	002	EPA 300.0	Chloride
108.120	003	EPA 300.0	Fluoride
108.120	004	EPA 300.0	Nitrate
108.120	008	EPA 300.0	Sulfate

108.200	001	EPA 350.1	Ammonia
108.232	001	EPA 353.2	Nitrate-nitrite
108.232	002	EPA 353.2	Nitrite
108.323	001	EPA 410.4	Chemical Oxygen Demand
108.360	001	EPA 420.1	Phenols, Total
108.362	001	EPA 420.4	Phenols, Total
108.381	001	EPA 1664A	Oil and Grease
108.410	001	SM2320B	Alkalinity
108.420	001	SM2340B	Hardness (calculation)
108.430	001	SM2510B	Conductivity
108.440	001	SM2540B	Residue, Total
108.441	001	SM2540C	Residue, Filterable
108.442	001	SM2540D	Residue, Non-filterable
108.443	001	SM2540F	Residue, Settleable
108.452	001	SM4500-Cl- E	Chloride
108.472	001	SM4500-CN E	Cyanide, Total
108.473	001	SM4500-CN G	Cyanide, amenable
108.480	001	SM4500-F C	Fluoride
108.490	001	SM4500-H+ B	pH
108.510	001	SM4500-NO2 B	Nitrite
108.525	001	SM4500-NO3 H	Nitrate-nitrite
108.540	001	SM4500-P E-1999	Phosphate, Ortho
108.541	001	SM4500-P E-1999	Phosphorus, Total
108.602	001	SM5220D	Chemical Oxygen Demand
108.700	001	ASTM D516-90	Sulfate

109 - Toxic Chemical Elements of Wastewater

109.010	001	EPA 200.7	Aluminum
109.010	002	EPA 200.7	Antimony
109.010	003	EPA 200.7	Arsenic
109.010	004	EPA 200.7	Barium
109.010	005	EPA 200.7	Beryllium
109.010	007	EPA 200.7	Cadmium
109.010	009	EPA 200.7	Chromium
109.010	010	EPA 200.7	Cobalt
109.010	011	EPA 200.7	Copper
109.010	012	EPA 200.7	Iron
109.010	013	EPA 200.7	Lead
109.010	015	EPA 200.7	Manganese
109.010	016	EPA 200.7	Molybdenum
109.010	017	EPA 200.7	Nickel
109.010	019	EPA 200.7	Selenium

109.010	021	EPA 200.7	Silver
109.010	023	EPA 200.7	Thallium
109.010	024	EPA 200.7	Tin
109.010	026	EPA 200.7	Vanadium
109.010	027	EPA 200.7	Zinc
109.020	001	EPA 200.8	Aluminum
109.020	002	EPA 200.8	Antimony
109.020	003	EPA 200.8	Arsenic
109.020	004	EPA 200.8	Barium
109.020	005	EPA 200.8	Beryllium
109.020	006	EPA 200.8	Cadmium
109.020	007	EPA 200.8	Chromium
109.020	008	EPA 200.8	Cobalt
109.020	009	EPA 200.8	Copper
109.020	010	EPA 200.8	Lead
109.020	011	EPA 200.8	Manganese
109.020	012	EPA 200.8	Molybdenum
109.020	013	EPA 200.8	Nickel
109.020	014	EPA 200.8	Selenium
109.020	015	EPA 200.8	Silver
109.020	016	EPA 200.8	Thallium
109.020	017	EPA 200.8	Vanadium
109.020	018	EPA 200.8	Zinc
109.020	022	EPA 200.8	Tin
109.020	023	EPA 200.8	Titanium
109.190	001	EPA 245.1	Mercury
109.809	002	SM3500-Cr B (20th)	Chromium (VI)

110 - Volatile Organic Chemistry of Wastewater

110.040	001	EPA 624	Benzene
110.040	002	EPA 624	Bromodichloromethane
110.040	003	EPA 624	Bromoform
110.040	004	EPA 624	Bromomethane
110.040	005	EPA 624	Carbon Tetrachloride
110.040	006	EPA 624	Chlorobenzene
110.040	007	EPA 624	Chloroethane
110.040	008	EPA 624	2-Chloroethyl Vinyl Ether
110.040	009	EPA 624	Chloroform
110.040	010	EPA 624	Chloromethane
110.040	011	EPA 624	Dibromochloromethane
110.040	012	EPA 624	1,2-Dichlorobenzene
110.040	013	EPA 624	1,3-Dichlorobenzene

110.040	014	EPA 624	1,4-Dichlorobenzene
110.040	015	EPA 624	1,1-Dichloroethane
110.040	016	EPA 624	1,2-Dichloroethane
110.040	017	EPA 624	1,1-Dichloroethene
110.040	018	EPA 624	trans-1,2-Dichloroethene
110.040	019	EPA 624	1,2-Dichloropropane
110.040	020	EPA 624	cis-1,3-Dichloropropene
110.040	021	EPA 624	trans-1,3-Dichloropropene
110.040	022	EPA 624	Ethylbenzene
110.040	023	EPA 624	Methylene Chloride
110.040	024	EPA 624	1,1,2,2-Tetrachloroethane
110.040	025	EPA 624	Tetrachloroethene
110.040	026	EPA 624	Toluene
110.040	027	EPA 624	1,1,1-Trichloroethane
110.040	028	EPA 624	1,1,2-Trichloroethane
110.040	029	EPA 624	Trichloroethene
110.040	030	EPA 624	Trichlorofluoromethane
110.040	031	EPA 624	Vinyl Chloride

