100016793

On this day, December 23, 2020,

the U.S. Environmental Protection Agency (U.S. EPA)

Determines that

Elektron Solar Project Area within PRI-15 of the U.S. Magnesium Site

Is Ready for Solar (Industrial) Reuse

This Ready for Reuse (RfR) Determination is for approximately 640 acres within Utah School and Institutional Trust Lands Administration (SITLA) Development Lease Agreement No. 1118, SITLA Easement No. 2227, and U.S. Bureau of Land Management Right of Way Grant UTU-092039640 (Project Area) located within the preliminary remedial investigation area 15 Buffer Area West associated with the Preliminary Remedial Investigation area 15 (PRI-15), Buffer Area West, associated with Operable Unit 1 (OU1) of the U.S. Magnesium Superfund Site. To date, no cleanup actions have taken place or been deemed necessary for the Project Area. This RfR Determination provides information that the U.S. EPA has made a technical determination that the Project Area, located in in Tooele County, Utah is ready for industrial use as a solar project area. This RfR Determination is based on information established in U.S. Environmental Protection Agency (EPA) reports and letters documenting potential risks at the Site, specifically the September 2013 *EPA Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys (EPA Phase 1A RI)* and the December 2020 *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination*.

EPA has made a technical determination that the future use of the Project Area for a proposed solar energy system is an acceptable future use because the screening level risk evaluation shows cancer and non-cancer risks all within EPA acceptable risk ranges under an industrial exposure, and all constituents screened were within background concentrations. This Ready for Reuse Determination is a technical decision document and an environmental status report and does not have any legally binding effect, nor does it expressly or implicitly create, expand, or limit any legal rights, obligations, responsibilities, expectations or benefits of any party. U.S. EPA assumes no responsibility for reuse activities or for any possible or potential harm that might result from reuse activities. U.S. EPA retains any and all rights to authorities it has, including but not limited to legal, equitable, or administrative rights. U.S. EPA specifically retains any and all rights and authorities it has to conduct, direct, oversee, and/or require environmental response actions in connection with OU1, including instances when new or additional information has been discovered regarding the contamination or conditions at OU1 are no longer protective of human health or the environment for the uses identified in the Ready for Reuse Determination.

The types of uses identified in this RfR Determination remain subject to (i) applicable federal, state, and local regulation, including, but not limited to, zoning ordinances and building codes, and to (ii) title documents, including, but not limited to, easements, restrictions, and institutional controls.

Ready for Reuse Determination
Elektron Solar Project Area
U.S. Magnesium Superfund Site

List of Figures and Tables

I. Executive Summary

This Ready for Reuse (RfR) Determination is for approximately 640 acres within Utah School and Institutional Trust Lands Administration (SITLA) Development Lease Agreement No. 1118, SITLA Easement No. 2227, and U.S. Bureau of Land Management (BLM) Right of Way Grant UTU-092039640 (Project Area) located within the preliminary remedial investigation area 15 Buffer Area West (PRI-15) associated with the U.S. Magnesium Superfund Site (Site) in Tooele County, Utah (see Figures 1 and 2). There is interest in using the Project Area for a proposed solar energy system.

The sparsely populated Site includes the U.S. Magnesium facility and surrounding areas of waste disposal. The facility has been producing magnesium at the Site since 1972. The production process involves isolating magnesium chloride salts from the Great Salt Lake and then extracting the magnesium by electrolysis. Facility operations and waste disposal practices resulted in hazardous waste contamination of soil, air, surface water, sediment and groundwater.

To evaluate the potential impact to surrounding areas from the U.S. Magnesium facility, the EPA established 18 preliminary remedial investigation (PRI) areas. The inner PRI areas (PRI areas 1 and 3 through 7) include areas known to have directly received waste streams from the U.S. Magnesium facility and where existing data indicated high chemical concentrations were present. The outer PRI areas (PRI areas 2 and 8 through 18) include areas that may be affected by waste streams and air emissions from the U.S. Magnesium facility and/or secondary releases. The Project Area is located within PRI-15 with the exception of a small portion of the southeast corner.

This RfR Determination is based on information established in U.S. Environmental Protection Agency (EPA) reports and letters documenting potential risks at the Site, specifically the September 2013 *EPA Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys* (EPA Phase 1A RI) and the December 2020 *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination* (Appendix B of this document). According to the EPA Phase1A RI, the only identified pathway for contaminant deposition in PRI-15 is through air deposition. EPA performed a screening level risk evaluation which reviewed two data sets available to EPA. Using the maximum detected values from two data sets, the screening level risk evaluations found that potential industrial use cancer risk falls within the EPA's acceptable risk management range (1×10^{-4} to 1×10^{-6}) and non-cancer hazard (under a hazard index (HI) of 1). Under a residential scenario, risk falls within the acceptable cancer range, but the HI slightly exceeds 1. The contaminants that contribute to the slight exceedance of the HI were cobalt, iron and manganese. The maximum detections of these four metals are within the background ranges in the upland south and upland southeast locations. Because EPA cannot reduce metals concentrations below background concentrations, the exceedance is acceptable.

EPA has concluded that the future use of the Project Area for a proposed solar energy system is an acceptable future use because the screening level risk evaluation shows cancer and non-cancer risks all within EPA acceptable management risk range under an industrial exposure.

EPA Region 8 issued this Ready for Reuse Determination, effective December 23, 2020.

Approved by: Date:

BETSY SMIDINGER Digitally signed by BETSY SMIDINGER Date: 2020.12.23 15:56:55 -07'00'

12/23/2020

Betsy Smidinger, Director
Superfund and Emergency Management Division
U.S. EPA Region 8

Documents pertaining to the Site may be found at Grantsville City Hall, 429 East Main Street Grantsville, Utah 84029 and online at https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0802704. Additional information can be obtained from Ken Wangerud, EPA's Remedial Project Manager (RPM) for the Site, who can be reached at (303) 312-6703 or wangerud.ken@epa.gov.

II. Site and Parcel Location

The Site is located in Tooele County, Utah (Figure 1). The Site, approximately 4,525 acres, is located one mile to the east of Rowley Road and 7.25 miles north of Interstate 80, and approximately 21 miles to the northwest of Grantsville, Utah. The EPA organized the Site into two operable units (OUs). The EPA further established 18 PRI areas. The inner PRI areas (PRI areas 1 and 3 through 7) include areas known to have directly received waste streams from the U.S. Magnesium facility and where existing data indicated high chemical concentrations were present. The outer PRI areas (PRI areas 2 and 8 through 18) include areas that may be affected by waste streams and air emissions from the U.S. Magnesium facility and/or secondary releases. OU1 includes all soils, sediments, solid wastes, surface water, wastewater, and groundwater within PRIs 1 through 17, and OU-2 includes ambient air within the 5-mile radius as PRI 18.

This RfR Determination is for approximately 640 acres within SITLA Development Lease Agreement No. 1118, SITLA Easement No. 2227, and BLM Right of Way Grant UTU-092039640 (Project Area) located within PRI area 15 Buffer Area West (PRI-15) as depicted in Figure 2.

The Project Area is in the southernmost portion of PRI-15 and consists of vacant land with unpaved roadways and a brine conveyance canal. The Project Area is covered with native vegetation with low hills and berms, with a slight descending slope to the east/northeast. No buildings or pavement are present within the Project Area. It is zoned Manufacturing General.

Figure 1: Site Location Map

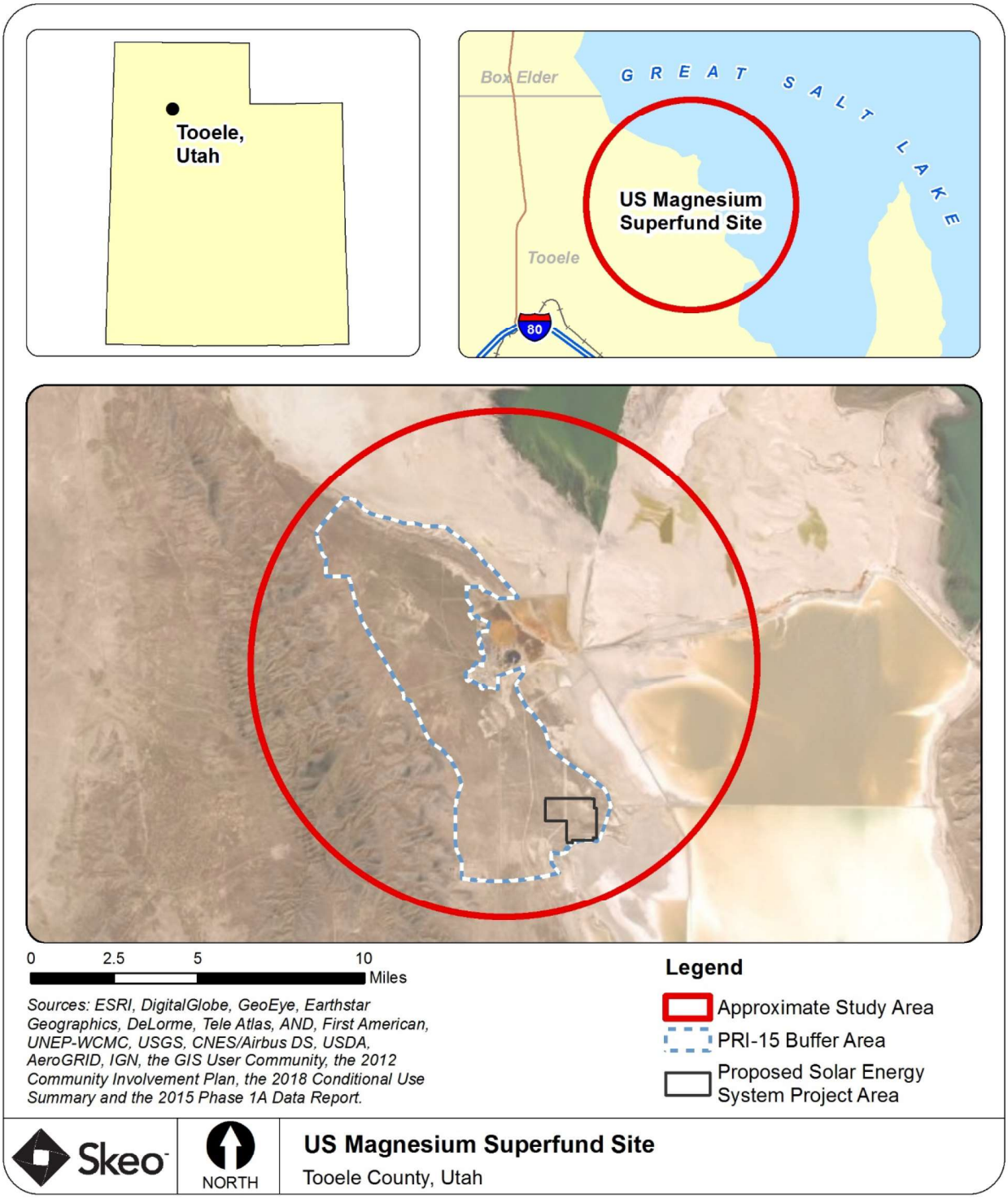

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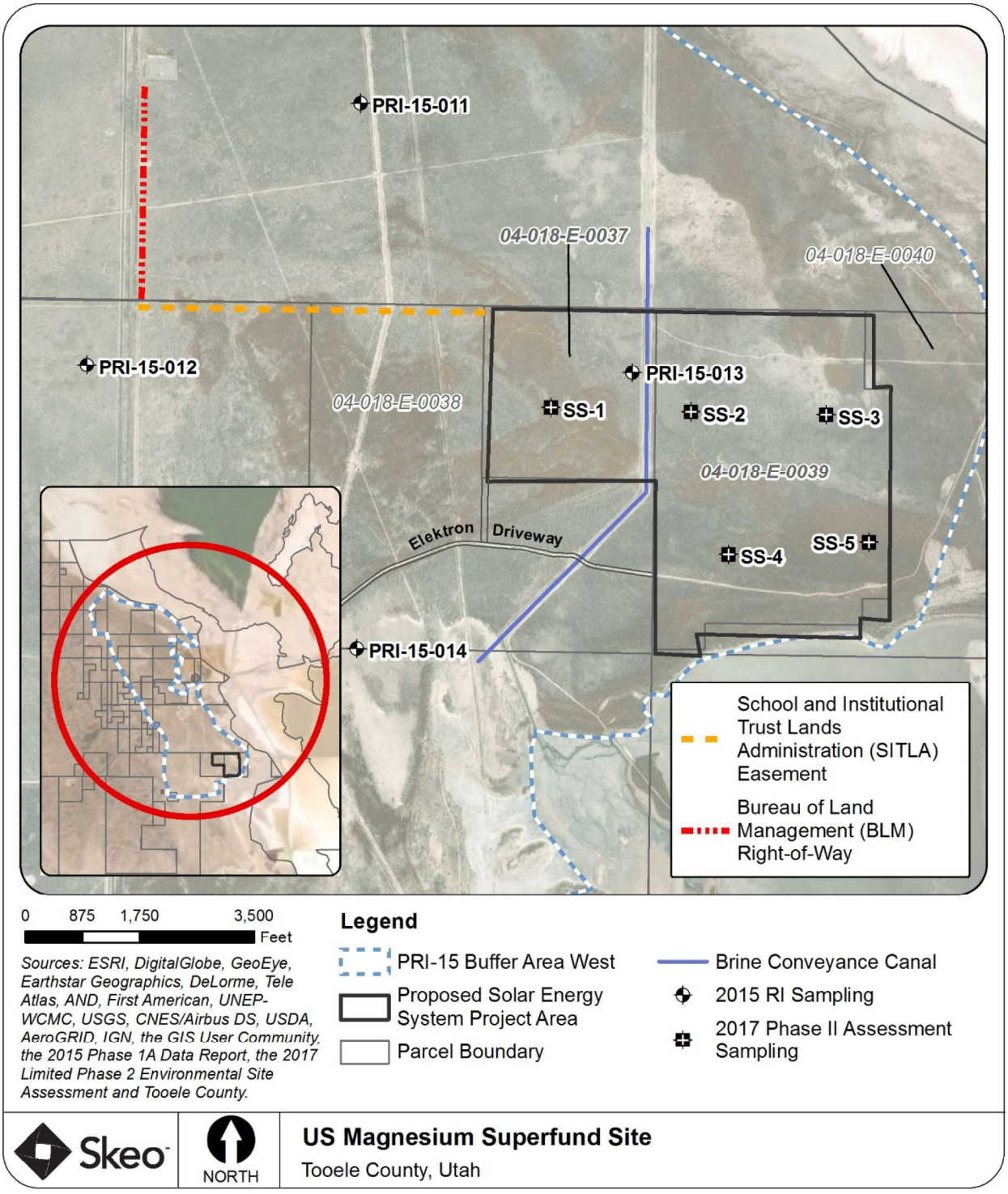
Figure 2: Site Parcel Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only.

