REVISED ADDITIONAL SOIL INVESTIGATION REPORT AND HUMAN HEALTH SCREENING EVALUATION

Lower Main Meadow, Pogonip Open Space 501 Golf Club Drive Santa Cruz, California 01-POG-002

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1.0 INTRODUCTION

RMD Environmental Solutions, Inc. (RMD), on behalf of the City of Santa Cruz (the City), has prepared this *Revised Additional Soil Investigation Report and Human Health Screening Evaluation* (Report) for the Lower Main Meadow, Pogonip Open Space, located at 501 Golf Club Drive¹ in Santa Cruz, California (the Site, Figures 1 and 2). The investigation activities documented in this Report were conducted in accordance with the *Revised Delineation of Lead-Impacted Soil Work Plan*, dated May 26, 2021 (Work Plan; RMD, 2021a) and the County of Santa Cruz (the County) approval letter, dated June 2, 2021. This Report was prepared in response to the County's letter dated December 15, 2021, which requested a revised report to address comments to the *Additional Soil Investigation Report and Human Health Screening Evaluation* (Report) dated October 15, 2021 (RMD, 2021b).

The Site is located in the Pogonip Open Space Preserve. The City leased approximately 9.5 acres in the lower meadow area of the preserve to the Homeless Garden Project (HGP), a non-profit organization, for conversion from recreational and natural open space to an agricultural and educational farm. In 2019, the City learned that a portion of the Site had been used as a skeet and trap shooting range between the 1930s and 1950s. Metals, primarily lead and to a lesser extent antimony, arsenic, copper, and zinc, are associated with shot, and polycyclic aromatic hydrocarbons (PAHs) are associated with clay targets. In 2019, a *Phase I Environmental Site Assessment* (Phase I; Weber, Hayes & Associates [WHA], 2019) identified the following two recognized environmental conditions (RECs):

- The historic operation of a skeet shooting range with confirmed elevated lead and PAH concentrations in shallow soil samples; and
- The presence of trash and debris primarily observed within the ravine of the lower meadow where homeless encampments have been established.

Based on the proposed land use by HGP, these RECs were investigated and the results were reported in the *Preliminary Endangerment Assessment Report* (PEA Report; RMD, 2020b). Based on the findings of the PEA Report, PAHs and select metals, primarily lead, were identified in HGP's proposed planting areas of the Site. PAHs have been adequately delineated at the Site.

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¹ Note, the Site address changed from 333 Golf Club Drive to 501 Golf Club Drive in 2021.

1.1 Project Objective

The objective of this investigation was to delineate the horizontal and vertical extent of lead in shallow soil associated with the historic shooting range in areas not previously investigated at the Site.

1.2 Scope of Work

To meet this objective, the delineation investigation included the following scope of work:

- Field screening of surface and shallow soil samples for the presence of lead shot.
- Collection and laboratory analysis of soil samples for lead.
- Assess laboratory analytical results to determine the nature, concentration, and extent of lead at the surface and in shallow soil at the Site.
- Compare soil sample analytical results to human health and environmental screening levels presented in the Work Plan (RMD, 2021a).

This Report documents completion of the above-mentioned activities and considers results of this investigation to evaluate the nature and extent of lead and whether any corrective actions are warranted relative to the existing and proposed land-uses. Additionally, the Report includes an updated screening level evaluation for PAHs using data from the May 2020 investigation and development of screening levels for the hypothetical unauthorized camper receptor.

2.0 SITE BACKGROUND

2.1 Site Location and Description

The Site is identified as the Lower Main Meadow of the Pogonip Open Space Preserve in Santa Cruz, California (Figure 1). The Site is the southern portion of the larger Santa Cruz County Assessor's Parcel Number [APN] 001-211-01 (Figure 2), with the Site entrance located at 36.990364°N, 122.036831°W. The Site is currently undeveloped except for a series of dirt roads and hiking trails accessible from Golf Club Drive, which is located along the southern and western Site boundaries (Figure 2). The Site is divided into the east meadow, the west meadow, a ravine between the east and west meadows, the north orchard, and the Emma McCrary Trail Area (Figure 2). A 0.08-acre seasonal wetland has been identified in the northern portion of west meadow. The Site is bordered by additional open space and the Pogonip clubhouse to the northwest, additional open space and a former horse stable to the southwest, a forested slope to the east with a railroad line, Highway 9 and the San Lorenzo River beyond, and a plant nursery and Santa Cruz METRO office buildings to the south with commercial businesses beyond.

The California Department of Toxic Substances Control (DTSC) was the lead oversight agency during the PEA investigation described in the PEA Report. The County is the current lead oversight agency for the delineation activities described in this Report.

A record of environmental conditions at the Site (i.e., regulatory directives and correspondence, Site documents, and analytical data) may be obtained through a review of the case files for DTSC EnviroStor Database Number 60002874 at the following website: https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=60002874 (Site Code 202272).

2.2 Historical Land Use

The following summarizes the historical land use based on information presented in the Phase I:

- Beginning in approximately 1850, the area surrounding the Site was used for limestone mining and the production of lime;
- From approximately 1912 through 1986, the Site was part of a social club that included:
 - In 1912, the Site and surrounding open space were developed into a golf course and social club. The Pogonip clubhouse is located northeast of the Site;
 - In 1935, the golf course was turned into polo fields with horse stables located immediately off-Site to the west;

- In 1937, the polo club constructed a skeet shooting range in the west meadow between Golf Club Drive and the ravine;
- o In 1948, a shooting range with a "Remington electrical trap" was added adjacent to the existing skeet shooting range, and the grounds were leveled by grading;
- A 1956 aerial photograph of the Site shows the shooting range infrastructure removed and the area opened to rangeland;
- From approximately 1958 to 1967, the Site was used for cattle grazing; and
- o In 1987, the Pogonip clubhouse was posted as unsafe for occupancy.

2.3 Current Land Use

In 1989, the Site was acquired by the City and has since been maintained as recreational open space. A fire break is maintained along the eastern boundary of the Site. During Phase I activities, Site inspection observations included concrete shooting pads and clay target fragments in the west meadow. In addition, the presence of unauthorized camping and some trash and debris, including shopping carts and hypodermic needles, were observed largely in the ravine area. City staff perform homeless encampment clean-ups; fire prevention work, such as removing vegetation and clearing dead trees; and trail work along the existing trails.

2.4 Anticipated Land Use

Based on results of the PEA Report, the HGP may develop portions of the west meadow, east meadow, and north orchard classified as unrestricted land use into active farming land. The HGP has considered plans to fence off the unrestricted portions of the Site to delineate their planting areas. An Operation and Maintenance Plan and Development Plans for the Pogonip Farm and Garden propose a building complex, consisting of an administrative building, a pole barn, two greenhouses, and parking in the northeast portion of the west meadow along Golf Club Drive (HGP, 2017). In areas of the Site classified as restricted land use, the City has posted signs notifying the public of known shallow soil contamination in the area. In July 2021, HGP sent a letter to the Mayor and City Councilmembers requesting to relocate the site of the planned Pogonip Farm and Garden from the Lower Main Meadow to the Upper Main Meadow. The Upper Main Meadow is located near the Pogonip clubhouse, an area outside the hypothetical range of lead shot and clay targets that is not expected to be impacted by the former skeet and trap shooting use. The City is currently evaluating the possibility of relocating the farm to this recently proposed location. In unfarmed areas, the Site is and would continue to be used for outdoor

recreation (hiking and biking trails), natural resource and trail management, and homeless encampment clean-up activities.

2.5 Geological and Hydrogeological Setting

As described in the Phase I, grassland terraces are composed of fine-grained unconsolidated terrace deposits that overlie bedrock sandstones of the Santa Margarita Formation. Perched shallow groundwater supports seasonal wetlands and seeps. A 345-foot deep water supply well near the Pogonip clubhouse reported a depth to water of 128 feet below ground surface (bgs) in 1993. Previous investigations indicate shallow soil at the Site consist mainly of sandy silts with fine-grained sand to depths of 2 feet bgs.

2.6 Conceptual Shooting Range Contaminant Distribution

The types and distribution of contaminants associated with shooting ranges typically display a systematic pattern (Interstate Technology & Regulatory Council [ITRC], 2005). In general, metals, primarily lead and to a lesser extent antimony, arsenic, copper and zinc, are associated with shot, and PAHs are associated with clay targets. These materials are expected to be deposited on the surface or near surface.

Trap and skeet shooting ranges feature a fan-shaped clay target and shot fall zone radiating from the shooting pads. Although the distribution may vary, the following general dimensions relative to the shooting pads are hypothetically expected:

- 0 to 100 feet Spent cartridge cases and wads;
- 200 to 325 feet Clay target fragments; and
- 200 to 700 feet (skeet)/770 feet (trap) Shot fall zone, with the greatest anticipated shot density at 400 to 600 feet.

This conceptual distribution of contaminants was generally observed during the PEA investigation conducted in May 2020 (Section 2.7.3).

2.7 Previous Site Investigations

Between November 2018 and March 2021, soil samples were collected. Consistent with the anticipated land use and the PEA Report, the following soil screening levels (SLs) were compared with Site investigation results:

 <u>Background Concentrations for Metals</u> – DTSC (2015) recommends that metals detected at background (ambient) levels not be identified as chemicals of potential concern (COPCs) at a site. In accordance with the DTSC-approved *Preliminary Endangerment Assessment Work Plan* (RMD, 2020a), a 2009 Lawrence Berkeley National Laboratory (LBNL) study was used to identify acceptable background levels for metals except for arsenic, which used the background level for San Francisco Bay Region of 11 milligrams per kilogram (mg/kg, Duvergé, 2011). Table 1 of the PEA Report presents background levels for metals detected in soil.

- Risk-Based SLs The risk-based soil SLs include U.S. Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs; USEPA, 2021) modified per DTSC Office of Human and Ecological Risk Human Health Risk Assessment (HHRA) Note Number 3 (HHRA Note 3; DTSC, 2020) in accordance with the PEA Manual (DTSC, 2015). The risk-based soil SLs were available for unrestricted residential and commercial/industrial receptors. Risk-based soil SLs for lead were developed separately, as described in the following bullet.
- Lead SLs Unlike other COPCs, the soil SL for lead is based on blood-lead models. Neither USEPA nor California Environmental Protection Agency (CalEPA) publishes toxicity values for lead. In the absence of toxicity values, noncarcinogenic effects from exposure to lead are evaluated by predicting blood lead concentrations using toxicokinetic modeling. This section describes the blood-lead models used to develop lead soil SLs for the hypothetical long-term receptors anticipated at the Site.
 - Future On-Site Unrestricted Receptor This receptor is a long-term receptor that includes unrestricted land use, which may include farming and gardening activities for the purpose of cultivating, consuming and/or selling produce. DTSC LeadSpread 8² is recommended by DTSC for evaluating lead exposure under unrestricted land use. This model is based on child exposures only and an exposure frequency of seven days per week. Based on this model, DTSC's soil SL for lead is 80 mg/kg (DTSC, 2020). The soil SL of 80 mg/kg represents a reasonably conservative soil SL to protect future on-Site unrestricted receptors (RMD, 2020b).
 - Future On-Site Commercial Worker Receptor This receptor is a long-term adult receptor, a full-time employee that is assumed to spend 250 days per year

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 $^{^2}$ The DTSC LeadSpread 8 model (DTSC, 2011) calculates several blood lead concentrations, including the median, 90th, 95th, 98th, and 99th percentile estimates for the predicted distribution. Additionally, the model calculates the concentration in exterior soil and interior dust that will result in a 90th percentile estimate of blood lead equal to the target increase in children's blood lead level of concern by 1 microgram per deciliter (μ g/dL; CalEPA benchmark incremental change criterion for lead).

working at the Site for 25 years. This receptor may spend the workday (8 hours per day) both indoors performing light office duties and outdoors performing moderate soil invasive activities in surface or near surface soil (e.g., maintenance or landscaping). For commercial worker exposure scenarios, DTSC recommends a modified version of USEPA's June 21, 2009 adult lead model (ALM; DTSC, 2011)³. Based on this model, DTSC's commercial soil SL for lead is 320 mg/kg (DTSC, 2020; RMD, 2020b).

Current/Future Recreational Trail User Receptor – This receptor is a long-term receptor that includes receptors using the Site for outdoor recreation (hiking and biking trails). This receptor is anticipated to be primarily an adult receptor; however, a child receptor may occasionally visit the Site during organized field trips or other visits accompanied by an adult. For this reason, the LeadSpread 8 model based on child exposures was used to estimate a soil SL for on-Site recreational trail user receptors. In the LeadSpread 8 model, DTSC indicates that non-residential scenarios may involve fewer than seven days per week for exposure frequency. Based on best professional judgement, to evaluate a recreational trail user scenario, the exposure frequency in the model was reduced from seven days per week to one day per week. The resulting soil SL for lead of 540 mg/kg represents a reasonably conservative soil SL to protect current/future on-Site recreational trail user receptors (RMD, 2020b)⁴.

The SLs for soil are shown on Tables 1 and 2. Unless otherwise specified, the results of the previous Site investigation activities are compared with the soil SLs and discussed below.

2.7.1 2018/2019 Soil Investigation

The HGP conducted agricultural soil testing and incorporated evaluation of the potential agricultural impacts of the lead associated with the historic shooting range (HGP, 2019). This evaluation indicated the following:

 Extractable lead concentrations ranging from 0.9 parts per million (ppm) to 89.8 ppm, which exceeded a laboratory-recommended threshold for safe agricultural use of 22 ppm; and

 $^{^3}$ The model calculates the concentration in exterior soil and interior dust that will result in a 90th percentile estimate of blood lead among fetuses of adult workers of 1 μ g/dL.

⁴ The soil SL for lead of 540 mg/kg for on-Site recreational trail user receptors was included in the Work Plan (RMD, 2021) and subsequently approved by the County in their approval letter, dated June 2, 2021.

Total sorbed lead concentrations ranging from 56.08 mg/kg to 145.86 mg/kg, which
were below a threshold of 400 mg/kg that would require implementation of modified
farming practices (HGP, 2019).

Based on these results, the City decided to conduct additional sampling at the Site.

2.7.2 February 2019 Soil Investigation

Soil samples were collected from 52 soil borings, each advanced to approximately 2 feet bgs, in the west meadow at the Site (Environmental Investigation Services, Inc., 2019). Twelve 4-part composite samples (B1 through B12) were collected from 48 borings at depths of approximately 0 to 0.5 foot bgs (surface) and 1.5 to 2 feet bgs (shallow). Additionally, one 4-part composite sample (B13) was collected from approximately 0 to 0.5 foot bgs. The surface composite samples were analyzed for select metals (total lead, arsenic, copper, and zinc), PAHs, and total petroleum hydrocarbons (TPH) as diesel and motor oil (with silica gel cleanup). The 1.5 to 2 feet bgs composite samples were analyzed for metals only. The 4-part composite sample results for surface soil at borings B1 (northwestern portion of the west meadow) and B3 (northern portion of the west meadow) reported lead concentrations exceeding the residential screening level of 80 mg/kg. Therefore, the four individual samples for these locations were analyzed for lead and reported lead concentrations exceeding the residential (unrestricted) screening level of 80 mg/kg. Samples with PAH concentrations exceeding screening levels were limited to surface soil in borings B5 and B7 (eastern portion of the west meadow) and borings B6 and B11 (central portion of the west meadow, near a former shooting pad location). Data summary tables for this investigation are provided as Tables A1 and A2 of Appendix A.

Based on the findings of the 2019 investigation, the following data gaps were identified:

- The magnitude of select metals (lead, antimony, arsenic, copper, zinc) concentrations in unsampled areas within the planned planting footprint in the west meadow;
- The extent and magnitude of select metals (lead, antimony, arsenic, copper, zinc) concentrations within the planned planting footprint in the north orchard and east meadow where higher shot fall density is anticipated;
- The extent and magnitude of PAH concentrations within the planned planting footprint in the western portion of the north orchard and east meadow; and
- The vertical extent of PAH concentrations that exceed screening levels in the west meadow and other areas.

2.7.3 May 2020 Soil Investigation

To address the data gaps identified during the 2019 investigation, soil samples were collected from 71 soil borings located across the Site, each advanced to approximately 2 feet bgs (RMD, 2020b). Twenty-six soil borings were located in the west meadow, 12 soil borings were located in the north orchard, and 33 soil borings were located in the east meadow. Soil sample locations were selected based on the planned farm and garden areas at the Site, findings of the 2019 soil investigation, and hypothetical shot and clay target fragment fall zones. During boring advancement, soil at approximate 6-inch intervals (0-0.5 foot bgs, 0.5-1.0 foot bgs, and 1.0-1.5 foot bgs [collectively referred to as the "surface"], and 1.5-2.0 foot bgs [shallow]) was visually inspected and logged. Soil from each boring location was screened with a X-Ray Fluorescence (XRF) analyzer to evaluate the vertical distribution of lead in the field. Two soil samples were collected from each boring location based on field observations. The selected soil samples were analyzed for select metals (lead, antimony, arsenic, copper, and zinc) and PAHs according to field observations and XRF screening (for lead) as described in the PEA Report. Data summary tables for this investigation are provided as Tables A3 and A4 of Appendix A.

Lead concentrations exceeded the commercial worker soil SL of 320 mg/kg and the recreational trail user soil SL of 540 mg/kg at one location south of the southern shooting range in the west meadow, in the western portion of the north orchard along the trail connecting the west meadow to the east meadow, and in the south and west portions of the east meadow along the ravine.

PAH concentrations exceeded one or more soil SLs at eight boring locations in the west meadow. As mentioned above, the extent of PAHs in soil have been delineated to the extent necessary.

Based on the findings of the 2020 investigation, the following data gaps were identified:

- The extent of lead concentrations near the north orchard along the trail connecting the west meadow to the east meadow:
- The extent of lead concentrations within the sloped ravine area between the west meadow and east meadow; and
- The extent of lead concentrations along the recreational trails located south of the east meadow (Emma McCrary Trail Area).

2.7.4 December 2020 Site Visit

On December 15, 2020, RMD, City, and County personnel conducted a Site visit to review previous sampling locations where lead concentrations exceeded the recreational trail user soil SL, discuss potential delineation sampling locations, and evaluate potential access issues.

The findings of the Site visit included:

- Two arcs of concrete pads, which are interpreted as the shooting pads for the historic trap and skeet ranges, were further observed in the central portion of the west meadow;
- Vegetation covers most of the Site with homeless encampments further observed in several wooded areas including the ravine area; and
- The southern side of the east meadow, the ravine area, and public recreation trails in the southeastern portion of the Site and connecting the west meadow to the east meadow had not been adequately delineated for lead concentrations in shallow soil.

The hypothetical fan-shaped clay target and shot fall distribution associated with the orientation of the shooting pads is depicted on Figure 2. These features are augmented with the prior and proposed soil sampling locations on Figure 3.

Based on previous investigations and the Site visit, the County determined that further investigation is needed to fully delineate the lateral and vertical extent of lead concentrations in shallow soil near the southern side of the east meadow, in accessible portions of the ravine, and along select public recreation trails in the southeastern portion of the Site.

2.7.5 March 2021 Soil Investigation

Based on findings of the PEA Report, WHA collected shallow soil samples from 12 soil borings located along the trail connecting the west meadow to the east meadow near the north orchard to delineate the extent of lead concentrations near boring NO-3 and to support the use of this trail (WHA, 2021). At each boring, soil samples were collected at the surface and at approximately 1.5 feet bgs and analyzed for lead. The reported lead concentrations of up to 208 mg/kg were below the commercial soil SL of 320 mg/kg and the recreational trail user soil SL of 540 mg/kg. Based on these results, additional soil investigation is no longer necessary in this portion of the Site. A data summary table for this investigation is provided as Table A5 of Appendix A.

2.7.6 Summary of COPCs

Based on the sample-by-sample comparison with background levels and risk-based soil SLs for the PEA investigation (RMD, 2020b), the following metals and PAHs were identified as COPCs in each area:

| Summary of Chemicals of Potential Concern (COPCs) | | | |
|---|---|--|---|
| Area | Unrestricted Land Use | | Commercial Land Use |
| West Meadow | AntimonyArsenicCopperLeadZinc | Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenz(a,h)anthracene Indeno(1,2,3-c,d)pyrene Naphthalene | Benzo(a)pyrene Lead Benzo(b)fluoranthene Dibenz(a,h)anthracene |
| North Orchard | • Lead | | • Lead |
| East Meadow | • Lead | | • Lead |

Based on the findings of the PEA Report, PAHs and select metals, primarily lead, were identified in proposed planting areas of the Site, as described in the following sections.

2.7.6.1 Metals

A total of 103 samples were analyzed for metals, including 76 surface samples and 27 shallow samples. Based on comparison of detected concentrations with background levels and unrestricted and/or commercial soil SLs, select metals were identified as COPCs at the Site. Antimony, arsenic, copper, and zinc were only detected at concentrations above unrestricted soil SLs in soil sample WM-DG-13-1.5' in the west meadow. The extent of antimony, arsenic, copper, and zinc concentrations above unrestricted soil SLs are delineated and determined to be localized at a single sample location, where a shell casing was observed, and does not indicate a significant release area. However, lead was identified as a COPC in all three areas sampled during the PEA investigation. Based on the locations of lead concentrations above the recreational trail user soil SL of 540 mg/kg (Table 1, Figures 3 and 4), further delineation of the horizontal and vertical extent of lead in shallow soil in areas not previously investigated at the Site was warranted. This Report presents the results of additional delineation activities for lead.

2.7.6.2 Polycyclic Aromatic Hydrocarbons

A total of 48 samples were analyzed for PAHs, including 40 surface samples and 8 shallow samples. PAH concentrations exceeded one or more unrestricted and/or commercial soil SL at eight boring locations in the west meadow only. Benzo(a)pyrene and dibenz(a,h)anthracene, with or without benzo(a)anthracene, benzo(b)fluoranthene, indeno(1,2,3-c,d)pyrene, and naphthalene, exceeded their soil SLs near the historic shooting ranges in the west meadow. PAHs were not detected above reporting limits in the north orchard or east meadow.

Based on this evaluation of potential human health risks from exposure to PAHs in the west meadow of the Lower Main Meadow, Pogonip Open Space (Appendix B), the noncancer adverse health effects or hazard index (HI) does not exceed the USEPA and CalEPA target level of one and the excess cancer risk is within CalEPA's risk management range of 1 x 10⁻⁶ to 1 x 10⁻⁴. The cumulative excess cancer risk of 4 x 10⁻⁶ slightly exceeds 1 x 10⁻⁶, the most stringent end of the risk management; but the individual excess cancer risks for PAHs detected in soil did not exceed 1 x 10⁻⁶, except for benzo(a)pyrene with an individual risk of 1.4 x 10⁻⁶. According to USEPA (1989), cancer risk and hazard index should be expressed using one significant figure. Given the uncertainty in both exposure factors and toxicity data, expressing cancer risk and hazard index with more than one significant figure would imply greater precision than warranted. Therefore, benzo(a)pyrene does not pose a significant human health risk above acceptable thresholds.

Since there are no published soil SLs for recreational receptors, Site-specific risk-based recreational trail user soil SLs were developed for use at the Site. Using the HI and excess cancer risk estimates, soil exposure point concentrations (EPCs), and USEPA and CalEPA target HI and excess cancer risk, risk-based soil SLs were estimated for PAHs detected in soil (Appendix B). The recreational trail user soil SLs for PAHs detected in shallow soil at the Site are presented in Appendix B.

Based on comparison of detected concentrations with recreational trail user soil SLs, PAHs were identified as COPCs at four boring locations in the west meadow only (Table 2, Figure 4). Benzo(a)pyrene and/or dibenz(a,h)anthracene exceeded the recreational trail user soil SLs near the historic shooting ranges at borings WM-C-9A, WM-DG-6, WM-DG-11, and WM-DG-13. PAHs were not detected above reporting limits in the north orchard or east meadow. The extent of PAHs in the west meadow have been delineated to the extent necessary. Additional evaluation of PAHs and a sample-by-sample comparison with background levels and risk-based soil SLs was included in the PEA Report.

3.0 HUMAN HEALTH CONCEPTUAL SITE MODEL

To develop a conceptual understanding of the Site, information regarding potential chemical source, chemical release, and transport mechanisms; locations of potentially exposed human receptors; and potential exposure routes were assessed. This information was previously presented in the PEA Report. Based upon comments from the County, the human health conceptual site model (CSM) was updated to include the hypothetical recreational trail user receptor and hypothetical unauthorized camper receptor. The updated CSM is outlined schematically on Figure 5 and discussed below.

The CSM associates sources of chemicals with potentially exposed human receptors and associated complete exposure pathways. In this way, the CSM assists in quantifying potential impacts to human health. As defined by USEPA (1989), the following four components are necessary for a chemical exposure pathway to be considered complete and for chemical exposure to occur:

- A chemical source and a mechanism of chemical release to the environment;
- An environmental transport medium (e.g., soil) for the released chemical;
- A point of contact between the contaminated medium and the receptor (i.e., the exposure point); and
- An exposure route (e.g., incidental ingestion of soil) at the exposure point.

As described below, these components provide a basis for the CSM.

3.1 Chemical Source, Release, and Transport

To evaluate the first two components necessary for a complete exposure pathway, chemical properties of the detected chemicals and the physical characteristics of the Site were reviewed to identify factors that might allow the release and transport of chemicals. As discussed in Section 2.0, the potential source of impacts at the Site is related to the deposition of shot and clay target fragments. Based on historic land use as a shooting range and previous Site investigations, the COPCs include metals and PAHs, which tend to adsorb to soil particles and typically do not readily dissolve into water or volatilize into ambient air. Therefore, this CSM focuses on direct contact exposure routes to metals and PAHs in on-Site soil.

3.2 Potential Receptors

The third component necessary for an exposure pathway to be complete is identification of potential receptors at the Site based on anticipated land use. Based on the anticipated future land use as an agricultural and educational farm with a commercial building complex, the following hypothetical receptors were considered in this CSM:

- Future On-Site Unrestricted Receptor; and
- Future On-Site Commercial Worker Receptor.

Based on current and anticipated future land use as a recreational area, the following hypothetical receptors were considered in this CSM:

- Current/Future On-Site Recreational Trail User Receptor; and
- Current/Future On-Site Unauthorized Camper Receptor.

As stated in the PEA Report, a future on-Site construction worker receptor will be present during redevelopment of the Site; but this receptor will be a short-term receptor, performing activities subject to applicable administrative controls (e.g., Site Management Plan [SMP], Site Health and Safety Plan [HASP], and best management practices [BMPs]). This receptor is expected to be a short-term outdoor worker (i.e., 2 weeks to 1 year) for a single construction or development project at the Site. The exposures for a construction worker receptor are expected to be limited in comparison to long-term worker receptors.