111 - Semi-volatile Organic Chemistry of Wastewater

111.100	001	EPA 625	Acenaphthene
111.100	002	EPA 625	Acenaphthylene
111.100	003	EPA 625	Anthracene
111.100	004	EPA 625	Benzidine
111.100	005	EPA 625	Benzo(a)anthracene
111.100	006	EPA 625	Benzo(b)fluoranthene
111.100	007	EPA 625	Benzo(k)fluoranthene
111.100	008	EPA 625	Benzo(g,h,i)perylene
111.100	009	EPA 625	Benzo(a)pyrene
111.100	010	EPA 625	Benzyl Butyl Phthalate
111.100	011	EPA 625	bis(2-chloroethoxy)methane
111.100	012	EPA 625	bis(2-chloroethyl) Ether
111.100	013	EPA 625	Bis(2-chloroisopropyl) Ether
111.100	014	EPA 625	Di(2-ethylhexyl) Phthalate
111.100	015	EPA 625	4-Bromophenyl Phenyl Ether
111.100	016	EPA 625	4-Chloro-3-methylphenol
111.100	017	EPA 625	2-Chloronaphthalene
111.100	018	EPA 625	2-Chlorophenol
111.100	019	EPA 625	4-Chlorophenyl Phenyl Ether
111.100	020	EPA 625	Chrysene
111.100	021	EPA 625	Dibenz(a,h)anthracene
111.100	025	EPA 625	3,3'-Dichlorobenzidine

111.100	026	EPA 625	2,4-Dichlorophenol
111.100	027	EPA 625	Diethyl Phthalate
111.100	028	EPA 625	2,4-Dimethylphenol
111.100	029	EPA 625	Dimethyl Phthalate
111.100	030	EPA 625	Di-n-butyl phthalate
111.100	031	EPA 625	Di-n-octyl phthalate
111.100	032	EPA 625	2,4-Dinitrophenol
111.100	033	EPA 625	2,4-Dinitrotoluene
111.100	034	EPA 625	2,6-Dinitrotoluene
111.100	035	EPA 625	Fluoranthene
111.100	036	EPA 625	Fluorene
111.100	037	EPA 625	Hexachlorobenzene
111.100	038	EPA 625	Hexachlorobutadiene
111.100	039	EPA 625	Hexachlorocyclopentadiene
111.100	040	EPA 625	Hexachloroethane
111.100	041	EPA 625	Indeno(1,2,3-c,d)pyrene
111.100	042	EPA 625	Isophorone
111.100	043	EPA 625	2-Methyl-4,6-dinitrophenol
111.100	044	EPA 625	Naphthalene
111.100	045	EPA 625	Nitrobenzene
111.100	046	EPA 625	2-Nitrophenol
111.100	047	EPA 625	4-Nitrophenol
111.100	048	EPA 625	N-nitrosodimethylamine
111.100	049	EPA 625	N-nitroso-di-n-propylamine
111.100	050	EPA 625	N-nitrosodiphenylamine
111.100	051	EPA 625	Pentachlorophenol
111.100	052	EPA 625	Phenanthrene
111.100	053	EPA 625	Phenol
111.100	054	EPA 625	Pyrene
111.100	055	EPA 625	1,2,4-Trichlorobenzene
111.100	056	EPA 625	2,4,6-Trichlorophenol
111.111	001	EPA 1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
111.111	002	EPA 1613B	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
111.111	003	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
111.111	004	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
111.111	005	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
111.111	006	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
111.111	007	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
111.111	008	EPA 1613B	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
111.111	009	EPA 1613B	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
111.111	010	EPA 1613B	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)

111.111	011	EPA 1613B	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
111.111	012	EPA 1613B	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
111.111	013	EPA 1613B	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
111.111	014	EPA 1613B	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
111.111	015	EPA 1613B	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
111.111	016	EPA 1613B	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
111.111	017	EPA 1613B	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)
111.111	018	EPA 1613B	Total TCDD
111.111	019	EPA 1613B	Total PeCDD
111.111	020	EPA 1613B	Total HxCDD
111.111	021	EPA 1613B	Total HpCDD
111.111	022	EPA 1613B	Total TCDF
111.111	023	EPA 1613B	Total PeCDF
111.111	024	EPA 1613B	Total HxCDF
111.111	025	EPA 1613B	Total HpCDF
111.273	001	EPA 1664A	Oil and Grease

114 - Inorganic Chemistry of Hazardous Waste

114.010	001	EPA 6010B	Antimony
114.010	002	EPA 6010B	Arsenic
114.010	003	EPA 6010B	Barium
114.010	004	EPA 6010B	Beryllium
114.010	005	EPA 6010B	Cadmium
114.010	006	EPA 6010B	Chromium
114.010	007	EPA 6010B	Cobalt
114.010	008	EPA 6010B	Copper
114.010	009	EPA 6010B	Lead
114.010	010	EPA 6010B	Molybdenum
114.010	011	EPA 6010B	Nickel
114.010	012	EPA 6010B	Selenium
114.010	013	EPA 6010B	Silver
114.010	014	EPA 6010B	Thallium
114.010	015	EPA 6010B	Vanadium
114.010	016	EPA 6010B	Zinc
114.020	001	EPA 6020	Antimony
114.020	002	EPA 6020	Arsenic
114.020	003	EPA 6020	Barium
114.020	004	EPA 6020	Beryllium
114.020	005	EPA 6020	Cadmium
114.020	006	EPA 6020	Chromium
114.020	007	EPA 6020	Cobalt
114.020	008	EPA 6020	Copper

114.020	009	EPA 6020	Lead	
114.020	010	EPA 6020	Molybdenum	
114.020	011	EPA 6020	Nickel	
114.020	012	EPA 6020	Selenium	
114.020	013	EPA 6020	Silver	
114.020	014	EPA 6020	Thallium	
114.020	015	EPA 6020	Vanadium	
114.020	016	EPA 6020	Zinc	
114.140	001	EPA 7470A	Mercury	Aqueous Only
114.141	001	EPA 7471A	Mercury	

115 - Extraction Test of Hazardous Waste

115.020	001	EPA 1311	Toxicity Characteristic Leaching Procedure (TCLP)	
115.021	001	EPA 1311	TCLP Inorganics	
115.022	001	EPA 1311	TCLP Extractables	
115.023	001	EPA 1311	TCLP Volatiles	
115.040	001	EPA 1312	Synthetic Precipitation Leaching Procedure (SPLP)	