III. Site Summary

Site and Contaminant History

The U.S. Magnesium plant electro-chemically processes magnesium chloride derived from Great Salt Lake brine waters in melt-reactors, adding petroleum-coke and hydrochloric-acid to produce approximately 60,000 metric-tons/year of primary magnesium and approximately 30 million-gallons pure liquid chlorine. By-product wastes released include: (1) highly acidic liquid- and slurry-streams containing large concentrations of hexachlorobenzene, polychlorinated biphenyl (PCBs), dioxins/furans, and (2) liquid and gaseous releases of chlorine and hydrogen-chloride, as well as particulates/aerosols containing chlorinated-organic compounds. The plant remains in continuous operation and subject to various hazardous pollutant control and risk-management requirements under the Clean Air Act and the Resource Conservation and Recovery Act.

PRI-15 includes the alluvial upland or grassland areas west of the U.S. Magnesium facility. Buffer Area West (PRI 15) is impacted primarily by windblown stack and fugitive emissions.[1]

Description of Risks

A screening-level risk evaluation, the December 2020 *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination,* was conducted using two independent data sets relevant for the area covered by this RfR Determination. The *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination* is available in Appendix B of this RfR Determination.

Using the maximum detected values from two data sets and assuming potential residential use, which includes exposures via incidental ingestion, dermal contact and inhalation of dust, the cancer risks fall within the EPA's risk management range of 1×10^{-6} to 1×10^{-4} for both data sets. The contaminants that contribute to a cumulative risk above 1×10^{-6} (the lower end of EPA's risk management range) were further reviewed against background and in all cases, the maximum concentration falls within the background concentrations

The noncancer hazard indices (HI) are slightly above the EPA's threshold of 1.0 when not accounting for contributions from background conditions. The contaminants that contribute to the slight exceedance of the HI were cobalt, iron and manganese in both data sets, and arsenic for the Phase II data set. Similar to the observations for the cancer risk evaluation, the maximum detections of these four metals are within the background ranges in the upland south and upland southeast locations. Because EPA cannot reduce metals concentrations below background concentrations, the exceedance is acceptable.

The *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination* also shows that under a default

[1] U.S. EPA Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air and Receptor Surveys, September 2013, page 34 of 336.

industrial exposure assumption, the cancer risks are even lower as are the HIs. The resultant screening-level cancer risks fall within EPA's risk management range and the total HIs are below 1.0. Industrial exposure scenarios (properties that are zoned Manufacturing General) are consistent with use as a solar energy system.

Summary of Cleanup Activities

Table 1 summarizes relevant events and important dates in the Site's history. Because the Site is early in EPA's cleanup process, it includes many non-EPA documents, including several activities supported by U.S. Magnesium's contractor Environmental Resources Management (ERM) and the private sector. To date, no cleanup actions have taken place or been deemed necessary for the Project Area.

Table 1: Chronology of Site Events

Event	Date
Initial Assessment completed	January 4, 2008
Proposed to the National Priorities List	September 3, 2008
Finalized on the National Priorities List	November 4, 2009
Remedial Investigation started	November 25, 2009
EPA completes Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys	September 2013
Phase 1A Data Report for PRI Areas 2 and 8 – 17 prepared by ERM	October 2015
ERM prepares the Final OU-1 Baseline Human Health Risk Assessment Technical Memorandum	August 2016
Phase I Environmental Site Assessment for the Elektron Solar Project performed by Kleinfelder	October 12, 2017
Revised Final OU-1 Baseline Human Health Risk Assessment Technical Memorandum prepared by ERM	March 2019

Additional information about Site activities, are available online from the Superfund Information System, which can be viewed by going to the following website: https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0802704.

Redevelopment/Reuse History

The Project Area is owned by the SITLA, with the exception of an easement associated with a brine conveyance canal and the transmission right of way (ROW) owned by the BLM. The Project developer leases the land from SITLA and holds the ROW. U.S. Magnesium owns and operates the canal and holds the associated easement. The Project Area has been undeveloped and/or used for grazing land from as early as 1953 through the present, with the exception of unpaved tracks and roadways. The canal was constructed on the Site between 1972 and 1985 by U.S. Magnesium. The canal was, and still is, used for lateral conveyance of magnesium chloride brine between the U.S. Magnesium facility, the Great Salt Lake, and associated U.S. Magnesium solar concentrator ponds. The southeast and east portions were used as a gravel borrow pit by Wasatch Regional Landfill in approximately 1985, in the area located along West Stansbury Causeway Road and the adjacent salt flats.

IV. EPA's Basis for the RfR Determination

EPA has based the U.S Magnesium Superfund Site RfR Determination for the Project Area on the *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination* in December 2020. Using data collected for the (1) Phase 1A RI and (2) the *Phase I Environmental Site Assessment, Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT*, the EPA has determined the proposed solar energy system is an appropriate use.

Using the maximum detected values from two data sets, the screening level risk evaluation found that potential residential and industrial use fall within the EPA's acceptable risk range for cancer and non-cancer risks. For more information about risk and findings of the *U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination*, please see Appendix B.

V. Ongoing Limitations and Responsibilities Previously Established by EPA

Institutional and Engineering Controls

There are currently no institutional or engineering controls required for the Project Area. There is an easement associated with the brine conveyance canal.

Operations and Maintenance Requirements

Since the Project Area, like the rest of the Site, is currently included in the remedial investigation phase of cleanup, no operation and maintenance requirements have been identified.

VI. Provisos

This Ready for Reuse Determination is a technical document and does not have any legally binding effect. Further, it does not expressly or implicitly change, create, expand, or limit any legal rights, obligations, responsibilities, expectations, or benefits of any party. EPA assumes no responsibility for reuse activities and/or for any potential harm that might result from reuse activities. EPA retains any and all rights and authorities it has, including, but not limited to, legal, equitable, or administrative rights. EPA specifically retains any and all rights and authorities it has to conduct, direct, oversee, and/or require environmental response actions in connection with the Site including the Project Area.

The types of uses identified as protective in this RfR Determination remain subject to: (i) applicable federal, state and local regulation; and to (ii) title documents, including, but not limited to, easements, restrictions and ICs.

This RfR Determination is based on all the information currently available to EPA. Should conditions change or new information become available that indicates re-evaluation is necessary, this RfR Determination will no longer be valid.

APPENDIX A

ACRONYMS AND ABBREVIATIONS

BLM: U.S. Bureau of Land Management

EPA: U.S. Environmental Protection Agency

EPA Phase 1A RI: EPA Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys

ERM: Environmental Resources Management

HI: Hazard Index

IC: institutional control

OU: operable unit

PCBs: polychlorinated biphenyl

Project Area: approximately 640 acres within Utah School and Institutional Trust Lands Administration (SITLA) Development Lease Agreement No. 1118, SITLA Easement No. 2227, and U.S. Bureau of Land Management Right of Way Grant UTU-092039640

PRI: preliminary remedial investigation

PRI-15: preliminary remedial investigation area 15 Buffer Area West

RfR: Ready for Reuse

RPM: Remedial Project Manager

Site: U.S. Magnesium Superfund Site

SITLA: Utah School and Institutional Trust Lands Administration

APPENDIX B

Screening level risk evaluation Summary

U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination

EPA Region 8 requested risk assessment support for the U.S. Magnesium site (Site) to evaluate if property known as the Project Area, located within the Preliminary Remedial Investigation Area 15 (PRI-15), can be used for industrial purposes. The proposed redevelopment project involves construction of a solar project within a portion of PRI-15, also known as the Buffer Area West. The surface soils in this area were investigated in 2013 and 2017 to determine if any Site-related contamination is present due to windblown stack and fugitive emissions from the U.S. Magnesium's operating facility.

The risk assessment support activities included the following:

- Reviewed the documentation furnished by EPA Region 8 for the Site and from a Phase II site assessment provided to EPA by a private party interested in implementing the solar project to identify relevant information to support a screening-level risk evaluation.
- Identified relevant existing soil sample locations to include in the screening level risk evaluation and the basis for selection.
- Conducted a screening-level risk evaluation of the selected soil data.
- Summarized risk evaluation methods and assumptions and interpreted the results.

The risk assessment activities demonstrate that the Project Area can be re-used for a solar energy project based on the results of residential and industrial screening-level risk evaluations using conservative default exposure assumptions. Details of this demonstration are presented in the following sections.

Documents Used in the Evaluation

The documents used in this review are as follows (Table 1):

Table 1: Documents Reviewed

Document	Basis
Technical Memorandum for Oversight of the Phase 1A-B Remedial Investigation in PRI Areas 1 and 3 through 7 and Background US Magnesium NPL Site. Prepared by PWT for EPA Region 8. January 2016	Provides basis of background data for Upland South (UPS) and Upland Southeast (UPSE)(page 20 of 23) Figure 3 shows background area locations
Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys (Phase 1A RI SAP). Revision 0 for PRI Areas 2 and 8 through 17 US Magnesium NPL Site. Prepared by ERM. September 2013	Page 114, 126 and 153 Describes sampling strategy for PRI-15 samples (page 114, 126, 153 and 156 of 336) Describes limited detection of VOCs during previous risk assessment conducted in 2007 Pages 43-46
Phase 1A Data Report for PRI Areas 2 and 8–17 US Magnesium RI/FS, Rowley, Utah. Prepared by ERM. October 2015	Locations of the four PRI-15 sample locations within the proposed solar project. (Figure 4-9) Soil analytical results for PRI-15 (Table I-9)
Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016	Background locations relative to PRI-15 (Figure 3-7) Background sample location map for UPS (Figure 1.4) Background sample location map for UPSE (Figure 1.5) Background sample analytical results for the UPS and UPSE areas (Table 5-16)

Document	Basis
Final Problem Formulation and Baseline Ecological Risk Assessment Technical Memorandum. US Magnesium RI/FS Rowley, Utah. Prepared by ERM. May 2020	Supports that soil geologic conditions are generally similar within the upland areas with surface soils are generally classified as silty fine sands, clayey silts, and silts with fine sand (page 11)
Phase I Environmental Site Assessment. Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.	General background information for the 640-acre parcel for soil types, groundwater use and maps of site boundary
Limited Phase II Environmental Site Assessment Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.	Phase II soil sample locations (Figure 2) Soil analytical results (Table 1) Dioxin soil results (Appendix B) to convert to TEQs using WHO TEFs as the lab used ITE Toxicity Equivalency Factors that were developed nearly 30 years ago[a]
Revised Final OU-1 Baseline Human Health Risk Assessment Technical Memorandum Remedial Investigation/Feasibility Study US Magnesium Site Rowley, Utah. Prepared by ERM. March 2019	Gain insights into likely human exposure pathways (Section 4.2 and Figure 4-15).

Notes:

a. Pilot Study on International Information Exchange on Dioxins and Related Compounds. Prepared by the National Atlantic Treaty Organization, Committee on the Challenges of Modern Society. August 1988.