The hypothetical on-Site receptors included in the CSM are described in more detail below.

3.2.1 Hypothetical On-Site Unrestricted Receptor

The hypothetical future on-Site unrestricted receptor was included to evaluate an unrestricted land use scenario, which is considered the most protective scenario for potential on-Site receptors including farm and garden workers. This receptor is a long-term receptor (i.e., greater than 7 years [USEPA, 1989]) that spends 350 days per year at the Site for a period of 26 years (as both a child [6 years] and an adult [20 years]). The unrestricted land use may include farming and gardening activities for the purpose of cultivating, consuming and/or selling produce (RMD, 2020b).

3.2.2 Hypothetical On-Site Commercial Worker Receptor

The hypothetical future on-Site commercial worker receptor is a long-term adult receptor. This receptor is a full-time employee that is assumed to spend 250 days per year working at the Site for 25 years. This receptor may spend the workday (8 hours per day) both indoors performing light office duties and outdoors performing moderate soil invasive activities in surface or near surface soil (e.g., maintenance or landscaping).

3.2.3 Hypothetical On-Site Recreational Trail User Receptor

The recreational trail user receptor is a long-term receptor that may include visitors using the recreational trails at the Site. Based on best professional judgment, this receptor is assumed to visit the Site one day per week (52 days per year) for a period of 26 years (as both a child [6 years] and an adult [20 years]). Potential exposures for this receptor are expected to occur from time spent outdoors only (8 hours per day). Typically, a recreational trail user that frequently visits a site would spend up to 4 hours per day on the trails (Gobster, 2005). It is conservative to assume that the recreational trail user that frequently visits the Site for 52 days a year will be using the trails for 8 hours a day at each visit, considering only short segments of the greater Pogonip Open Space trail system intersect the lead and PAH impacted areas of the Site.

3.2.4 Hypothetical On-Site Unauthorized Camper Receptor

Camping is prohibited at the Site and the exposure pathways for this receptor are incomplete due to the implementation of engineering controls to mitigate unauthorized camping at the Site. However, at the request of the County, the on-Site unauthorized camper receptor was included in the CSM⁵. Since camping is prohibited, it is unknown how long the average unauthorized camper receptor stays at the Site. Based on best professional judgment, two exposure frequencies were considered. For one exposure scenario, this receptor is assumed to camp at the Site for 14 days per year. This is consistent with the Bureau of Land Management (BLM) yearly recreational exposure frequency for a recreational visitor, which includes a range of possible activities including camping (BLM, 2017). For the second exposure scenario, this exposure frequency was doubled to be 28 days per year. This receptor is a long-term receptor for a period of 26 years (as both a child [6 years] and an adult [20 years]). Potential exposures

⁵ In addition, the County requested the development of risk-based soil SLs for the hypothetical unauthorized camper receptor. These soil SLs are presented in Appendix B.

for this receptor are expected to occur from time spent camping outdoors only (24 hours per day).

3.3 Complete Exposure Pathways

The fourth and final component, a complete exposure pathway (i.e., route of exposure) is discussed in combination with the third component (i.e., presence of receptors at an exposure point) to define those exposure pathways considered to be complete and significant for the future on-Site receptors. The exposure pathways assumed to be complete and significant for the hypothetical current/future on-Site receptors includes the following:

- Incidental ingestion of soil;
- Dermal contact with soil; and
- Inhalation of fugitive dust.

As a working farm and garden, it is assumed that the future on-Site farm and garden worker receptor will grow fruits and vegetables to consume and/or sell to the public. The produce sourced from the Pogonip Farm and Garden will only account for a portion of a potential receptors diet; therefore, is not likely a significant exposure pathway. Evaluation of the exposure pathways listed above for an unrestricted land use scenario are considered adequately protective for the proposed future land use at the Site (RMD, 2020b).

3.4 Summary of CSM

This CSM provides a scientifically defensible basis for the selection of potential hypothetical receptors and the most likely ways they might be exposed to chemicals at the Site (Figure 5). The future on-Site unrestricted and commercial worker receptors were evaluated in the PEA Report and are not considered further in this Report. On-Site camping is prohibited, but at the request of the County the on-Site unauthorized camper receptor was considered and is included in Appendix B. Based on the approved Work Plan scope, the remainder of this report focuses on the on-Site recreational trail user receptor. Due to the presence of COPCs in soil at the Site, further evaluation of potential exposure to COPCs via incidental ingestion of soil, dermal contact with soil, and inhalation of fugitive dust was performed, as described in the following sections.

4.0 SCOPE OF WORK

The following sections describe the pre-field activities, sampling, sample handling, decontamination, and borehole completion procedures.

4.1 Pre-field Activities

The following pre-field activities were conducted prior to mobilizing for the sampling event.

4.1.1 Site Health and Safety Plan

The Site-specific HASP was updated for the planned field activities. Field personnel were required to follow the procedures set forth in the HASP. Based on historical Site information, the work was completed using Occupational Safety and Health Administration (OSHA) Level D personal protective equipment (PPE).

4.1.2 Site Reconnaissance

On July 26, 2021 and January 6, 2022, RMD and City personnel conducted Site visits to evaluate potential access issues to the proposed sample locations and mark out the locations with survey stakes. Based on these Site visits, several proposed sample locations were shifted.

4.1.3 Borehole Clearance

To confirm the absence of obstructions and as required, the Site was marked with white paint and survey stakes. At least 72 hours before delineation sampling activities were conducted, Underground Services Alert (USA) was notified to mark the locations of potential subsurface utilities beneath the Site.

4.2 Soil Screening and Sampling Locations and Depths

In August 2021 and January 2022, soil samples were collected from 32 boring locations across the Site (Figures 3 and 4) as follows:

- Seven soil borings were located along the southwestern portion of the east meadow;
- Fourteen soil borings were located throughout the ravine;
- Seven soil borings were located in the Emma McCrary Trail Area in the southeastern portion of the Site;
- Two soil borings were located southwest of the north orchard; and

Two soil borings were located northwest of the west meadow.

These soil boring locations were needed to fully delineate the lateral and vertical extent of lead concentrations in shallow soil based on findings of previous soil investigations and hypothetical shot fall zones. Soil boring locations and rationale are presented below in Table A.

| Table A Soil Sample Locations and Rationale | | | |
|--|---------------------|---|--|
| Area | Sampling Location | Rationale | |
| East Meadow | EM-34 through EM-40 | Evaluate lateral and vertical extent of lead concentrations between the southern portion of the east meadow and ravine | |
| Ravine | R-1 through R-14 | Improve data density and evaluate lateral and vertical extent of lead concentrations in the ravine area between the east and west meadows | |
| Emma McCrary Trail Area | T-1 through T-7 | Improve data density and evaluate lateral extent of lead concentrations south of the east meadow | |
| North Orchard | NO-13 and NO-14 | Evaluate lateral extent of lead concentrations northwest of borings NO-1, NO-2, and NO-4 | |
| West Meadow | WM-16 and WM-17 | Evaluate lateral extent of lead concentrations northwest of borings WM-C-1 and WM-DG-1 | |

During field activities, soil boring locations were measured and recorded using a Garmin eTrex 20x handheld global positioning system (GPS) navigator, which has an estimated GPS location accuracy of around 10 feet, 95% of the time, according to the manufacturer. The GPS coordinates of each boring location are included on the field sampling forms presented in Appendix C.

4.3 Soil Logging, Screening, Sampling, and Laboratory Analysis

The following presents the soil logging, screening, sampling and laboratory analysis procedures. Laboratory analyses that were performed by Pace Analytical National Center for Testing & Innovation in Mt. Juliet, Tennessee (Pace), a California-certified laboratory.

4.3.1 Soil Logging

The soil borings were advanced using a hand auger to an approximate depth of 2 feet bgs. During boring advancement, soil at approximate 6-inch intervals (0-0.5 foot bgs, 0.5-1.0 foot bgs, 1.0-1.5 foot bgs, and 1.5-2.0 foot bgs) was segregated and placed in a clean resealable plastic bag. Soil was visually inspected and logged using the Unified Soil Classification System (USCS). Visual observations were recorded on field forms and are presented in Appendix C.

4.3.2 Soil Screening

Visual Observations: Soil at the surface and from the four 6-inch intervals was visually inspected for evidence of shot fragments. Shot fragments were not observed at any of the boring locations.

XRF Screening: Soil from the four 6-inch intervals was screened in general accordance with USEPA Method 6200 using a handheld Olympus Vanta XRF analyzer to evaluate the vertical distribution of lead in the field. A summary of the XRF measurements includes the following:

- Lead concentrations of more than 1,000 ppm were measured at the following boring locations and depths:
 - EM-35 at 0-0.5 foot bgs;
 - EM-36 at 0-0.5 foot bgs;
 - o R-4 at 0-0.5 foot bgs; and
 - o R-14 at 0-0.5 foot bgs.
- Lead concentrations between 500 ppm and 1,000 ppm were measured at the following boring locations and depths:
 - o EM-34 at 0.5-1.0 foot bgs;
 - EM-37 at 0-0.5 foot bgs;
 - EM-39 at 0-0.5 foot bgs;
 - o R-3 at 0-0.5 foot bgs;
 - o R-6 at 0-0.5 foot bgs; and
 - R-13 at 0-0.5 foot bgs.

The handheld XRF analyzer was factory calibrated. At the beginning of each day, the XRF analyzer was allowed to warm up for 15 to 30 minutes before analysis of samples and checked against a manufacturer-provided standard sample. XRF measurements for each boring location and depth were recorded on field forms (Appendix C). The downloaded XRF data are presented in Appendix D.

4.3.3 Soil Sample Selection

Two soil samples were collected from each boring location as follows:

- Of the 0-0.5 foot bgs, 0.5-1.0 foot bgs, and 1.0-1.5 foot bgs aliquots, the "surface" soil sample was selected based on the 6-inch soil interval with the highest XRF reading. In the absence of field screening indicators (i.e., shot fragments or elevated XRF readings), the 0-0.5 foot bgs soil interval was collected; and
- The 1.5-2.0 foot bgs soil interval (the "shallow" soil sample).

4.3.4 Soil Sampling Procedures

Soil samples were collected in laboratory-supplied glass jars. The sample containers were labeled, placed in sealable, plastic bags, and stored in a chilled cooler for transportation to Pace, under standard chain-of-custody procedures.

4.3.5 Soil Analyses

At borings R-1 through R-14, T-1 through T-3, NO-13 and NO-14, and WM-16 and WM-17 where XRF readings for lead were less than 250 mg/kg, soil samples were collected and placed on hold at the laboratory pending analysis of the initial soil samples.

At borings EM-34 through EM-40 and at borings R-1 through R-14, T-1 through T-3, NO-13 and NO-14, and WM-16 and WM-17 where XRF readings for lead were greater than 250 mg/kg, soil samples were analyzed at the laboratory. Additionally, at borings where XRF readings were less than 250 mg/kg but were located adjacent to borings with elevated lead concentrations, soil samples were analyzed at the laboratory to define lateral extent of lead in soil. The samples were analyzed for lead using USEPA Method 6020. Prior to analysis, samples were sieved at the laboratory using a No. 10 sieve.

⁶ During the 2019 and 2020 soil investigations, the 0-0.5 foot bgs samples was referred to as the surface soil sample. This Report applies "surface" soil sample to the 6-inch interval selected for analysis from the upper 1.5 feet bgs.

Laboratory analytical reports are presented in Appendix E. Analytical results are summarized on Table 1 and in Section 5.0.

4.4 Borehole Completion

Following completion of soil screening and sampling activities, each boring was backfilled to the surface with soil cuttings.

4.5 Decontamination Procedures

Disposable equipment intended for one-time use was packaged for appropriate disposal. Reusable augering and sampling devices that were in contact with potentially contaminated soil were decontaminated between each boring location using the following procedures:

- 1. Knock off loose soil with a brush;
- 2. Wash with non-phosphate detergent and tap water;
- 3. Rinse with tap-water;
- 4. Rinse with distilled water; and
- 5. Set on clean surface to air dry.

Decontamination was repeated if observable or suspected organic material remained on the sampling equipment.

4.6 Investigation-Derived Waste Handling

The investigation-derived waste (IDW) generated during the field activities included several gallons of decontamination water with phosphate free soap. The IDW water was discharged to the ground and left to evaporate on Site.

4.7 Field Variances

Following review of XRF readings, soil samples were collected from two additional borings located west of boring R-4 that were not proposed in the Work Plan. The two additional borings (R-13 and R-14) were each advanced to approximately two feet bgs and soil samples were selected using the same criteria described above.

5.0 HUMAN HEALTH SCREENING EVALUATION OF LEAD ANALYTICAL RESULTS

Based on the approved Work Plan scope, the locations of lead concentrations above the recreational trail user soil SL of 540 mg/kg (Table 1, Figures 3 and 4) were delineated further. In accordance with the methods and procedures described in Section 4.3, a total of 46 samples⁷ were analyzed for lead. Consistent with the approved Work Plan scope, the human health screening evaluation (HHSE) compared the lead results to the recreational trail user soil SL of 540 mg/kg. In addition to a point-by-point screening level evaluation, the soil data were evaluated separately for each designated use area (i.e., west meadow, east meadow, north orchard, ravine, recreational trail). Table 1 summarizes the analytical results and presents a point-by-point screening level evaluation, highlighting any lead concentrations that exceed the recreational trail user soil SL of 540 mg/kg. The laboratory analytical results are provided in Appendix E. Figure 3 depicts the locations of soil samples analyzed for lead with concentrations exceeding the recreational trail user SL shown and highlighted.

This HHSE was prepared in general accordance with the HHSE for lead presented in the PEA Report. This HHSE was conducted to further evaluate potential exposures associated with the anticipated future land uses to identify the need for any remediation, mitigation, or engineering controls to adequately protect human health. The anticipated future land uses include the continuation of recreational trail use, natural resource and trail maintenance, and a planned building complex as part of an agriculture farm and garden (i.e., perennial orchards and row crops) in relatively flat portions of the Site. The potential source of soil impacts at the Site is related to the deposition of lead shot fragments based on former land use as a shooting range.

It is unlikely that a potential receptor will spend the entire exposure duration (i.e., years) residing over maximum detected concentrations in soil. Therefore, for lead in soil, it is relevant and appropriate to statistically evaluate the soil data separately within each designated use area for the purpose of making risk management decisions. Consistent with USEPA (1989) procedures, when evaluating a reasonable maximum exposure scenario, the lesser of the maximum detected concentration and the 95-percent upper confidence limit of the mean concentration (95UCL)⁸

⁷ Sample EM-35-2' initially reported a lead concentration of 5,810 mg/kg and was reanalyzed to confirm the result. The reanalyzed sample reported a lead concentration of 198 mg/kg.

⁸ A USEPA software package, ProUCL Version 5.1, was used to estimate the 95UCL. The ProUCL software makes recommendations for estimating UCLs and was developed as a tool to support risk assessment.

will be selected as the appropriate soil EPC for each designated use area and compared to the recreational trail user soil SL of 540 mg/kg.

The HHSE for lead concentrations detected in soil for each designated use area are described below.

5.1 Analytical Summary

East Meadow

Based on soil data collected during the August 2021 investigation, lead was detected above laboratory reporting limits (RLs) in each of the 14 samples analyzed at concentrations ranging from 323 mg/kg to 2,090 mg/kg in the surface samples and from 14.7 mg/kg to 220 mg/kg in the shallow samples. Lead concentrations exceeded the soil SL of 540 mg/kg in four surface samples and none of the shallow samples.

When considering the soil data collected during the May 2020 and August 2021 investigations for the east meadow, the 95UCLs for surface and shallow soil samples were 702 mg/kg and 92 mg/kg, respectively (Appendix F). The 95UCLs were less than the maximum detected concentrations for surface and shallow soil samples; therefore, 95UCLs were selected as the appropriate EPC for comparison with the soil SL. The lead EPC for surface soil exceeded the soil SL of 540 mg/kg and the lead EPC for shallow soil did not exceed the soil SL.

Ravine

Based on soil data collected during the August 2021 investigation⁹, lead was detected above RLs in each of the 24 samples analyzed at concentrations ranging from 9.86 mg/kg to 1,600 mg/kg in the surface samples and from 6.59 mg/kg to 341 mg/kg in the shallow samples. Lead concentrations exceeded the soil SL of 540 mg/kg in five surface samples and none of the shallow samples.

The 95UCLs for surface and shallow soil samples were 884 mg/kg and 170 mg/kg, respectively (Appendix F). The 95UCLs were less than the maximum detected concentrations for surface and shallow soil samples; therefore, 95UCLs were selected as the appropriate EPC for comparison with the soil SL. The lead EPC for surface soil exceeded the soil SL of 540 mg/kg and the lead EPC for shallow soil did not exceed the soil SL. At two borings (R-8 and R-12), XRF readings ranged from 28 ppm to 98 ppm and soil samples were not analyzed at the laboratory.

Emma McCrary Trail Area

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⁹ The ravine area was not sampled during previous Site investigations.

Lead was detected above RLs in each of the eight samples collected and analyzed from the Emma McCrary Trail Area at concentrations ranging from 153 mg/kg to 474 mg/kg in the four surface samples and 7.07 mg/kg to 9.42 mg/kg in the four shallow samples. Lead concentrations did not exceed the soil SL of 540 mg/kg 10 .

At three borings (T-1, T-2, and T-4), XRF readings ranged from 6 ppm to 48 ppm and soil samples were not analyzed at the laboratory.

North Orchard

Based on soil data collected during the August 2021 investigation, XRF readings ranged from 3 ppm to 56 ppm at borings NO-13 and NO-14. The corresponding samples were not analyzed for lead.

When considering the soil data collected during the May 2020 and August 2021 investigations for the north orchard, the 95UCLs for surface and shallow soil samples were 312 mg/kg and 32 mg/kg, respectively (Appendix F). The 95UCLs were less than the maximum detected concentrations for surface and shallow soil samples; therefore, 95UCLs were selected as the appropriate EPC for comparison with the soil SL. The lead EPCs for surface and shallow soil did not exceed the soil SL of 540 mg/kg.

West Meadow

Based on soil data collected during the August 2021 investigation, XRF readings ranged from 3 ppm to 133 ppm at borings WM-16 and WM-17. The corresponding samples were not analyzed for lead.

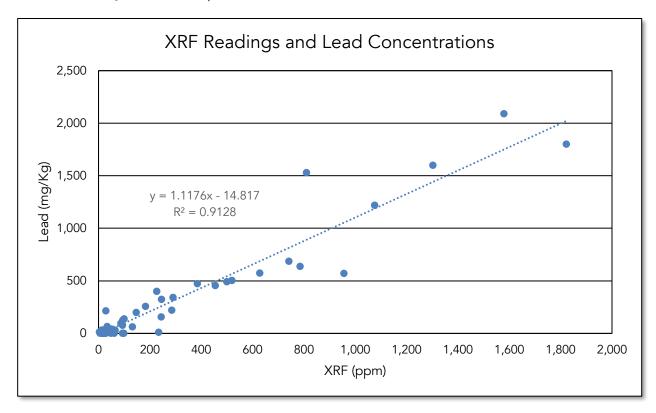
When considering the soil data collected during the May 2020 and August 2021 investigations for the west meadow, the 95UCLs for surface and shallow soil samples were 163 mg/kg and 34 mg/kg, respectively (Appendix F). The 95UCLs were less than the maximum detected concentrations for surface and shallow soil samples; therefore, 95UCLs were selected as the appropriate EPC for comparison with the soil SL. The lead EPCs for surface and shallow soil did not exceed the soil SL of 540 mg/kg.

5.2 Findings

The following summarizes the findings of the field sampling and laboratory analysis:

¹⁰ Soil samples were not collected from the Emma McCrary Trail Area during previous Site investigations. Since maximum detected lead concentrations were below the soil SL of 540 mg/kg and the analytical data set only included 8 samples, a 95UCL was not estimated.

• Lead shot fragments were not observed during field screening of soil samples. As shown on the graph below, XRF readings exhibit a favorable correlation with lead concentrations in associated sieved soil samples. The absence of observed shot fragments and favorable correlation between XRF readings and lead concentrations in sieved soil samples suggest that the shot has dissolved and associated metals have sorbed to soil during the more than 60 years since deposition.



Lead concentrations indicated the following:

East Meadow

Lead exceeded the recreational trail user soil SL in surface samples collected from the southwestern portion of the east meadow along the border with the ravine. Lead did not exceed the soil SL in shallow samples collected from the east meadow. In the east meadow, lead concentrations above the soil SL are delineated by borings EM-6, EM-17, EM-18, and EM-19 to the north, borings EM-20, EM-22, and EM-39 to the east, borings EM-38 and EM-40 to the south, and borings R-2, R-5, R-7, R-10, and R-11 to the west.

Ravine

Lead exceeded the soil SL in surface samples collected from the northwestern and eastern portions of the ravine. Lead did not exceed the soil SL in shallow samples collected from the ravine. In the northwestern portion of the ravine, lead concentrations above soil SL are delineated by borings B-7, B-8, B-9, and R-1 to the north, borings R-2 and R-5 to the east, borings R-9 and WM-C-4 to the south, and borings B-5 and B-6 to the west. In the ravine, lead concentrations above the soil SL are delineated by borings EM-3, EM-4, and EM-5 to the north, borings EM-6, EM-19, EM-20, EM-22, and EM-39 to the east, borings R-7 and R-11 to the south, and borings R-2, R-5, and R-10 to the west.

Emma McCrary Trail Area

Based on lead concentrations at borings T-3, T-5, T-6, and T-7 and XRF readings at borings T-1, T-2, and T-4 lead did not exceed the soil SL in samples collected in this area.

North Orchard

Based on XRF readings at borings NO-13 and NO-14, lead did not exceed the soil SL in samples collected southwest of the north orchard. In the north orchard, the lead concentration above the soil SL at boring NO-3 is delineated by boring NO-4 to the north, boring B-7 to the east, boring B-6 to the south, and borings NO-1 and NO-2 to the west.

West Meadow

Based on XRF readings at borings WM-16 and WM-17, lead did not exceed the soil SL in samples collected northwest of the west meadow. In the west meadow, the lead concentration above the soil SL at boring WM-DG-13 is delineated by boring WM-C-9(A) to the north, borings WM-C-10 and WM-DG-15 to the east, boring WM-C-6 to the south, and boring WM-DG-14 to the west.

Based on findings of this Report and previous Site investigations, lead concentrations in soil are adequately delineated laterally and vertically and lead concentrations above the recreational trail user SL are limited to surface soil in previously identified areas, as described above.

6.0 CONCLUSIONS

As presented herein, lead and PAHs associated with shot and clay target deposition in soil from historic shooting range activities have been identified and adequately delineated at the Site. COPCs identified in prior investigations include select metals, primarily lead, and PAHs. The HHSE was revised to further characterize risk and evaluate lead concentrations above the recreational trail user SL.. The findings of the HHSE indicate that lead concentrations above the recreational trail user SL are limited to surface soil at the Site, as follows and displayed on Figures 3 and 4¹¹:

- East Meadow Lead concentrations exceeded the soil SL in surface samples collected from the southwestern portion of this area.
- Ravine Lead concentrations exceeded the soil SL in surface samples collected from the northwestern and eastern portions of this area.
- North Orchard The lead concentration exceeded the soil SL in the surface sample collected from boring NO-3, in the southwestern portion of this area.
- West Meadow The lead concentration exceeded the soil SL in the surface sample collected from boring WM-DG-13, in the southern portion of this area.

Lead concentrations did not exceed the recreational trail user SL in samples collected in the Emma McCrary Trail Area.

The findings of the HHSE indicate that PAH concentrations above the recreational trail user SLs are limited to soil in the west meadow at the Site, as follows and displayed on Figure 4¹³:

 West Meadow – PAH concentrations exceeded the soil SLs in the surface samples collected from borings WM-C-9A, WM-DG-11, and WM-DG-13; and in the shallow sample collected from boring WM-DG-6 in the central portion of this area near the former shooting pads.

PAH concentrations did not exceed the soil SLs in samples collected in the north orchard and east meadow. PAHs were not analyzed in soil samples collected from the ravine or Emma McCrary Trail Area.

¹¹ Figure 6 shows areas where lead and PAH concentrations exceeded the soil SLs for unrestricted land use.

Based on our evaluation of the Site conditions, consideration of the following activities is recommended:

- Prepare a draft Covenant and Environmental Restriction to establish the following use restrictions and controls for the Site:
 - Restrict land use in areas where COPCs may pose a human health risk at the Site (i.e., modify the proposed farm and garden development plan to restrict access to areas where soil samples exceed unrestricted SLs); and
 - o Implement engineering controls (e.g., soil amendments or fence and post notices) and remediate (e.g., surface soil excavation and on-Site burial or off-Site disposal) in areas where COPC concentrations exceed SLs for the current and proposed land uses to reduce potential exposures.
 - o Implement engineering controls to mitigate unauthorized camping at the Site.
- Prepare a Soil Management Plan to provide guidance for working around and handling potentially impacted soil encountered during Site activities.