116 - Volatile Organic Chemistry of Hazardous Waste

116.010	001	EPA 8011	1,2-Dibromoethane	Aqueous Only
116.010	002	EPA 8011	Dibromochloropropane	Aqueous Only
116.030	001	EPA 8015B	Gasoline-range Organics	
116.040	002	EPA 8021B	Benzene	
116.040	039	EPA 8021B	Ethylbenzene	
116.040	041	EPA 8021B	Methyl tert-butyl Ether (MTBE)	
116.040	047	EPA 8021B	Toluene	
116.040	056	EPA 8021B	Xylenes, Total	
116.080	001	EPA 8260B	Acetone	
116.080	002	EPA 8260B	Acetonitrile	
116.080	003	EPA 8260B	Acrolein	
116.080	004	EPA 8260B	Acrylonitrile	
116.080	006	EPA 8260B	Allyl Chloride	
116.080	007	EPA 8260B	Benzene	
116.080	010	EPA 8260B	Bromochloromethane	
116.080	011	EPA 8260B	Bromodichloromethane	
116.080	012	EPA 8260B	Bromoform	
116.080	013	EPA 8260B	Bromomethane	
116.080	015	EPA 8260B	Carbon Disulfide	
116.080	016	EPA 8260B	Carbon Tetrachloride	
116.080	018	EPA 8260B	Chlorobenzene	
116.080	019	EPA 8260B	Chloroethane	
116.080	020	EPA 8260B	2-Chloroethyl Vinyl Ether	
116.080	021	EPA 8260B	Chloroform	

116.080	022	EPA 8260B	Chloromethane	
116.080	023	EPA 8260B	Chloroprene	
116.080	026	EPA 8260B	Dibromochloromethane	
116.080	027	EPA 8260B	Dibromochloropropane	
116.080	028	EPA 8260B	1,2-Dibromoethane	
116.080	030	EPA 8260B	Dibromomethane	
116.080	031	EPA 8260B	1,2-Dichlorobenzene	
116.080	032	EPA 8260B	1,3-Dichlorobenzene	
116.080	033	EPA 8260B	1,4-Dichlorobenzene	
116.080	034	EPA 8260B	cis-1,4-Dichloro-2-butene	
116.080	035	EPA 8260B	trans-1,4-Dichloro-2-butene	
116.080	036	EPA 8260B	Dichlorodifluoromethane	
116.080	037	EPA 8260B	1,1-Dichloroethane	
116.080	038	EPA 8260B	1,2-Dichloroethane	
116.080	039	EPA 8260B	1,1-Dichloroethene	
116.080	040	EPA 8260B	trans-1,2-Dichloroethene	
116.080	041	EPA 8260B	cis-1,2-Dichloroethene	
116.080	042	EPA 8260B	1,2-Dichloropropane	
116.080	043	EPA 8260B	1,3-Dichloropropane	
116.080	044	EPA 8260B	2,2-Dichloropropane	
116.080	045	EPA 8260B	1,1-Dichloropropene	
116.080	046	EPA 8260B	cis-1,3-Dichloropropene	
116.080	047	EPA 8260B	trans-1,3-Dichloropropene	
116.080	050	EPA 8260B	1,4-Dioxane	
116.080	052	EPA 8260B	Ethyl Acetate	
116.080	053	EPA 8260B	Ethylbenzene	
116.080	055	EPA 8260B	Ethyl Methacrylate	
116.080	056	EPA 8260B	Hexachlorobutadiene	
116.080	058	EPA 8260B	2-Hexanone (MBK)	
116.080	059	EPA 8260B	Iodomethane	
116.080	060	EPA 8260B	Isobutyl Alcohol	
116.080	062	EPA 8260B	Methacrylonitrile	
116.080	064	EPA 8260B	Methyl tert-butyl Ether (MTBE)	
116.080	065	EPA 8260B	Methylene Chloride	
116.080	066	EPA 8260B	Methyl Ethyl Ketone	
116.080	067	EPA 8260B	Methyl Methacrylate	
116.080	068	EPA 8260B	4-Methyl-2-pentanone (MIBK)	
116.080	069	EPA 8260B	Naphthalene	
116.080	071	EPA 8260B	2-Nitropropane	
116.080	078	EPA 8260B	Propionitrile	Aqueous Only
116.080	081	EPA 8260B	1,1,1,2-Tetrachloroethane	

116.080	082	EPA 8260B	1,1,2,2-Tetrachloroethane
116.080	083	EPA 8260B	Tetrachloroethene
116.080	084	EPA 8260B	Toluene
116.080	086	EPA 8260B	1,2,3-Trichlorobenzene
116.080	087	EPA 8260B	1,2,4-Trichlorobenzene
116.080	088	EPA 8260B	1,1,1-Trichloroethane
116.080	089	EPA 8260B	1,1,2-Trichloroethane
116.080	090	EPA 8260B	Trichloroethene
116.080	091	EPA 8260B	Trichlorofluoromethane
116.080	092	EPA 8260B	1,2,3-Trichloropropane
116.080	093	EPA 8260B	Vinyl Acetate
116.080	094	EPA 8260B	Vinyl Chloride
116.080	095	EPA 8260B	Xylenes, Total
116.080	096	EPA 8260B	tert-Amyl Methyl Ether (TAME)
116.080	097	EPA 8260B	tert-Butyl Alcohol (TBA)
116.080	098	EPA 8260B	Ethyl tert-butyl Ether (ETBE)
116.080	099	EPA 8260B	Bromobenzene
116.080	100	EPA 8260B	n-Butylbenzene
116.080	101	EPA 8260B	sec-Butylbenzene
116.080	102	EPA 8260B	tert-Butylbenzene
116.080	103	EPA 8260B	2-Chlorotoluene
116.080	104	EPA 8260B	4-Chlorotoluene
116.080	105	EPA 8260B	Isopropylbenzene
116.080	106	EPA 8260B	N-propylbenzene
116.080	107	EPA 8260B	Styrene
116.080	108	EPA 8260B	1,2,4-Trimethylbenzene
116.080	109	EPA 8260B	1,3,5-Trimethylbenzene