A review of the available documents on the Site was performed to identify data that would be relevant to conducting a screening risk evaluation for the Project Area located within PRI-15. The review identified the following

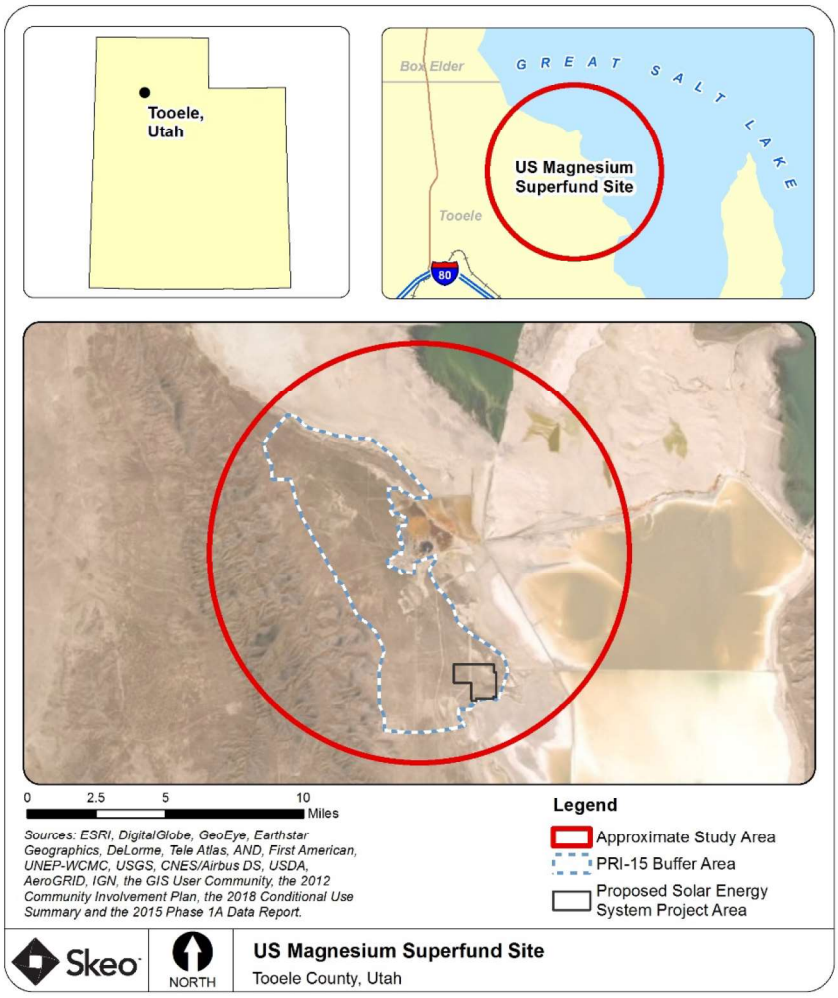
- Basis of the selection of soil sampling locations and depth of samples
- Analytical methods used for sampling analysis
- Final analytical results
- Background data

Identification of Relevant Soil Data to Include in the Screening-level Risk Evaluation

The Project Area proposed for re-use is located on an approximately 640-acre area about 3 miles southeast of the U.S. Magnesium operating facility (Figure 1), in the southernmost portion of PRI-15, also known as the Buffer West Area. The Project Area consists of vacant land with unpaved roadways and a Site brine conveyance canal. The Project Area is covered with native vegetation with low hills and berms, with a slight descending slope to the east/northeast. No buildings or pavement are present in the Project Area. The Project Area is zoned Manufacturing General.

The data collected by ERM in 2013 in support of the Remedial Investigation (RI) for the Site were reviewed to identify the PRI-15 soil sample locations that fall within the footprint of the Project Area. ERM collected 14 samples within PRI-15 in 2013 with four samples located in the general vicinity of the Project Area; one sample (PRI-15-13) was collected within the Project Area boundaries. These samples include PRI-15-011, PRI-15-012, PRI-15-013, and PRI-15-014 (Figure 1); these samples are referred to herein as the RI samples. According to the 2013 SAP, the PRI sample locations were selected based on a

Figure 1: Project Area Location



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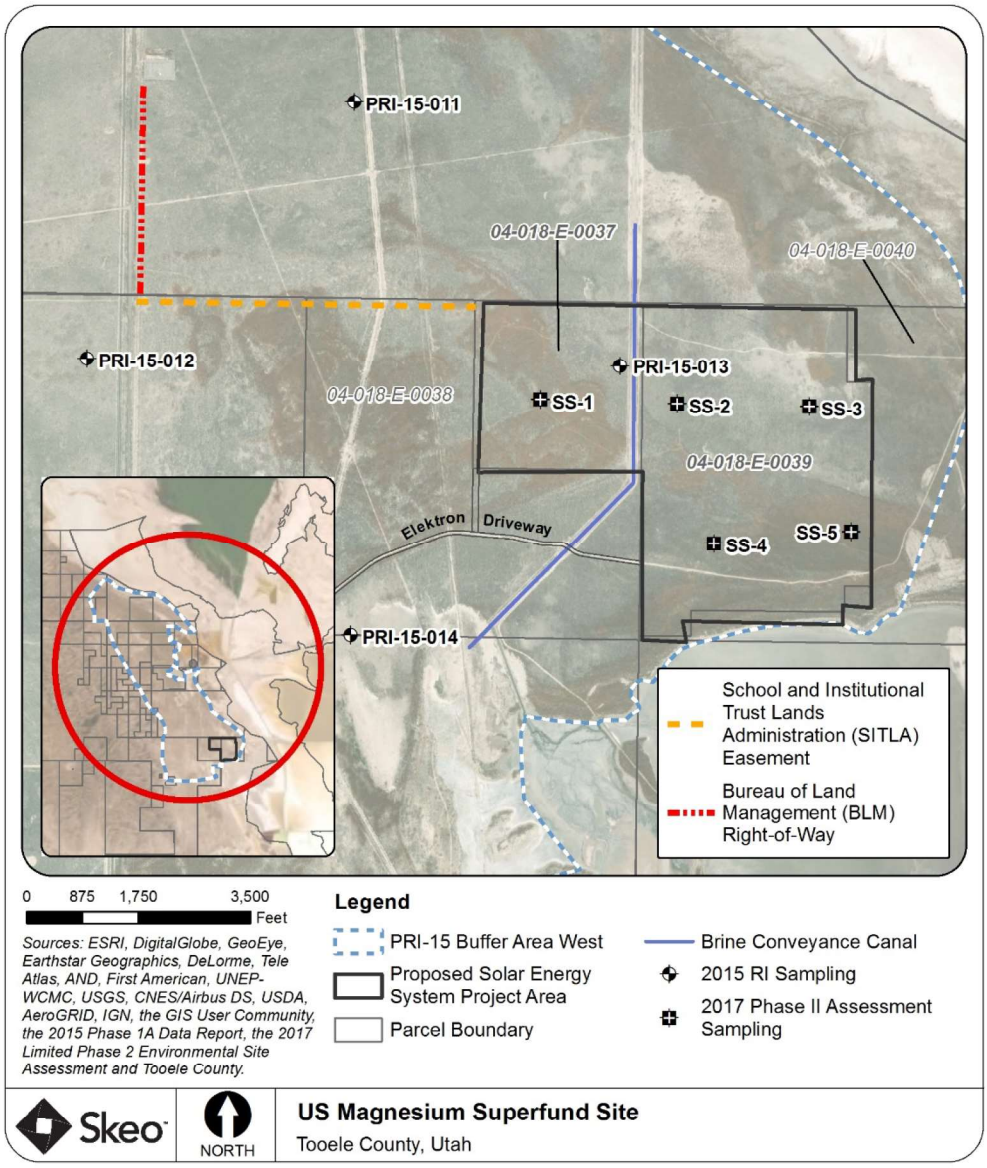
systematic grid pattern where the starting point for the grid was selected at random. The use of a systematic grid assures adequate coverage within each PRI area and does not likely introduce any significant sampling bias. In order to characterize the effect of air deposition from the U.S. Magnesium operating facility on the downgradient buffer areas, the surface soil samples were collected from the top 2 inches of material.

The data collected by Kleinfelder in support of the Limited Phase II Environmental Site Assessment, selected five surface soil sampling locations in 2017 to assess potential contaminants that may have been deposited through air dispersion within the surface soil consistent with the PRI-15 RI investigation. Kleinfelder divided up the Project Area into five sections, with one five-point composite surface soil sample location within each section (SS-1 through SS-5) (Figure 2); these samples are referred herein as the Phase II samples. Soil samples were composited from a sampling center point and at approximate distances of 30 to 40 feet from the center point of the four surrounding quadrants, for a total of 25 surface soil samples. Equal volumes of soil were collected from the top 2 inches using a hand trowel from each point and composited in a stainless-steel bowl.

Figure 2: PRI-15 Soil Sample Locations Near the Project Area



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The two data sets are comparable for the depth sampled and the laboratory analytical methods used to characterize contaminant concentrations. A summary of historical investigations presented in the Phase 1A RI SAP indicate there were very limited detections of volatile organic compounds in soil, thus, the follow-on investigations have been focused on dioxins and furans, polychlorinated bi-phenyls (PCBs), semivolatile organic compounds (SVOCs) and metals (Table 2). The only difference in the two data sets is the sample design. The RI data were collected as discrete random samples from an established grid while the Phase II data were five-point composite samples collected from each of the five sections of the Project Area.

Table 2: Laboratory Analytical Methods for Soil Samples

Analytical Group	Analytical Method
Total metals	EPA Methods 6010B and 7471A
Dioxins and furans	EPA Method 8290
Polychlorinated biphenyls (PCBs)	EPA Method 1668A
Semi-volatile organic compounds (SVOCs)	8270C
Polycyclic aromatic hydrocarbons (PAHs)	8270C-SIM

Screening-level Residual Soil Risk Evaluation of Project Area

A screening-level risk evaluation was conducted on the soil data collected within or in close proximity to the Project Area to determine if future exposure to surface soil poses any human health concerns based on incidental ingestion, dermal contact or inhalation of dust. The screening level risk evaluation was conducted starting with the most conservative assumption that the Project Area would be available for unrestricted use which would include a residential exposure. This is considered very conservative since the area is zoned Manufacturing General, and the proposed solar project is consistent with the current zoned use. Currently the most likely human receptors are federal and/or state resource managers (persons involved with management of federal and state lands neighboring the facility); and recreational persons visiting the federal and state lands neighboring the facility, which could include hunters, hikers, all-terrain vehicle users, etc. In addition, ranchers could periodically be exposed on lands neighboring the facility.

All of these most likely exposure scenarios represent less frequent exposures than a default future resident or industrial worker. Consequently, evaluating the default residential or industrial exposure scenarios ensures this screening level evaluation is very likely to overestimate potential health risks. If the health risks for the conservative exposure assumptions associated with residential or industrial scenarios are within acceptable limits, then additional, more realistic exposure evaluations (e.g., construction worker, solar project employee, etc.) are not required.

The screening evaluation was conducted separately for the RI samples and the Phase II samples to evaluate if there are any differences in the screening-level risk results. A screening-level risk evaluation involves the use of conservative default exposure assumptions for a future industrial use rather than site-specific exposure assumptions to provide a high-end risk estimate. Use of site-specific exposure assumptions would result in lower risk since the total hours in contact with soil by current receptors such as recreational visitors, resource managers, and ranchers, is much lower than under a default industrial scenario.[1]

Methods

The screening-level risk evaluation was conducted in the following manner:

1. Summary of RI and Phase II data sets – This step identified the minimum and maximum concentrations of compounds detected in the four RI samples (Appendix A, Table A-1), the five Phase II samples including dioxins, furans, metals, semi-volatile organic compounds (SVOCs) and polycyclic aromatic hydrocarbons (PAHs)(Appendix A, Table A-2). If the results for all samples within a data set were below detection, the compound was not carried further in the evaluation since the detection limits were not elevated. This applied to nearly all SVOCs except for several PAHs.

[1] In the Revised Final OU-1 Baseline Human Health Risk Assessment Technical Memorandum (ERM, 2019), total exposure dose to surface soil was reduced from a default exposure assumption by a use of a survey fraction that accounts for hours actually spent in contact with soil.

2. Dioxin data conversion – Dioxins are a group of compounds that share distinct chemical structures and characteristics. The term dioxin commonly refers to the compound in this group considered most toxic, 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD). In order to evaluate risks due to exposure to the group of dioxin compounds, also referred to as congeners, the congeners are converted to a calculated toxic equivalent (TEQ) relative to the toxicity of TCDD.

   The Phase II sample data set was reviewed, and the dioxins congener data had been converted by the analytical laboratory using outdated toxicity equivalency factors (TEFs) from 1988. In accordance with current EPA recommendations (https://www.epa.gov/risk/documents-recommended-toxicity-equivalency-factors-human-health-risk-assessments-dioxin-and), to calculate the TEQ for the 2017 samples, the congener data listed in the analytical laboratory reports were multiplied using the most current assigned TEF (adopted by the World Health Organization (WHO) in 2005) for each congener by the concentration detected for that congener (Appendix A, Table A-3). If a concentration was below the detection limit, then one-half the detection limit was used as the concentration. The individual TEQs were then summed resulting in the single TEQ. The ERM RI data did not require conversion as the data summary report was reviewed and the dioxin TEQs were calculated using the most current TEFs along with one-half the detection limit for those congeners that were below detection.

3. Conversion of polychlorinated biphenyl compounds (PCBs) data – Twelve of the 209 PCB congeners have been designated by the WHO as having "dioxin-like" toxicity. According to risk assessment guidance, the results of the 12 dioxin-like congeners (PCB- 7, 81, 105, 114, 118, 123, 126, 156, 157, 167, 169, and 189) are adjusted using the 12 WHO TEFs.[2] The resultant TEQs for each of the 12 dioxin-like PCBs are then summed and added to the TCDD TEQ and evaluated using the toxicity factors developed for TCDD. The concentrations of the remaining PCB congeners are summed as "non-dioxin like" PCBs to obtain a total PCB concentration and evaluated separately in the risk evaluation using the toxicity factors established for high risk PCBs.