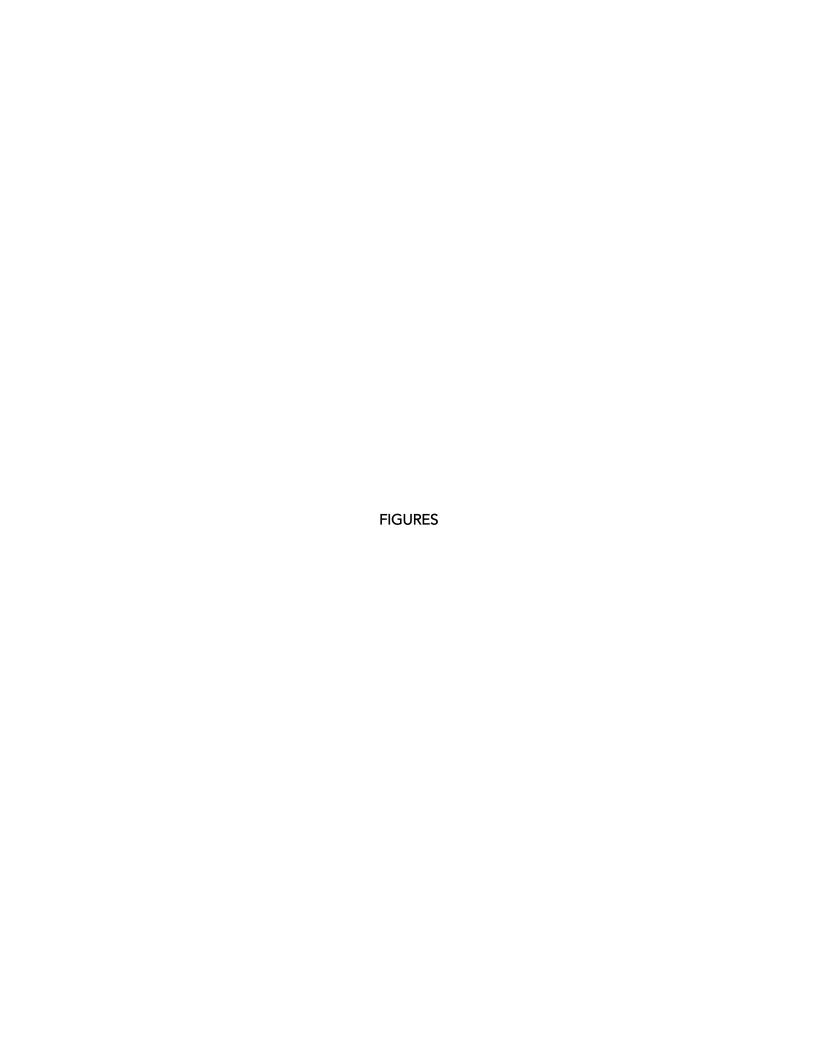
7.0 LIMITATIONS

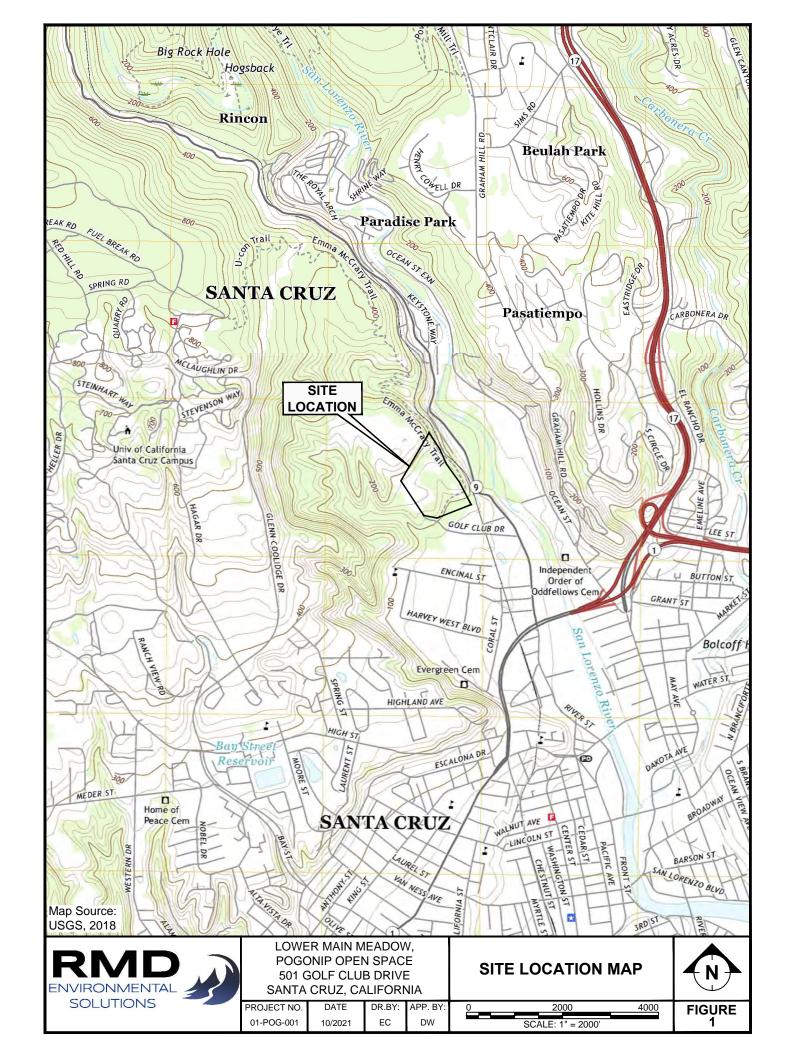
This document was prepared for the exclusive use of the City and County for the express purpose of complying with a client or regulatory directive for environmental investigation or restoration. RMD has used professional judgment to present the findings and opinions of a scientific and technical nature. The opinions expressed are based on the conditions of the Site existing at the time of the field investigation, current regulatory requirements, and any specified assumptions. The presented findings and recommendations in this report are intended to be taken in their entirety to assist City and County personnel in applying their own professional judgment in making decisions related to the property. No warranty or guarantee, whether expressed or implied, is made with respect to the data or the reported findings, observations, conclusions, and recommendations.

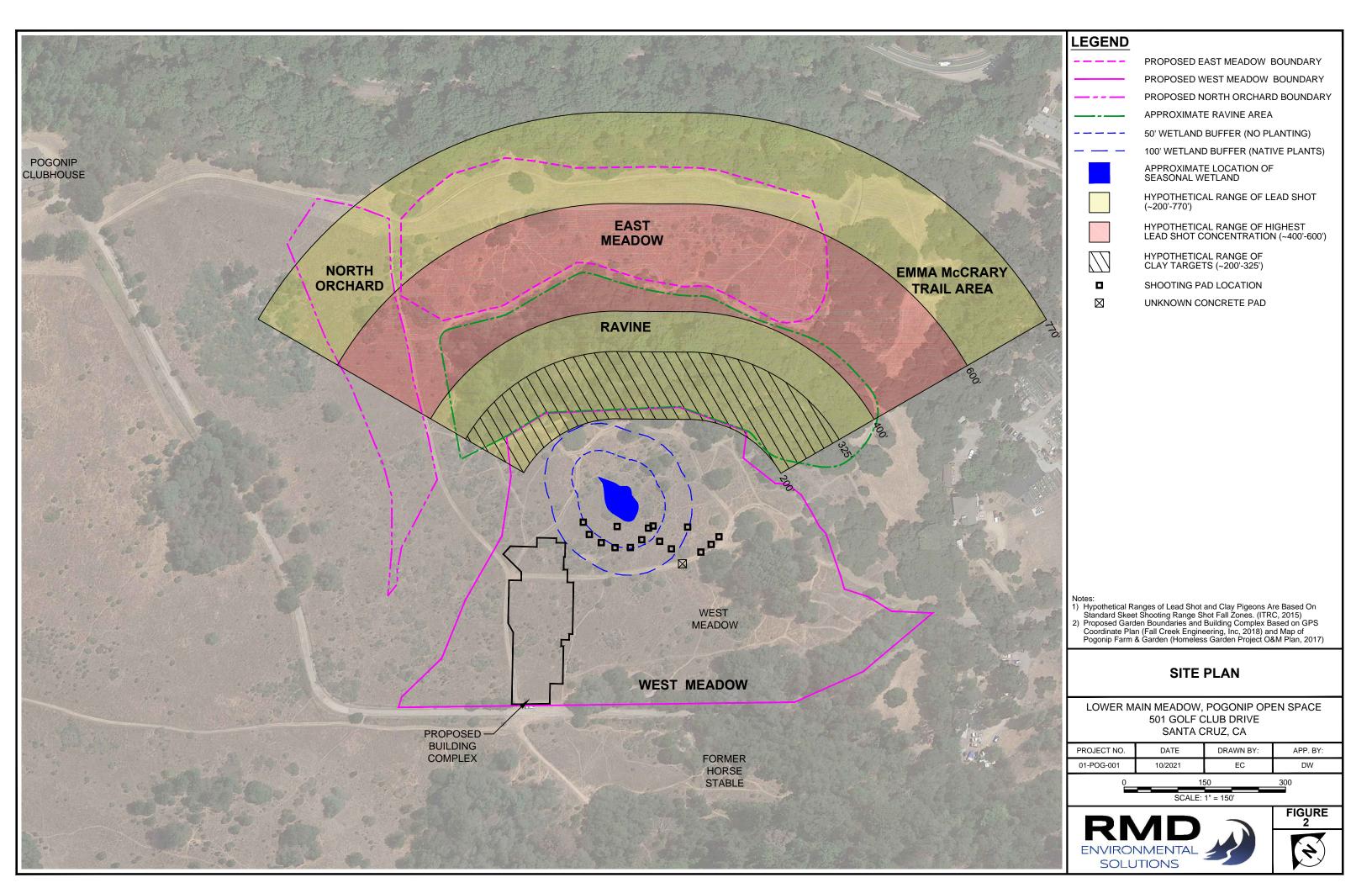
8.0 REFERENCES

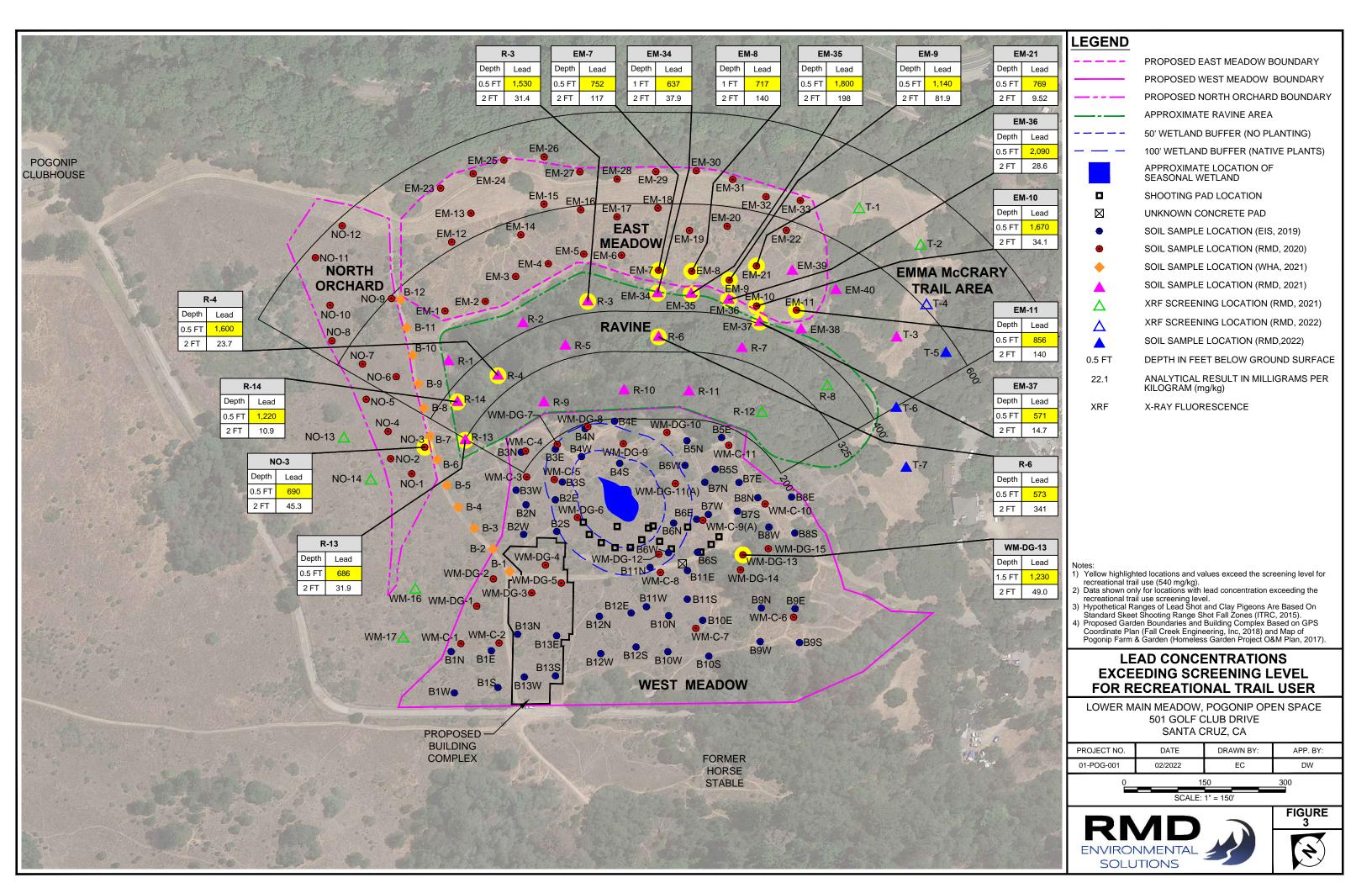
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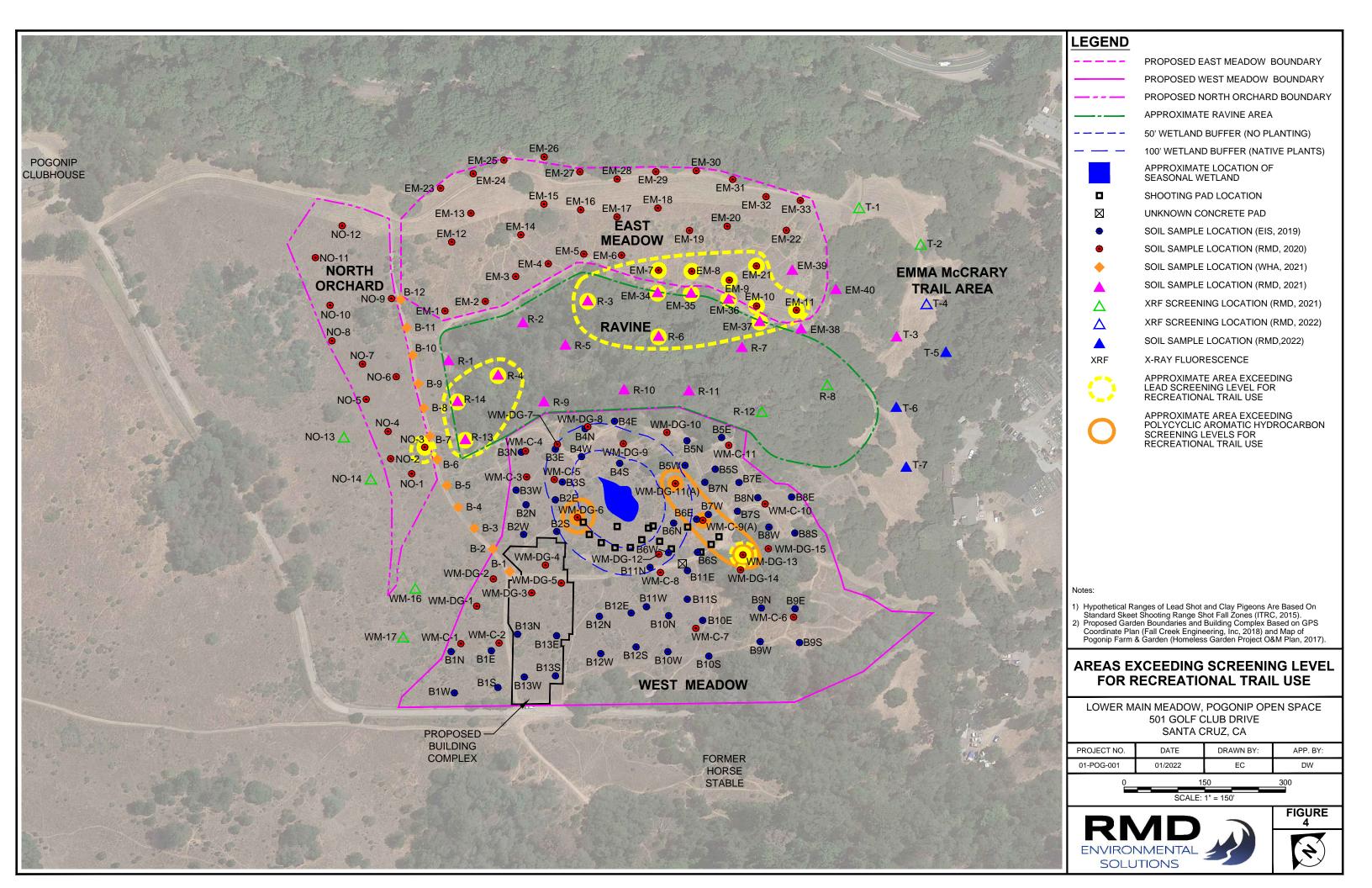
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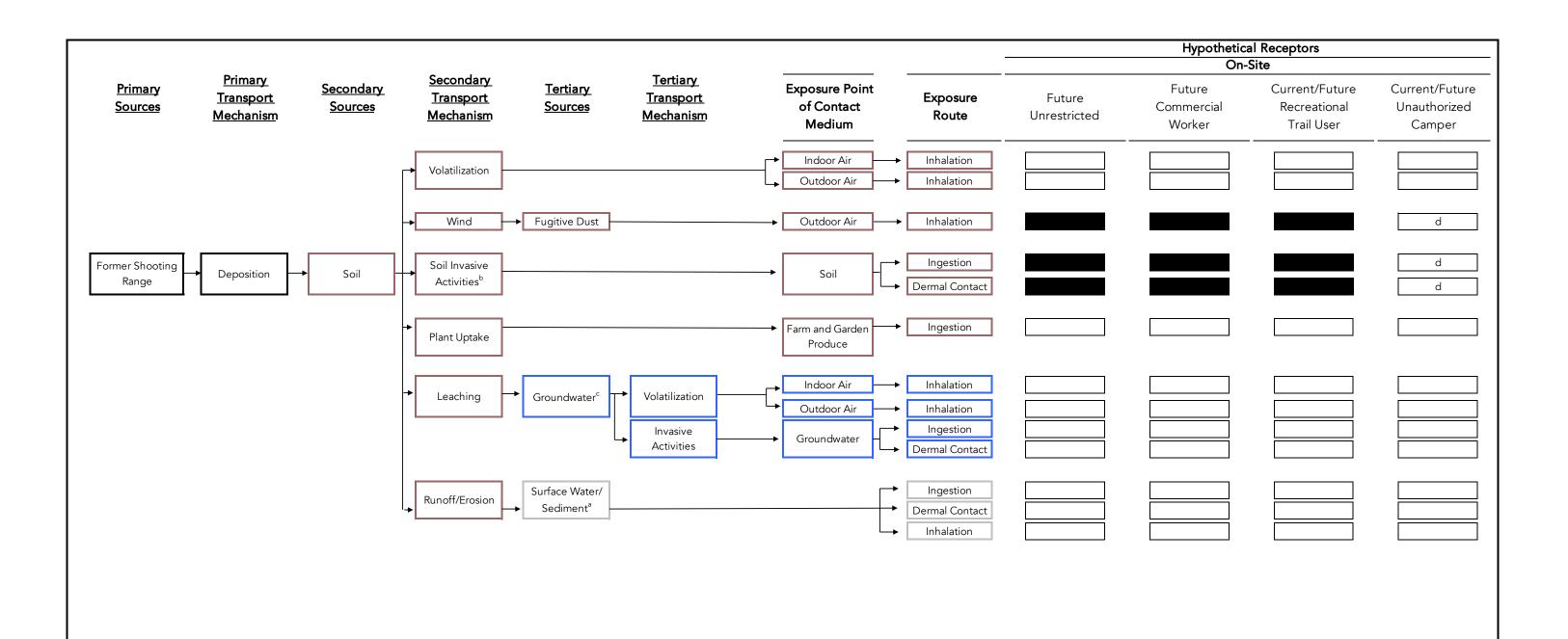












CSM components related to soil.

CSM components related to groundwater.

CSM components related to surface water.

Receptor likely to be exposed via this route, so pathway is considered potentially complete.

Receptor may be exposed via this route, so pathway is considered potentially complete; however, pathway is considered minor.

Pathway is incomplete, no further evaluation required.

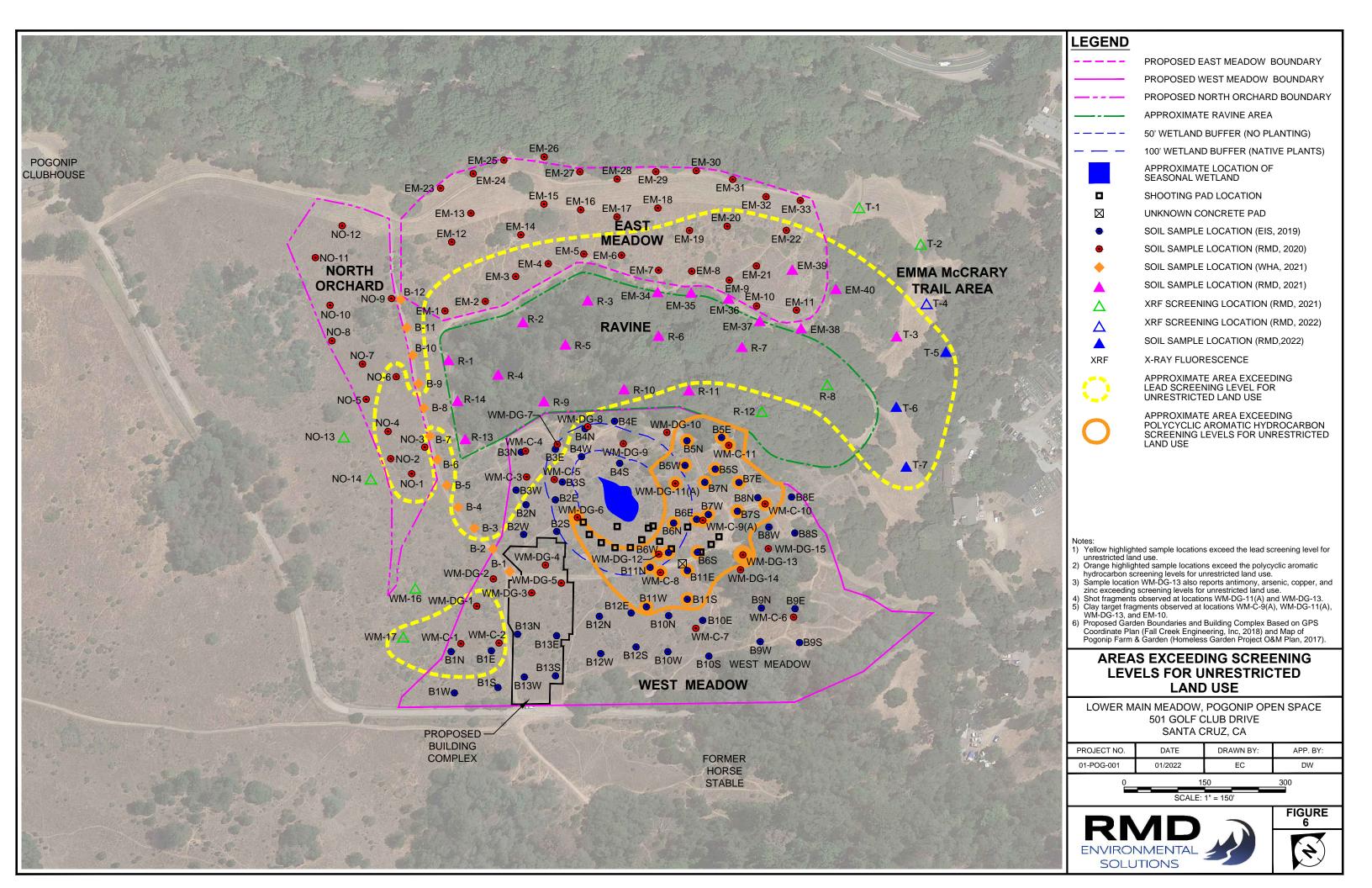
- ^a With the exception of the seasonal wetland, there are no identified surface water bodies within a one-half mile radius of the site.
- ^b Surface invasive activities are not expected to extend beyond 2 feet bgs.
- ^c Perched shallow groundwater supports seasonal wetlands and seeps. A 345 foot deep water supply well near the Pogonip clubhouse reported a depth to water of 128 feet below ground surface (bgs) in 1993. Due to depth to groundwater, it is not a media of concern at the site.
- d Camping is prohibited at the Site and the exposure pathways for this receptor are incomplete due to the implementation of engineering controls to mitigate unauthorized camping at the Site.

| POGONIP FARM AND GARDEN |
|-------------------------|
| SANTA CRUZ, CALIFORNIA |

HUMAN HEALTH CONCEPTUAL SITE MODEL

| PROJECT NO. | DATE | DRAWN BY | APP. BY | RMD |
|-------------|----------|----------|---------|----------------------------|
| 01-POG-001 | 02/02/22 | II | DW | ENVIRONMENTAL SOLUTIONS |