117 - Semi-volatile Organic Chemistry of Hazardous Waste

117.010	001	EPA 8015B	Diesel-range Total Petroleum Hydrocarbons
117.110	001	EPA 8270C	Acenaphthene
117.110	002	EPA 8270C	Acenaphthylene
117.110	008	EPA 8270C	Anthracene
117.110	010	EPA 8270C	Benzidine
117.110	011	EPA 8270C	Benz(a)anthracene
117.110	012	EPA 8270C	Benzo(b)fluoranthene
117.110	013	EPA 8270C	Benzo(k)fluoranthene
117.110	014	EPA 8270C	Benzo(g,h,i)perylene
117.110	015	EPA 8270C	Benzo(a)pyrene
117.110	016	EPA 8270C	Benzoic Acid
117.110	018	EPA 8270C	Benzyl Alcohol
117.110	019	EPA 8270C	Benzyl Butyl Phthalate

117.110	020	EPA 8270C	bis(2-chloroethoxy)methane
117.110	021	EPA 8270C	bis(2-chloroethyl) Ether
117.110	022	EPA 8270C	Bis(2-chloroisopropyl) Ether
117.110	023	EPA 8270C	Di(2-ethylhexyl) Phthalate
117.110	024	EPA 8270C	4-Bromophenyl Phenyl Ether
117.110	026	EPA 8270C	4-Chloroaniline
117.110	027	EPA 8270C	4-Chloro-3-methylphenol
117.110	029	EPA 8270C	2-Chloronaphthalene
117.110	030	EPA 8270C	2-Chlorophenol
117.110	031	EPA 8270C	4-Chlorophenyl Phenyl Ether
117.110	032	EPA 8270C	Chrysene
117.110	036	EPA 8270C	Dibenz(a,h)anthracene
117.110	037	EPA 8270C	Dibenzofuran
117.110	039	EPA 8270C	1,2-Dichlorobenzene
117.110	040	EPA 8270C	1,3-Dichlorobenzene
117.110	041	EPA 8270C	1,4-Dichlorobenzene
117.110	042	EPA 8270C	3,3'-Dichlorobenzidine
117.110	043	EPA 8270C	2,4-Dichlorophenol
117.110	045	EPA 8270C	Diethyl Phthalate
117.110	053	EPA 8270C	2,4-Dimethylphenol
117.110	054	EPA 8270C	Dimethyl Phthalate
117.110	055	EPA 8270C	Di-n-butyl phthalate
117.110	060	EPA 8270C	2,4-Dinitrophenol
117.110	061	EPA 8270C	2,4-Dinitrotoluene
117.110	062	EPA 8270C	2,6-Dinitrotoluene
117.110	064	EPA 8270C	1,2-Diphenylhydrazine
117.110	067	EPA 8270C	Fluoranthene
117.110	068	EPA 8270C	Fluorene
117.110	069	EPA 8270C	Hexachlorobenzene
117.110	070	EPA 8270C	Hexachlorobutadiene
117.110	071	EPA 8270C	Hexachlorocyclopentadiene
117.110	072	EPA 8270C	Hexachloroethane
117.110	075	EPA 8270C	Indeno(1,2,3-c,d)pyrene
117.110	076	EPA 8270C	Isophorone
117.110	080	EPA 8270C	2-Methyl-4,6-dinitrophenol
117.110	083	EPA 8270C	2-Methylnaphthalene
117.110	084	EPA 8270C	2-Methylphenol
117.110	085	EPA 8270C	3-Methylphenol
117.110	086	EPA 8270C	4-Methylphenol
117.110	087	EPA 8270C	Naphthalene
117.110	092	EPA 8270C	2-Nitroaniline

117.110	093	EPA 8270C	3-Nitroaniline
117.110	094	EPA 8270C	4-Nitroaniline
117.110	095	EPA 8270C	Nitrobenzene
117.110	096	EPA 8270C	2-Nitrophenol
117.110	097	EPA 8270C	4-Nitrophenol
117.110	100	EPA 8270C	N-nitrosodimethylamine
117.110	101	EPA 8270C	N-nitroso-di-n-propylamine
117.110	102	EPA 8270C	N-nitrosodiphenylamine
117.110	110	EPA 8270C	Pentachlorophenol
117.110	112	EPA 8270C	Phenanthrene
117.110	113	EPA 8270C	Phenol
117.110	119	EPA 8270C	Pyrene
117.110	120	EPA 8270C	Pyridine
117.110	129	EPA 8270C	1,2,4-Trichlorobenzene
117.110	130	EPA 8270C	2,4,5-Trichlorophenol
117.110	131	EPA 8270C	2,4,6-Trichlorophenol
117.130	001	EPA 8290	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)
117.130	002	EPA 8290	1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)
117.130	003	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	004	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	005	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)
117.130	006	EPA 8290	2,3,7,8-Tetrachlorodibenzofuran (TCDF)
117.130	007	EPA 8290	1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)
117.130	008	EPA 8290	2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)
117.130	009	EPA 8290	1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	010	EPA 8290	1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	011	EPA 8290	1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)
117.130	012	EPA 8290	2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)
117.130	013	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)
117.130	014	EPA 8290	1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)
117.130	015	EPA 8290	1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)
117.130	016	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)
117.130	017	EPA 8290	1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)
117.210	001	EPA 8081A	Aldrin
117.210	002	EPA 8081A	a-BHC
117.210	003	EPA 8081A	b-BHC
117.210	004	EPA 8081A	d-BHC
117.210	005	EPA 8081A	g-BHC (Lindane)
117.210	007	EPA 8081A	a-Chlordane
117.210	008	EPA 8081A	g-Chlordane
117.210	009	EPA 8081A	Chlordane (tech.)