   The RI data had already been converted to total TCDD TEQs which included the 12 dioxin-like PCBs; therefore, the conversion was not warranted for these data. The 12 dioxin-like PCBs in the Phase II data set were all below detection, therefore there was no conversion warranted for this data set.[3] The detection limits were reviewed, and the maximum detection limit was 0.0000625 mg/kg for PCB 123 (also known as 2',3,4,4',5-Pentachloro-biphenyl). This dioxin-like PCB concentrations multiplied by the TEF of 0.00003 results in a TCDD TEQ of 1.9×10^{-9} mg/kg which is well below the conservative cancer risk-based and noncancer based residential RSLs of 4.8×10^{-6} (based on a 10^{-6} risk) and 5.1×10^{-5} (based on a noncancer HQ of 1) mg/kg, respectively.

4. Summary of background concentrations – The minimum and maximum detection of several metals from two background areas near the Project Area were identified. The two background

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[2] Recommended Toxicity Equivalence Factors (TEFs) for Human Health Risk Assessments of 2,3,7,8-Tetrachlorodibenzo-p-dioxin and Dioxin-Like Compounds. EPA/100/R-10/005 December 2010 https://www.epa.gov/sites/production/files/2013-09/documents/tefs-for-dioxin-epa-00-r-10-005-final.pdf and *Use of Dioxin TEFs in Calculating Dioxin TEQs at CERCLA and RCRA Sites*. Prepared by EPA and obtained at: http://semspub.epa.gov/src/document/HQ/174558.

[3] The PCB congener results are located in Table 1 of the Limited Phase II Environmental Site Assessment Elektron Solar Project Report. Prepared by Kleinfelder. October 2017.

areas include the Upland Southeast area (UPSE) and the Upland South area (UPS) which were sampled in 2015 as part of the Phase 1A-B RI for the Site.

5. Screening Level cancer risk estimate – This step calculated cancer risks by the ratio of the maximum detected concentration of each compound to EPA's 2020 carcinogenic-based Regional Screening Level (RSL) (based on a cancer risk of 1 x 10^{-6}) and then dividing this quotient by 1 x 10^{-6} to estimate the potential cancer risks associated with incidental ingestion, dermal contact and inhalation exposures. Individual risks were summed to obtain a total risk to all carcinogenic contaminants detected in surface soil. The risks were based on standard default exposure assumptions for a standard default industrial exposure setting. In addition, risks were estimated for an unrestricted residential land use scenario which is overly conservative due to the industrial nature of the Site. The residential analysis was conducted for perspective.

6. Screening Level noncancer hazard quotient (HQ) estimate – This step calculated the noncancer hazard for each detected compound by dividing the maximum detected concentration of each compound by the noncarcinogenic based 2020 RSL (based on a HQ of 1) to estimate potential HQ associated with incidental ingestion, dermal contact and inhalation exposures. Individual HQs were summed to obtain a total hazard index (HI) to all noncarcinogenic contaminants detected in surface soil. Contaminants that contribute to a cumulative HI greater than 1.0 were identified. The noncancer hazards were based on standard default exposure assumptions for an industrial exposure setting. In addition, noncancer hazards were estimated for an unrestricted residential land use scenario which is overly conservative due to the industrial nature of the Site. The residential analysis was conducted for perspective.

7. Background Comparison – To place the cancer risk and noncancer HIs in perspective, Site-specific background data were reviewed relative to the range of concentrations detected near or within the Project Area. The comparison was conducted for contaminants without RSLs or for those that contributed to risk outside of EPA's acceptable risk range or above the noncancer HI threshold of 1.0 to provide perspective on background contribution to overall risk or hazard.

Results

A screening-level risk evaluation was conducted on the two independent data sets using the maximum detected value from each data set as the exposure concentration. The first evaluation was based on the most conservative land use assumption - residential use, followed by an industrial land use evaluation.

Residential

A residential land use is the most conservative land use, as it results in adults and young children being exposed to soil at a much higher frequency and longer duration than under any other land use assumption. The default land use assumptions include being exposed to soil for 350 days per year, eight hours per day for 26 years as an adult and 6 years as a child with exposure to soil through incidental ingestion, dermal contact and inhalation of dust. Generally, if the risk and hazard results are within acceptable limits as defined by EPA, then evaluation of land use scenarios in which exposures are less frequent is not necessary. A summary of the residential risk evaluation for the two data sets is presented in Table 3 and shows that the overall conclusions and observations are very similar for the two data sets.

Table 3 shows that under a default residential exposure, which includes exposures via incidental ingestion, dermal contact and inhalation of dust, the cancer risks fall within the EPA's risk management range of 1 x 10^{-6} to 1 x 10^{-4} for both data sets. For perspective, the contaminants that contribute to a cumulative risk above 1 x 10^{-6} (the lower end of EPA's risk management range) were further reviewed against background and in all cases, the maximum concentration of those contaminants falls within the

background ranges for the Upland Southeast (UPSE) and/or Upland South (UPS) as described in the Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS.

Table 3: Summary of the Residential Risk Evaluation

Data Set Used	Cumulative Cancer Risk	COCs Contributing >1 x 10^{-6}	Notes	Cumulative Noncancer HI	COCs Contributing > 0.2 HI	Notes
RI	5.4 x 10^{-5}	Arsenic and total chromium	Arsenic within UPSE and UPS background. Chromium within UPSE background.	1.4	Cobalt, iron, manganese	Cobalt and manganese within the UPSE background. Iron (essential nutrient) is within the UPSE and UPS background.
Phase II	5.1 x 10^{-5}	Arsenic and total chromium	Arsenic within UPSE background. Chromium within UPS and UPSE background.	1.5	Arsenic, cobalt, iron and manganese	Arsenic, cobalt, iron (essential nutrient) and manganese within UPSE background.
Source: See Appendix A (Table B-1 and Table B-2) for the detailed risk evaluation results of the RI and Phase II residential risk valuations, respectively.						

Table 3 also shows that the noncancer HI, which is a cumulative sum of the individual hazard quotients (HQs), are slightly above the EPA's threshold of 1.0 (1.4 for the RI data set and 1.5 for the Phase II data set) which includes contributions from background metals concentrations. The major contaminants that contribute to the slight exceedance of the HI were cobalt, iron and manganese in both data sets, and arsenic for the Phase II data set. However, the maximum detections of these four metals are all within the background ranges in the UPSE and/or UPS.

Four contaminants that did not have established toxicity criteria (calcium, magnesium, potassium and sodium) were compared to background levels in the UPSE and UPS and all maximum concentrations were within background levels. These four compounds are also considered nutritionally essential which supports the absence of toxicity criteria.

Industrial

The most realistic land use for the Project Area is industrial thus industrial risks and noncancer hazards were also evaluated. The default land use assumptions include being exposed to soil for 250 days per year, eight hours per day for 25 years with exposure to soil through incidental ingestion, dermal contact and inhalation of dust. This is also considered conservative relative to a solar project where exposure frequency to soil is likely to be much lower duration for a construction worker installing the solar project. In addition, once the solar project has been installed, human activity at the Project Area will be limited to occasional maintenance, repair activities which are not expected to result in limited contact with soil and less frequency than 250 days per year that is assumed for a standard default industrial worker. Table 4 shows that under a default industrial land use exposure scenario, cancer risks are at the lower bound of EPA's risk management range and the HIs are below 1.0.

Table 4: Summary of the Industrial Risk Evaluation

Data Set Used	Cumulative Cancer Risk	COCs Contributing >1 x 10^{-6}	Notes	Cumulative Noncancer HI	COCs Contributing > 0.2 HI	Notes
RI	4.0 x 10^{-6}	Arsenic and chromium	Arsenic within UPSE and UPS background.	0.12	None	None

			Chromium within UPSE background.			
Phase II	4.6×10^{-6}	Arsenic and chromium	Arsenic within UPSE background. Chromium within UPS and UPSE background.	0.14	None	None
Source: See Appendix A (Table B-3 and Table B-4) for the detailed risk evaluation results of the RI and Phase II industrial risk valuations, respectively.						

Uncertainties in the Results

Many of the factors influencing exposure and risk are not known precisely or may vary, depending on the habits of the exposed population and the circumstances associated with the exposure. The risk assessment process requires that conservative assumptions be made for these unknown variables to ensure that exposure, toxicity, and, hence, potential risk are not underestimated. When taken together, these assumptions contribute to the likely overestimation of any actual risks. For the toxicity evaluation, the risk evaluation conservatively assumed that the total chromium measured at the Site was in the more toxic hexavalent form, when in the environment, chromium is more likely to be present as a mix of hexavalent and the much less toxic trivalent form. In addition, conservative default exposure assumptions were used to evaluate risk, in order to address any uncertainties that may be present in understanding the actual exposure assumptions related to a solar project construction worker, or maintenance worker where exposure duration is much lower which would be the duration of the project construction. Many construction projects are 1 to 2 years versus a 25-year duration under a default industrial worker assumption. In addition, the maximum detected concentrations were used as the soil exposure concentration, instead of an average or 95% upper confidence limit (UCL) concentrations. Usually a human receptor is exposed to an average across an area and is not stationary remaining at the sample location exhibiting the highest detection. Thus, use of the maximum provides an additional level of/ conservatism to the risk evaluation. Finally, the overall risks include contributions from background levels of some metals in soil, which fall within ranges representative of natural soil conditions in the area.

APPENDIX A: DATA USED IN THE SCREENING-LEVEL RISK EVALUATION

Table A-1: 2013 RI Data Evaluated in the Screening-Level Risk Evaluation

Analyte	Location ID Sample Date Depth Sample ID Unit	PRI15-011 23-Nov-13 N 0 - 2 in PRI15-011-SS01-112313	PRI15-012 24-Nov-13 N 0 - 2 in PRI15-012-SS01-112413	PRI15-013 24-Nov-13 N 0 - 2 in PRI15-013-SS01-112413	PRI15-014 24-Nov-13 N 0 - 2 in PRI15-014-SS01-112413
01-Dioxins and Furans					
2,3,7,8-TCDD	pg/g	*< 0.13 U*	*< 0.11 U*	*< 0.23 U*	*< 0.092 U*
1,2,3,7,8-PeCDD	pg/g	*< 0.21 U*	*< 0.15 U*	*< 0.20 U*	*< 0.17 U*
1,2,3,4,7,8-HxCDD	pg/g	*< 0.12 U*	*< 0.10 U*	*< 0.11 U*	*< 0.091 U*
1,2,3,6,7,8-HxCDD	pg/g	*< 0.11 U*	0.24 J	*< 0.089 U*	*< 0.18 UQ*
1,2,3,7,8,9-HxCDD	pg/g	*< 0.098 U*	0.23 J	*< 0.086 U*	0.17 J
1,2,3,4,6,7,8-HpCDD	pg/g	1.0 J	2.1 J	0.87 J	0.97 J
OCDD	pg/g	8.1 J	11	*< 5.5 U*	4.2 J
2,3,7,8-TCDF	pg/g	0.37 J	0.44 J	*< 0.28 UQ*	*< 0.4 UQ*
1,2,3,7,8-PeCDF	pg/g	*< 0.41 U*	*< 0.31 U*	*< 0.24 UQ*	*< 0.29 U*
2,3,4,7,8-PeCDF	pg/g	*< 0.43 U*	0.64 J	*< 0.17 U*	*< 0.30 U*
1,2,3,4,7,8-HxCDF	pg/g	1.4 J	3.9 J	*< 0.78 UQ*	1.1 J
1,2,3,6,7,8-HxCDF	pg/g	1.4 J	1.5 J	*< 0.54 UQ*	*< 0.77 UQ*
1,2,3,7,8,9-HxCDF	pg/g	*< 0.16 U*	*< 0.22 U*	*< 0.20 U*	*< 0.15 U*
2,3,4,6,7,8-HxCDF	pg/g	0.42 J	0.44 J	0.24 J	*< 0.26 UQ*
1,2,3,4,6,7,8-HpCDF	pg/g	*< 7.7 UQ*	12	4.1 J	5.2 J
1,2,3,4,7,8,9-HpCDF	pg/g	*< 1.2 UQ*	0.77 J	0.69 J	*< 0.52 UQ*
OCDF	pg/g	76	72	44	46
Calculated TEQ (ND=0), Mammalian	pg/g	0.39	1.0	0.094	0.20
Calculated TEQ (ND=1/2 DL), Mammalian	pg/g	0.73	1.2	0.48	0.52
Calculated TEQ (ND=0), Avian	pg/g	0.80	1.8	0.13	0.26
Calculated TEQ (ND=1/2 DL), Avian	pg/g	13	14	12	13
02-PCBs					
PCB-81	pg/g	*< 0.61 U*	*< 0.92 U*	*< 0.85 U*	*< 1.1 U*
PCB-77	pg/g	2.0 J	*< 1.6 UQ*	1.1 J	1.5 J
PCB-105	pg/g	*< 1.9 UQ*	3.1	1.3 J	1.7 J
PCB-114	pg/g	*< 0.42 U*	*< 0.84 U*	*< 0.54 U*	*< 0.67 U*
PCB-118	pg/g	5.3	6.4	3.6	5.3
PCB-123	pg/g	*< 0.42 U*	*< 0.86 U*	*< 0.54 U*	*< 0.66 U*
PCB-126	pg/g	*< 0.41 U*	*< 0.83 U*	*< 0.55 U*	*< 0.70 U*
PCB-156 & 157	pg/g	*< 0.64 UQ*	*< 1.4 UQ*	1.1 J	1.1 J
PCB-167	pg/g	*< 0.52 U*	*< 0.41 U*	*< 0.31 U*	*< 0.57 U*
PCB-169	pg/g	*< 0.53 U*	*< 0.43 U*	*< 0.33 U*	*< 0.66 U*
PCB-189	pg/g	*< 0.56 U*	*< 1.1 U*	*< 0.53 U*	*< 0.76 U*
Monochlorobiphenyls, Total	pg/g	6.2 J	5.4 J	5.6 J	3.7 J
Dichlorobiphenyls, Total	pg/g	19 J	12 J	*< 20 U*	*< 14 U*
Trichlorobiphenyls, Total	pg/g	13 J	9.1 J	5.2 J	4.8 J
Tetrachlorobiphenyls, Total	pg/g	14 J	16 J	10 J	10 J
Pentachlorobiphenyls, Total	pg/g	27 J	40 J	19 J	26 J
Hexachlorobiphenyls, Total	pg/g	35 J	52 J	30 J	45 J
Heptachlorobiphenyls, Total	pg/g	31 J	47 J	23 J	30 J
Octachlorobiphenyls, Total	pg/g	36 J	41 J	27 J	26 J
Nonachlorobiphenyls, Total	pg/g	76 J	63 J	53 J	46 J
Decachlorobiphenyl (PCB-209)	pg/g	460	310	270	270
Total PCBs	pg/g	720	600	450	460
03- Metals					
Total Aluminum	mg/kg	13,000	12,000	10,000	12,000
Total Antimony	mg/kg	0.33 J-	0.33 J-	0.30 J-	0.31 J-
Total Arsenic	mg/kg	4.7	5.1	5.0	5.1
Total Barium	mg/kg	250	270	330	250
Total Beryllium	mg/kg	0.53	0.46	0.48	0.53
Total Cadmium	mg/kg	0.51	0.49	0.40	0.38
Total Calcium	mg/kg	68,000	73,000	85,000	64,000
Total Chromium	mg/kg	14	13	12	14
Total Cobalt	mg/kg	4.4	4.2	3.8	4.6
Total Copper	mg/kg	17	16	14	17