FIGURE 5



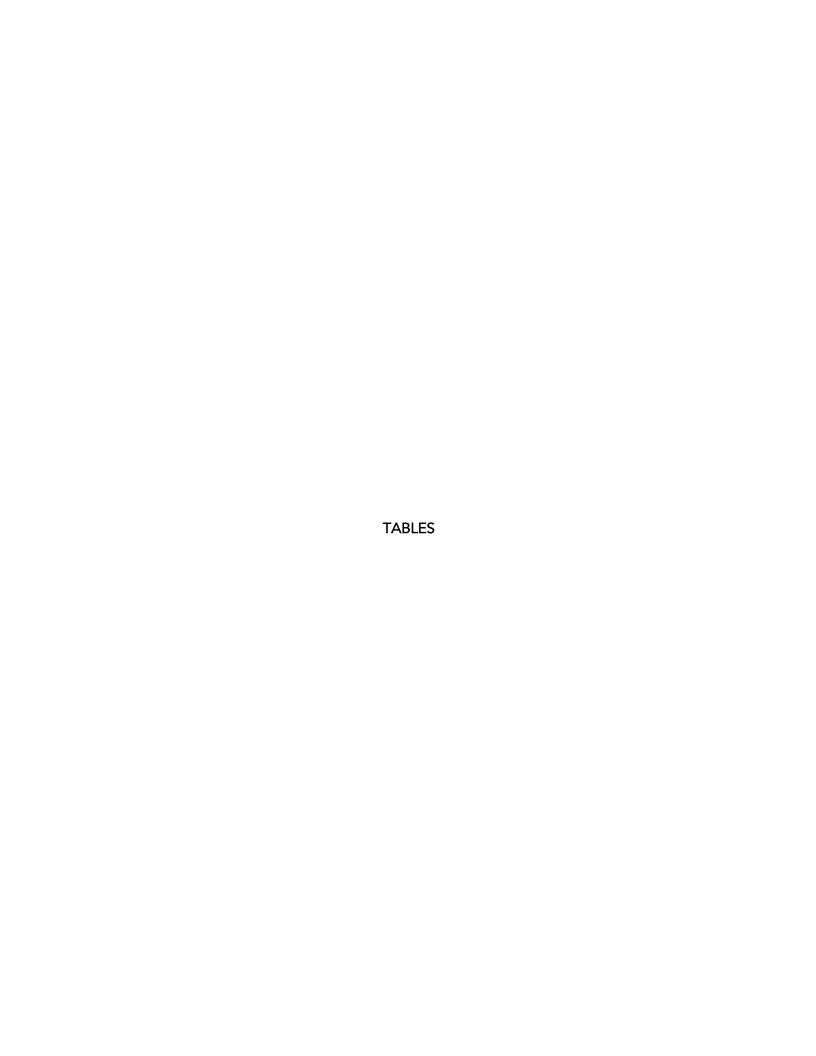


Table 1 Lead Concentrations in Soil

Lower Main Meadow, Pogonip Open Space Santa Cruz, California

| Sample ID | Date | Sample Depth | Lead Shot Observed | XRF Reading | Lead | |
|------------|-----------------------|--------------|---------------------------|-----------------------------------|------------|----|
| | | (feet bgs) | (Yes / No) | (ppm) | (mg/kg) | |
| | | | | Background Level ¹ | 43 | |
| | | Unr | | ial) Screening Level ² | 80 | |
| | | | | cial Screening Level ² | 320 540 | |
| | | | Recreational Trail Ceadow | Jse Screening Level ³ | 340 | |
| EM-34-1' | 8/3/2021 | 1 | No | 784 | 637 | _ |
| EM-34-2' | 8/3/2021 | 2 | No | 56 | 37.9 | |
| EM-35-0.5' | 8/3/2021 | 0.5 | No | 1,822 | 1,800 | |
| EM-35-2' | 8/3/2021 ⁴ | 2 | No | 147 | 198 | |
| EM-36-0.5' | 8/3/2021 | 0.5 | No | 1,579 | 2,090 | |
| EM-36-2' | 8/3/2021 | 2 | No | 64 | 28.6 | |
| EM-37-0.5' | 8/3/2021 | 0.5 | No | 955 | 571 | |
| EM-37-2' | 8/3/2021 | 2 | No | 13 | 14.7 | |
| EM-38-0.5' | 8/3/2021 | 0.5 | No | 499 | 490 | |
| EM-38-2' | 8/3/2021 | 2 | No | 48 | 41.3 | + |
| EM-39-0.5' | 8/3/2021 | 0.5 | No | 519 | 504 | |
| EM-39-2' | 8/3/2021 | 2 | No | 285 | 220 | |
| EM-40-0.5 | 8/3/2021 | 0.5 | No | 245 | 323 | 01 |
| EM-40-2' | 8/3/2021 | 2 | No | 16 | 18.6 | + |
| 2111 10 2 | 0/0/2021 | | vine | 10 | | |
| R-1-0.5' | 8/4/2021 | 0.5 | No | 226 | 400 | T |
| R-1-2' | 8/4/2021 | 2 | No | 131 | 61.5 | 1 |
| R-2-0.5' | 8/4/2021 | 0.5 | No | 28 | 215 | † |
| R-2-2' | 8/4/2021 | 2 | No | 4 | 8.80 | 01 |
| R-3-0.5' | 8/3/2021 | 0.5 | No | 810 | 1,530 | |
| R-3-2' | 8/3/2021 | 2 | No | 12 | 31.4 | |
| R-4-0.5' | 8/4/2021 | 0.5 | No | 1,302 | 1,600 | |
| R-4-2' | 8/4/2021 | 2 | No | 16 | 23.7 | |
| R-5-0.5' | 8/4/2021 | 0.5 | No | 234 | 9.86 | |
| R-5-2' | 8/4/2021 | 2 | No | 18 | 17.9 | |
| R-6-0.5' | 8/3/2021 | 0.5 | No | 628 | 573 | |
| R-6-2' | 8/3/2021 | 2 | No | 290 | 341 | |
| R-7-0.5' | 8/4/2021 | 0.5 | No | 454 | 456 | |
| R-7-2' | 8/4/2021 | 2 | No | 33 | 66.0 | |
| R-8-1.5' | 8/4/2021 | 1.5 | No | 98 | | |
| R-8-2' | 8/4/2021 | 2 | No | 93 | | |
| R-9-0.5' | 8/4/2021 | 0.5 | No | 182 | 256 | |
| R-9-2' | 8/4/2021 | 2 | No | 11 | 6.59 | |
| R-10-0.5' | 8/4/2021 | 0.5 | No | 86 | 94.0 | |
| R-10-2' | 8/4/2021 | 2 | No | 3 | 12.5 | |
| R-11-0.5' | 8/4/2021 | 0.5 | No | 93 | 75.7 | |
| R-11-2' | 8/4/2021 | 2 | No | 20 | 23.3 | |
| R-12-0.5' | 8/4/2021 | 0.5 | No | 61 | | |
| R-12-2' | 8/4/2021 | 2 | No | 28 | | |
| R-13-0.5' | 8/5/2021 | 0.5 | No | 741 | 686 | |
| R-13-2' | 8/5/2021 | 2 | No | 17 | 31.9 | |
| R-14-0.5' | 8/5/2021 | 0.5 | No | 1,075 | 1,220 | |
| R-14-2' | 8/5/2021 | 2 | No | 6 | 10.9 | |

Table 1

Lead Concentrations in Soil

Lower Main Meadow, Pogonip Open Space Santa Cruz, California

| Sample ID | Date | Sample Depth | Lead Shot Observed | XRF Reading | Lead | |
|------------|------------|--------------|-----------------------|----------------------------------|------------|--------|
| | | (feet bgs) | (Yes / No) | (mqq) | (mg/kg) | |
| | | | | Background Level ¹ | 43 | |
| | | Uni | | al) Screening Level ² | 80 | |
| | | | Commerc | ial Screening Level ² | 320 540 | |
| | | F M.C | | se Screening Level ³ | 540 | |
| T 4 0 FI | 0./2./0004 | | ary Trail Area | 40 | | |
| T-1-0.5' | 8/3/2021 | 0.5 | No | 19 | | |
| T-1-2' | 8/3/2021 | 2 | No | 14 | | |
| T-2-0.5' | 8/4/2021 | 0.5 | No | 23 | | |
| T-2-2' | 8/4/2021 | 2 | No | 6 | | |
| T-3-0.5' | 8/4/2021 | 0.5 | No | 384 | 474 | |
| T-3-2' | 8/4/2021 | 2 | No | 8 | 8.15 | |
| T-4-0.5' | 1/11/2022 | 0.5 | No | 48 | | |
| T-4-2' | 1/11/2022 | 2 | No | 15 | | |
| T-5-0.5' | 1/11/2022 | 0.5 | No | 99 | 159 | |
| T-5-2' | 1/11/2022 | 2 | No | 13 | 7.07 | |
| T-6-0.5' | 1/11/2022 | 0.5 | No | 152 / 489 / 91 | 187 | |
| T-6-2' | 1/11/2022 | 2 | No | 12 | 9.42 | |
| T-7-0.5' | 1/11/2022 | 0.5 | No | 107 / 82 | 153 | |
| T-7-2' | 1/11/2022 | 2 | No | 33 | 8.92 | |
| | | North (| Orchard | | | |
| NO-13-0.5' | 8/5/2021 | 0.5 | No | 14 | | |
| NO-13-2' | 8/5/2021 | 2 | No | 3 | | |
| NO-14-0.5' | 8/5/2021 | 0.5 | No | 56 | | |
| NO-14-2' | 8/5/2021 | 2 | No | 4 | | |
| | | West N | /leadow | | | |
| WM-16-0.5' | 8/5/2021 | 0.5 | No | 18 | | |
| WM-16-2' | 8/5/2021 | 2 | No | 3 | | \neg |
| WM-17-0.5' | 8/5/2021 | 0.5 | No | 133 | | |
| WM-17-2' | 8/5/2021 | 2 | No | 5 | | |

Notes:

Soil samples sieved using No. 10 sieve and metals analyzed using USEPA Method 6020.

Analytes detected above laboratory reporting limit are emboldened.

Analytes detected above background level and Recreational Trail User Screening Level are highlighted.

XRF = X-Ray Fluorescence.

bgs = below ground surface.

ppm = parts per million.

mg/kg = milligrams per kilogram.

-- = Not analyzed.

O1 = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

- ¹ Lawrence Berkeley National Laboratory (LBNL, 2009), was used to establish an acceptable upper estimate background concentration for
- ² In order of priority, the screening level represents the Department of Toxic Substances Control (DTSC)-modified screening level (DTSC, 2020) followed by U.S. Environmental Protection Agency (USEPA) Regional Screening Level (RSL; USEPA, 2020).
- ³ The Recreational Trail Use Screening Level was determined based on an evaluation of soil data collected from 2019-2020 and was described in the Preliminary Endangerment Assessment Report (RMD, 2020).
- ⁴ Sample EM-35-2' initially reported a lead concentration of 5,810 mg/kg and was reanalyzed to confirm the result. The reanalyzed sample reported a lead concentration of 198 mg/kg.

References:

LBNL, 2009. Analysis of Background Distributions of Metals in Soil at Lawrence Berkeley National Laboratory. Revised April. RMD, 2020. Preliminary Endangerment Assessment Report, Pogonip Farm and Garden, 333 Golf Club Drive, Santa Cruz, California. August

Table 2

Polycyclic Aromatic Hydrocarbon Concentrations in Soil

Lower Main Meadow, Pogonip Open Space Santa Cruz, California

| Sample ID | Date | Sample Depth | Depth Clay Target Fragments Observed | Notes | ANTHRACENE | ACENAPHTHENE | BENZO(A) ANTHRACENE | BENZO(A) PYRENE | BENZO(B) | | BENZO(G,H,I) PERYLENE | BENZO(K) | | CHRYSENE | | ANTHRACENE | FLUORENE | | INDENO(1,2,3-CD) PYRENE | PHENANTHRENE | PYRENE | NAPHTHALENE | 1-METHYL NAPHTHALENE | 2-METHYL NAPHTHALENE |
|-------------------|------------|-----------------|---|--|------------------|------------------|------------------------|--------------------|---------------------|-------|-----------------------|------------------|--|----------------|----------------|-------------------------|---------------------|-----|-------------------------|---------------|-------------------|------------------|-------------------------|-------------------------|
| | | (feet bgs) | (feet bgs) (Residential) So | | mg/kg) 17,000 | (mg/kg) 3,300 | (mg/kg) 1.1 | (mg/kg) 0.11 |) (mg/kg 1.1 | , | (mg/kg) NE | (mg/kg | 3) | (mg/kg) 110 | _ | g/kg) (mg/ 0.028 2,4 | | | (mg/kg) 1.1 | (mg/kg) NE |) (mg/kg 1,800 | | (mg/kg) 9.9 | (mg/kg) 190 |
| | | | Commercial So | | 130,000 | 23,000 | 12 | 1.3 | 13 | | NE NE | 130 | | 1,300 | | 0.31 18,0 | | | 13 | NE | 13,000 | | 30 | 1,300 |
| | | | nal Trail Use So | | 120,000 | 23,000 | 45 | 4.5 | 45 | | NE | 450 | | 4,500 | | 1.1 N | | | 45 | NE | 12,000 | | 160 | 1,600 |
| | | Reciedado | nai man ose se | accining Ecver | | | | | | | | West Meadow | | .,,,,,,, | | | , | | | | , | | | .,,,,, |
| WM-C-5-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0645 | <0.00645 | 0.00425 J | 0.00642 | J 0.00668 | | 0.00606 | J 0.00326 | J | 0.00552 | J <0.00 | 645 0.0044 | 5 J <0.00645 | 0. | 00467 J | <0.00645 | 0.00486 | J <0.0215 | <0.0215 | <0.0215 |
| WM-C-6-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0644 | <0.00644 | <0.00644 | < 0.00644 | 0.00244 | J | < 0.00644 | <0.00644 | | <0.00644 | <0.00 | | | | 0.00644 | < 0.00644 | <0.00644 | <0.0215 | <0.0215 | <0.0215 |
| WM-C-7-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0752 | <0.00752 | 0.00232 J | 0.00283 | J 0.00352 | J | 0.00295 | J <0.00752 | | <0.00752 | <0.00 | 752 <0.0075 | 2 <0.00752 | <(| 0.00752 | <0.00752 | 0.00292 | J <0.0251 | <0.0251 | <0.0251 |
| WM-C-8-0.5' | 05/14/2020 | 0 - 0.5 | | 0.0 | 273 | 0.0102 | 0.216 | 0.267 | 0.323 | | 0.176 | 0.081 | | 0.261 | 0.05 | | 0.00293 | J (| 0.155 | 0.102 | 0.309 | <0.0240 | <0.0240 | <0.0240 |
| WM-C-8-2' | 05/14/2020 | 1.5 - 2 | | | 0741 | <0.00741 | <0.00741 | <0.00741 | <0.00741 | | <0.00741 | <0.00741 | | <0.00741 | <0.00 | | | <(| 0.00741 | <0.00741 | <0.00741 | <0.0247 | <0.0247 | <0.0247 |
| WM-C-9A-1' | 05/15/2020 | 0.5 - 1 | | 0.2 | 231 | 0.0866 | 5.64 | 10.4 | 11.5 | | 4.88 | 2.79 | | 6.44 | 1.8 | 5 4.22 | 0.0319 | J | 4.99 | <0.215 | 0.828 | 4.68 | <0.215 | <0.215 |
| WM-C-9-2' | 05/14/2020 | 1.5 - 2 | 0.5-1.5 | | 0717 | <0.00717 | 0.0332 | 0.0608 | 0.0593 | | 0.0545 | 0.0232 | | 0.0412 | 0.01 | | | 0 | .0446 | 0.00582 | J 0.0319 | <0.0239 | <0.0239 | <0.0239 |
| WM-C-10-0.5' | 05/14/2020 | 0 - 0.5 | | | 115 | 0.00499 J | 0.121 | 0.185 | 0.192 | | 0.131 | 0.0803 | 1 | 0.172 | 0.03 | | <0.00706 | | 0.112 | 0.0508 | 0.155 | <0.0235 | <0.0235 | <0.0235 |
| WM-C-10-2' | 05/14/2020 | 1.5 - 2 | | | 258 | 0.00645 J | 0.175 | 0.243 | 0.298 | | 0.179 | 0.0819 | | 0.217 | 0.05 | | 0.00249 | | 0.153 | 0.0736 | 0.229 | <0.0217 | <0.0217 | <0.0217 |
| WM-C-11-0.5' | 05/13/2020 | 0 - 0.5 | | | 0640 | <0.00640 | 0.00257 J | 0.00383 | J 0.00553 | J | 0.00419 | J <0.00640 | | 0.00307 | J <0.00 | | | | 00306 J | <0.00640 | 0.0028 | J <0.0213 | <0.0213 | <0.0213 |
| WM-C-11-2' | 05/13/2020 | 1.5 - 2 | | 0. | 56 | 0.23 | 2.68 | 2.56 | 2.88 | | 1.42 | 0.772 | | 3.02 | 0.4 | 3.81 | 0.123 | | 1.25 | 2.43 | 4.18 | 0.0112 J | 0.0106 J | 0.0215 J |
| WM-DG-1-0.5' | 05/13/2020 | 0 - 0.5 | | | 0687 | <0.00687 | <0.00687 | <0.00687 | 0.00247 | J | <0.00687 | <0.00687 | | <0.00687 | <0.00 | | | _ | 0.00687 | <0.00687 | <0.00687 | <0.0229 | <0.0229 | <0.0229 |
| WM-DG-2-0.5' | 05/13/2020 | 0 - 0.5 | | | 0725 | <0.00725 | <0.00725 | <0.00725 | <0.00725 | | <0.00725 | <0.00725 | 1 | <0.00725 | <0.00 | | | | 0.00725 | <0.00725 | <0.00725 | <0.0242 | <0.0242 | <0.0242 |
| WM-DG-3-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0676 | <0.00676 | <0.00676 | < 0.00676 | 0.00267 | J | 0.00215 | J <0.00676 | | <0.00676 | <0.00 | 676 <0.0067 | 6 <0.00676 | <(| 0.00676 | < 0.00676 | <0.00676 | <0.0225 | <0.0225 | <0.0225 |
| WM-DG-4-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0726 | <0.00726 | <0.00726 | 0.0027 | J 0.00347 | J | 0.00283 | J <0.00726 | | <0.00726 | <0.00 | 726 <0.0072 | 6 <0.00726 | <(| 0.00726 | < 0.00726 | <0.00726 | <0.0242 | <0.0242 | <0.0242 |
| WM-DG-5-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0733 | <0.00733 | <0.00733 | 0.00239 | J 0.00287 | J | 0.00256 | J <0.00733 | | < 0.00733 | <0.00 | 733 <0.0073 | 3 <0.00733 | <(| 0.00733 | < 0.00733 | < 0.00733 | <0.0244 | <0.0244 | <0.0244 |
| WM-DG-6-0.5' | 05/13/2020 | 0 - 0.5 | | 0.1 | 31 | 0.0763 | 2.85 | 3.61 | 3.88 | | 2.27 | 1.31 | | 3.61 | 0.8 | 3.07 | 0.0173 | | 2.03 | 0.633 | 3.23 | 0.00974 J | 0.0111 J | 0.0133 J |
| WM-DG-6-2' | 05/13/2020 | 1.5 - 2 | | 0.1 | 185 | 0.114 | 5.43 | <u>7.56</u> | 7.92 | | 4.06 | 1.85 | | 7.05 | 0.2 | | 0.0248 | | 3.58 | 0.942 | 6.73 | 0.0141 J | 0.0162 J | 0.0194 J |
| WM-DG-7-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0639 | <0.00639 | 0.00345 J | 0.00558 | J 0.00635 | J | 0.00506 | J <0.00639 | | 0.00452 | J <0.00 | 639 0.0039 | 9 J <0.00639 | 0. | 00419 J | < 0.00639 | 0.00411 | J <0.0213 | <0.0213 | <0.0213 |
| WM-DG-8-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0730 | <0.00730 | 0.0529 | 0.107 | 0.113 | | 0.0893 | 0.0331 | | 0.0669 | 0.02 | 52 0.0409 | <0.00730 | 0 | .0754 | 0.00898 | 0.0444 | <0.0243 | <0.0243 | <0.0243 |
| WM-DG-9-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0694 | <0.00694 | <0.00694 | 0.00271 | J 0.0034 | J | 0.00272 | J <0.00694 | | <0.00694 | <0.00 | 694 <0.0069 | 4 <0.00694 | 0. | 00213 J | < 0.00694 | <0.00694 | <0.0231 | <0.0231 | <0.0231 |
| WM-DG-10-0.5' | 05/13/2020 | 0 - 0.5 | | <0.0 | 0690 | <0.00690 | 0.00254 J | 0.00254 | J 0.00298 | J | <0.00690 | <0.00690 | | 0.00297 | J <0.00 | 690 0.0036 | 6 J <0.00690 | <(| 0.00690 | <0.00690 | 0.00373 | J <0.0230 | <0.0230 | <0.0230 |
| WM-DG-11-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0242 | <0.0242 | 0.041 | 0.0608 | 0.0665 | | 0.0445 | 0.0224 | J | 0.0535 | 0.01 | 15 J 0.0469 | <0.0242 | 0 | .0371 | 0.0158 | J 0.0477 | <0.0804 | <0.0804 | <0.0804 |
| WM-DG-11-0.5'-DUP | 05/14/2020 | 0 - 0.5 | 0.5.4 | Duplicate 0.9 | 986 | 0.651 | 8.45 | <u>10.5</u> | 12.2 | | 3.35 | 4.00 | | 9.86 | 2.3 | 8 11.1 | 0.260 | | 3.61 | 4.14 | 11.8 | 0.321 | 0.0762 | 0.11 |
| WM-DG-11A-1' | 05/15/2020 | 0.5 - 1 | 0.5-1 | 0.00 | 0491 . | J <0.00659 | 0.0544 J3 | 0.0886 | J3,J6 0.0813 | J3,J6 | 0.0751 | J3 0.0336 | J3 | 0.0709 J | J3 0.01 | 96 0.0595 | <0.00659 | 0 | . 0637 J3 | <0.0220 | 0.0152 | 0.061 | <0.0220 | <0.0220 |
| WM-DG-11-2' | 05/14/2020 | 1.5 - 2 | | <0.0 | 0716 | <0.00716 | 0.00212 J | 0.00258 | J 0.00271 | J | <0.00716 | < 0.00716 | | <0.00716 | <0.00 | 716 <0.0071 | 6 <0.00716 | <(| 0.00716 | <0.00716 | < 0.00716 | 0.00716 J | <0.0239 | <0.0239 |
| WM-DG-12-0.5' | 05/14/2020 | 0 - 0.5 | | 0.0 | 278 | 0.0132 | 0.304 | 0.354 | 0.415 | | 0.243 | 0.12 | | 0.365 | 0.06 | 61 0.347 | 0.00273 | J (| 0.203 | 0.13 | 0.498 | <0.0222 | <0.0222 | <0.0222 |
| WM-DG-12-2' | 05/14/2020 | 1.5 - 2 | | <0.0 | 0675 | <0.00675 | 0.0100 | 0.00997 | 0.0102 | | 0.00534 | J 0.00445 | J | 0.0126 | <0.00 | 675 0.014 | <0.00675 | 0. | . 00474 J | 0.00682 | 0.0159 | <0.0225 | <0.0225 | <0.0225 |
| WM-DG-13-1.5' | 05/14/2020 | 1 - 1.5 | 0.5-2 | 0.2 | 252 | 0.113 | 6.42 | <u>11.7</u> | <u>14.8</u> | | 7.52 | 4.02 | | 8.75 | 4.4 | 5.74 | 0.0241 | | 6.25 | 0.901 | 5.68 | 0.0462 | 0.0166 J | 0.0201 J |
| WM-DG-13-2' | 05/14/2020 | 1.5 - 2 | 0.3-2 | 0.00 | 0609 | J <0.00670 | 0.19 | 0.358 | 0.393 | | 0.365 | 0.123 | | 0.257 | 0.1 | 0.123 | <0.00670 | (| 0.292 | 0.0186 | 0.158 | 0.00491 J | <0.0223 | <0.0223 |
| WM-DG-14-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0659 | <0.00659 | 0.00997 | 0.0149 | 0.0169 | | 0.0138 | 0.00589 | J | 0.0122 | 0.00 | 377 J 0.0108 | <0.00659 | 0 | .0107 | 0.00295 | J 0.0124 | <0.0220 | <0.0220 | <0.0220 |
| WM-DG-15-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0686 | <0.00686 | 0.00482 J | 0.00658 | J 0.00832 | | 0.00645 | J 0.00264 | J | 0.00575 | J <0.00 | 686 0.0055 | 2 J <0.00686 | 0. | 00486 J | <0.00686 | 0.0065 | J <0.0229 | <0.0229 | <0.0229 |
| | | | | | | | | | | | | North Orchard | | | | | | | | | | | | |
| NO-3-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0726 | <0.00726 | <0.00726 | <0.00726 | 0.00191 | J | <0.00726 | <0.00726 | | <0.00726 | <0.00 | | | <(| 0.00726 | <0.00726 | <0.00726 | <0.0242 | <0.0242 | <0.0242 |
| NO-4-0.5' | 05/14/2020 | 0 - 0.5 | | | 0700 | <0.00700 | <0.00700 | <0.00700 | <0.00700 | | <0.00700 | <0.00700 | + | <0.00700 | <0.00 | | | | 0.00700 | <0.00700 | <0.00700 | | <0.0233 | <0.0233 |
| NO-6-0.5' | 05/14/2020 | 0 - 0.5 | | <0.0 | 0786 | <0.00786 | <0.00786 | <0.00786 | <0.00786 | | <0.00786 | <0.00786 | | <0.00786 | <0.00 | 786 <0.0078 | 6 <0.00786 | <(| 0.00786 | <0.00786 | <0.00786 | <0.0262 | <0.0262 | <0.0262 |
| | | | | · · | - | 1 | | | | | | East Meadow | 1 | 1 | | | 1 1 | | 1 | | | | | |
| EM-1-0.5' | 05/12/2020 | 0 - 0.5 | | | 8860 | <0.00688 J3 | | <0.00688 | 0.00228 | J | <0.00688 | <0.00688 | _ | | <0.00 | | | _ | 0.00688 | <0.00688 | <0.00688 | <0.0229 J3 | | |
| EM-2-0.5' | 05/12/2020 | 0 - 0.5 | | | 0693 | <0.00693 | 0.00233 J | 0.00267 | J 0.00508 | J | 0.00326 | J <0.00693 | + | 0.0028 | J <0.00 | | | | 00232 J | <0.00693 | 0.00292 | J <0.0231 | <0.0231 | <0.0231 |
| EM-3-0.5' | 05/12/2020 | 0 - 0.5 | | | 0690 | <0.00690 | <0.00690 | <0.00690 | 0.00324 | J | 0.00258 | J <0.00690 | + | <0.00690 | <0.00 | | | | 0.00690 | <0.00690 | <0.00690 | <0.0230 | <0.0230 | <0.0230 |
| EM-4-1.5' | 05/12/2020 | 1 - 1.5 | | | 0656 | <0.00656 | <0.00656 | <0.00656 | <0.00656 | | <0.00656 | <0.00656 | | <0.00656 | <0.00 | | | | 0.00656 | <0.00656 | <0.00656 | <0.0219 | <0.0219 | <0.0219 |
| EM-5-0.5' | 05/12/2020 | 0 - 0.5 | | | 0647 | <0.00647 | <0.00647 | <0.00647 | <0.00647 | | <0.00647 | <0.00647 | | <0.00647 | <0.00 | | | | 0.00647 | <0.00647 | <0.00647 | <0.0216 | <0.0216 | <0.0216 |
| EM-6-0.5' | 05/12/2020 | 0 - 0.5 | | | 0671 | <0.00671 | <0.00671 | <0.00671 | 0.00332 | J | 0.00223 | J <0.00671 | | <0.00671 | <0.00 | | | | 0.00671 | <0.00671 | <0.00671 | <0.0224 | <0.0224 | <0.0224 |
| EM-7-0.5' | 05/12/2020 | 0 - 0.5 | | | 0663 | <0.00663 | <0.00663 | <0.00663 | 0.00224 | J | <0.00663 | <0.00663 | | <0.00663 | <0.00 | | | | 0.00663 | <0.00663 | <0.00663 | <0.0221 | <0.0221 | <0.0221 |
| EM-8-1' | 05/12/2020 | 0.5 - 1 | | | 0652 | <0.00652 | <0.00652 | <0.00652 | <0.00652 | | <0.00652 | <0.00652 | | <0.00652 | <0.00 | | | | 0.00652 | <0.00652 | <0.00652 | <0.0217 | <0.0217 | <0.0217 |
| EM-9-0.5' | 05/12/2020 | 0 - 0.5 | _ | | 0641 | <0.00641 | <0.00641 | <0.00641 | <0.00641 | | <0.00641 | <0.00641 | | <0.00641 | <0.00 | | | | 0.00641 | <0.00641 | <0.00641 | <0.0214 | <0.0214 | <0.0214 |
| EM-10-0.5' | 05/12/2020 | 0 - 0.5 | 0-1.5 | | 0633 | <0.00633 | <0.00633 | <0.00633 | <0.00633 | | <0.00633 | <0.00633 | | <0.00633 | <0.00 | | | | 0.00633 | <0.00633 | <0.00633 | <0.0211 | <0.0211 | <0.0211 |
| EM-11-0.5' | 05/12/2020 | 0 - 0.5 | | | 0708 | <0.00708 | <0.00708 | <0.00708 | <0.00708 | | <0.00708 | <0.00708 | | <0.00708 | <0.00 | | | | 0.00708 | <0.00708 | <0.00708 | 0.0114 J | <0.0236 | 0.0102 J |
| EM-21-0.5' | 05/14/2020 | 0 - 0.5 | | | 0646 | <0.00646 | <0.00646 | <0.00646 | <0.00646 | | <0.00646 | <0.00646 | + | <0.00646 | <0.00 | | | | 0.00646 | <0.00646 | <0.00646 | <0.0215 | <0.0215 | <0.0215 |
| EM-21-0.5'-DUP | 05/14/2020 | 0 - 0.5 | | Duplicate <0.0 | 0650 | <0.00650 | <0.00650 | <0.00650 | 0.00183 | J | <0.00650 | <0.00650 | 1 | <0.00650 | <0.00 | 650 <0.0065 | 0 <0.00650 | <(| 0.00650 | <0.00650 | <0.00650 | <0.0217 | <0.0217 | <0.0217 |

Notes:

PAHs analyzed using USEPA Method 8270C-SIM.