117.210	013	EPA 8081A	4,4'-DDD
117.210	014	EPA 8081A	4,4'-DDE
117.210	015	EPA 8081A	4,4'-DDT
117.210	021	EPA 8081A	Endosulfan I
117.210	022	EPA 8081A	Endosulfan II
117.210	023	EPA 8081A	Endosulfan Sulfate
117.210	024	EPA 8081A	Endrin
117.210	025	EPA 8081A	Endrin Aldehyde
117.210	026	EPA 8081A	Endrin Ketone
117.210	027	EPA 8081A	Heptachlor
117.210	028	EPA 8081A	Heptachlor Epoxide
117.210	031	EPA 8081A	Isodrin
117.210	033	EPA 8081A	Methoxychlor
117.210	039	EPA 8081A	Toxaphene
117.220	000	EPA 8082	PCBs
117.220	001	EPA 8082	PCB-1016
117.220	002	EPA 8082	PCB-1221
117.220	003	EPA 8082	PCB-1232
117.220	004	EPA 8082	PCB-1242
117.220	005	EPA 8082	PCB-1248
117.220	006	EPA 8082	PCB-1254
117.220	007	EPA 8082	PCB-1260



Pace Analytical Services, Inc.
Method Detection Limits and Reporting Limits
for EPA 8081B Water

Analyte	CAS#	LCS/LCSD			MS/MSD			DUP
		Lower	Upper	RPD	Lower	Upper	RPD	RPD
4,4'-DDD	72-54-8	70	130	20	70	130	20	20
4,4'-DDE	72-55-9	70	130	20	70	130	20	20
4,4'-DDT	50-29-3	70	130	20	70	130	20	20
Aldrin	309-00-2	70	130	20	70	130	20	20
alpha-BHC	319-84-6	70	130	20	70	130	20	20
alpha-chlordane	5103-71-9	70	130	20	70	130	20	20
beta-BHC	319-85-7	70	130	20	70	130	20	20
Chlordane, Technical	12789-03-6	70	130	20	70	130	20	20
delta-BHC	319-86-8	70	130	20	70	130	20	20
Dieldrin	60-57-1	70	130	20	70	130	20	20
Endosulfan I	959-98-8	70	130	20	70	130	20	20
Endosulfan II	33213-65-9	70	130	20	70	130	20	20
Endosulfan sulfate	1031-07-8	70	130	20	70	130	20	20
Endrin	72-20-8	70	130	20	70	130	20	20
Endrin Aldehyde	7421-36-3	70	130	20	70	130	20	20
Endrin Ketone	53494-70-5	70	130	20	70	130	20	20
gamma-BHC (Lindane)	58-89-9	70	130	20	70	130	20	20
gamma-chlordane	5103-74-2	70	130	20	70	130	20	20
Heptachlor	76-44-8	70	130	20	70	130	20	20
Heptachlor expoxide	1024-57-3	70	130	20	70	130	20	20
Methoxychlor	72-43-5	70	130	20	70	130	20	20
Toxaphene	8001-35-2	70	130	20	70	130	20	20
Surrogate								
Decachlorobiphenyl (S)	2051-24-3	70	130					
Tetrachloro-m-xylene (S)	877-09-8	70	130					



Pace Analytical Services, Inc.
Method Detection Limits and Reporting Limits
for EPA 8081B Soil

Analyte	CAS#	LCS/LCSD			MS/MSD			DUP
		Lower	Upper	RPD	Lower	Upper	RPD	RPD
4,4'-DDD	72-54-8	70	130	20	70	130	20	20
4,4'-DDE	72-55-9	70	130	20	70	130	20	20
4,4'-DDT	50-29-3	70	130	20	70	130	20	20
Aldrin	309-00-2	70	130	20	70	130	20	20
alpha-BHC	319-84-6	70	130	20	70	130	20	20
alpha-chlordane	5103-71-9	70	130	20	70	130	20	20
beta-BHC	319-85-7	70	130	20	70	130	20	20
Chlordane, Technical	12789-03-6	70	130	20	70	130	20	20
delta-BHC	319-86-8	70	130	20	70	130	20	20
Dieldrin	60-57-1	70	130	20	70	130	20	20
Endosulfan I	959-98-8	70	130	20	70	130	20	20
Endosulfan II	33213-65-9	70	130	20	70	130	20	20
Endosulfan sulfate	1031-07-8	70	130	20	70	130	20	20
Endrin	72-20-8	70	130	20	70	130	20	20
Endrin Aldehyde	7421-36-3	70	130	20	70	130	20	20
Endrin Ketone	53494-70-5	70	130	20	70	130	20	20
gamma-BHC (Lindane)	58-89-9	70	130	20	70	130	20	20
gamma-chlordane	5103-74-2	70	130	20	70	130	20	20
Heptachlor	76-44-8	70	130	20	70	130	20	20
Heptachlor expoxide	1024-57-3	70	130	20	70	130	20	20
Methoxychlor	72-43-5	70	130	20	70	130	20	20
Toxaphene	8001-35-2	70	130	20	70	130	20	20

Surrogate								
Decachlorobiphenyl (S)	2051-24-3	70	130					
Tetrachloro-m-xylene (S)	877-09-8	70	130					



Pace Analytical Services, Inc.
Method Detection Limits and Reporting Limits
for EPA 6020 Water

6020		LCS/LCSD			MS/MSD			DUP
Analyte	CAS#	Lower	Upper	RPD	Lower	Upper	RPD	RPD
Arsenic	7440-38-2	80	120	20	75	125	20	20
Lead	7439-92-1	80	120	20	75	125	20	20



Pace Analytical Services, Inc.
Method Detection Limits and Reporting Limits
for EPA 6020 Solid

Analyte	CAS#	LCS/LCSD			MS/MSD			DUP
		Lower	Upper	RPD	Lower	Upper	RPD	RPD
Arsenic	7440-38-2	80	120	20	75	125	20	20
Lead	7439-92-1	80	120	20	75	125	20	20

Appendix E

Transportation Plan

Marysville Joint Unified School District

Transportation Plan

Hammonton Smartsville Property
Yuba County, California

March 2014

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1. Introduction

This Transportation Plan has been prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Marysville Joint Unified School District (MJUSD) for the Hammonton Smartsville property located on the southwestern corner of the intersection of Dantoni and Hammonton Smartsville Roads in Yuba County, California (the Site).