Analyte	Location ID Sample Date Depth Sample ID Unit	PRI15-011 23-Nov-13 N 0 - 2 in PRI15-011-SS01-112313	PRI15-012 24-Nov-13 N 0 - 2 in PRI15-012-SS01-112413	PRI15-013 24-Nov-13 N 0 - 2 in PRI15-013-SS01-112413	PRI15-014 24-Nov-13 N 0 - 2 in PRI15-014-SS01-112413
Total Iron	mg/kg	11,000	10,000	10,000	11,000
Total Lead	mg/kg	19 J	20 J	18 J	21 J
Total Magnesium	mg/kg	18,000	16,000	17,000	16,000
Total Manganese	mg/kg	510	480	460	500
Total Mercury	mg/kg	0.012 J	0.025 J	0.014 J	0.010 J
Total Molybdenum	mg/kg	0.58	1.1	0.82	0.87
Total Nickel	mg/kg	11	10	8.9	11
Total Potassium	mg/kg	5,300	4,800	4,400	5,000
Total Selenium	mg/kg	0.26 J-	0.36 J-	0.34 J-	0.25 J-
Total Silver	mg/kg	*< 0.066 U*	0.085 J	*< 0.066 U*	*< 0.064 U*
Total Sodium	mg/kg	1,100	1,200	900	1,700
Total Thallium	mg/kg	0.11 J	*< 0.11 U*	*< 0.11 U*	*< 0.11 U*
Total Vanadium	mg/kg	23	21	20	22
Total Zinc	mg/kg	51	48	43	47
05-SVOCs					
1,1'-Biphenyl	µg/kg	*< 180 U*	*< 180 U*	*< 180 U*	*< 180 U*
1,2,4,5-Tetrachlorobenzene	µg/kg	*< 28 U*	*< 28 U*	*< 28 U*	*< 28 U*
2,3,4,6-Tetrachlorophenol	µg/kg	*< 89 U*	*< 89 U*	*< 87 U*	*< 89 U*
2,4,5-Trichlorophenol	µg/kg	*< 90 U*	*< 90 U*	*< 88 U*	*< 90 U*
2,4,6-Trichlorophenol	µg/kg	*< 91 U*	*< 91 U*	*< 89 U*	*< 91 U*
2,4,6-Trichlorophenol (SIM Screen)	µg/kg	*< 4.8 U*	*< 4.8 U*	*< 4.7 U*	*< 4.8 U*
2,2-Oxybis(1-chloropropane)	µg/kg	*< 86 U*	*< 86 U*	*< 84 U*	*< 85 U*
2,4-Dichlorophenol	µg/kg	*< 97 U*	*< 97 U*	*< 95 U*	*< 96 U*
2,4-Dimethylphenol	µg/kg	*< 180 U*	*< 180 U*	*< 180 U*	*< 180 U*
2,4-Dinitrophenol	µg/kg	*< 230 U*	*< 230 U*	*< 230 U*	*< 230 U*
2,4-Dinitrotoluene	µg/kg	*< 97 U*	*< 97 U*	*< 95 U*	*< 96 U*
2,6-Dinitrotoluene	µg/kg	*< 110 U*	*< 110 U*	*< 110 U*	*< 110 U*
2-Chloronaphthalene	µg/kg	*< 88 U*	*< 88 U*	*< 86 U*	*< 87 U*
2-Chlorophenol	µg/kg	*< 96 U*	*< 96 U*	*< 93 U*	*< 95 U*
2-Methylphenol	µg/kg	*< 63 U*	*< 63 U*	*< 62 U*	*< 63 U*
2-Nitroaniline	µg/kg	*< 91 U*	*< 91 U*	*< 89 U*	*< 91 U*
2-Nitrophenol	µg/kg	*< 89 U*	*< 89 U*	*< 87 U*	*< 89 U*
3,3'-Dichlorobenzidine	µg/kg	*< 100 U*	*< 100 U*	*< 100 U*	*< 100 U*
3-Nitroaniline	µg/kg	*< 180 U*	*< 180 U*	*< 180 U*	*< 180 U*
4,6-Dinitro-2-methylphenol	µg/kg	*< 88 U*	*< 88 U*	*< 86 U*	*< 87 U*
4-Bromophenyl-phenylether	µg/kg	*< 92 U*	*< 92 U*	*< 90 U*	*< 92 U*
4-Chloro-3-methylphenol	µg/kg	*< 100 U*	*< 100 U*	*< 98 U*	*< 99 U*
4-Chloroaniline	µg/kg	*< 63 UJ*	*< 63 UJ*	*< 62 UJ*	*< 63 UJ*
4-Chlorophenyl-phenylether	µg/kg	*< 100 U*	*< 100 U*	*< 99 U*	*< 100 U*
3 & 4 Methylphenol	µg/kg	*< 360 U*	*< 360 U*	*< 350 U*	*< 360 U*
4-Nitroaniline	µg/kg	*< 96 U*	*< 96 U*	*< 93 U*	*< 95 U*
4-Nitrophenol	µg/kg	*< 300 U*	*< 300 U*	*< 300 U*	*< 300 U*
Acetophenone	µg/kg	*< 27 U*	*< 27 U*	*< 27 U*	*< 27 U*
Benzaldehyde	µg/kg	*< 180 U*	*< 180 U*	*< 180 U*	*< 180 U*
Benzylbutylphthalate	µg/kg	*< 100 U*	*< 100 U*	*< 100 U*	*< 100 U*
Bis(2-chloroethoxy)methane	µg/kg	*< 96 U*	*< 96 U*	*< 93 U*	*< 95 U*
bis(2-Chloroethyl) ether	µg/kg	*< 88 U*	*< 88 U*	*< 86 U*	*< 87 U*
Bis(2-ethylhexyl)phthalate	µg/kg	*< 110 U*	*< 110 U*	*< 100 U*	*< 110 U*
Carbazole	µg/kg	*< 100 U*	*< 100 U*	*< 100 U*	*< 100 U*
Dibenzofuran	µg/kg	*< 94 U*	*< 93 U*	*< 91 U*	*< 93 U*
Diethyl phthalate	µg/kg	*< 98 U*	*< 98 U*	*< 96 U*	*< 97 U*
Dimethylphthalate	µg/kg	*< 95 U*	*< 95 U*	*< 92 U*	*< 94 U*
Di-n-butylphthalate	µg/kg	*< 110 U*	*< 110 U*	*< 100 U*	*< 100 U*
Di-n-octylphthalate	µg/kg	*< 110 U*	*< 110 U*	*< 100 U*	*< 100 U*
Hexachlorobenzene	µg/kg	*< 97 U*	*< 97 U*	*< 95 U*	*< 96 U*
Hexachlorobenzene (SIM Screen)	µg/kg	*< 2.4 U*	*< 2.4 U*	*< 2.3 U*	*< 2.4 U*
Hexachlorobutadiene	µg/kg	*< 89 U*	*< 89 U*	*< 87 U*	*< 89 U*

Analyte	Location ID Sample Date Depth Sample ID Unit	PRI15-011 23-Nov-13 N 0 - 2 in PRI15-011-SS01-112313	PRI15-012 24-Nov-13 N 0 - 2 in PRI15-012-SS01-112413	PRI15-013 24-Nov-13 N 0 - 2 in PRI15-013-SS01-112413	PRI15-014 24-Nov-13 N 0 - 2 in PRI15-014-SS01-112413
Hexachlorobutadiene (SIM Screen)	µg/kg	*< 4.0 U*	*< 4.0 U*	*< 3.9 U*	*< 4.0 U*
Hexachlorocyclopentadiene	µg/kg	*< 67 U*	*< 67 U*	*< 66 U*	*< 67 U*
Hexachloroethane	µg/kg	*< 88 U*	*< 88 U*	*< 86 U*	*< 87 U*
Isophorone	µg/kg	*< 100 U*	*< 100 U*	*< 99 U*	*< 100 U*
Nitrobenzene	µg/kg	*< 83 U*	*< 83 U*	*< 81 U*	*< 82 U*
N-Nitrosodimethylamine	µg/kg	*< 100 U*	*< 100 U*	*< 100 U*	*< 100 U*
n-Nitrosodimethylamine (SIM Screen)	µg/kg	*< 100 U*	*< 100 U*	*< 100 U*	*< 100 U*
N-Nitroso-di-n-propylamine	µg/kg	*< 91 U*	*< 91 U*	*< 89 U*	*< 91 U*
N-Nitrosodiphenylamine	µg/kg	*< 94 U*	*< 93 U*	*< 91 U*	*< 93 U*
Pentachlorophenol	µg/kg	*< 55 U*	*< 55 U*	*< 54 U*	*< 55 U*
Pentachlorophenol (SIM Screen)	µg/kg	*< 26 U*	*< 26 U*	*< 25 U*	*< 26 U*
Phenol	µg/kg	*< 90 U*	*< 90 U*	*< 88 U*	*< 90 U*
06-PAHs by SIM					
2-Methylnaphthalene	µg/kg	*< 0.83 U*	*< 0.7 U*	*< 0.47 U*	*< 0.43 U*
Acenaphthene	µg/kg	*< 1 U*	*< 0.88 U*	*< 0.52 U*	*< 0.47 U*
Acenaphthylene	µg/kg	*< 0.37 U*	*< 0.38 U*	*< 0.36 U*	*< 0.33 U*
Anthracene	µg/kg	*< 0.45 U*	*< 0.46 U*	*< 0.43 U*	*< 0.40 U*
Benzo(a)anthracene	µg/kg	0.40 J	*< 0.35 U*	0.37 J	0.32 J
Benzo(a)pyrene	µg/kg	*< 0.45 U*	*< 0.46 U*	*< 0.44 U*	*< 0.40 U*
Benzo(b)fluoranthene	µg/kg	*< 0.57 U*	*< 0.58 U*	*< 0.56 U*	*< 0.51 U*
Benzo(g,h,i)perylene	µg/kg	*< 1.1 U*	*< 1.2 U*	*< 1.1 U*	*< 1.0 U*
Benzo(k)fluoranthene	µg/kg	*< 0.86 U*	*< 0.88 U*	*< 0.84 U*	*< 0.76 U*
Chrysene	µg/kg	1.2 J	1.2 J	1.0 J	0.89 J
Dibenzo(a,h)anthracene	µg/kg	*< 1.4 U*	*< 1.4 U*	*< 1.3 U*	*< 1.2 U*
Fluoranthene	µg/kg	0.64 J	0.66 J	0.51 J	0.48 J
Fluorene	µg/kg	*< 0.55 U*	*< 0.57 U*	*< 0.54 U*	*< 0.49 U*
Indeno(1,2,3-cd)pyrene	µg/kg	*< 0.54 U*	*< 0.55 U*	*< 0.53 U*	*< 0.48 U*
Naphthalene	µg/kg	6.6	*< 4.6 U*	*< 0.61 U*	*< 0.53 U*
Phenanthrene	µg/kg	*< 1.2 U*	*< 1.2 U*	*< 0.72 U*	*< 0.66 U*
Pyrene	µg/kg	0.47 J	0.46 J	0.41 J	0.41 J
Low Molecular Weight PAH (ND=0)	µg/kg	6.6	*< 4.6 U*	*< 0.72 U*	*< 0.66 U*
Low Molecular Weight PAH (ND=1/2DL)	µg/kg	8.8	*< 4.4 U*	*< 1.8 U*	*< 1.7 U*
High Molecular Weight PAH (ND=0)	µg/kg	2.7	2.3	2.3	2.1
High Molecular Weight PAH (ND=1/2DL)	µg/kg	5.2	5.0	4.7	4.3
08-General Chemistry Parameters for Solids					
Perchlorate	µg/kg				
Total Organic Carbon	g/kg	6.5	9.3	8.4	7.4
pH	pH units	8.64	8.90	8.55	8.35
Cyanide, Total	mg/kg	*< 0.22 U*	*< 0.23 U*	*< 0.22 U*	*< 0.23 U*