Analytes detected above laboratory reporting limit are **emboldened**.

Analytes detected above Unrestricted (Residential) Screening Level are highlighted orange.

Analytes detected above Recreational Trail Use Screening Level are highlighted blue.

Analytes detected above Commercial Screening Level are <u>underlined</u>.

bgs = Below ground surface.

mg/kg = Milligrams per kilogram.

NE = Not Established.

PAHs = Polycyclic Aromatic Hydrocarbons.

SIM = Selective Ion Mode.

J = The identification of the analyte is acceptable; the reported value is an estimate.

J3 = The associated batch QC was outside the established quality control range for precision.

J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

¹ The screening level represents the Department of Toxic Substances Control (DTSC)-modified screening level (DTSC, 2020).

 2 The Recreational Trail Use Screening Level was determined based on an evaluation of soil data collected from 2019-2020.

References:

DTSC, 2020. Human Health Risk Assessment (HHRA) Note Number 3. June.

Table 2

Polycyclic Aromatic Hydrocarbon Concentrations in Soil

Lower Main Meadow, Pogonip Open Space Santa Cruz, California

> Page 2 of 2 RMD ENVIRONMENTAL SOLUTIONS, INC.

APPENDIX A EXCERPTS FROM PREVIOUS REPORTS

Report: Soil Lead Levels in the Lower Main Meadow of Pogonip

This is report updated **January 18, 2019**. By the Homeless Garden Project

On November 18, 2018, following a meeting with Parks and Recreation staff, HGP received a formal letter alerting us to the presence of historic skeet shooting in the Lower Main Meadow, and the possibility of higher lead levels resulting from this use.

At the time agricultural soil testing was underway. The initial soil test results were received on December 7, 2018 and are shown in Table 1. Soil samples were taken using the <u>best practices</u> <u>methodology outlined by the Soil and Plant Nutrient Testing Laboratory at the University of Massachusetts Amherst, for agriculture soil testing. Lead levels tested in this initial phase <u>report plant available (extractible) lead levels, NOT total lead levels.</u> (In addition to reporting plant available lead, 10 other agriculturally significant tests were reported including pH.)</u>

Table 1 (below) shows the results of round 1 testing. Sample locations are shown with green pins on the map.

Table 1.

| Location | Extractable Lead ppm | рН |
|----------|----------------------|-----|
| Orchard | 76.6 | 5.3 |
| Field 1 | 1.4 | 5.3 |
| Acacia | 1.2 | 4.6 |
| Field 2 | 4.9 | 5.5 |

One sample, from the area planned as the future orchard, showed lead levels that fell above the optimum range of 22 ppm recommended by the lab.

Further samples were collected from the lower meadow to explore what area of the Lower Meadow showed elevated lead levels. Three samples (numbers 2,3,6) showed elevated lead levels. These samples correspond to the 100 foot wetlands buffer zone. Table 2 shows the results of round 2 testing Samples locations are shown with red "pins" on the map.

Table 2 shows the results of round 2 testing showing extractable Lead. Sample locations are shown on the map by red pins.

| Location | Extractable Lead ppm | рН |
|----------|----------------------|-----|
| 1 | 8.1 | 5.4 |
| 2 | 89.8 | 5.3 |
| 3 | 50.2 | 5.4 |
| 4 | 11.2 | 5.2 |
| 5 | 16.5 | 5.5 |
| 6 | 69.4 | 5.3 |

January 2019 update

The lab at the University of Massachusetts recommends that soils with elevated levels of extractable lead (>22 ppm) be tested for <u>Total Sorbed Lead</u>. They recommend that samples be analyzed by the Agricultural Analytical Services Laboratory at the Pennsylvania State University Analytical Services Lab. Additional samples for both extractable and total Sorbed Lead were taken on December 19, 2018 and shipped to the lab on December 27, 2018. Table 3 and 4 show the results of this third round of soil testing. Locations of these samples are indicated on the map with light blue pins.

Table 3. Round 3 testing for extractable lead (same tests as shown in Table 1 and 2) Locations of these samples are indicated on the map with light blue pins. Plum Creek is indicated with a white pin.

| Location | Extractable Lead ppm | рН |
|---------------------------------------|----------------------|-----|
| Plum Creek | 0.9 | 6.2 |
| Sample 7 (1 +2+3 from Table 2) | 3.4 | 5.3 |
| Sample 8 (4 +5 +6 from Table 2) | 9.6 | 5.5 |

Table 4 shows total Sorbed Lead as measured by the Pennsylvania State University Analytical Services Lab. We are pleased to report that this testing indicates that while the area shows somewhat elevated lead levels, the results are below the EPA standards of 400 to 1200 ppm that would require modified farming practices.

Table 4. Shows total Sorbed Lead as measured by the Pennsylvania State University Analytical Services Lab. Note mg/kg = ppm. Light blue pins (Sorb 1 is near the road and Sorb two is further to the east)

| Location | Pb (Lead) mg/kg | Cd (Cadmium) mg/kg | Cu (Copper) mg/kg | Cr (Chromium) mg/kg | Ni (Nickel) mg/kg | Zn (Zink) mg/kg |
|----------------------------|-----------------------|--------------------------|-------------------------|----------------------------|-------------------------|-----------------------|
| Sorb1 (1+2+3 from Table 2) | 145.86 | 0.25 | 3.85 | 11.06 | 4.68 | 17.82 |
| Sorb2 (4+5+6 from Table 2) | 56.08 | 0.25 | 3.36 | 11.24 | 4.76 | 18.62 |

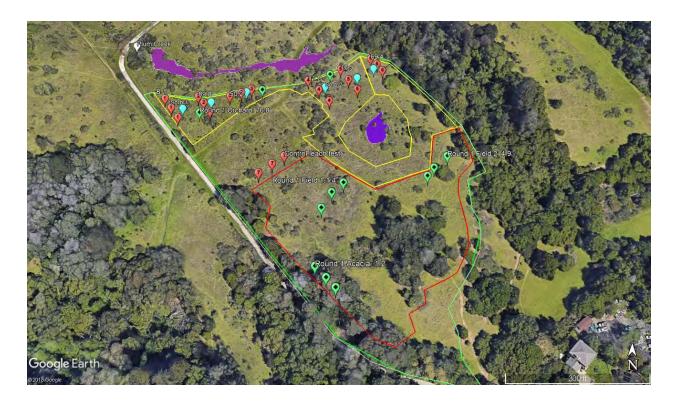
NOTE: 400 to 1200 ppm lead are set by the EPA and would require modified farming practices

Additional information:

According to Pennsylvania State College of Agriculture Science Lead Fact Sheet and other sources, the plant available Lead depends on its solubility and solubility is strongly impacted by soil pH. At low pH (pH 5 or less), lead is more soluble. At neutral (or more basic) pHs lead is held tightly in soil and its solubility is low.

Both the <u>University of Massachusetts</u> and <u>Oregon State University</u> publish guidelines for cultivation in areas impacted by higher lead levels. These recommendations are identical and allow for cultivations at lead levels up to 1200 ppm TOTAL LEAD. These recommendations follow the guidelines issued by the <u>EPA</u>.

Map showing sample locations:



References (shown in the order they appear linked in the text):

- 1) https://ag.umass.edu/soil-plant-nutrient-testing-laboratory/fact-sheets/sampling-instructio ns-for-routine-soil-analysis
- 2) https://ag.umass.edu/soil-plant-nutrient-testing-laboratory/fact-sheets/soil-lead-testing-interpretation-recommendations
- 3) https://ag.umass.edu/soil-plant-nutrient-testing-laboratory/fact-sheets/soil-lead-testing-int-erpretation-recommendations
- 4) https://ag.umass.edu/soil-plant-nutrient-testing-laboratory/fact-sheets/soil-lead-testing-int-erpretation-recommendations
- 5) Lead in Residential Soils: Sources, Testing, and Reducing Exposure. Pennsylvania State College of Agricultural Sciences. Copyright 1999
- 6) http://smallfarms.oregonstate.edu/sfn/su10toxicmetals
- 7) https://www.atsdr.cdc.gov/csem/csem.asp?csem=34&po=8

Table A1 Summary of Soil Analytical Results

Pogonip Farm and Garden Santa Cruz, California

| Sample | Sample | Sample | Sample | | Me | tals | | Т | PH |
|---------|-----------|---------------|-----------------|---------|--------|------|---------|--------------|-------------|
| ID | Date | Depth | Туре | Arsenic | Copper | Lead | Zinc | Diesel | Motor Oil |
| | • | RWQCB R | esidential ESLs | 0.26 | 3,100 | 80 | 23,000 | 260 | 12,000 |
| | RWQCE | 3 Commercial/ | Industrial ESLs | 0.31 | 47,000 | 320 | 350,000 | 1,200 | 180,000 |
| | RWQC | B Constructio | n Worker ESLs | 0.98 | 14,000 | 160 | 110,000 | 1,100 | 54,000 |
| B1 | 2/28/2019 | 0.0-0.5 | Composite | 2.1 | 3.9 | 120 | 17 | <0.24 | <1.3 |
| B1N-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 150 | | | |
| B1S-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 58 | | | |
| B1E-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 110 | | | |
| B1W-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 64 | | | |
| B1 | 2/28/2019 | 1.5-2.0 | Composite | 2.9 | 4.6 | 6.2 | 18 | | |
| B1N-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 4.5 | | | |
| B1S-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 9.5 | | | |
| B1E-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 8.0 | | | |
| B1W-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 6.4 | | | |
| B2 | 2/28/2019 | 0.0-0.5 | Composite | 2.0 | 3.2 | 60 | 60 | <0.24 | <1.3 |
| B2 | 2/28/2019 | 1.5-2.0 | Composite | 1.6 | 3.3 | 5.8 | 98 | | |
| В3 | 2/28/2019 | 0.0-0.5 | Composite | 2.8 | 3.1 | 84 | 20 | <0.24 | <1.3 |
| B3N-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 190 | | | |
| B3S-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 48 | | | |
| B3E-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 47 | | | |
| B3W-0.5 | 2/28/2019 | 0.0-0.5 | Discrete | | | 89 | | | |
| В3 | 2/28/2019 | 1.5-2.0 | Composite | 2.5 | 3.9 | 5.6 | 22 | | |
| B3N-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 5.7 | | | |
| B3S-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 11 | | | |
| B3E-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 20 | | | |
| B3W-2.0 | 2/28/2019 | 1.5-2.0 | Discrete | | | 5.8 | | | |
| B4 | 2/28/2019 | 0.0-0.5 | Composite | 1.8 | 3.6 | 24 | 19 | <0.24 | <1.3 |
| B4 | 2/28/2019 | 1.5-2.0 | Composite | 1.8 | 3.8 | 6.6 | 19 | | |
| B5 | 2/28/2019 | 0.0-0.5 | Composite | 9.6 | 4.2 | 25 | 26 | <0.24 | <1.3 |
| B5 | 2/28/2019 | 1.5-2.0 | Composite | 7.3 | 3.7 | 4.6 | 20 | | |
| В6 | 2/28/2019 | 0.0-0.5 | Composite | 1.6 | 4.0 | 60 | 23 | 8.4 A01, A52 | 85 A01, A57 |
| В6 | 2/28/2019 | 1.5-2.0 | Composite | 2.1 | 3.5 | 6.4 | 22 | | |
| В7 | 2/28/2019 | 0.0-0.5 | Composite | 3.2 | 50 | 38 | 160 | <0.24 | <1.3 |
| В7 | 2/28/2019 | 1.5-2.0 | Composite | 2.9 | 7.1 | 8.6 | 47 | | |
| В8 | 2/28/2019 | 0.0-0.5 | Composite | 3.7 | 4.8 | 19 | 22 | 1.3 J, A52 | 2.1 J, A57 |
| В8 | 2/28/2019 | 1.5-2.0 | Composite | 4.4 | 4.1 | 5.8 | 19 | | |
| В9 | 2/28/2019 | 0.0-0.5 | Composite | 1.8 | 3.8 | 8.9 | 19 | 1.3 J, A52 | 3.4 J, A57 |

Table A1 **Summary of Soil Analytical Results**

Pogonip Farm and Garden Santa Cruz, California

| Sample | Sample | Sample | Sample | | Me | tals | | Т | PH |
|--------|-----------|-----------------|-----------------|---------|--------|-------|---------|------------|------------|
| ID | Date | Depth | Туре | Arsenic | Copper | Lead | Zinc | Diesel | Motor Oil |
| | • | RWQCB R | esidential ESLs | 0.26 | 3,100 | 80 | 23,000 | 260 | 12,000 |
| | RWQCE | 3 Commercial/ | Industrial ESLs | 0.31 | 47,000 | 320 | 350,000 | 1,200 | 180,000 |
| | RWQC | CB Construction | n Worker ESLs | 0.98 | 14,000 | 160 | 110,000 | 1,100 | 54,000 |
| В9 | 2/28/2019 | 1.5-2.0 | Composite | 3.0 | 4.3 | 12 | 20 | | |
| B10 | 2/28/2019 | 0.0-0.5 | Composite | 0.98 | 3.2 | 6.1 | 19 | 1.3 J, A52 | 1.7 J, A57 |
| B10 | 2/28/2019 | 1.5-2.0 | Composite | 1.2 | 3.4 | 4.4 | 17 | | |
| B11 | 2/28/2019 | 0.0-0.5 | Composite | 2.2 | 4 | 11 | 20 | <0.24 | <1.3 |
| B11 | 2/28/2019 | 1.5-2.0 | Composite | 1.9 | 3.5 | 5.1 | 19 | | |
| B12 | 2/28/2019 | 0.0-0.5 | Composite | 1.2 | 2.9 | 10 | 15 | <0.24 | <1.3 |
| B12 | 2/28/2019 | 1.5-2.0 | Composite | 2.2 | 3.3 | 6.9 | 24 | NA | NA |
| B13 | 2/28/2019 | 0.0-0.5 | Composite | 1.4 | 2.8 | 70 | 17 | NA | NA |
| otes: | • | • | • | 9.6 | 50.0 | 190.0 | 160.0 | • | • |

Notes: 9.6 Sample results reported in milligrams per kilogram (mg/kg).

Metals analyzed by USEPA Method 6010B.

TPH analyzed by USEPA Method 8015B.

TPH = total petroleum hydrocarbons.

Bolded value = exceedence of Residential ESL.

<0.24 = not detected above analytical laboratory Method Detection Limit (MDL).

--- = not analyzed or not established.

J = Estimated Value.

A01 = Detection and quantation limits were raised due to sample dilution.

A52 = Chromatogram not typical of diesel.

A57 = Chromatogram not typical of motor oil.

RWQCB ESL = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level (January 2019, Rev 1).

Table A2 Summary of Soil Analytical Results - PAHs

Pogonip Farm and Garden Santa Cruz, California

| | | | | | | | | | PAHs | | | | | | | |
|--------------|------------------|---------------------------|--------------|------------|--------------------|----------------------|----------------------|----------------|----------------------|----------|------------------------|---------------|----------|------------------------|--------------|----------|
| Sample ID | Sample Date | Sample Depth (feet) | Acenaphthene | Anthracene | Benzo[a]anthracene | Benzo[b]fluoranthene | Benzo[k]fluoranthene | Benzo[a]pyrene | Benzo[g,h,i]perlyene | Chrysene | Dibenzo[a,h]anthracene | Fluoroanthene | Fluorene | Indeno[1,2,3-cd]pyrene | Phenanthrene | Pyrene |
| | RWQCB Re | esidential ESLs | 3,600 | 18,000 | 1.1 | 1.1 | 11 | 0.11 | NE | 110 | 0.11 | 2,400 | 2,400 | 1.1 | NE | 1,800 |
| RWQ | CB Commercial/I | Industrial ESLs | 45,000 | 230,000 | 20 | 21 | 210 | 2.1 | NE | 2,100 | 2.1 | 30,000 | 30,000 | 21 | NE | 23,000 |
| RWC | QCB Construction | n Worker ESLs | 10,000 | 50,000 | 110 | 110 | 910 | 10 | NE | 9,100 | 11 | 6,700 | 6,700 | 110 | NE | 5,000 |
| B1 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | <0.0011 | <0.00095 | <0.0011 | 0.0020 J | <0.0011 | <0.00097 | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |
| B2 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | 0.0012 J | 0.0028 J | <0.0011 | 0.0031 | <0.0011 | 0.0011 J | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |
| В3 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | 0.0016 J | 0.0034 | <0.0011 | 0.0034 | <0.0011 | 0.0016 J | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |
| B4 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | <0.0011 | 0.0019 J | <0.0011 | 0.0024 J | <0.0011 | <0.00097 | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |
| B5 | 2/28/2019 | 0.0-0.5 | 0.026 | 0.13 A01 | 0.55 A01 | 0.49 A01 | 0.20 A01 | 0.44 A01 | 0.17 A01 | 0.59 A01 | 0.063 | 0.78 A01 | 0.013 | 0.18 A01 | 0.48 A01 | 0.85 A01 |
| В6 | 2/28/2019 | 0.0-0.5 | 0.006 | 0.014 | 0.22 A01 | 0.33 A01 | 0.10 A01 | 0.32 A01 | 0.23 A01 | 0.25 A01 | 0.066 A01 | 0.19 A01 | 0.0012 J | 0.20 A01 | 0.042 | 0.24 A01 |
| В7 | 2/28/2019 | 0.0-0.5 | 0.0063 | 0.024 | 0.42 A01 | 0.66 A01 | 0.26 A01 | 0.64 A01 | 0.50 A01 | 0.49 A01 | 0.17 A01 | 0.31 A01 | 0.0019 J | 0.45 A01 | 0.075 A01 | 0.39 A01 |
| В8 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | 0.0095 | 0.19 | 0.0054 | 0.014 | 0.0097 | 0.011 | 0.0016 J | 0.0092 | <0.0011 | 0.0078 | 0.0025 J | 0.012 |
| В9 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | 0.0021 J | <0.00095 | <0.0011 | 0.0043 J | 0.0019 J | 0.0023 J | <0.00099 | 0.0019 J | <0.0011 | 0.0015 J | <0.0012 | 0.0022 J |
| B10 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | <0.0011 | <0.00095 | <0.0011 | 0.0019 J | <0.0011 | <0.00097 | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |
| B11 | 2/28/2019 | 0.0-0.5 | 0.0050 | 0.0098 | 0.17 A01 | 0.21 A01 | 0.064 | 0.19 A01 | 0.091 A01 | 0.20 A01 | 0.031 | 0.17 A01 | <0.0011 | 0.089 A01 | 0.028 | 0.20 A01 |
| B12 | 2/28/2019 | 0.0-0.5 | <0.0012 | <0.0012 | <0.0011 | <0.00095 | <0.0011 | <0.00095 | <0.0011 | <0.00097 | <0.00099 | <0.0014 | <0.0011 | <0.00092 | <0.0012 | <0.0015 |

Notes:

Sample results reported in milligrams per kilogram (mg/kg).

PAHs analyzed by USEPA Method 8270C.

Bolded value = exceedence of Residential ESL.

<0.0012 = not detected above analytical laboratory Method Detection Limit (MDL).

PAHs = Polycyclic Aromatic Hydrocarbons.

NA = not analyzed.

J = Estimated Value.

NE = ESL not established.

A01 = Detection and quantation limits were raised due to sample dilution.

RWQCB ESL = San Francisco Bay Regional Water Quality Control Board Environmental Screening Level (January 2019, Rev 1).