This Transportation Plan describes how soil removed during the implementation of the *Removal Action Work Plan* (RAW) at the Site located at 2176 Hammonton Smartsville Road in Marysville, California, will be managed during transportation to the selected off-site disposal facility(ies). The Transportation Plan was prepared in order to comply with the *Interim Final Guidance for Preparation of Transportation Plans at Hazardous Substance Release Sites*, dated May 1994 and prepared by the California Department of Toxic Substances Control (DTSC).

2. Background

2.1 Location, History, Regulatory Status of the Site

The primary contaminants of potential concern (COPCs) for the Site are organochlorine pesticides (OCPs), lead and arsenic. Environmental assessment activities previously performed by ARCADIS have focused on Yuba County Assessor's Office (YCAO) Assessor Parcel Number (APN) 021-150-062 located at 2176 Hammonton Smartsville Road in Marysville, California. The site was rerecorded during 2011 from APN 021-150-032 and a portion of APN 021-150-060. For purposes of the RAW, the Site consists of multiple areas of affected soil.

2.2 Description of Removal/Remedial Actions and Site Map

Elevated levels of pesticides, lead and arsenic, were detected in site soils. Based on the soil volume calculations, approximately 753 cubic yards (cy) of affected soils are proposed for removal. Soil removal will be accomplished by use of earthmoving equipment (backhoes, bobcats, articulated loaders, etc.) which will place the excavated material into stockpiles in an onsite staging area. Soils will be characterized for off-site disposal prior to transport off-site.

A Site Location Map is provided as Figure 1 of the RAW.



3. Purpose and objective

The purpose of this transportation plan is to minimize potential health, safety, and environmental risks resulting from the transportation of material and/or equipment during the proposed remedial action.

The purpose of the proposed action at the Site focuses on the removal and disposal of soils affected with COPCs, to reduce the threat to human health and to provide a permanent solution that reduces the toxicity, mobility, and volume of contaminated soil. Remedial action objectives (RAOs) have been established that are protective of human health and the environment and reduce the potential for exposure to COPCs in shallow soil encountered at the Site. These RAOs are presented in the RAW.

The remedial goals developed and adopted for affected media at the Site will be responsive to these RAOs and are presented in the RAW.

The removal action goal is to excavate and remove affected Site soil with COPC concentrations detected above the cleanup goals summarized in the RAW, and to have it disposed of off-site. Upon completion, a Removal Action Completion Report will be prepared that will summarize removal activities and will include copies of applicable material transport documentation.

4. Characteristics of Material to be Transported

4.1 Transported Waste Description

The waste to be transported is anticipated to be dry-to-moist pesticide- and/or metal-affected soils. The anticipated volume of waste soil to be transported off-site is approximately 753 cy.

4.2 Hazardous Waste Characterization

Based on the analytical results for pesticides and metals conducted during previous site investigations, the waste soil is anticipated to be classified as a mixture of non-hazardous or California hazardous waste.

The exact soil waste classification will be assessed after the soil is excavated and stockpile samples are analyzed. Each stockpile will be sampled separately and classified for waste disposal separately. Due to the waste profiling sample



requirements, the soil will be submitted for analyses of known COPCs and/or other analytes in accordance with the methodology detailed in the RAW.

Based on the stockpile samples analytical results, California Total Threshold Limit Concentration (CA TTLC) and/or Soluble Threshold Limit Concentration (STLC) analyses may also be analyzed by the laboratory. California hazardous waste criteria are more conservative than the Federal Resource Conservation and Recovery Act (RCRA) hazardous waste regulatory criteria. As a result, the CA TTLC and STLC analyses will determine if waste is considered non-hazardous or hazardous under California and Federal regulations. California hazardous waste is also termed non-RCRA hazardous waste.

A description of the CA TTLC and STLC criteria and a flow chart outlining the conditions under which each analysis will be performed is provided as follows:

The CA TTLC is used to assess if a waste is considered a California hazardous or RCRA hazardous waste. Soils are considered California hazardous if the CA TTLC results are at or above the individual CA TTLC criteria provided as follows:

- Technical Chlordane – 2.5 milligrams per kilogram (mg/kg)
- Dieldrin – 8.0 mg/kg
- 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD – 1.0 mg/kg
- Toxaphene – 5.0 mg/kg
- Heptachlor (epoxide) – 4.7 mg/kg
- Lead or lead compounds – 1,000 mg/kg
- Lead compounds, organic – 13 mg/kg
- Arsenic – 500 mg/kg

STLC analysis is evaluated if concentrations are numerically below the CA TTLC and greater than ten times the STLC criteria provided as follows:

- Technical Chlordane – 0.25 milligrams per liter (mg/L)
- Dieldrin – 0.8 mg/L
- 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD – 0.1 mg/L
- Toxaphene – 0.5 mg/L
- Heptachlor (epoxide) – 0.47 mg/L
- Lead or lead compounds – 5.0 mg/L
- Arsenic – 5.0 mg/L



A waste profile will be submitted to and accepted by the off-site disposal facility(ies) prior to waste transport and disposal at the facility(ies). The facility(ies) will be responsible for using the project-specific analytical data to classify the waste as non-hazardous, California-hazardous and/or RCRA-hazardous.

4.3 Applicable Regulations

Soils removed from the Site will be handled and disposed of appropriately in accordance with final waste profiling results.