Table A-2: 2017 Phase II Data Evaluated in the Screening-Level Risk Evaluation

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Metals (results in mg/kg)					
ALUMINUM	6010B	5,060	6,420	6,470	6,290	10,600	6,350
ANTIMONY	6010B	<2.01	<2.01	<2.02	<2.01	<2.02	<2.02
ARSENIC	6010B	3.91	4.19	3.82	4.02	7.51	4.29
BARIUM	6010B	105	213	171	215	333	158
BERYLLIUM	6010B	0.308	0.351	0.355	0.352	0.608	0.376
CADMIUM	6010B	<0.504	<0.503	<0.504	<0.503	0.719	<0.505
CALCIUM	6010B	56,400	80,600	80,700	84,400	164,000	79,400
CHROMIUM	6010B	5.02	7.22	7.21	6.98	11.7	6.75
COBALT	6010B	2.41	3.5	3.63	3.51	5.91	3.36
COPPER	6010B	9.95	14.1	16	14	23.2	13.8
IRON	6010B	5,670	7,710	7,550	7,540	12,300	7,400
LEAD	6010B	9.96	18.7	21.7	18.6	30	16
MAGNESIUM	6010B	12,300	16,200	19,200	16,300	29,300	20,000
MANGANESE	6010B	247	366	332	368	574	324
NICKEL	6010B	6.04	8.73	9.05	8.58	15	8.77
POTASSIUM	6010B	2,870	4,180	3,490	4,200	6,520	3,100
SELENIUM	6010B	<2.01	<2.01	<2.02	<2.01	<2.02	<2.02
SILVER	6010B	<1.01	<1.01	<1.01	<1.01	<1.01	<1.01
SODIUM	6010B	636	1,320	1,050	1,390	1,760	539
THALLIUM	6010B	<2.01	<2.01	<2.02	<2.01	<2.02	<2.02
VANADIUM	6010B	7.8	11.4	10.6	10.8	18.1	11.1
ZINC	6010B	26.8	32.5	32.6	32.1	53	33.3
MERCURY	7471A	<0.0201	<0.0201	<0.0202	<0.0201	<0.0202	<0.0202
Analyte	Method	Semi-volatile Organic Compounds (results in mg/kg)					
ACENAPHTHENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
ACENAPHTHYLENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
ANTHRACENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZIDINE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
BENZO(A)ANTHRACENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZO(B)FLUORANTHENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZO(K)FLUORANTHENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZO(G,H,I)PERYLENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZO(A)PYRENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BIS(2-CHLORETHOXY)METHANE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
BIS(2-CHLOROETHYL)ETHER	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
BIS(2-CHLOROISOPROPYL)ETHER	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
4-BROMOPHENYL-PHENYLETHER	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2-CHLORONAPHTHALENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
4-CHLOROPHENYL-PHENYLETHER	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
CHRYSENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
DIBENZ(A,H)ANTHRACENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
3,3-DICHLOROBENZIDINE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2,4-DINITROTOLUENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2,6-DINITROTOLUENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
FLUORANTHENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
FLUORENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
HEXACHLOROBENZENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
HEXACHLORO-1,3-BUTADIENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
HEXACHLOROCYCLOPENTADIENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
HEXACHLOROETHANE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
INDENO(1,2,3-CD)PYRENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
ISOPHORONE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
NAPHTHALENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
NITROBENZENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
N-NITROSODIMETHYLAMINE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Semi-volatile Organic Compounds (results in mg/kg)					
N-NITROSODIPHENYLAMINE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
N-NITROSODI-N-PROPYLAMINE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
PHENANTHRENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
BENZYLBUTYL PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
BIS(2-ETHYLHEXYL)PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
DI-N-BUTYL PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
DIETHYL PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
DIMETHYL PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
DI-N-OCTYL PHTHALATE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
PYRENE	8270C	<0.0332	<0.0332	<0.0333	<0.0332	<0.0333	<0.0334
1,2,4-TRICHLOROBENZENE	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
4-CHLORO-3-METHYLPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2-CHLOROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2,4-DICHLOROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2,4-DIMETHYLPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
4,6-DINITRO-2-METHYLPHENOL	8270C	<0.335 J3 J4	<0.335 J3 J4	<0.336 J3 J4	<0.335 J3 J4	<0.336 J3 J4	<0.337 J3 J4
2,4-DINITROPHENOL	8270C	<0.335 J3 J4	<0.335 J3 J4	<0.336 J3 J4	<0.335 J3 J4	<0.336 J3 J4	<0.337 J3 J4
2-NITROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
4-NITROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
PENTACHLOROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
PHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
2,4,6-TRICHLOROPHENOL	8270C	<0.335	<0.335	<0.336	<0.335	<0.336	<0.337
ANTHRACENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
ACENAPHTHENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
ACENAPHTHYLENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
BENZO(A)ANTHRACENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
BENZO(A)PYRENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
BENZO(B)FLUORANTHENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
BENZO(G,H,I)PERYLENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
BENZO(K)FLUORANTHENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
CHRYSENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
DIBENZ(A,H)ANTHRACENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
FLUORANTHENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
FLUORENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
INDENO(1,2,3-CD)PYRENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
NAPHTHALENE	8270C-SIM	<0.0201	<0.0201	<0.0202	<0.0201	<0.0202	<0.0202
PHENANTHRENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
PYRENE	8270C-SIM	<0.00604	<0.00604	<0.00605	<0.00604	<0.00605	<0.00606
1-METHYLNAPHTHALENE	8270C-SIM	<0.0201	<0.0201	<0.0202	<0.0201	<0.0202	<0.0202
2-METHYLNAPHTHALENE	8270C-SIM	<0.0201	<0.0201	<0.0202	<0.0201	<0.0202	<0.0202
2-CHLORONAPHTHALENE	8270C-SIM	<0.0201	<0.0201	<0.0202	<0.0201	<0.0202	<0.0202
Analyte	Method	General Chemistry (results in mg/kg, except for pH, which is in standard units)					
CYANIDE	9012B	<0.252	<0.252	<0.252	<0.251	<0.252	<0.253
pH	9045D	**8.83 T8**	**9.44 T8**	**9.08 T8**	**9.75 T8**	**9.36 T8**	**8.59 T8**
CHLORIDE	9056A	**114**	**130 J3**	**275**	**147**	**109**	**90.2**
TOC (TOTAL ORGANIC CARBON)	USDA LOI	**8,790**	**7,200**	**11,900**	**9,040**	**10,100**	**14,700**
PERCHLORATE	314.0	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Analyte	Method	Dioxins and Furans (results in ng/kg)					
2,3,7,8-TCDF	8290	<1	<1	<1	<1	<1	<1
2,3,7,8-TCDD	8290	<1	<1	<1	<1	<1	<1
1,2,3,7,8-PeCDF	8290	<5	<5	<5	<5	<5	<5
2,3,4,7,8-PeCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,7,8-PeCDD	8290	<5	<5	<5	<5	<5	<5
1,2,3,4,7,8-HxCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,6,7,8-HxCDF	8290	<5	<5	<5	<5	<5	<5

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Dioxins and Furans (results in ng/kg)					
2,3,4,6,7,8-HxCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,7,8,9-HxCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,4,7,8-HxCDD	8290	<5	<5	<5	<5	<5	<5
1,2,3,6,7,8-HxCDD	8290	<5	<5	<5	<5	<5	<5
1,2,3,7,8,9-HxCDD	8290	<5	<5	<5	<5	<5	<5
1,2,3,4,6,7,8-HpCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,4,7,8,9-HpCDF	8290	<5	<5	<5	<5	<5	<5
1,2,3,4,6,7,8-HpCDD	8290	<5	<5	<5	<5	<5	<5
OCDF	8290	14	22	25	27	23	10
OCDD	8290	<10	<10	<10	<10	<10	<10
Total TCDF	8290	<1	<1	<1	1.2	1.3	<1
Total TCDD	8290	<1	<1	<1	<1	<1	<1
Total PeCDF	8290	<5	<5	<5	<5	<5	<5
Total PeCDD	8290	<5	<5	<5	<5	<5	<5
Total HxCDF	8290	<5	<5	<5	<5	<5	<5
Total HxCDD	8290	<5	<5	<5	<5	<5	<5
Total HpCDF	8290	<5	<5	<5	<5	<5	<5
Total HpCDD	8290	<5	<5	<5	<5	<5	<5
Total Equivalence	8290	0.014	0.022	0.025	0.027	0.023	0.01
Analyte	Method	Polychlorinated Biphenyls (results in ng/kg)					
2-MoCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3-MoCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
4-MoCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,2'-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,6-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,5-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,4-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3'-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,4'-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,5-DiCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,3'-DiCB	1668A	<236	<238	<236	<238	<238	<238
(12/13)	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
4,4'-DiCB	1668A	<31.7	<32	<31.7	<32	<32	<32
2,2',6-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
(18/30)	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',4-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3',6-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3,6-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,2',3-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,4',6-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3',5'-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,3,5-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
(26/29)	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
2,4',5-TrCB	1668A	<125	<126	<125	<126	<126	<126
(20/28)	1668A	<124	<125	<124	<125	<125	<125
(21/33)	1668A	<130	<131	<130	<131	<131	<131
2,3,4'-TrCB	1668A	<91.3	<92.2	<91.3	<92.2	<92.2	<92.2
3,3',5-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,4',5-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,4,5-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,3',4-TrCB	1668A	<24	<24.3	<24	<24.3	<24.3	<24.3
3,4,4'-TrCB	1668A	<51	<51.5	<51	<51.5	<51.5	<51.5

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Polychlorinated Biphenyls (results in ng/kg)					
2,2',6,6'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(50/53)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
(45/51)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,6'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',5,5'-TeCB	1668A	<148	<150	<148	<150	<150	<150
2,3',5',6-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
43/73	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(49/69)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',4,5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(44/47/65)	1668A	<144	<146	<144	<146	<146	<146
(59/62/75)	1668A	<144	<146	<144	<146	<146	<146
2,2',3,4'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(40/41/71)	1668A	<144	<146	<144	<146	<146	<146
2,3,4',6-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',5,5'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,5'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',5'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,4',5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(61/70/74/76)	1668A	<192	<194	<192	<194	<194	<194
2,3',4,4'-TeCB	1668A	<80.8	<81.6	<80.8	<81.6	<81.6	<81.6
2,3,3',4-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,4,4'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',5,5'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',4,5'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',4,5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,4,4',5-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',4,4'-TeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',4,6,6'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,6,6'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',4,5',6-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,5,6'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,5',6-PeCB	1668A	<91.3	<92.2	<91.3	<92.2	<92.2	<92.2
(93/98/100/102)	1668A	<192	<194	<192	<194	<194	<194
(88/91)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,3',6-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,6'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,5',6-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,5,5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(90/101/113)	1668A	<144	<146	<144	<146	<146	<146
2,2',3,3',5-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',4,4',5-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',5,6-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(86/87/97/108/119/125)	1668A	<288	<291	<288	<291	<291	<291
(85/117/116)	1668A	<144	<146	<144	<146	<146	<146
(110/115)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,3',4-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',5,5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,5,5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(107/124)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,3,3',4,6-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,4',5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Polychlorinated Biphenyls (results in ng/kg)					
2,3,3',4,5-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,4',5-PeCB	1668A	<61.5	<62.1	<61.5	<62.1	<62.1	<62.1
2,3,3',4',5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,4,4',5-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,4'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',4,5,5'-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
3,3',4,4',5-PeCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',4,4',6,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,5,6,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4',6,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',6,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,6,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4',5,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(135/151)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',4,4',5,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,5',6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(147/149)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
(134/143)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
(139/140)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,3',4,6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,5,6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,6'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',5,5',6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4',5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,5',6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(153/168)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,4,5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,4',5-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4',5',6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(129/138/163)	1668A	<144	<146	<144	<146	<146	<146
2,3,3',4,5,6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,4',6-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(128/166)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,3,3',4,5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4',5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3',4,4',5,5'-HxCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(156/157)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
3,3',4,4',5,5'-HxCB	1668A	<40.1	<40.5	<40.1	<40.5	<40.5	<40.5
2,2',3,4',5,6,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',5,6,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,4',6,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,6,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,5,6,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',5,5',6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,5',6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4',5,5',6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,4',5,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(183/185)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,2',3,3',4,5,6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,5',6'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,4,4',5,6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(171/173)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1