Table A3 Metals in Soil Pogonip Farm and Garden Santa Cruz, California

| Sample ID | Date | Sample Depth | Depth Shot Observed | XRF Reading | Notes | Antimon | , | Arsenic | | Copper | | Lead | | Zinc | |
|-----------------------------------|------------------------|--------------------|------------------------|----------------|--------------|-----------------------|----------|----------------|------------|------------------|--|---------------|----------|-------------------|---------------|
| | | (feet bgs) | (feet bgs) | (ppm) | eening Level | (mg/kg) 31 | | (mg/kg) 11 | | (mg/kg) 3,100 | | (mg/kg) 80 | | (mg/kg) 23,000 | |
| | | | | | Level Source | USEPA RS | | Backgrour | nd | USEPA RS | Ls | HHRA Note | 3 | USEPA RS | |
| WM-C-1-0.5' | 5/13/2020 | 0.05 | l I | 222 | ı | West Meadow | | 2.63 | | 12.3 | 1 | 181 | 1 | 23.9 | _ |
| WM-C-1-0.5 | 5/13/2020 | 0 - 0.5 1.5 - 2 | | 222 54 | | 1.31 | J | 2.03 | | 12.3 | | 36.9 | | 23.9 | + |
| WM-C-2-0.5' | 5/13/2020 | 0 - 0.5 | | 202 | | 0.989 | J | 2.13 | J | 6.91 | | 182 | | 15.3 | † |
| WM-C-2-0.5' DUP | 5/13/2020 | 0 - 0.5 | | 202 | Duplicate | 1.57 | J | 2.45 | | 7.54 | | 156 | | 13.6 | |
| WM-C-2-2' | 5/13/2020 | 1.5 - 2 0 - 0.5 | | 26 | | 1.23 | | - 214 | | 8.38 | | 11.1 161 | | 53.6 | 4 |
| WM-C-3-0.5' WM-C-3-2' | 5/13/2020 5/13/2020 | 1.5 - 2 | | 244 13 | | 1.23 | J | 2.14 | J | 0.30 | | 23.5 | | 55.0 | +- |
| WM-C-4-0.5' | 5/13/2020 | 0 - 0.5 | | 368 | | 0.683 | J | 1.92 | J | 6.96 | | 141 | | 15 | + |
| WM-C-4-21 | 5/13/2020 | 1.5 - 2 | | 27 | | - | | - | | 'n | | 12.6 | | - | |
| WM-C-5-0.5' | 5/13/2020 | 0 - 0.5 | | 95 | | 0.568 | J | 1.58 | J | 77.7 | 01 | 76.9 | 01 | 78.5 | 01 |
| WM-C-6-0.5' | 5/14/2020 | 0 - 0.5 | | 30 | | 0.897 | J,J6 | 2.16 | | 4.92 | | 10.6 | | 19.7 | + |
| WM-C-7-0.5' WM-C-8-0.5' | 5/14/2020 5/14/2020 | 0 - 0.5 0 - 0.5 | | 13 31 | | 0.785 0.879 | J | <2.51 <2.40 | | 47.3 18.1 | | 8.57 15.0 | | 59.1 31.0 | +- |
| WM-C-9A-1' | 5/15/2020 | 0.5 - 1 | | 105 | | 0.727 | J | 1.55 | J | 5.61 | | 71.2 | | 18.6 | +- |
| WM-C-10-0.5' | 5/14/2020 | 0 - 0.5 | | - | | 1.65 | J | 3.81 | | 9.09 | | 27.0 | | 26.6 | + |
| WM-C-11-0.5' | 5/13/2020 | 0 - 0.5 | | 45 | | 1.47 | J | 10.7 | | 7.86 | | 29.3 | | 24.3 | |
| WM-DG-1-0.5' | 5/13/2020 | 0 - 0.5 | | 241 | | 1.41 | J | 2.69 | | 8.57 | <u> </u> | 188 | <u> </u> | 16.4 | 4 |
| WM-DG-1-2' WM-DG-2-0.5' | 5/13/2020 5/13/2020 | 1.5 - 2 0 - 0.5 | | 9 168 | | <2.42 | \vdash | 2.74 | 1 | 10.3 | 1 | 15.9 6.16 | | 12.9 | +- |
| WM-DG-2-0.5' WM-DG-3-0.5' | 5/13/2020 | 0 - 0.5 | | 90 | | <2.42 0.833 | J | 1.28 | J | 5.66 | 1 | 51.1 | | 23.0 | +- |
| WM-DG-4-0.5' | 5/13/2020 | 0 - 0.5 | | 30 | | <2.42 | Ť | 1.76 | J | 16.2 | 1 | 19.8 | | 28.3 | 1 |
| WM-DG-5-0.5' | 5/13/2020 | 0 - 0.5 | | 19 | | <2.44 | | 1.53 | J | 13.9 | | 38.1 | | 23.1 | |
| WM-DG-6-0.5' | 5/13/2020 | 0 - 0.5 | | 311 | | <2.22 | | 2.25 | | 11.0 | | 27.0 | | 18.5 | |
| WM-DG-7-0.5' WM-DG-7-2' | 5/13/2020 5/13/2020 | 0 - 0.5 1.5 - 2 | | 120 29 | | 0.721 | J | 1.77 | J | 7.01 | - | 116 | | 17.0 | - |
| WM-DG-7-2 WM-DG-8-0.5' | 5/13/2020 | 0 - 0.5 | | 59 59 | | 0.637 | J | 1.43 | J | 9.12 | | 12.1 55.7 | | 21.0 | +- |
| WM-DG-9-0.5' | 5/13/2020 | 0 - 0.5 | | 28 | | <2.31 | J | 1.52 | J | 299 | | 17.5 | | 91.1 | † |
| WM-DG-10-0.5' | 5/13/2020 | 0 - 0.5 | | 46 | | 0.640 | J | 2.78 | | 10.9 | | 28.7 | | 25.0 | |
| WM-DG-11-0.5' | 5/14/2020 | 0 - 0.5 | | 59 | | 2.01 | J | 2.72 | В | 263 | | 76.0 | | 689 | |
| WM-DG-11-0.5'-DUP WM-DG-11A-1' | 5/14/2020 5/15/2020 | 0 - 0.5 0.5 - 1 | 0.5-2 | 59 16 | Duplicate | 1.55 <2.20 | J | 2.13 1.77 | B,J J | 14.9 9.01 | - | 40.9 | | 75.8 15.6 | + |
| WM-DG-11A-1 | 5/14/2020 | 0.5 - 1 | | 64 | | 1.58 | J | 1.65 | B,J | 10.8 | | 11.5 39.1 | | 51.6 | + |
| WM-DG-13-1.5' | 5/14/2020 | 0 - 0.5 | 1.0 | 1,095 | | 41.7 | J | 15.9 | B,J | 6,320 | | 1,230 | | 28,500 | 1 |
| WM-DG-13-2' | 5/14/2020 | 1.5 - 2 | 1-2 | 33 | | 3.33 | | 3.61 | В | 214 | | 49.0 | | 2,770 | |
| WM-DG-14-0.5' | 5/14/2020 | 0 - 0.5 | | 19 | | 0.817 | J | 2.82 | В | 8.28 | | 13.8 | | 40.8 | — |
| WM-DG-15-0.5' | 5/14/2020 | 0 - 0.5 | | 23 | | 1.80 North Orchard | J | 2.17 | B,J | 76.9 | | 23.8 | | 303 | |
| NO-1-0.5' | 5/14/2020 | 0 - 0.5 | | 225 | | 3.54 | <u>.</u> | 3.05 | В | 6.32 | I | 265 | | 24.0 | $\overline{}$ |
| NO-1-2' | 5/14/2020 | 1.5 - 2 | | 25 | | - | | - | | - | | 6.55 | | - | 1 |
| NO-2-0.5' | 5/14/2020 | 0 - 0.5 | | 119 | | 1.65 | J | 1.94 | B,J | 8.14 | | 107 | | 17.6 | |
| NO-2-2' | 5/14/2020 | 1.5 - 2 | | 28 | | - / 04 | | 4 77 | D. | - 44.0 | | 5.58 | | - 04.5 | 4— |
| NO-3-0.5' NO-3-2' | 5/14/2020 5/14/2020 | 0 - 0.5 1.5 - 2 | | 863 35 | | 6.94 | | 4.77 | В | 11.3 | 1 | 690 45.3 | 1 | 21.5 | + |
| NO-4-0.5' | 5/14/2020 | 0 - 0.5 | | 211 | | 2.03 | J | 1.60 | B,J | 8.16 | | 180 | | 15.7 | † |
| NO-4-2' | 5/14/2020 | 1.5 - 2 | | 16 | | ı | | - | | ı | | 3.97 | | - | |
| NO-5-0.5' | 5/14/2020 | 0 - 0.5 | | 10 | | 1.08 | J | 1.57 | B,J | 50.8 | | 40.0 | | 44.2 | |
| NO-6-0.5' | 5/14/2020 | 0 - 0.5 | | 118 | | 1.97 | J | 2.32 | B,J | 23.2 | | 144 | | 41.8 | + |
| NO-6-2' NO-7-0.5' | 5/14/2020 5/14/2020 | 1.5 - 2 0 - 0.5 | | 14 43 | | 0.926 | J | 1.91 | B,J | 8.08 | | 13.9 29.8 | | 24.8 | + |
| NO-8-0.5' | 5/15/2020 | 0 - 0.5 | | 31 | | 0.928 | J | <2.46 | د, د | 18.9 | 1 | 18.5 | | 23.1 | +- |
| NO-9-0.5' | 5/14/2020 | 0 - 0.5 | | 39 | | 1.51 | J | 1.70 | B,J | 14.4 | L | 20.0 | | 26.7 | 1 |
| NO-10-0.5' | 5/15/2020 | 0 - 0.5 | | 17 | | <2.33 | | <2.33 | | 18.0 | | 14.0 | | 27.5 | |
| NO-11-0.5' | 5/15/2020 | 0 - 0.5 | | 18 | | 1.04 | J | 0.655 | J | 15.0 | | 14.5 | | 26.8 | |
| NO-12-0.5' | 5/15/2020 | 0 - 0.5 | | 21 | | 0.718 | J | <2.42 | | 17.1 | | 10.5 | | 49.8 | |
| EM-1-0.5' | 5/12/2020 | 0 - 0.5 | | 119 | | East Meadow 2.34 | 1 | 2.42 | | 63.1 | T | 138 | ı | 69.6 | T |
| EM-1-0.5 | 5/12/2020 | 1.5 - 2 | | 39 | | 2.34 | + | 2.42 | 1 | - 63.1 | 1 | 22.1 | | - 69.6 | +- |
| EM-2-0.5' | 5/12/2020 | 0 - 0.5 | | 153 | | 1.93 | J | 2.42 | | 24.6 | 1 | 182 | l | 31.0 | + |
| EM-2-2' | 5/12/2020 | 1.5 - 2 | | 15 | | - | | - | | - | | 13.4 | | - | |
| EM-3-0.5' | 5/12/2020 | 0 - 0.5 | | 219 | | 2.87 | Щ | 3.23 | lacksquare | 16.6 | \perp | 203 | | 20.4 | 1 |
| EM-3-2' EM-4-1.5' | 5/12/2020 5/12/2020 | 1.5 - 2 1 - 1.5 | | 24 166 | | 5.15 | \vdash | 4.58 | | 15.8 | | 51.3 164 | <u> </u> | 25.3 | + |
| EM-4-1.5' | 5/12/2020 | 1 - 1.5 | | 47 | | 5.15 | + | 4.58 | 1 | 15.8 | 1 | 61.3 | | - 25.3 | +- |
| EM-5-0.5' | 5/12/2020 | 0 - 0.5 | | 139 | | 2.51 | | 3.21 | | 19.1 | 1 | 115 | | 26.4 | +- |
| EM-5-2' | 5/12/2020 | 1.5 - 2 | | 95 | | - | | - | | - | | 53.6 | | - | |
| EM-6-0.5' | 5/12/2020 | 0 - 0.5 | | 372 | | 3.46 | | 3.91 | | 19.9 | | 264 | | 28.8 | |
| EM-6-2' | 5/12/2020 | 1.5 - 2 | | 83 | | - 17.0 | \vdash | - 0 50 | 1 | - 21 1 | 1 | 17.9 | <u> </u> | - 30.7 | + |
| EM-7-0.5' EM-7-2' | 5/12/2020 5/12/2020 | 0 - 0.5 1.5 - 2 | | 758 46 | | 17.0 | \vdash | 9.58 | 1 | 21.1 | | 752 117 | - | 30.7 | +- |
| EM-8-1' | 5/12/2020 | 0.5 - 1 | | 549 | | 11.8 | + | 8.69 | | 14.7 | 1 | 717 | | 31.1 | + |
| EM-8-2' | 5/12/2020 | 1.5 - 2 | | 94 | | - | | - | | - | | 140 | | - | \perp |
| EM-9-0.5' | 5/12/2020 | 0 - 0.5 | | 1,227 | | 5.46 | | 6.71 | | 10.7 | | 1,140 | | 22.1 | T |
| EM-9-2' | 5/12/2020 | 1.5 - 2 | | 168 | | - | | - | | - | | 81.9 | | - | |

Table A3

Metals in Soil

Pogonip Farm and Garden Santa Cruz, California

| Sample ID | Date | Sample Depth | Depth Shot Observed | XRF Reading | Notes | Antimony | , | Arsenic | | Copper | Lead | Zinc | |
|----------------|-----------|-----------------|------------------------|----------------|--|---------------|---|-------------------|---|----------------------|---------------|-----------------------|---|
| | | (feet bgs) | (feet bgs) | (ppm) | eening Level | (mg/kg) 31 | | (mg/kg) | | (mg/kg) | (mg/kg) 80 | (mg/kg) | |
| FM-10-0.51 | 5/12/2020 | 0 - 0.5 | Ke | 2,973 | eening Levei | 6.07 | | 11 8.44 | | 3,100 12.6 | 1,670 | 23,000 29.0 | 1 |
| EM-10-0.5 | 5/12/2020 | 1.5 - 2 | | 15 | | 6.07 | | 0.44 | | 12.0 | 34.1 | 27.0 | |
| EM-11-0.5' | 5/12/2020 | 0 - 0.5 | | 569 | | 3.78 | | 7.16 | | 24.4 | 856 | 36.2 | |
| EM-11-2' | 5/12/2020 | 1.5 - 2 | | 94 | | | | 7.10 | | 24.4 | 140 | 30.2 | |
| EM-12-0.5' | 5/14/2020 | 0 - 0.5 | | 31 | | <2.44 | | 3.04 | В | 38.6 | 9.15 | 98.3 | |
| EM-13-0.5' | 5/15/2020 | 0 - 0.5 | | 24 | | 0.815 | J | 0.554 | J | 9.98 | 11.2 | 25.4 | |
| EM-14-0.5' | 5/14/2020 | 0 - 0.5 | | 38 | | 1.58 | J | 2.92 | В | 12.5 | 33.0 | 44.5 | |
| EM-14-0.5'-DUP | 5/14/2020 | 0 - 0.5 | | 38 | Duplicate | 2.14 | J | 2.80 | В | 14.0 | 32.5 | 55.3 | |
| EM-15-0.5' | 5/15/2020 | 0 - 0.5 | | 26 | | 1.12 | J | 1.72 | J | 13.0 | 16.1 | 33.0 | |
| EM-16-0.5' | 5/15/2020 | 0 - 0.5 | | 42 | | 1.00 | J | 1.33 | J | 14.0 | 24.6 | 37.3 | |
| EM-17-0.5' | 5/15/2020 | 0 - 0.5 | | 47 | | 1.50 | J | 1.13 | J | 13.8 | 40.3 | 35.0 | |
| EM-18-0.5' | 5/15/2020 | 0 - 0.5 | | 39 | | 3.29 | | 2.35 | | 11.2 | 44.5 | 30.5 | |
| EM-19-0.5' | 5/14/2020 | 0 - 0.5 | | 167 | | 3.13 | | 3.57 | В | 12.7 | 116 | 46.0 | |
| EM-19-2' | 5/14/2020 | 1.5 - 2 | | 64 | | - | | - | | - | 38.4 | - | |
| EM-20-0.5' | 5/15/2020 | 0 - 0.5 | | 58 | i i | <2.53 | | 2.07 | J | 20.5 | 95.2 | 33.4 | |
| EM-20-2' | 5/15/2020 | 1.5 - 2 | | 10 | i i | = | | - | | - | 9.26 | - | |
| EM-21-0.5' | 5/14/2020 | 0 - 0.5 | | 776 | | 10.0 | | 6.12 | | 7.16 | 768 | 28.7 | |
| EM-21-0.5'-DUP | 5/14/2020 | 0 - 0.5 | | 776 | Duplicate | 6.85 | | 5.65 | В | 7.33 | 769 | 30.6 | |
| EM-21-2' | 5/14/2020 | 1.5 - 2 | | 17 | | = | | - | | - | 9.52 | - | |
| EM-22-0.5' | 5/15/2020 | 0 - 0.5 | | 100 | | <2.28 | | 2.39 | | 12.3 | 92.6 | 22.8 | |
| EM-22-2' | 5/15/2020 | 1.5 - 2 | | 17 | i i | = | | - | | - | 25.9 | - | |
| EM-23-0.5' | 5/15/2020 | 0 - 0.5 | | 29 | | 0.932 | J | 1.24 | J | 12.8 | 10.7 | 26.0 | |
| EM-24-0.5' | 5/15/2020 | 0 - 0.5 | | 33 | | 0.886 | J | 0.686 | J | 9.50 | 9.18 | 26.8 | |
| EM-25-0.5' | 5/15/2020 | 0 - 0.5 | | 30 | | 0.786 | J | 0.810 | J | 12.2 | 10.3 | 28.7 | |
| EM-26-0.5' | 5/15/2020 | 0 - 0.5 | | 19 | | 0.656 | J | 1.02 | J | 11.7 | 10.8 | 25.1 | |
| EM-27-0.5' | 5/15/2020 | 0 - 0.5 | | 34 | | 1.02 | J | 0.823 | J | 13.6 | 6.12 | 26.4 | |
| EM-28-0.5' | 5/15/2020 | 0 - 0.5 | | 29 | | 0.813 | J | 0.865 | J | 14.4 | 14.3 | 31.9 | |
| EM-29-0.5' | 5/15/2020 | 0 - 0.5 | | 31 | | 0.720 | J | 1.02 | J | 10.8 | 17.8 | 36.8 | |
| EM-30-0.5' | 5/15/2020 | 0 - 0.5 | | 31 | | <2.25 | | 2.52 | | 21.9 | 18.0 | 24.1 | |
| EM-31-0.5' | 5/15/2020 | 0 - 0.5 | | 33 | | <2.30 | | 2.07 | J | 9.94 | 15.4 | 19.1 | |
| EM-32-0.51 | 5/15/2020 | 0 - 0.5 | | 18 | | <2.34 | | 2.01 | J | 13.8 | 37.4 | 23.0 | |
| EM-33-0.5' | 5/15/2020 | 0 - 0.5 | | 17 | İ | <2.25 | | 2.23 | J | 8.74 | 12.3 | 19.0 | |

Notes: Metals analyzed using USEPA Method 6010B.

Analytes detected above laboratory reporting limit are **emboldened**.

Analytes detected above Residential Screening Level are highlighted.

Background = Duverge, 2011. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region. December.

HHRA Note 3 = DTSC, 2019. Human Health Risk Assessment (HHRA) Note Number 3. April.

USEPA RSLs = USEPA, 2020. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). May.

USEPA RSLS = USEPA, 2020. Regional Screening Level (RSL) Summary Table (TR=1E-6, FIQ=1).

DTSC = California Environmental Protection Agency, Department of Toxic Substances Control.

USEPA = United States Environmental Protection Agency.

bgs = Below ground surface.

mg/kg = Milligrams per kilogram.

- = Not analyzed.

B = The same analyte is found in the associated blank.

J = The identification of the analyte is acceptable; the reported value is an estimate.

J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

O1 = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

Table A4

Polycyclic Aromatic Hydrocarbons in Soil

Pogonip Farm and Garden Santa Cruz, California

| Sample ID | Date | Sample Depth | Depth Clay Target Fragments Observed | Notes | ANTHRACENE | ACENAPHTHENE | BENZO(A) ANTHRACENE | BENZO(A) | | BENZO(B) FLUORANTHENE | BENZO(G,H,I) PERYLENE | BENZO(K) FLUORANTHENE | CHRYSENE | DIBENZ(A,H) ANTHRACENE | FLUORANTHENE | FLUORENE | INDENO(1,2,3-CD) PYRENE | | PHENANTHRENE | NAPHTHALENE | 1-METHYL NAPHTHALENE | 2-METHYL NAPHTHALENE |
|------------------------------|--|--------------------|---|-----------|--|----------------------------------|----------------------------------|----------------------------------|-------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--------|--|-------------------------------------|---------------------------------|------------------------------|
| Residential S | Screening Level | (feet bgs) | (feet bgs) | | (mg/kg) 17,000 | (mg/kg) 3,300 | (mg/kg) 1.1 | (mg/kg | g) | (mg/kg) 1.1 |) (mg/kg) NE | (mg/kg |) (mg/kg) 110 | (mg/kg) 0.028 | (mg/kg, 2,400 |) (mg/kg) 2,300 | (mg/kg | 1) (| mg/kg) (mg/kg) NE 1,800 | (mg/kg) 2.0 | (mg/kg) 9.9 | (mg/kg) 190 |
| Residential S | ocieening Level | | | | 17,000 | 3,300 | 1.1 | 0.11 | | 1.1 | West Me | | 110 | 0.020 | 2,400 | 2,300 | 1.1 | | 142 1,000 | 2.0 | 7.7 | 170 |
| WM-C-5-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00645 | <0.00645 | 0.00425 J | 0.00642 | J | 0.00668 | 0.00606 J | 0.00326 | J 0.00552 . | J <0.00645 | 0.00445 | J <0.00645 | 0.00467 | J <0.0 | 0645 0.00486 J | <0.0215 | <0.0215 | <0.0215 |
| WM-C-6-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00644 | < 0.00644 | < 0.00644 | <0.00644 | | 0.00244 | J <0.00644 | <0.00644 | < 0.00644 | <0.00644 | <0.00644 | < 0.00644 | <0.00644 | <0.0 | 0644 <0.00644 | <0.0215 | < 0.0215 | <0.0215 |
| WM-C-7-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00752 | <0.00752 | 0.00232 J | 0.00283 | J | 0.00352 | J 0.00295 J | <0.00752 | < 0.00752 | <0.00752 | <0.00752 | < 0.00752 | <0.00752 | <0.0 | 0752 0.00292 J | <0.0251 | < 0.0251 | <0.0251 |
| WM-C-8-0.5' | 05/14/2020 | 0 - 0.5 | | | 0.0273 | 0.0102 | 0.216 | 0.267 | | 0.323 | 0.176 | 0.081 | 0.261 | 0.0532 | 0.340 | 0.00293 | 0.155 | 0. | 102 0.309 | <0.0240 | <0.0240 | <0.0240 |
| WM-C-8-2' | 05/14/2020 | 1.5 - 2 | | | <0.00741 | <0.00741 | <0.00741 | <0.00741 | < | <0.00741 | <0.00741 | <0.00741 | <0.00741 | <0.00741 | <0.00741 | <0.00741 | <0.00741 | <0.0 | 0741 <0.00741 | <0.0247 | <0.0247 | <0.0247 |
| WM-C-9A-1' | 05/15/2020 | 0.5 - 1 | 0.5-1.5 | | 0.231 | 0.0866 | 5.64 | 10.4 | | 11.5 | 4.88 | 2.79 | 6.44 | 1.85 | 4.22 | 0.0319 | J 4.99 | | 215 0.828 | 4.68 | <0.215 | <0.215 |
| WM-C-9-2' | 05/14/2020 | 1.5 - 2 | | | <0.00717 | <0.00717 | 0.0332 | 0.0608 | | 0.0593 | 0.0545 | 0.0232 | 0.0412 | 0.0145 | 0.0272 | <0.00717 | 0.0446 | | 0582 J 0.0319 | <0.0239 | <0.0239 | <0.0239 |
| WM-C-10-0.5' | 05/14/2020 | 0 - 0.5 | | | 0.0115 | 0.00499 J | 0.121 | 0.185 | | 0.192 | 0.131 | 0.0803 | 0.172 | 0.0395 | 0.162 | <0.00706 | 0.112 | | 508 0.155 | <0.0235 | <0.0235 | <0.0235 |
| WM-C-10-2' | 05/14/2020 | 1.5 - 2 | | | 0.0258 | 0.00645 J | 0.175 | 0.243 | | 0.298 | 0.179 | 0.0819 | 0.217 | 0.0506 | 0.268 | 0.00249 | 0.153 | | 736 0.229 | <0.0217 | <0.0217 | <0.0217 |
| WM-C-11-0.5' | 05/13/2020 05/13/2020 | 0 - 0.5 | | | <0.00640 0.56 | <0.00640 | 0.00257 J | 0.00383 2.56 | J | 0.00553 2.88 | J 0.00419 J 1.42 | <0.00640 0.772 | 0.00307 . 3.02 | J <0.00640 | 0.00273 | J <0.00640 0.123 | 0.00306 | | 0640 0.0028 J 43 4.18 | <0.0213 | <0.0213 J 0.0106 | <0.0213 J 0.0215 J |
| WM-C-11-2' WM-DG-1-0.5' | 05/13/2020 | 1.5 - 2 0 - 0.5 | | | <0.00687 | 0.23 <0.00687 | 2.68 <0.00687 | <0.00687 | | 0.00247 | J <0.00687 | <0.00687 | <0.00687 | 0.468 <0.00687 | 3.81 <0.00687 | <0.00687 | 1.25 < 0.00687 | | 43 4.18 0687 <0.00687 | 0.0112 <0.0229 | <0.0229 | <0.0219 |
| WM-DG-2-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00725 | <0.00725 | <0.00725 | <0.00725 | | <0.00247 | <0.00725 | <0.00725 | <0.00725 | <0.00725 | <0.00725 | <0.00725 | <0.00725 | | 0725 <0.00725 | <0.0227 | <0.0227 | <0.0242 |
| WM-DG-3-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00725 | <0.00725 | <0.00676 | <0.00725 | | 0.00267 | J 0.00215 J | < 0.00728 | <0.00676 | <0.00676 | <0.00728 | <0.00676 | <0.00725 | | 0676 <0.00676 | <0.0225 | <0.0212 | <0.0225 |
| WM-DG-4-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00726 | <0.00726 | <0.00726 | 0.0027 | | 0.00347 | J 0.00283 J | <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.00726 | | 0726 <0.00726 | <0.0242 | <0.0242 | <0.0242 |
| WM-DG-5-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00733 | < 0.00733 | <0.00733 | 0.00239 | | 0.00287 | J 0.00256 J | < 0.00733 | < 0.00733 | < 0.00733 | < 0.00733 | < 0.00733 | < 0.00733 | | 0733 <0.00733 | <0.0244 | <0.0244 | <0.0244 |
| WM-DG-6-0.5' | 05/13/2020 | 0 - 0.5 | | | 0.131 | 0.0763 | 2.85 | 3.61 | | 3.88 | 2.27 | 1.31 | 3.61 | 0.836 | 3.07 | 0.0173 | 2.03 | 0.0 | 533 3.23 | 0.00974 | J 0.0111 | J 0.0133 J |
| WM-DG-6-2' | 05/13/2020 | 1.5 - 2 | | | 0.185 | 0.114 | 5.43 | 7.56 | | 7.92 | 4.06 | 1.85 | 7.05 | 0.238 | 5.06 | 0.0248 | 3.58 | 0.9 | 942 6.73 | 0.0141 | J 0.0162 | J 0.0194 J |
| WM-DG-7-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00639 | < 0.00639 | 0.00345 J | 0.00558 | J | 0.00635 | J 0.00506 J | < 0.00639 | 0.00452 | J <0.00639 | 0.00399 | J <0.00639 | 0.00419 | J <0.0 | 0639 0.00411 J | <0.0213 | < 0.0213 | <0.0213 |
| WM-DG-8-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00730 | <0.00730 | 0.0529 | 0.107 | | 0.113 | 0.0893 | 0.0331 | 0.0669 | 0.0252 | 0.0409 | < 0.00730 | 0.0754 | 0.0 | 0.0444 | <0.0243 | <0.0243 | <0.0243 |
| WM-DG-9-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00694 | <0.00694 | <0.00694 | 0.00271 | J | 0.0034 | J 0.00272 J | <0.00694 | < 0.00694 | <0.00694 | <0.00694 | < 0.00694 | 0.00213 | J <0.0 | 0694 <0.00694 | <0.0231 | <0.0231 | <0.0231 |
| WM-DG-10-0.5' | 05/13/2020 | 0 - 0.5 | | | <0.00690 | <0.00690 | 0.00254 J | 0.00254 | J | 0.00298 | J <0.00690 | <0.00690 | 0.00297 | J <0.00690 | 0.00366 | J <0.00690 | <0.00690 | | 0690 0.00373 J | <0.0230 | <0.0230 | <0.0230 |
| WM-DG-11-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.0242 | <0.0242 | 0.041 | 0.0608 | | 0.0665 | 0.0445 | 0.0224 | J 0.0535 | 0.0115 J | 0.0469 | <0.0242 | 0.0371 | | 158 J 0.0477 | <0.0804 | <0.0804 | <0.0804 |
| WM-DG-11-0.5'-DUP | 05/14/2020 | 0 - 0.5 | 0.5-1 | Duplicate | 0.986 | 0.651 | 8.45 | 10.5 | | 12.2 | 3.35 | 4.00 | 9.86 | 2.38 | 11.1 | 0.260 | 3.61 | | 14 11.8 | 0.321 | 0.0762 | 0.11 |
| WM-DG-11A-1' | 05/15/2020 | 0.5 - 1 | | | 0.00491 | J <0.00659 | 0.0544 J3 | 3 0.0886 | J3,J6 | 0.0813 | J3,J6 0.0751 J3 | 0.0336 | | 0.0196 | 0.0595 | <0.00659 | 0.0637 | | 0220 0.0152 | 0.061 | <0.0220 | <0.0220 |
| WM-DG-11-2' | 05/14/2020 | 1.5 - 2 | | | <0.00716 | <0.00716 | 0.00212 J | 0.00258 | J | 0.00271 | J <0.00716 | <0.00716 | <0.00716 | <0.00716 | <0.00716 | <0.00716 | <0.00716 | | 0716 <0.00716 | 0.00716 | J <0.0239 | <0.0239 |
| WM-DG-12-0.5' WM-DG-12-2' | 05/14/2020 05/14/2020 | 0 - 0.5 1.5 - 2 | | | 0.0278 < 0.00675 | 0.0132 < 0.00675 | 0.304 | 0.354 0.00997 | | 0.415 | 0.243 0.00534 J | 0.12 0.00445 | 0.365 J 0.0126 | 0.0661 | 0.347 | 0.00273 < 0.00675 | 0.203 0.00474 | | 13 0.498 0682 0.0159 | <0.0222 <0.0225 | <0.0222 <0.0225 | <0.0222 <0.0225 |
| WM-DG-13-1.5' | 05/14/2020 | 1.5 - 2 | | | 0.252 | 0.113 | 6.42 | 11.7 | | 14.8 | 7.52 | 4.02 | 8.75 | <0.00675 4.45 | 5.74 | 0.0241 | 6.25 | | 901 5.68 | 0.0462 | 0.0166 | J 0.0201 J |
| WM-DG-13-1.3 | 05/14/2020 | 1.5 - 2 | 0.5-2 | | 0.00609 | J <0.00670 | 0.19 | 0.358 | | 0.393 | 0.365 | 0.123 | 0.257 | 0.105 | 0.123 | <0.00670 | 0.292 | | 186 0.158 | 0.00491 | J <0.0223 | <0.0201 |
| WM-DG-14-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00659 | <0.00659 | 0.00997 | 0.0149 | | 0.0169 | 0.0138 | 0.00589 | J 0.0122 | 0.00377 J | 0.0108 | <0.00659 | 0.0107 | | 0295 J 0.0124 | <0.0220 | <0.0220 | <0.0220 |
| | 05/14/2020 | | | | <0.00686 | <0.00686 | 0.00482 J | | | | | | J 0.00575 . | | | J <0.00686 | 0.00486 | | | | <0.0229 | |
| | | | | | | 1 | | | | | North O | | | | | | | | | | | |
| NO-3-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00726 | <0.00726 | <0.00726 | <0.00726 | | 0.00191 | J <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.00726 | <0.0 | 0726 <0.00726 | <0.0242 | <0.0242 | <0.0242 |
| NO-4-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00700 | <0.00700 | <0.00700 | <0.00700 | < | <0.00700 | <0.00700 | <0.00700 | <0.00700 | <0.00700 | <0.00700 | <0.00700 | <0.00700 | <0.0 | 0700 <0.00700 | <0.0233 | <0.0233 | <0.0233 |
| NO-6-0.5' | 05/14/2020 | 0 - 0.5 | | | <0.00786 | <0.00786 | <0.00786 | <0.00786 | < | <0.00786 | <0.00786 | <0.00786 | <0.00786 | <0.00786 | <0.00786 | <0.00786 | <0.00786 | <0.0 | 0786 <0.00786 | <0.0262 | <0.0262 | <0.0262 |
| | | | | | | | | | | | East Me | adow | | | | | | | | | | |
| EM-1-0.5' | 05/12/2020 | 0 - 0.5 | | | <0.00688 | <0.00688 J3 | | <0.00688 | _ | 0.00228 | J <0.00688 | <0.00688 | J3 <0.00688 | <0.00688 | <0.00688 | <0.00688 | <0.00688 | | <0.00688 | | | J3 <0.0229 J3 |
| EM-2-0.5' | 05/12/2020 | 0 - 0.5 | | | <0.00693 | <0.00693 | 0.00233 J | 0.00267 | _ | 0.00508 | | <0.00693 | 0.0028 | J <0.00693 | 0.00337 | J <0.00693 | 0.00232 | J <0.0 | | <0.0231 | <0.0231 | <0.0231 |
| EM-3-0.5' | 05/12/2020 | 0 - 0.5 | | | <0.00690 | <0.00690 | <0.00690 | <0.00690 | _ | 0.00324 | J 0.00258 J | <0.00690 | <0.00690 | <0.00690 | <0.00690 | <0.00690 | <0.00690 | | 0690 <0.00690 | <0.0230 | <0.0230 | <0.0230 |
| EM-4-1.5' | 05/12/2020 | 1 - 1.5 | | | <0.00656 | <0.00656 | <0.00656 | <0.00656 | | <0.00656 | <0.00656 | <0.00656 | <0.00656 | <0.00656 | <0.00656 | <0.00656 | <0.00656 | | 0656 <0.00656 | <0.0219 | <0.0219 | <0.0219 |
| EM-5-0.5' | 05/12/2020 | 0 - 0.5 | | | <0.00647 | <0.00647 | <0.00647 | <0.00647 | _ | <0.00647 | <0.00647 | <0.00647 | <0.00647 | <0.00647 | <0.00647 | <0.00647 | <0.00647 | | 0647 <0.00647 | <0.0216 | <0.0216 | <0.0216 |
| EM-6-0.5' | 05/12/2020 | 0 - 0.5 | | | <0.00671 | <0.00671 | <0.00671 | <0.00671 | | 0.00332 | J 0.00223 J | <0.00671 | <0.00671 | <0.00671 | <0.00671 | <0.00671 | <0.00671 | <0.0 | | <0.0224 | <0.0224 | <0.0224 |
| EM-7-0.5' EM-8-1' | 05/12/2020 | 0 - 0.5 | | | <0.00663 <0.00652 | <0.00663 | <0.00663 | <0.00663 <0.00652 | _ | 0.00224 < 0.00652 | J <0.00663 <0.00652 | <0.00663 <0.00652 | <0.00663 <0.00652 | <0.00663 | <0.00663 <0.00652 | <0.00663 <0.00652 | <0.00663 <0.00652 | | 0663 <0.00663 0652 <0.00652 | <0.0221 <0.0217 | <0.0221 <0.0217 | <0.0221 <0.0217 |
| EM-9-0.5' | 05/12/2020 05/12/2020 | 0.5 - 1 0 - 0.5 | | | <0.00652 | <0.00652 <0.00641 | <0.00652 <0.00641 | <0.00652 | | <0.00652 | <0.00652 | <0.00652 | <0.00652 | <0.00652 <0.00641 | <0.00652 | <0.00652 | <0.00652 | | 0641 <0.00641 | <0.0217 | <0.0217 | <0.0217 |
| | | | 0-1.5 | | | | | _ | | | | + | | | + | | | | | | | <0.0214 |
| | | | 0-1.3 | | | | | _ | _ | | | | | | + | | | | | | | 0.0102 J |
| EM-10-0.5' EM-11-0.5' | 05/12/2020 05/12/2020 05/12/2020 | 0 - 0.5 0 - 0.5 | 0-1.5 | | <0.00641 <0.00633 <0.00708 | <0.00641 <0.00633 <0.00708 | <0.00641 <0.00633 <0.00708 | <0.00641 <0.00633 <0.00708 | < | <0.00641 <0.00633 <0.00708 | <0.0 | 00641 | <0.0214 <0.0211 0.0114 | <0.0214 <0.0211 J <0.0236 | <0.02 |