If waste profile testing indicates that the soil is considered something other than non-hazardous, the excavated soils will be managed appropriately. If necessary, the MJUSD (as the hazardous waste generator) will obtain an EPA ID number that will be used for manifesting the waste. Compliance with the DTSC requirements of hazardous waste transportation and disposal is required for hazardous waste and will be incorporated during this project. The hazardous waste will be transported by a registered hazardous waste hauler under a uniform hazardous waste manifest. In addition, land ban requirements will be followed as necessary.

5. Material Destination

Soil removal, off-site transport and disposal (T&D), and/or registered hazardous waste hauler (if necessary) contractors have not yet been selected to implement the RAW.

For RAW preparation and cost estimating purposes, approximately 450 tons (1.5x conversion cy to ton) of California-hazardous waste and approximately 680 tons (1.5x conversion cy to ton) of non-hazardous waste are anticipated for off-site disposal.

The following Class I/II disposal facilities will likely be utilized to profile, classify and properly dispose of the waste generated during the removal action:

- Waste Management Inc., Kettleman Hills landfill located at 35251 Old Skyline Road, Kettleman City, California. Kettleman is an appropriate Class I disposal facility for California-hazardous waste soil.
- Recology Hay Road Landfill, located in Vacaville, California. Hay Road Landfill is an appropriate Class II disposal facility for non-hazardous waste soil.



6. Transportation Equipment

Off-site T&D and/or registered hazardous waste hauler (if necessary) contractors have not yet been selected to implement the RAW.

Turn-Key Construction Services, Inc., (Turn-Key), of Rocklin, California has provided pricing information and for the purposes of this plan is assumed to be the T&D contractor; however, if another contractor other than Turn-Key is awarded the work, qualification information will be updated. Turn-Key anticipates using Denbeste Transportation, Inc., of Windsor, California (Denbeste) as their T&D contractor.

Waste will be transported using end dump trucks and transfers with a 26 ton maximum capacity. It is anticipated that approximately 44 roundtrips will be necessary to remove approximately 753 cy (approximately 1,130 tons) of soil from the site. Trailers with plastic liners will be utilized for wet non-hazardous soil and all hazardous soil (if applicable). Trailers will be covered with tight-fitting tarp-style covers prior to leaving the site.

6.1 Transporter Qualifications

Denbeste is registered with the United States Environmental Protection Agency (USEPA) identification number CAD982513632 as both a non-hazardous and hazardous waste transporter. All vehicles utilized for waste transport will be properly registered, operated, placarded in compliance with local, state, and federal requirements. The vehicles will be equipped with dust covers and other required equipment to prevent releases of material.

7. Route

7.1 Primary Routes

The following routes to two potential landfills were selected, as they are the most direct and avoid residential areas and hazardous road conditions. The roadways selected for transport are not listed with the California Highway Patrol as prohibited for the hauling of hazardous waste. Additionally, local ordinances or road maintenance activities do not restrict the designated routes.

- Class I – 2176 Hammonton Smartsville Road, Marysville, California to Waste Management Kettleman Hills Landfill, Kettleman City, California

Trucks with covered soil loads will exit the site heading west onto Hammonton Smartsville Road (turns into Beale Road) towards California highway (CA) 70. Trucks will turn left to merge onto CA-70 South toward Sacramento. Trucks will proceed on CA-70 and merge onto CA-99 South toward Sacramento. Trucks will proceed on CA-99 and merge onto Interstate (I) 5 South toward Sacramento. Trucks will proceed on I-5 for approximately 249 miles.

Trucks will turn right on the CA-41 South and turn right onto Old State Highway. Trucks will proceed on Old State Highway for approximately 0.7 miles. The estimated roundtrip time from the Site to the facility is 3.5 hours with a possibility of an additional one hour due to adverse traffic.

- Class II (non-hazardous) – 2176 Hammonton Smartsville Road, Marysville, California to Hay Road Landfill, Vacaville, California

Trucks with covered soil loads will exit the site heading west onto Hammonton Smartsville Road (turns into Beale Road) towards California highway (CA) 70. Trucks will turn left to merge onto CA-70 South toward Sacramento. Trucks will proceed on CA-70 and merge onto CA-99 South toward Sacramento. Trucks will proceed on CA-99 and merge onto Interstate (I) 80 West toward San Francisco.

Trucks will turn left from I-80 onto Pedrick Road. Trucks will proceed on Pedrick Road for approximately five miles and turn right onto Midway Road. Trucks will proceed on Midway Road for approximately one mile and turn left onto CA-113 for approximately seven miles. After approximately seven miles, the Hay Road Landfill is located on the right on Hay Road. The estimated roundtrip time from the Site to the facility is 1.2 hours with a possibility of an additional one hour due to adverse traffic.

7.2 Secondary Routes

Given the distances between the Site and the proposed soil disposal facilities, there are numerous secondary routes that are possible. If one of the primary routes is not passable, the most direct secondary route (based on evaluating a map) will be selected. Prior to using the secondary route, the hauler will ensure that none of the secondary roadways selected for transport are listed with the California Highway Patrol as prohibited for the hauling of California hazardous waste. Additionally, local ordinances or road maintenance activities do not restrict the designated routes.



7.3 Scheduling

The anticipated number of trips per day is expected to be approximately 20. Approximately 10 vehicles per day will be required for this job which each vehicle making 2 trips each if the waste is classified as non-hazardous. In addition, approximately 20 vehicles per day will be required for this job which each vehicle making one trip each if the waste is classified as California-hazardous. It is anticipated that container loading and T&D activities will be conducted between the hours of 7:00 a.m. and 6:00 p.m. Reasonable effort will be made to avoid heavy truck traffic during peak traffic hours.