Client Sample ID		SS-1	SS-2	SS-3	SS-D	SS-4	SS-5
Depth Sampled (inches)		0-2	0-2	0-2	0-2	0-2	0-2
Lab Sample IDs		L933492-01/ L934092-01/ L933495-01	L933492-02/ L934092-02/ L933495-02	L933492-03/ L934092-03/ L933495-03	L933492-04/ L934092-04/ L933495-04	L933492-05/ L934092-05/ L933495-05	L933492-06/ L934092-06/ L933495-06
Analyte	Method	Polychlorinated Biphenyls (results in ng/kg)					
2,2',3,3',4,5,5'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,5,5',6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
(180/193)	1668A	<96.2	<97.1	<96.2	<97.1	<97.1	<97.1
2,3,3',4,4',5',6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',4,4',5-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,4',5,6-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,3,3',4,4',5,5'-HpCB	1668A	<48.1	<48.5	<48.1	<48.5	<48.5	<48.5
2,2',3,3',5,5',6,6'-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,3',4,5',6,6'-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,4,4',5,6,6'-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
(197/200)	1668A	<144	<146	<144	<146	<146	<146
(198/199)	1668A	<144	<146	<144	<146	<146	<146
2,2',3,3',4,4',5,6'-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,4,4',5,5',6-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,3',4,4',5,6-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,3',4,4',5,5'-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,3,3',4,4',5,5',6-OcCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,3',4,5,5',6,6'-NoCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
2,2',3,3',4,4',5,6,6'-NoCB	1668A	<72.1	<72.0	<72.1	<72.0	<72.0	<72.0
2,2',3,3',4,4',5,5',6-NoCB	1668A	<72.1	<72.8	<72.1	<72.8	<72.8	<72.8
Decachlorobiphenyl	1668A	**128**	**402**	**109**	**103**	**95.2**	<72.8

Notes:
Bold - indicates analyte detection.
mg/kg - milligrams per kilogram
ng/kg - nanograms per kilogram
<5 - Analyte was not detected at or above the laboratory reporting limit specified
J3 - The associated batch QC was outside the established quality control range for precision.
J4 - The associated batch QC was outside the established quality control range for accuracy
T8 - Sample(s) received past holding time expiration.

Source: Limited Phase II Environmental Site Assessment Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.

Table A-3: 2017 Phase II Dioxin Data Converted to Dioxin TEQs

SS-1

Compound	DL/RL	Qual.	Conc. or 1/2 DL/RL (ng/kg)	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF	1		0.5	0.1	0.05
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			14	0.0003	0.0042
Total TEQ/WHO					**5.7**

SS-3 dupe

Compound	DL/RL	Qual.	Conc. or 1/2 DL/RL (ng/kg)	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF			1.2	0.1	0.12
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			27	0.0003	0.0081
Total TEQ/WHO					**5.8**

SS-2

Compound	DL/RL	Qual.	Conc. or 1/2 DL/RL (ng/kg	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF	1		0.5	0.1	0.05
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			22	0.0003	0.0066
Total TEQ/WHO					**5.7**

SS-4

Compound	DL/RL	Qual.	DL/RL (ng/kg)	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF			1.3	0.1	0.13
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			23	0.0003	0.0069
Total TEQ/WHO					**5.8**

SS-3

Compound	DL/RL	Qual.	Conc. or 1/2 DL/RL (ng/kg)	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF	1		0.5	0.1	0.05
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-IIpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			25	0.0003	0.0075
Total TEQ/WHO					**5.7**

SS-5

Compound	DL/RL	Qual.	DL/RL (ng/kg)	WHO TEFs	TEF Conc.
2,3,7,8-TCDD	1		0.5	1	0.5
1,2,3,7,8-PeCDD	5		2.5	1	2.5
1,2,3,4,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDD	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDD	5		2.5	0.1	0.25
1,2,3,4,6,7,8-HpCDD	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDD	10		5	0.0003	0.0015
2,3,7,8-TCDF	1		0.5	0.1	0.05
1,2,3,7,8-PeCDF	5		2.5	0.03	0.075
2,3,4,7,8-PeCDF	5		2.5	0.3	0.75
1,2,3,4,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,6,7,8-HxCDF	5		2.5	0.1	0.25
2,3,4,6,7,8-HxCDF	5		2.5	0.1	0.25
1,2,3,7,8,9-HxCDF	5		2.5	0.1	0.25
1,2,3,4,6,7,8-IIpCDF	5		2.5	0.01	0.025
1,2,3,4,7,8,9-HpCDF	5		2.5	0.01	0.025
1,2,3,4,6,7,8,9-OCDF			10	0.0003	0.003
Total TEQ/WHO					**5.7**

APPENDIX B: DETAILED SCREENING-LEVEL RISK EVALUATION TABLES

Table B-1: Detailed Screening-Level Residential Risk Evaluation Using the 2013 RI Data

Contaminant	PRI Samples* (mg/kg)		Residential RSL (mg/kg)[a]		Residential		Background Samples for Upland South (UPS-01 to UPS-10)		Background Samples for Upland Southeast (UPSE-01 to UPSE-10)		Notes
	Minimum	Maximum	Risk=10^{-6}	HQ=1	Risk[b]	HQ[c]	Minimum	Maximum	Minimum	Maximum	
Dioxins and Furans											
TCDD TEQ +dioin-like PCB*	4.80E-07	1.20E-06	4.80E-06	5.10E-05	2.50E-07	2.35E-02					
Total PCBs (non-dioxin like)*	4.50E-04	7.20E-04	2.30E-01	NA	3.13E-09	-					
Metals											
Total Aluminum	1.00E+04	1.30E+04	NA	7.70E+04	-	1.69E-01					
Total Antimony	3.00E-01	3.30E-01	NA	3.10E+01	-	1.06E-02					
Total Arsenic	4.70E+00	5.10E+00	6.80E-01	3.50E+01	***7.50E-06***	1.46E-01	4.1	6.2	6.2	10	Within background range for UPS and UPSE.
Total Barium	2.50E+02	3.30E+02	NA	1.50E+04	-	2.20E-02					
Total Beryllium	4.60E-01	5.30E-01	1.60E+03	1.60E+02	3.31E-10	3.31E-03					
Total Cadmium	3.80E-01	5.10E-01	2.10E+03	7.10E+01	2.43E-10	7.18E-03					
Total Calcium	6.40E+04	8.50E+04	NA	NA	-	-	78000	120000	100000	150000	Within background range for UPS and UPSE; essential nutrient
Total Chromium[c]	1.20E+01	1.40E+01	3.00E-01	2.30E+02	***4.67E-05***	6.09E-02	7.7	12	9	16	Within background range for UPSE
Total Cobalt	3.80E+00	4.60E+00	4.20E+02	2.30E+01	1.10E-08	***2.00E-01***	2.6	3.9	3.2	7.6	Within background range for UPSE
Total Copper	1.40E+01	1.70E+01	NA	3.10E+03	-	5.48E-03					
Total Iron	1.00E+04	1.10E+04	NA	5.50E+04	-	***2.00E-01***	8400	11000	11000	20000	Within background range for UPS and UPSE; essential nutrient
Total Lead	1.80E+01	2.10E+01	NA	4.00E+02	-	5.25E-02					
Total Magnesium	1.60E+04	1.80E+04	NA	NA	-	-	17000	23000	12000	21000	Within background range for UPS and UPSE; essential nutrient
Total Manganese	4.60E+02	5.10E+02	NA	1.80E+03	-	***2.83E-01***	220	450	350	630	Within background range for UPSE
Total Mercury	1.00E-02	2.50E-02	NA	1.10E+01	-	2.27E-03					
Total Molybdenum	5.80E-01	1.10E+00	NA	3.90E+02	-	2.82E-03					
Total Nickel[d]	8.90E+00	1.10E+01	1.50E+04	1.50E+03	7.33E-10	7.33E-03	6.4	9.2	7.4	15	Within background range for UPSE
Total Potassium	4.40E+03	5.30E+03	NA	NA	-	-	4300	5400	1700	7000	Within background range for UPS and UPSE; essential nutrient
Total Selenium	2.50E-01	3.60E-01	NA	3.90E+02	-	9.23E-04					
Total Silver	6.40E-02	8.50E-02	NA	3.90E+02	-	2.18E-04					
Total Sodium	9.00E+02	1.70E+03	NA	NA	-	-	880	4200	250	3800	Within background range for UPS and UPSE; essential nutrient
Total Thallium	1.10E-01	1.10E-01	NA	7.80E-01	-	1.41E-01	0.12	0.22	0.13	0.27	
Total Vanadium	2.00E+01	2.30E+01	NA	3.90E+02	-	5.90E-02					
Total Zinc	4.30E+01	5.10E+01	NA	2.30E+04	-	2.22E-03					
SVOCs	Below detection										
PAHs by SIM											
Benzo(a)anthracene	3.20E-04	4.00E-04	1.10E+00	NA	3.64E-10	-					
Chrysene	8.00E-04	1.20E-03	1.10E+02	NA	1.09E-11	-					
Fluoranthene	4.00E-04	6.60E-04	NA	2.40E+03	-	2.75E-07					
Naphthalene	6.60E-03	6.60E-03	2.00E+00	1.30E+02	3.30E-09	5.08E-05					
Pyrene	4.10E-04	4.70E-04	NA	1.80E+03	-	2.61E-07					
				Total Risk or HI	5.44E-05	**1.40E+00**					

Notes:

Current EPA RSLs, dated May 2020 avaiable at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 8/3/2020).

Cancer risks were calculated using RSLs derived based on 1 x 10-6 risk: Maximum sample concentration ÷ cancer-based RSL) × 10^{-6}

Noncancer HQ was calculated using the following equation: composite sample concentration ÷ noncancer-based RSL

* Includes only samples located within or in close proximity to the proposed solar project area PRI15-011 to PRI15-014.

NA - no toxicity values available, comparison made to background levels.

bold italic - contaminant contributing to a risk > 1 x 10^{-6} or HI>1.

a. Used the RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin

b. Used the RSL for high risk PCBs.

c. Used toxicity values for hexavalent chromium

d. Used toxicity values for nickel soluble salts

Sources:

Phase 1A Data Report for PRI Areas 2 and 8–17. US Magnesium RI/FS, Rowley, Utah. Prepared by ERM. October 2015.

Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016

Table B-2: Detailed Screening-Level Residential Risk Evaluation Using the 2017 Phase II Data

Contaminant	Phase II Samples* (mg/kg)		Residential RSL (mg/kg)[a]		Residential		Background Samples for Upland South (UPS-01 to UPS-10)		Background Samples for Upland Southeast (UPSE-01 to UPSE-10)		
	Minimm	Maximum	Risk=10^{-6}	HQ=1	Risk	HQ	Minimm	Maximum	Minimm	Maximum	Notes
Metals											
Aluminum	5.06E+03	1.06E+04	NA	7.70E+04	-	1.38E-01					
Arsenic	3.82E+00	7.51E+00	6.80E-01	3.50E+01	***1.10E-05***	***2.15E-01***	4.1	6.2	6.2	10	Within background range for UPSE
Barium	1.05E+02	3.33E+02	NA	1.50E+04	-	2.22E-02					
Beryllium	3.08E-01	6.08E-01	1.60E+03	1.60E+02	3.80E-10	3.80E-03					
Cadmium	7.19E-01	7.19E-01	2.10E+03	7.10E+01	3.42E-10	1.01E-02					
Calcium	5.64E+04	1.64E+05	NA	NA	-	-	78000	120000	100000	150000	Slightly above background; essential nutrient
Chromium[a]	5.02E+00	1.17E+01	3.00E-01	2.30E+02	***3.90E-05***	5.09E-02	7.7	12	9	16	Within background range for UPS and UPSE
Cobalt	2.41E+00	5.91E+00	4.20E+02	2.30E+01	1.41E-08	***2.57E-01***	2.6	3.9	3.2	7.6	Within background range for UPSE
Copper	9.95E+00	2.32E+01	NA	3.10E+03	-	7.48E-03					
Iron	5.67E+03	1.23E+04	NA	5.50E+04	-	***2.24E-01***	8400	11000	11000	20000	Within background range for UPSE; essential nutrient
Lead	9.96E+00	3.00E+01	NA	4.00E+02	-	7.50E-02					
Magnesium	1.23E+04	2.93E+04	NA	NA	-	-	17000	23000	12000	21000	Slightly above background; essential nutrient
Manganese	2.47E+02	5.74E+02	NA	1.80E+03	-	***3.19E-01***	220	450	350	630	Within background range for UPSE
Nickel[b]	6.04E+00	1.50E+01	1.50E+04	1.50E+03	1.00E-09	1.00E-02	6.4	9.2	7.4	15	Within background range for UPSE
Potassium	2.87E+03	6.52E+03	NA	NA	-	-	4300	5400	1700	7000	Within background range for UPSE; essential nutrient
Sodium	5.39E+02	1.76E+03	NA	NA	-	-	880	4200	250	3800	Within background range for UPS and UPSE' essential nutrient
Vanadium	7.80E+00	1.81E+01	NA	3.90E+02	-	4.64E-02					
Zinc	2.68E+01	5.30E+01	NA	2.30E+04	-	2.30E-03					
Dioxins and Furans											
TCDD TEQs (all dioxin PCB BDL)[c]	5.70E-06	5.80E-06	4.80E-06	5.10E-05	1.21E-06	1.14E-01					
PCBs											
Total PCBs (based on homologues)[d]	9.52E-05	4.02E-04	2.30E-01	NA	1.75E-09	-					
				Total Risk or HI	5.13E-05	**1.49E+00**					

Notes:

Current EPA RSLs, dated May 2020 avaiable at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 8/3/2020).