Table A4

Polycyclic Aromatic Hydrocarbons in Soil

Pogonip Farm and Garden Santa Cruz, California

| Sample ID | Date | Sample Depth | Depth Clay Target Fragments Observed | Notes | ANTHRACENE | ACENAPHTHENE | BENZO(A) ANTHRACENE | BENZO(A) PYRENE | BENZO(B) FLUORANTHENE | BENZO(G,H,I) PERYLENE | BENZO(K) FLUORANTHENE | CHRYSENE | DIBENZ(A,H) ANTHRACENE | FLUORANTHENE | FLUORENE | INDENO(1,2,3-CD) PYRENE | PHENANTHRENE | PYRENE | NAPHTHALENE | 1-METHYL NAPHTHALENE | 2-METHYL NAPHTHALENE |
|----------------|-----------------|--------------|---|-----------|------------|--------------|------------------------|--------------------|--------------------------|--------------------------|--------------------------|----------|---------------------------|--------------|-----------|----------------------------|--------------|-----------|-------------|-------------------------|-------------------------|
| | | (feet bgs) | (feet bgs) | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Residential S | Screening Level | | | | 17,000 | 3,300 | 1.1 | 0.11 | 1.1 | NE | 11 | 110 | 0.028 | 2,400 | 2,300 | 1.1 | NE | 1,800 | 2.0 | 9.9 | 190 |
| EM-21-0.51 | 05/14/2020 | 0 - 0.5 | | | <0.00646 | <0.00646 | <0.00646 | < 0.00646 | <0.00646 | < 0.00646 | <0.00646 | <0.00646 | < 0.00646 | <0.00646 | <0.00646 | < 0.00646 | < 0.00646 | < 0.00646 | <0.0215 | <0.0215 | < 0.0215 |
| EM-21-0.5'-DUP | 05/14/2020 | 0 - 0.5 | | Duplicate | <0.00650 | <0.00650 | < 0.00650 | <0.00650 | 0.00183 J | < 0.00650 | <0.00650 | <0.00650 | < 0.00650 | <0.00650 | < 0.00650 | < 0.00650 | < 0.00650 | < 0.00650 | <0.0217 | <0.0217 | <0.0217 |

PAHs analyzed using USEPA Method 8270C-SIM.

Analytes detected above laboratory reporting limit are emboldened.

Analytes detected above Residential Screening Level are highlighted. Residential Screening Levels are based on HHRA Note 3 values.

bgs = Below ground surface.

mg/kg = Milligrams per kilogram.

NE = Not Established.

PAHs = Polycyclic Aromatic Hydrocarbons.

SIM = Selective Ion Mode.

HHRA Note 3 = DTSC, 2019. Human Health Risk Assessment (HHRA) Note Number 3. April.

DTSC = California Environmental Protection Agency, Department of Toxic Substances Control.

J = The identification of the analyte is acceptable; the reported value is an estimate.

J3 = The associated batch QC was outside the established quality control range for precision.

J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.



Weber, Hayes & Associates

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December 29, 2021

<u>Heather.Hanna@santacruzcounty.us</u> (831) 454- 4813

County of Santa Cruz Health Services Agency Environmental Health Division To the attention of: Heather Hanna, P.G. 701 Ocean Street, Suite 312 Santa Cruz, California 95060

Subject: Shallow Soil Sampling for Total Lead

Location: Lower Meadows Access Road, Pogonip, 333 Golf Club Drive, Santa Cruz

This Letter Report describes completed field sampling and laboratory testing tasks designed to document Total Lead concentrations along an untested access road that is located in the vicinity of a historic skeet shooting range. The shallow soil sampling was completed to supplement the results of previous shallow sampling and testing conducted by RMD Environmental Solutions in August 2020 (see Attachment C).

These tasks were completed to evaluate *potential* environmental risks associated with using this dirt connector path as a walking/ vehicle road for possible future land uses. This report is being submitted in accordance with an approved *Workplan*¹, and includes the following attachments:

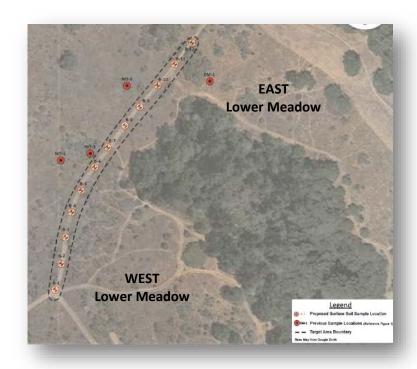


Figure 1: Topographic Location Map

Figure 2: Aerial Vicinity Map

Figure 3: Soil Sample Location Map (including Lead Results

Table 1: Summary of Soil Sample Analytical Results

Attachment A: Field Documentation and Photos Attachment B: State-Certified Laboratory Report

Attachment C: Reference: Previous Testing Results in the Vicinity (RMD, August 2020)

¹ Weber Hayes and Associates (WHA) report: Workplan: Shallow Soil Sampling for Total Lead, March 2021.

Field Sample Collection: On March 11, 2021, twelve (12) soil borings were hand-augured at sampling sites *B-1* through *B-12* to an approximate depth of 2-ft below ground surface (bgs). See Figure 3 for locations. The soil samples were obtained using a stainless-steel hand-auger used to remove soils to the target depth and logged noting the lithology of the soils, moisture content, and any unusual odor or discoloration. There was no evidence of chemical impacts observed in any of the soil borings.

Two (2) samples per location were selected for laboratory analysis: one sample was obtained from ground surface to 6-inches, and the second, deeper sample was collected from 18-to 24-inches below ground surface (bgs). Relatively undisturbed soil samples were obtained using a specialty-machined slide hammer. Borings were initially augured to a target depth whereupon the slide hammer was used to drive clean stainless-steel liners into native soils. The slide hammer was then gently back-tapped out of the boring to retrieve a relatively undisturbed soil sample. The stainless steel auger and sampling hammer was decontaminated between each boring location using non-phosphate detergent and distilled water.

The sample containers were labeled, placed in sealed, plastic bags, and stored in a chilled cooler for transportation under standard chain-of-custody procedures to Pace Analytical, a California-certified laboratory. Field notes and photo documentation of the field sampling is included in Appendix A.

Laboratory Analysis: The twenty-four (24) discrete soil samples were analyzed for Total Lead concentrations. The dry weight results are tabulated along with agency screening thresholds on Table 1 and clip of the results is presented to the right. Certified laboratory report is attached (Attachment B)

Data Summary: The majority of samples have Total Lead concentrations below risk-based, *Environmental Screening Levels (ESL)* for different land uses (i.e., commercial, construction worker, and unrestricted/residential land uses. Three (3) of the twelve (12) *surface* samples have detectable concentrations of Total Lead that <u>exceed</u> the *residential/ unrestricted* land use ESL of 80 mg/kg, but <u>do not exceed</u> the commercial/construction worker threshold of 320 and 160 respectively (see Table 1 for details).

Note: This additional sampling and testing was originally completed to provide supporting data for an agricultural project (i.e., safe use as an access road for the possible location of Homeless Garden Project,

| S | ample Inforn | nation | Lab Results |
|----------------|----------------|---|-----------------------------------|
| Sample Date | Sample ID | Depth (inches below ground surface) | Total Lead Concentrations (mg/kg) |
| | 8-1 | surface | 13.9 |
| | | 18" | 5.68 |
| | B-2 | surface | 42.5 |
| | 7.7 | 18" | 7.61 |
| - 11 | B-3 | surface | 183 |
| | | 18" | 6.54 |
| | B-4 | surface | 208 |
| | 5.4 | 18" | 10.6 |
| | B-5 | surface | 8.2 |
| 7 | 6-5 | 18" | 5.74 |
| 20. | B-6 | surface | 37.5 |
| 4 | | 18" | 9.61 |
| March 11, 2021 | B-7 | surface | 19 |
| arc | B-7 | 18" | 15.2 |
| Σ | B-8 | surface | 158 |
| | 6-8 | 18" | 5.25 |
| | B-9 | surface | 78 |
| | 6-9 | 18" | 7.16 |
| | B-10 | surface | 51.6 |
| | B-10 | 18" | 7.32 |
| | B-11 | surface | 33.3 |
| | 0-11 | 18" | 5.06 |
| | B-12 | surface | 14.9 |
| | 6-12 | 18" | 7 |
| | ental Screenir | CONTRACTOR OF THE PROPERTY OF | 80 / 320 (160) |

HGP). Currently, HGP plans for farming on this portion of Pogonip have been postponed indefinitely.

Limitations: Our service consists of professional opinions and recommendations made in accordance with generally accepted geologic principles and practices. This warranty is in lieu of all others, either expressed or implied. The analysis and conclusions in this report are based on sampling and testing which are necessarily limited. Additional data from future work may lead to modifications of the options expressed herein.

If you have any questions or comments regarding this report, please contact us our office (722-3580). Sincerely,

WEBER, HAYES AND ASSOCIATES

Pat Hoban, PG
Principal Geologist

ATTACHMENTS:

Figure 1: Location
Figure 2: Vicinity Map

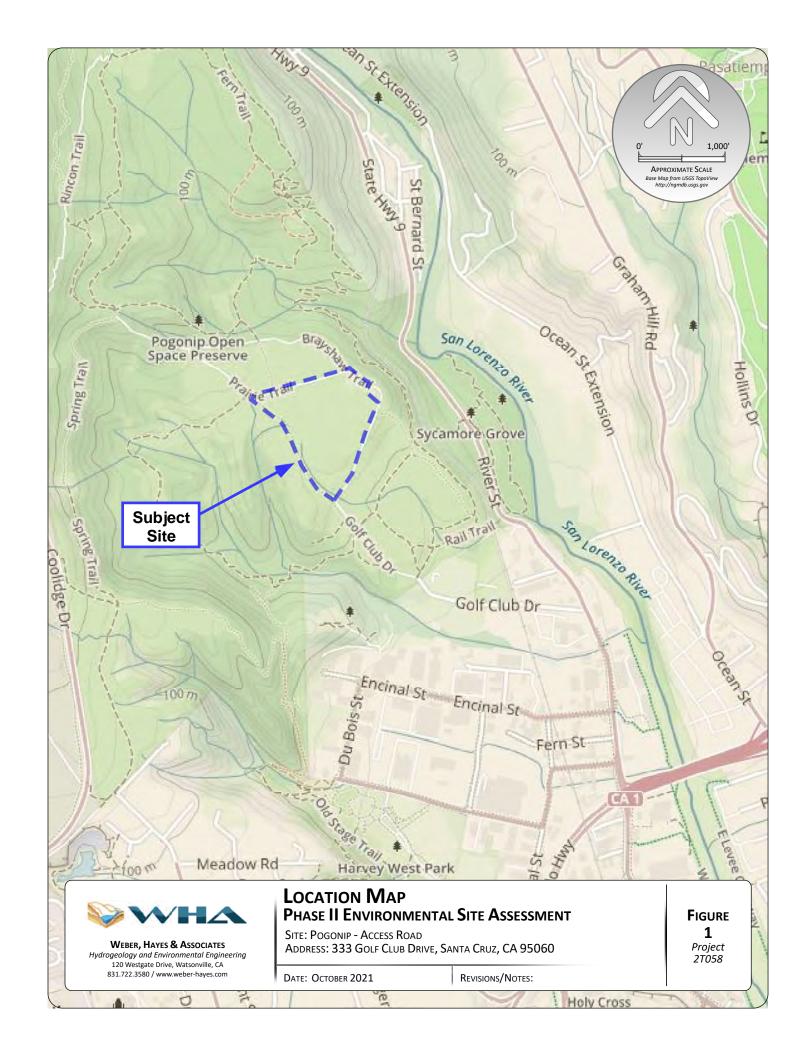
Figure 3: Soil Sample Locations and Lead Results

Table 1: Summary of Soil Sample Analytical Results

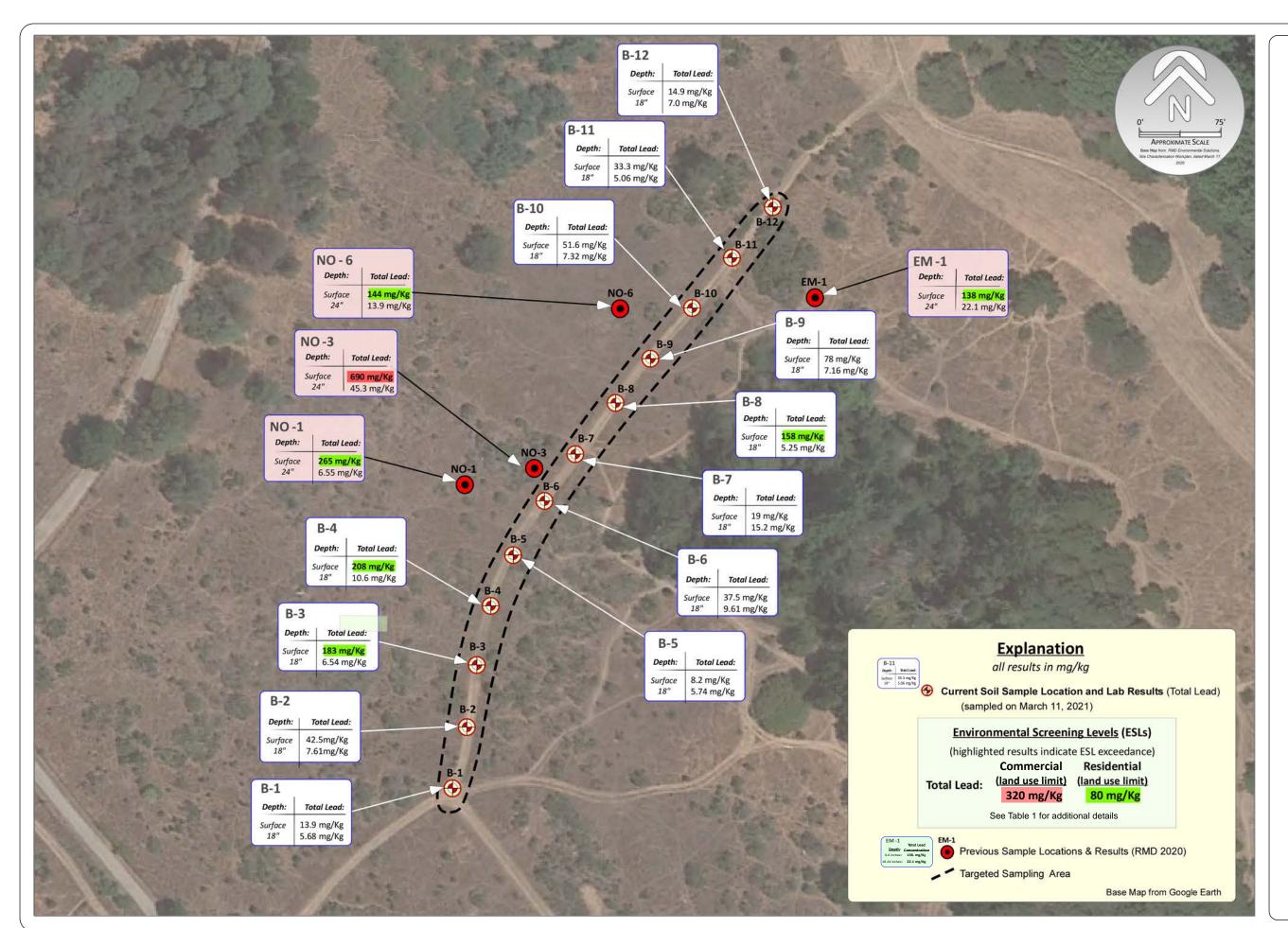
Attachment A: Field Documentation Attachment B: Laboratory Report

Attachment C: Reference: Previous Testing Results in the Vicinity - RMD, August 2020

| FIGURES | |
|--|-----------|
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| Figure 1: Legation Man | |
| Figure 1: Location Map | |
| Figure 2: Vicinity Map | l Dogulto |
| Figure 3: Soil Sample Locations And Lead | i Results |
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Soil Sample Locations And Lead Results

SITE: **POGONIP ACCESS TRAIL EVALUATION** ADDRESS: 333 GOLF CLUB DRIVE, SANTA CRUZ

DATE: MARCH 2021

| TABLES | |
|---|--|
| Table 1: Summary of Soil Analytical Results | |
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Table 1

Summary of Soil Analytical Results

Pogonip Access Trail Evaluation

333 Golf Club Dr. Santa Cruz

All soil results are in milligrams per Kilogram (mg/Kg)

| | Sample Inform | ation | Lab Results |
|----------------|--|--|-----------------------------------|
| Sample Date | Sample ID | Depth (inches below ground surface) | Total Lead Concentrations (mg/kg) |
| | B-1 | surface | 13.9 |
| | J 1 | 18" | 5.68 |
| | B-2 | surface | 42.5 |
| | 5 - | 18" | 7.61 |
| | B-3 | surface | 183 |
| | 2 3 | 18" | 6.54 |
| | B-4 | surface | 208 |
| | 5 1 | 18" | 10.6 |
| | B-5 | surface | 8.2 |
| 21 | 5 3 | 18" | 5.74 |
| March 11, 2021 | B-6 | surface | 37.5 |
| 11, | 5 0 | 18" | 9.61 |
| <u> </u> | B-7 | surface | 19 |
| larc | 5 7 | 18" | 15.2 |
| Σ | B-8 | surface | 158 |
| | 50 | 18" | 5.25 |
| | B-9 | surface | 78 |
| | B-3 | 18" | 7.16 |
| | B-10 | surface | 51.6 |
| | 9-10 | 18" | 7.32 |
| | B-11 | surface | 33.3 |
| | D-11 | 18" | 5.06 |
| | B-12 | surface | 14.9 |
| | D-12 | 18" | 7 |
| | nental Screenin dential / Commercia (Construction Wo | l Land Uses | 80 / 320 (160) |

Notes

Environmental Screening Levels (ESLs): Regional Water Quality Control Board (San Francisco Bay Region) guideline document: *Screening for Environmental Concerns at Sites With Contaminated Soil and Groundwater* (Final version, 2019). The ESLs are intended to provide quantitative risk-based guidance on whether further assessment or remediation of contamination is warranted

https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/ESL/new/ESL_Summary_Tables_24Jan19_Rev1.pdf

| 158 | = green-shaded cell indicates detected concentration exceeds the ESL threshold limit for a residential land use |
|-----|---|
| | = red-shaded cell indicates detected concentration exceeds the ESL threshold limit for a |

residential land use

| Field Documentation Field Notes and Photo Sheets | |
|--|--|
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| Field Notes and Photo Sheets | |
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This following provides detailed descriptions of methods used during shallow soil sampling investigations. Included are specifications for shallow soil sampling with a slide hammer, and decontamination procedures.

Shallow Soil Sampling Procedures: A backhoe, two-person power auger, or a hand auger will be used to get to a point immediately above the sampling depth. Once at the desired sampling depth, a slide hammer will be used to drive a clean stainless-steel liner encased in the slide hammer sampling shoe to obtain a relatively undisturbed sample. The slide hammer consists of a metal rod with one end containing a sampling shoe and cutting head with which a sample liner can be installed. At the other end of the metal rod there is a handle that is constrained on the rod, but slides up and down the rod allowing force to be applied to the sampling shoe. Manual operation is



used to slide the handle down the rod to force the sampling shoe equipped with the liner into native soils.

Materials retrieved from the sampler will be logged on an as-needed basis by the experienced field geologist using the Unified Soil Classification System (USCS), noting in particular, the lithology of the soils, moisture content, and any unusual odor or discoloration. The liner and relatively undisturbed soils will then be removed from the sampling shoe. The liner is then protected at both ends with Teflon tape, sealed with non-reactive caps, taped, and immediately stored in an insulated container cooled with blue ice at a temperature of 4 degree Celsius or less. Soil samples selected for Volatile Organic Compound (VOC) analysis may follow field preservation protocols according to EPA Method 5035, as described in DTSC's Guidance Document for the Implementation of United States Environmental Protection Agency Method 5035: Methodologies for Collection, Preservation, Storage, and Preparation of Soils to be Analyzed for Volatile Organic Compounds, dated November 2004. Selected samples will be transported under appropriate chain-of-custody documentation to a State certified laboratory performing the targeted analysis.

Upon completion of sampling at the designated location, the location will be backfilled and compacted with the materials that were removed prior to sampling, supplemented by clean imported fill as necessary.

Equipment Decontamination and Containerization Procedures: All sampling equipment will be cleaned prior to arriving on site to prevent possible transfer of contamination from another site. Additionally, sampling equipment will be thoroughly cleaned between each sampling run with a Liqui-Nox ® or Alconox ® solution followed by a double rinsing with distilled water to prevent the vertical transfer of contamination, and/or contamination from location to location onsite. Accordingly, all sampling equipment will be cleaned following sampling operations to prevent the possible transfer of contamination to another site.

All cleaning rinsate, and wash water produced during the shallow soil sampling and decontamination process will be containerized on site in D.O.T. approved 55-gallon drums for subsequent profiling and disposal at an approved facility.