7.4 Emergency Services Notification List

The following is a list of emergency services organizations that may be notified prior to commencement of any hazardous waste substance transporting:

- Fire Department
- Ambulance Service
- Law Enforcement Agency
- Transportation Authority

8. Traffic Control and Loading Procedures

8.1 Traffic Control

Existing traffic patterns at various times of day will be examined so that the operation will not impact traffic conditions more than necessary. It is anticipated that work will occur between the hours of 7:00 a.m. and 6:00 p.m. Every effort will be made to avoid heavy truck traffic during peak traffic hours. A flagman or gatekeeper will be utilized to ensure safe entry/exit to and from the Site.

8.2 Loading Procedures

Excavated soils will be loaded using a backhoe, an articulated front-end loader or similar piece of equipment onto end-dump tractor-trailers. Dust generation will be minimized by spraying loads with water during dumping as necessary, slowly dumping each bucket load, and minimizing dumping height. Trailers with plastic liners will be utilized for wet non-hazardous soil and all hazardous soil. Trailers will be covered with tight-fitting tarp-style covers prior to leaving the site.



Truck inspection will be conducted by the T&D contractor prior to departure to ensure proper loading, covering/sealing, decontamination, placarding, and manifesting. Inspection and documentation will include date, time, vehicle type, driver's license number, vehicle license number, and signature of the inspector. A representative of the selected general contractor will be responsible for the inspection of all trucks.

The loading of trucks is anticipated after completion of the soil removal activities and after the waste has been properly characterized. Therefore, the trucks are not anticipated to enter excavation areas with COPC-affected soil and truck decontamination is not warranted.

Equipment in the stockpile areas will be dry decontaminated prior to leaving the site. Decontamination waste will be disposed of on the last truck.

9. Record Keeping

The following information will be recorded and tracked for each load of impacted soil transported off site:

- date, time
- weight/volume of waste/material
- trucking company and driver
- vehicle identification
- manifest number associated with each load

The following transportation documents must be carried with the driver when transporting the waste/material:

- bill of lading identifying the shipment
- generator's name and address
- if necessary, hazardous waste manifest and analytical results representing the load
- map and complete instructions describing the route to be traveled
- special instructions including emergency procedures and contacts for the transporter



10. Health and Safety

All contractors will be responsible for operating in accordance with the most current Occupational Safety and Health Administration (OSHA) regulations including 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, and 29 CFR 1926, Construction Industry Standards, as well as other applicable federal, state, and local laws and regulations. A Health and Safety Plan (HSP) is included in the RAW.

11. Contingency Plan

Prior to the start of soil transport operations, the transportation contractor will contact an Emergency Response Contractor (ERC) to establish general communication regarding the transportation of hazardous material from the site to the disposal facilities. The ERC will be provided with a copy of the Transportation Plan. The transportation contractor will work with the ERC to establish appropriate responses to transportation emergencies. The transportation company personnel will be briefed on procedures for contacting either the transportation contractor or the ERC in the event of a spill or incident during soil transport. The ERC will handle all emergency spill response measures, including the cleanup and disposal of any spilled material. This contingency plan will not be conducted if hazardous waste isn't generated during the soil removal activities.

The following sections outline the individual responsibilities of the parties expected to be involved in this project.

11.1 Emergency Response Contractor Responsibilities

The following matters shall be the responsibility of the ERC selected for the project:

- Upon notification that a spill has occurred, the ERC will call the reporting party to obtain complete details regarding the incident. Enough information must be obtained to develop initial response actions.
- Communication with the scene will be established.
- In the event of an emergency, the ERC will respond to the scene as soon as possible after gathering information to gauge an appropriate response to the spill.



11.2 Transportation Contractor Responsibilities

Adherence to the following conditions shall be the responsibility of the transporter firm contracted for the project:

- The contractor used to transport soil from the project site will be permitted by the USEPA.
- All Department of Transportation (DOT) safety regulations will be strictly followed. These include use of qualified drivers, written and road tests of drivers, medical evaluation, hours of service limitation, equipment standards and inspections, and operating procedures.
- The contractor will possess an USEPA Transporter Identification Number.
- The contractor will maintain public liability and property damage insurance.
- The contractor will be provided a copy of the HSP and is expected to adhere to the conditions of the plan. The contractor will advise its drivers regarding the characteristics of the material being hauled and corrective measures that must be taken in the event of an accident or exposure.
- The transportation contractor's vehicles, including trucks and trailers, must be equipped and maintained in accordance with the Federal Motor Carrier Safety Regulations (49 CFR Parts 393 and 396). These regulations specify minimum standards for equipment, including brakes, tires, lights, suspension, steering, emergency equipment, and maintenance. Trucks will be equipped with radios.

11.3 Driver and Jobsite Contractor Responsibilities

In the event of an emergency, a driver's responsibilities are as follows:

- Park the unit in the most secure area available, away from homes, traffic, or businesses.
- Never abandon the truck or disconnect the trailer unless told to do so by the proper authorities or there is immediate danger which could affect the cargo.
- Set out flares or reflectors.
- Warn all persons to keep away (minimum distance 500 feet, actual distance to be determined by the DOT emergency response guidebook).
- Protect manifest, paperwork, instruction materials, and equipment for later use.
- Notify the Emergency Contact listed on the manifest, the driver's dispatcher, or supervisor, providing the following:
 - o Proper shipping name, hazard class, and ID number of materials
 - o Exact Location

- o Quantity of material spilled
- o Location and distance to any surface water
- o Nature and extent of any injuries or property damage
- o Weather conditions
- o A telephone number where communications with the scene can be established
- o An estimate of what response and cleanup will be needed.
- Stay at the scene until relieved by an ERC.
- If the nature of the spill allows the driver, using appropriate Personal Protective Equipment, may safely take action within the limitations of the drivers company policy. The driver is not to attempt to enter a closed unit or handle waste materials without qualified assistance.

The soil removal contractor will be responsible for assuring that this Transportation Plan is followed and will act as a liaison between the site and the transporter. In addition, the soil removal contractor will oversee the proper preparation of manifests to comply with applicable federal, state, and DOT regulations.