Cancer risks were calculated using RSLs derived based on 1 x 10-6 risk: Maximum sample concentration ÷ cancer-based RSL) × 10^{-6}

Noncancer HQ was calculated using the following equation: composite sample concentration ÷ noncancer-based RSL

* Includes the five surface soil samples collected within the proposed solar project area SS-1 through SS-5.

NA - no toxicity values available, comparison made to background levels.

bold italic - contaminant contributing to a risk > 1 x 10^{-6} or HI>1.

a. Used toxicity values for hexavalent chromium

b. Used toxicity values for nickel soluble salts

c. Used the RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin

d. Used the RSL for high risk PCBs.

Sources:

Limited Phase II Environmental Site Assessment- Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.

Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016

Table B-3: Detailed Screening-Level Industrial Risk Evaluation Using the 2013 RI Data

Contaminant	PRI Samples* (mg/kg)		Industrial RSL (mg/kg)[a]		Industrial		Background Samples for Upland South (UPS-01 to UPS-10)		Background Samples for Upland Southeast (UPSE-01 to UPSE-10)		Notes
	Minimum	Maximum	Risk=10^{-6}	HQ=1	Risk[b]	HQ[c]	Minimum	Maximum	Minimum	Maximum	
Dioxins and Furans											
TCDD TEQ +dioin-like PCB[a]	4.80E-07	1.20E-06	2.20E-05	7.20E-04	5.45E-08	1.67E-03					
Total PCBs (non-dioxin like)[b]	4.50E-04	7.20E-04	9.40E-01	NA	7.66E-10	-					
Metals											
Total Aluminum	1.00E+04	1.30E+04	NA	1.10E+06	-	1.18E-02					
Total Antimony	3.00E-01	3.30E-01	NA	4.70E+02	-	7.02E-04					
Total Arsenic	4.70E+00	5.10E+00	3.00E+00	4.80E+02	***1.70E-06***	1.06E-02	4.1	6.2	6.2	10	Within background range for UPS and UPSE.
Total Barium	2.50E+02	3.30E+02	NA	2.20E+05	-	1.50E-03					
Total Beryllium	4.60E-01	5.30E-01	6.90E+03	2.30E+03	7.68E-11	2.30E-04					
Total Cadmium	3.80E-01	5.10E-01	9.30E+03	9.80E+02	5.48E-11	5.20E-04					
Total Calcium	6.40E+04	8.50E+04	NA	NA	-	-	78000	120000	100000	150000	Within background range for UPS and UPSE; essential nutrient
Total Chromium[c]	1.20E+01	1.40E+01	6.30E+00	3.50E+03	***2.22E-06***	4.00E-03	7.7	12	9	16	Within background range for UPSE
Total Cobalt	3.80E+00	4.60E+00	1.90E+03	3.50E+02	2.42E-09	1.31E-02	2.6	3.9	3.2	7.6	Within background range for UPSE
Total Copper	1.40E+01	1.70E+01	NA	4.70E+04	-	3.62E-04					
Total Iron	1.00E+04	1.10E+04	NA	8.20E+05	-	1.34E-02					
Total Lead	1.80E+01	2.10E+01	NA	8.00E+02	-	2.63E-02					
Total Magnesium	1.60E+04	1.80E+04	NA	NA	-	-	17000	23000	12000	21000	Within background range for UPS and UPSE; essential nutrient
Total Manganese	4.60E+02	5.10E+02	NA	2.60E+04	-	1.96E-02	220	450	350	630	Within background range for UPSE
Total Mercury	1.00E-02	2.50E-02	NA	4.60E+01	-	5.43E-04					
Total Molybdenum	5.80E-01	1.10E+00	NA	5.80E+03	-	1.90E-04					
Total Nickel[d]	8.90E+00	1.10E+01	6.40E+04	2.20E+04	1.72E-10	5.00E-04	6.4	9.2	7.4	15	Within background range for UPSE
Total Potassium	4.40E+03	5.30E+03	NA	NA	-	-	4300	5400	1700	7000	Within background range for UPS and UPSE; essential nutrient
Total Selenium	2.50E-01	3.60E-01	NA	5.80E+03	-	6.21E-05					
Total Silver	6.40E-02	8.50E-02	NA	5.80E+03	-	1.47E-05					
Total Sodium	9.00E+02	1.70E+03	NA	NA	-	-	880	4200	250	3800	Within background range for UPS and UPSE; essential nutrient
Total Thallium	1.10E-01	1.10E-01	NA	1.20E+01	-	9.17E-03	0.12	0.22	0.13	0.27	
Total Vanadium	2.00E+01	2.30E+01	NA	5.80E+03	-	3.97E-03					
Total Zinc	4.30E+01	5.10E+01	NA	3.50E+05	-	1.46E-04					
SVOCs	Below detection										
PAHs by SIM											
Benzo(a)anthracene	3.20E-04	4.00E-04	2.10E+01	NA	1.90E-11	-					
Chrysene	8.00E-04	1.20E-03	2.10E+03	NA	5.71E-13	-					
Fluoranthene	4.00E-04	6.60E-04	NA	3.00E+04	-	2.20E-08					
Naphthalene	6.60E-03	6.60E-03	8.60E+00	5.90E+02	7.67E-10	1.12E-05					
Pyrene	4.10E-04	4.70E-04	NA	2.30E+04	-	2.04E-08					
			Total Risk or HI		3.98E-06	1.18E-01					

Notes:

Current EPA RSLs, dated May 2020 avaiable at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 8/3/2020).

Cancer risks were calculated using RSLs derived based on 1 x 10-6 risk: Maximum sample concentration ÷ cancer-based RSL) × 10^{-6}

Noncancer HQ was calculated using the following equation: composite sample concentration ÷ noncancer-based RSL

* Includes only samples located within or in close proximity to the proposed solar project area PRI15-011 to PRI15-014.

NA - no toxicity values available, comparison made to background levels.

bold italic - contaminant contributing to a risk > 1 x 10^{-6} or HI>1.

a. Used the RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin

b. Used the RSL for high risk PCBs.

c. Used toxicity values for hexavalent chromium

d. Used toxicity values for nickel soluble salts

Sources:

Phase 1A Data Report for PRI Areas 2 and 8–17. US Magnesium RI/FS, Rowley, Utah. Prepared by ERM. October 2015.

Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016

Table B-4: Detailed Screening-Level Industrial Risk Evaluation Using the 2017 Phase II Data

Contaminant	Phase II Samples* (mg/kg)		Industrial RSL (mg/kg)[a]		Industrial		Background Samples for Upland South (UPS-01 to UPS-10)		Background Samples for Upland Southeast (UPSE-01 to UPSE-10)		
	Minimum	Maximum	Risk=10^{-6}	HQ=1	Risk[b]	HQ[c]	Minimum	Maximum	Minimum	Maximum	Notes
Metals											
Aluminum	5.06E+03	1.06E+04	NA	1.10E+06	-	9.64E-03					
Arsenic	3.82E+00	7.51E+00	3.00E+00	4.80E+02	***2.50E-06***	1.56E-02	4.1	6.2	6.2	10	Within background range for UPSE.
Barium	1.05E+02	3.33E+02	NA	2.20E+05	-	1.51E-03					
Beryllium	3.08E-01	6.08E-01	6.90E+03	2.30E+03	8.81E-11	2.64E-04					
Cadmium	7.19E-01	7.19E-01	9.30E+03	9.80E+02	7.73E-11	7.34E-04					
Calcium	5.64E+04	1.64E+05	NA	NA	-	-	78000	120000	100000	150000	Slightly above background; essential nutrient
Chromium[a]	5.02E+00	1.17E+01	6.30E+00	3.50E+03	***1.86E-06***	3.34E-03	7.7	12	9	16	Within background range for UPS and UPSE
Cobalt	2.41E+00	5.91E+00	1.90E+03	3.50E+02	3.11E-09	1.69E-02	2.6	3.9	3.2	7.6	Within background range for UPSE
Copper	9.95E+00	2.32E+01	NA	4.70E+04	-	4.94E-04					
Iron	5.67E+03	1.23E+04	NA	8.20E+05	-	1.50E-02	8400	11000	11000	20000	Within background range for UPSE; essential nutrient
Lead	9.96E+00	3.00E+01	NA	8.00E+02	-	3.75E-02					
Magnesium	1.23E+04	2.93E+04	NA	NA	-	-	17000	23000	12000	21000	Slightly above background; essential nutrient
Manganese	2.47E+02	5.74E+02	NA	2.60E+04	-	2.21E-02	220	450	350	630	Within background range for UPSE
Nickel[b]	6.04E+00	1.50E+01	6.40E+04	2.20E+04	2.34E-10	6.82E-04	6.4	9.2	7.4	15	Within background range for UPSE
Potassium	2.87E+03	6.52E+03	NA	NA	-	-	4300	5400	1700	7000	Within background range for UPSE; essential nutrient
Sodium	5.39E+02	1.76E+03	NA	NA	-	-	880	4200	250	3800	Within background range for UPS and UPSE' essential nutrient
Vanadium	7.80E+00	1.81E+01	NA	5.80E+03	-	3.12E-03					
Zinc	2.68E+01	5.30E+01	NA	3.50E+05	-	1.51E-04					
Dioxins and Furans											
TCDD TEQs (all dioxin PCB BDL)	5.70E-06	5.80E-06	2.20E-05	7.20E-04	2.64E-07	8.06E-03					
PCBs											
Total PCBs (based on homologues)[d]	9.52E-05	4.02E-04	9.40E-01	NA	4.28E-10	-					
				Total Risk or HI	4.63E-06	1.35E-01					

Notes:

Current EPA RSLs, dated May 2020 avaiable at http://www2.epa.gov/risk/risk-based-screening-table-generic-tables (accessed 8/3/2020).

Cancer risks were calculated using RSLs derived based on 1 x 10-6 risk: Maximum sample concentration ÷ cancer-based RSL) × 10^{-6}

Noncancer HQ was calculated using the following equation: composite sample concentration ÷ noncancer-based RSL

* Includes the five surface soil samples collected within the proposed solar project area SS-1 through SS-5.

NA - no toxicity values available, comparison made to background levels.

bold italic - contaminant contributing to a risk > 1 x 10^{-6} or HI>1.

a. Used toxicity values for hexavalent chromium

b. Used toxicity values for nickel soluble salts

c. Used the RSL for 2,3,7,8-Tetrachlorodibenzo-p-dioxin

d. Used the RSL for high risk PCBs.

Sources:

Limited Phase II Environmental Site Assessment- Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.

Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016

APPENDIX C

References

Final Phase 1A-B Remedial Investigation Data Report US Magnesium RI/FS. Rowley, Utah. Prepared by ERM. October 2016.

Final Problem Formulation and Baseline Ecological Screening level risk evaluation Technical Memorandum. US Magnesium RI/FS Rowley, Utah. Prepared by ERM. May 2020.

Limited Phase II Environmental Site Assessment Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.

Phase 1A Data Report for PRI Areas 2 and 8–17 US Magnesium RI/FS, Rowley, Utah. Prepared by ERM. October 2015.

Phase I Environmental Site Assessment. Elektron Solar Project Approximately 640-Acre Vacant Property Tooele County, UT. Prepared by Kleinfelder. October 2017.

Phase 1A Remedial Investigation Sampling and Analysis Plan to Identify Chemicals of Potential Concern in Soils, Sediment, Solid Waste, Water and Air, and Receptor Surveys. Revision 0 for PRI Areas 2 and 8 through 17 US Magnesium NPL Site. Prepared by ERM. September 2013.

Revised Final OU-1 Baseline Human Health Screening level risk evaluation Technical Memorandum Remedial Investigation/Feasibility Study US Magnesium Site Rowley, Utah. Prepared by ERM. March 2019.

Technical Memorandum for Oversight of the Phase 1A-B Remedial Investigation in PRI Areas 1 and 3 through 7 and Background US Magnesium NPL Site. Prepared by PWT for EPA Region 8. January 2016.

U.S. Magnesium Superfund Site: Focused Risk Evaluation Within a Select Portion of the RI Project Area to Support the Site Ready for Reuse Determination. Prepared by EPA Region 8. December 2020.