Pogonip - Access Road Sampling 333 Golf Club Drive, Santa Cruz, California 2021-3-11



Hand Auger used to collect samples



Example of Borehole showing shallow groundwater

Pogonip - Access Road Sampling 333 Golf Club Drive, Santa Cruz, California 2021-3-11



Hand Auger being decontaminated between samples



Collecting Soil from Hand Auger



Weber, Hayes & Associates Hydrogeology and Environmental Engineering

Page _____ of ____

| Project/Client: Popping Horeless Gorden Lead Soil Sampling | Project # : 2105% |
|--|--------------------------|
| Site Location: 333 Golf Club Drive Santa Cruz | Date: 3-11-21 |
| Field tasks: Shallow Soil Sampling (Hand Auger) | Weather: Cloudy Morning |
| Personnel / Company On-Site: RN and OA (WHA) | Close |
| Attachments: Site Map Data Sheets Geologic Logs Photos | COC Chargeable Materials |

| Time: | | | | | | | | | | Notes | ; | | | | | | | | | | |
|--|--|------------------------|---------------------------|----------|--|---------------|------------------------|-------------------------|----------------|------------------------------|--------------------------|---|------|---|--------------|---|---------------------|------|---|-----|---------|
| 0630 | -Villare | y ousi | le. (| Sale | code | 137 | 1. | ScHi | Kg .4 | p Sa | yle s | cvol | dec | on sta | ufiò- | 01 | . hu | ck | a l | B-1 | locati |
| 0700 | - Finis | | 5emp 1.0' | by: | Fo and and | la. | 3-1 bran | . Soil in. (1 led | | | | | | | | | | | | | |
| 0730 | - Oliv | . Ou | site | and | lhe | afh | v . l | lan | a .0 | nsite | a | s well. | * | | | | * | | * | | · · |
| 0800 0815 0835 0845 0900 0910 | - Finis - Finis - Finis - Finis - Finish | hed shed shed shed who | B-3 B-4 B-8-8-8-8-8 | | Saturalina hade | mesl | l (nater lev. a vstly | stendi | 1.5'6 1.5'6 | rater tgs. gs. medi | a f | -2') | _ | in i.c | 2 6 1 | 20' | 4.95. | | | | |
| 09 56 0945 1000 | - Finis - Finis - Finis | ales. | B-17 B-17 | l Vac | rosth ked | η Sί . υρ. | | | · 8 | . 10 | • | 6 (e) 74 (e) 6 (f) 75 (e) | conh | , wa | zed | * | | take | . L | | t. |
| 1030. | - Equ | i'pman | 22. | to | Luc. | | | | | | | | | | | | | | | | |
| 1045 | - Equi | ipman | | to. | be | | | . F. | | | | 786 | | 290 | | * | 96 (8 | | | | |
| | - Equ th -Demos | ipman | | . to . | be | | | . r. | | | | • 266 • 266 • 35 | | . (80 . (81 . (8) | | * | * | | | | * · |
| 1045 | - Equi | ipman | | to | 600 100 100 | | | . r | · | | - # - # - # - # | 200 000 150 150 | | . 290 . 260 . 260 | | ** | * * * | | e E | | * · * · |
| 1045 | - Equi | ipman | | . to: | 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 | | | | | | | • 86 • 85 • 95 • 98 | | • 280 • 282 • 302 • 660 | | * | 8 8 | | K K K | | * . |
| 1045 | - Equi | ipman | | | | | | | | | | · 66 | | . 200 | | | 8 8 2 | | K & & & & . | | |
| 1045 | - Equi | i'pman | | | | | | | | | | . 100 . 105 . 100 . 100 . 100 | | . 200 . 200 . 200 . 200 . 200 . 200 . 200 | | | 96 95 96 9 | | | | |
| 1045 | - Equi | i'pman | | | | | | | | | | . 86 . 85 . 30 . 30 . 30 . 30 . 30 | | . 200 . 200 . 200 . 200 . 200 . 200 . 200 | | | 96 95 93 | | | | |
| 1045 | - Equi | i'pman | | | | | | | | | | | | . 200 . 200 . 200 . 200 . 200 . 200 . 200 . 200 . 200 | | | | | | | |
| 1045 | - Equi | i'pman | | | | | | | | | | | | . 200 | | | | | | | |
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| 1045 | - Equi | i'pman | | | | | | | | | | | | . 990 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 . 980 | | | | | 化超离 医电影医医电影医电影 | | |
| 1045 | - Equi | i'pman | | | | | | | | | | PN | | . 26 25 25 25 25 25 25 25 25 25 25 25 25 25 | | | | | *************************************** | | |

Signature of Field Personnel & Date



Soil Logging Field Data Sheet

ect Name/Number: Pogonia Lead Soil Sampling / 2+058 Recorded by: Ryan Nyberg / Oliver Abbott

| Boring/Pothole I.D./ GPS Coordinate | Sample Depths (change in lithology) | Soil Type & % (Gravel, Sand, Silt, Clay) | Color (Brown, Black Grey, etc) | Density (loose, med-dense, dense, v.dense) | Moisture (Dry, damp, moist, wet) | Odors/ Discoloration? | Additional Comments |
|---------------------------------------|---|---|--|--|-------------------------------------|--------------------------|---------------------|
| B-1 (36.9921757, -122.0383443) | (0-0.5) (1.5-2.0) | 0-1: Silt 1-2: Clayer SILT | dark yellowish brown light brown w/ora | | damp-moist | None | 0700 |
| B-2 36.9913964, 122.0881860) | (11) | 0-15: Silt 1.5-2: Clay | dark yellowish bo | un 160 gc | t _t | None | 0136 |
| B-3 36.9925624, 122.0392454) | | 0-1: Silt 1-2: ClapsySilt | dark yellowish brown | 1008 | clamp-net Saturakel | None | 0750 |
| B-4 36.9926817, -122.0381974) | | 0-0.5: silt 0.5-2: Silt | dark yelvish | loose | Saturated Rosm a 5-2.0 | None | 0810 |
| B-5 36,9927929, 122.038(233) | | 0-1.5: Silt 1.5-2: Clayey Silt | darkyellwish brown light born | loose | saturally from | Non | 0825 |
| B-6 36.9928754, 122.0380503) | | 01.5: Si'lt | dark yellowith | lose | dang-net dang-net | None | 0840 |
| B-7 .36.9929619, 122.0379614) | | 0-1.5: Clayery Silt 1.5-2: CLAY | derk yellowish brown | loose to midina dose | daup to moist | Non | 0855 |
| B-9 36.9931065 -122.0378421) | | 0-1.5: Clarey Silt 1.5-2.0: Clarey Silt | dark yellowish brown light brown | loose | daup lanoist Saturated | Work | 0910 |
| (36.9932206, 122.0377093) | | 0-1.5: 5:17 1.5-2: Clay-5:11 | dark yellon light brunk | loose | damptomoist | nme | 8917 |
| B-10 36,9933007, 122.0376204) | | 0.0-1.5: Silt 1.5-2: cby-silt | dark yellowsh brown | loose | damp to moist | None | 0930 |
| B-11 36.99 34155, 122.0375 [25] | | 0.0-1.5: Silt 1.5-2: clayer silt | dork yellanish boom | loose | danp is moist | Done | 0940 |
| B-12 36.9935802, 122.0373690) | \ | 0-2.0 = silt | dark yellarish brown | loose | damp to moist | None | 0955 |
| | · k | | | | | | |
| - | | | | | | | |

Consistencey (clays): Density (sands/silts): Very soft, Soft, Firm, Stiff or Very Stiff. Very loose, loose, med-dense, dense, v.dens

| e-Certified Analytical Laboratory Res Soil - Pace Analytical L1326377 |
|--|
| Soil - Face Analytical LISZ0377 |
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Pace Analytical ANALYTICAL REPORT

Weber, Hayes & Associates - CA

Sample Delivery Group: L1326377 Samples Received: 03/12/2021 Project Number: 2t058

Description:

Site: 333 GOLF CLUB DR SANTA CRUZ

Report To: Ryan Nyberg

> 120 Westgate Drive Watsonville, CA 95076

Entire Report Reviewed By:



³Ss

⁶Qc

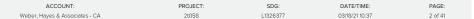
⁷Gl

Brian Ford Project Manager



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| | | | Collected by | Collected date/time | Received da | ite/time |
|---|------------------------|----------|----------------------------------|---------------------------------------|--------------------------------------|----------------------------------|
| B-1-D0 L1326377-01 Solid | | | Ryan Nyberg | 03/11/21 00:00 | 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634799 WG1634311 | 1 5 | 03/16/21 08:52 03/15/21 08:56 | 03/16/21 09:00 03/16/21 00:31 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-1-D1.5 L1326377-02 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634799 WG1634311 | 1 5 | 03/16/21 08:52 03/15/21 08:56 | 03/16/21 09:00 03/16/21 00:47 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-2-D0 L1326377-03 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634799 WG1634311 | 1 5 | 03/16/21 08:52 03/15/21 08:56 | 03/16/21 09:00 03/16/21 00:51 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-2-D1.5 L1326377-04 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received date/time 03/12/21 09:00 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:06 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-3-D0 L1326377-05 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received date/time 03/12/21 09:00 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:09 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-3-D1.5 L1326377-06 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:13 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-4-D0 L1326377-07 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| | | 1 | 03/16/21 12:47 | 03/16/21 12:56 | KDW | Mt. Juliet. TN |

| | SAMPLES | SUMN | ЛАRY | | | |
|---|------------------------|----------|----------------------------------|---------------------------------------|--|----------------------------------|
| B-4-D1.5 L1326377-08 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:20 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-5-D0 L1326377-09 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:23 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-5-D1.5 L1326377-10 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:27 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-6-D0 L1326377-11 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received date/time 03/12/21 09:00 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:30 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-6-D1.5 L1326377-12 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | e Received date/time 03/12/21 09:00 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634800 WG1634311 | 1 5 | 03/16/21 12:47 03/15/21 08:56 | 03/16/21 12:56 03/16/21 01:37 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-7-D0 L1326377-13 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1634800 | 1 | 03/16/21 12:47 | 03/16/21 12:56 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1634311 | 5 | 03/15/21 08:56 | 03/16/21 01:54 | TM | Mt. Juliet, TN |
| B-7-D1.5 L1326377-14 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1634840 | 1 | 03/16/21 12:37 | 03/16/21 12:45 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1634311 | 5 | 03/15/21 08:56 | 03/16/21 01:58 | TM | Mt. Juliet, TN |

| ACCOUNT: | PROJECT: | SDG: | DATE/TIME: | PAGE: |
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| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 3 of 41 |

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| | SAMPLE S | SUMN | MARY | | | |
|---|------------------------|----------|----------------------------------|---------------------------------------|--------------------------------------|----------------------------------|
| B-8-D0 L1326377-15 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634311 | 1 5 | 03/16/21 12:37 03/15/21 08:56 | 03/16/21 12:45 03/16/21 02:01 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-8-D1.5 L1326377-16 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634311 | 1 5 | 03/16/21 12:37 03/15/21 08:56 | 03/16/21 12:45 03/16/21 02:05 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-9-D0 L1326377-17 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634311 | 1 5 | 03/16/21 12:37 03/15/21 08:56 | 03/16/21 12:45 03/16/21 02:09 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-9-D1.5 L1326377-18 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634311 | 1 5 | 03/16/21 12:37 03/15/21 08:56 | 03/16/21 12:45 03/16/21 02:12 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-10-D0 L1326377-19 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received date/time 03/12/21 09:00 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634311 | 1 5 | 03/16/21 12:37 03/15/21 08:56 | 03/16/21 12:45 03/16/21 02:16 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-10-D1.5 L1326377-20 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634316 | 1 5 | 03/16/21 12:37 03/15/21 14:09 | 03/16/21 12:45 03/16/21 10:46 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-11-D0 L1326377-21 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received da 03/12/21 09: | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634316 | 1 5 | 03/16/21 12:37 03/15/21 14:09 | 03/16/21 12:45 03/16/21 10:50 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |

| S | AMPLE S | SUMN | ИARY | | | |
|---|------------------------|----------|----------------------------------|---------------------------------------|-------------------------------|----------------------------------|
| B-11-D1.5 L1326377-22 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634316 | 1 5 | 03/16/21 12:37 03/15/21 14:09 | 03/16/21 12:45 03/16/21 10:53 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-12-D0 L1326377-23 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634840 WG1634316 | 1 5 | 03/16/21 12:37 03/15/21 14:09 | 03/16/21 12:45 03/16/21 10:57 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |
| B-12-D1.5 L1326377-24 Solid | | | Collected by Ryan Nyberg | Collected date/time 03/11/21 00:00 | Received dat 03/12/21 09:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 Metals (ICPMS) by Method 6020 | WG1634841 WG1634316 | 1 5 | 03/16/21 11:23 03/15/21 14:09 | 03/16/21 11:32 03/16/21 11:00 | KDW TM | Mt. Juliet, TN Mt. Juliet, TN |

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CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory, as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Brian Ford Project Manager

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| ² Tc | |
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| B-1-D0 Collected date/time: 03/11 | IPLE RESULTS - 01 | | | | | | | |
|--------------------------------------|-------------------|-----------|----------|----------|------------|----------|------------------|------------------|
| Total Solids by Meth | nod 2540 G-20 |)11 | | | | | | |
| | Result | Qualifier | Dilution | Analysi | is | Batch | | |
| Analyte | % | | | date / t | ime | | | |
| Total Solids | 87.5 | | 1 | 03/16/2 | 2021 09:00 | WG1634 | 799 | |
| Metals (ICPMS) by M | lethod 6020 | | | | | | | |
| | Result (dry) | Qualifier | MDL (| dry) | RDL (dry) | Dilution | Analysis | Batch |
| Analyte | mg/kg | | mg/kg | 1 | mg/kg | | date / time | |
| Lead | 13.9 | | 0.113 | | 2.29 | 5 | 03/16/2021 00:31 | <u>WG1634311</u> |

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| | | | | 33333 | 10101111111 | | | | |
|---|--------------|-----------|----------|-----------|-------------|----------|------------------|-----------|-----------------|
| B-1-D1.5 Collected date/time: 03/11/21 0 | 0:00 | | SAM | PLE | RESUL | .TS - (| 02 | | |
| Total Solids by Method : | 2540 G-20 | 11 | | | | | | | 1 |
| | Result | Qualifier | Dilution | Analysi | | Batch | | | Ср |
| Analyte | % | | | date / ti | | | | | 2 |
| Total Solids | 85.2 | | 1 | 03/16/2 | 021 09:00 | WG16347 | 799 | | ² Tc |
| Metals (ICPMS) by Metho | od 6020 | | | | | | | | 3 Ss |
| | Result (dry) | Qualifier | MDL (| dry) | RDL (dry) | Dilution | Analysis | Batch | |
| Analyte | mg/kg | | mg/kg | 1 | mg/kg | | date / time | | ⁴ Cn |
| Lead | 5.68 | | 0.116 | | 2.35 | 5 | 03/16/2021 00:47 | WG1634311 | Ü., |
| | | | | | | | | | ⁵ Sr |
| | | | | | | | | | ⁶ Qc |
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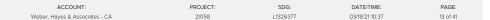
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| B-2-D1.5 Collected date/time: 03 | 3/11/21 00:00 | | SAM | PLE | RESUL | -TS - (| 04 | |
| Total Solids by Me | ethod 2540 G-20 |)11 | | | | | | |
| Analyte Total Solids | Result % 79.6 | Qualifier | Dilution | Analysis date / ti 03/16/2 | | Batch WG16348 | 300 | |
| Metals (ICPMS) by | Method 6020 | | | | | | | |
| Analyte | Result (dry) mg/kg | Qualifier | MDL (mg/kg | | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch |
| Lead | 7.61 | | 0.124 | | 2.51 | 5 | 03/16/2021 01:06 | WG1634311 |
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| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 12 of 41 |

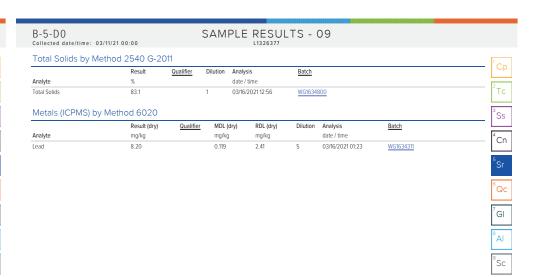
| B-3-D1.5 | | | SAMI | PLE | RESUI | LTS - (| 06 | | |
|-----------------------------|--------------|-----------|----------|------------|-----------|----------|------------------|-----------|--|
| Collected date/time: 03/11/ | 21 00:00 | | | | L1326377 | | | | |
| Total Solids by Metho | od 2540 G-20 |)11 | | | | | | | |
| | Result | Qualifier | Dilution | Analysis | ; | Batch | | | |
| Analyte | % | | | date / tir | me | | | | |
| Total Solids | 80.7 | | 1 | 03/16/20 | 02112:56 | WG16348 | 800 | | |
| Metals (ICPMS) by Me | ethod 6020 | | | | | | | | |
| | Result (dry) | Qualifier | MDL (| dry) | RDL (dry) | Dilution | Analysis | Batch | |
| Analyte | mg/kg | | mg/kg | 1 | mg/kg | | date / time | | |
| Lead | 6.54 | | 0.123 | | 2.48 | 5 | 03/16/2021 01:13 | WG1634311 | |
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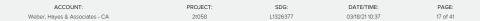
| B-4-D1.5 Collected date/time: 0 | 03/11/21 00:00 | | SAMPLE | RESUI | _TS - | 08 | | |
|------------------------------------|------------------|-----------|----------------|------------|----------|------------------|-----------|-----|
| Total Solids by M | lethod 2540 G-20 | 011 | | | | | | 1 |
| | Result | Qualifier | Dilution Analy | | Batch | | | |
| Analyte | % | | | / time | | | | 2 |
| Total Solids | 77.5 | | 1 03/16 | /202112:56 | WG1634 | 800 | | |
| Metals (ICPMS) by | y Method 6020 | | | | | | | 3 |
| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | |
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | 4 |
| Lead | 10.6 | | 0.128 | 2.58 | 5 | 03/16/2021 01:20 | WG1634311 | Ľ |
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|--------------------------------------|-----------------------|-----------|--------------|--------|--------------------|----------|-------------------------|-----------|-----------------|
| B-5-D1.5 Collected date/time: 03/ | 11/21 00:00 | | SAM | PLE | RESUI | LTS - | 10 | | |
| Total Solids by Met | thod 2540 G-20 | 011 | | | | | | | 1 |
| | Result | Qualifier | Dilution | Analys | | Batch | | | |
| Analyte Total Solids | % 86.7 | | 1 | date / | time 2021 12:56 | WG16348 | <u>300</u> | | Tc |
| Metals (ICPMS) by I | Method 6020 | | | | | | | | 3 Ss |
| Analyte | Result (dry) mg/kg | Qualifier | MDL mg/kg | | RDL (dry) mg/kg | Dilution | Analysis date / time | Batch | 4 Cr |
| Lead | 5.74 | | 0.114 | | 2.31 | 5 | 03/16/2021 01:27 | WG1634311 | _ |
| | | | | | | | | | ⁵ Sr |
| | | | | | | | | | ⁶ Qc |
| | | | | | | | | | ⁷ GI |
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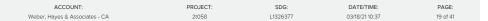




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| Total Solids by Method 2540 G-2011 Analyte | Collected date/time: 03 | /11/21 00:00 | | | | L1326377 | | | | |
|--|-------------------------|-----------------|-----------|----------|----------|-----------|----------|------------------|-----------|-----|
| Analyte % date / time Total Solids 78.3 1 03/16/202112:56 WG1634805 Metals (ICPMS) by Method 6020 Result (dry) Qualifier mg/kg MDL (dry) mg/kg Dilution blution date / time Analysis date / time | Total Solids by Me | ethod 2540 G-20 | O11 | | | | | | | 1 |
| Total Solids 78.3 1 0.3/16/202112:56 WG1634800 | | | Qualifier | Dilution | , | | Batch | | | |
| Metals (ICPMS) by Method 6020 Result (dry) mg/kg MDL (dry) MDL (d | | | | | | | | | | 2_ |
| Result (dry) <u>Qualifier</u> MDL (dry) RDL (dry) <u>Dilution</u> Analysis <u>Batch</u> Analyte mg/kg mg/kg date / time | Total Solids | 78.3 | | 1 | 03/16/20 | 2112:56 | WG16348 | 300 | | |
| Analyte mg/kg mg/kg mg/kg date / time | Metals (ICPMS) by | Method 6020 | | | | | | | | 3 |
| , | | Result (dry) | Qualifier | MDL | (dry) | RDL (dry) | Dilution | Analysis | Batch | |
| Lead 9.61 0.127 2.56 5 03//6/2021 01:37 WG1634311 | Analyte | mg/kg | | mg/k | g | mg/kg | | date / time | | 4 |
| | Lead | 9.61 | | 0.127 | 7 | 2.56 | 5 | 03/16/2021 01:37 | WG1634311 | Ľ |
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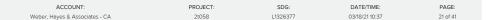




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| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 20 of 41 |

| B-7-D1.5 Collected date/time: | 03/11/21 00:00 | | SAM | PLE RESU | LTS - | 14 | | |
|----------------------------------|------------------|-----------|----------|------------------|----------|------------------|-----------|---|
| Total Solids by N | Method 2540 G-20 | 011 | | | | | | 1 |
| | Result | Qualifier | Dilution | Analysis | Batch | | | |
| Analyte | % | | | date / time | 11104004 | 0.40 | | 2 |
| Total Solids | 81.8 | | 1 | 03/16/2021 12:45 | WG1634 | 840 | | |
| Metals (ICPMS) b | by Method 6020 | | | | | | | 3 |
| | Result (dry) | Qualifier | MDL (| dry) RDL (dry) | Dilution | Analysis | Batch | |
| Analyte | mg/kg | | mg/kg | | | date / time | | 4 |
| Lead | 15.2 | | 0.121 | 2.44 | 5 | 03/16/2021 01:58 | WG1634311 | L |
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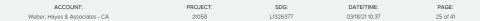
| B-8-D1.5 Collected date/time: | 03/11/21 00:00 | 9 | SAM | PLE RESU | ILTS - | 16 | | |
|----------------------------------|-----------------------|-----------|-----------------|---|------------------|-------------------------|-----------|---|
| Total Solids by M | lethod 2540 G-20 | 011 | | | | | | 1 |
| Analyte Total Solids | Result % 82.1 | | Dilution 1 | Analysis date / time 03/16/2021 12:45 | Batch WG16348 | 840 | | |
| Metals (ICPMS) b | y Method 6020 | | | | | | | 3 |
| Analyte | Result (dry) mg/kg | Qualifier | MDL (d mg/kg | | Dilution | Analysis date / time | Batch | 4 |
| Lead | 5.25 | | 0.121 | 2.44 | 5 | 03/16/2021 02:05 | WG1634311 | L |
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| Weher Hayes & Associates - CA | 21058 | I 1326377 | 03/18/21 10:37 | 24 of 41 |

| B-9-D1.5 Collected date/time: 0 | 3/11/21 00:00 | | OAIVI | | 326377 | LTS - | 10 | | |
|------------------------------------|-----------------------|-----------|-------------------|-------------------------|--------------------|----------|-------------------------|-----------|--|
| Total Solids by M | ethod 2540 G-20 | D11 | | | | | | | |
| Analyte | Result % | Qualifier | Dilution | Analysis date / time | | Batch | | | |
| Total Solids | 80.8 | | 1 03/16/202112:45 | | WG1634840 | | | | |
| Metals (ICPMS) by | / Method 6020 | | | | | | | | |
| Analyte | Result (dry) mg/kg | Qualifier | MDL (mg/kg | | PDL (dry) ng/kg | Dilution | Analysis date / time | Batch | |
| Lead | 7.16 | | 0.123 | 2 | .47 | 5 | 03/16/2021 02:12 | WG1634311 | |
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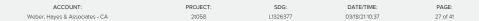




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| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 26 of 41 |

| B-10-D1.5 Collected date/time: 03 | 3/11/21 00:00 | S | SAM | PLE RESU | LTS - 2 | 20 | | |
|--------------------------------------|-----------------------|-----------|----------------|-------------------------|----------|-------------------------|-----------|-----------------|
| Total Solids by Me | ethod 2540 G-20 | 011 | | | | | | 1 |
| Analyte | Result % | Qualifier | Dilution | Analysis date / time | Batch | | | Cr |
| Total Solids | 84.2 | | 1 | 03/16/2021 12:45 | WG16348 | <u>340</u> | | ² Tc |
| Metals (ICPMS) by | Method 6020 | | | | | | | 3 Ss |
| Analyte | Result (dry) mg/kg | Qualifier | MDL (mg/kg | | Dilution | Analysis date / time | Batch | 4Cr |
| Lead | 7.32 | | 0.118 | 2.38 | 5 | 03/16/2021 10:46 | WG1634316 | |
| | | | | | | | | ⁵Sr |
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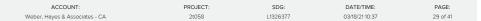




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| B-11-D1.5 Collected date/time: 0 | 3/11/21 00:00 | ! | SAMP | LE RESUL | _TS - 2 | 22 | | |
|-------------------------------------|-----------------|-----------|----------|-----------------|----------|------------------|-----------|-----------------|
| Total Solids by M | ethod 2540 G-20 | 011 | | | | | | 1 |
| | Result | Qualifier | | nalysis | Batch | | | Cp |
| Analyte | % | | | ate / time | | | | 2 |
| Total Solids | 85.7 | | 1 0 | 3/16/2021 12:45 | WG16348 | 840 | | ² Tc |
| Metals (ICPMS) by | y Method 6020 | | | | | | | 3Ss |
| | Result (dry) | Qualifier | MDL (dry |) RDL (dry) | Dilution | Analysis | Batch | |
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | |
| Lead | 5.06 | | 0.116 | 2.33 | 5 | 03/16/2021 10:53 | WG1634316 | |
| | | | | | | | | ⁵ Sr |
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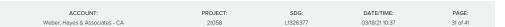


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| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 30 of 41 |

SAMPLE RESULTS - 24 B-12-D1.5 Collected date/time: 03/11/21 00:00 Total Solids by Method 2540 G-2011 Qualifier Dilution Analysis Batch Analyte date / time ²Tc ³Ss ⁴Cn ⁵Sr ⁶Qc ⁷Gl ⁸Al ⁹Sc 84.9 03/16/2021 11:32 WG1634841 Total Solids

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | L |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|---|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | 4 |
| Lead | 7.00 | | 0.117 | 2.35 | ς. | 03/16/2021 11:00 | WG1634316 | Ĺ |



| WG163479 | | 11 | | QUALIT | TY CONTROL SUMMARY L1326377-01.02.03 | |
|-----------------------|--------------------|---------------|------------|------------------------------|---|-----------------|
| Method Blank (M | 1B) | | | | in the second | |
| (MB) R3631692-1 03/16 | 5/21 09:00 | | | | | Ср |
| | MB Result | MB Qualifier | MB MDL | MB RDL | | 2 |
| Analyte | % | | % | % | | Tc |
| Total Solids | 0.000 | | | | | |
| | | | | | | Ss |
| L1326366-01 Ori | • | . , | | | | ⁶ Cn |
| (OS) L1326366-01 03/ | 16/21 09:00 • (DUF | P) R3631692-3 | 03/16/21 (| 9:00 | | CII |
| | Original Result | t DUP Result | Dilution | DUP RPD <u>DUP Qualifier</u> | DUP RPD Limits | 5 Sr |
| Analyte | % | % | | % | % | JI. |
| Total Solids | 62.7 | 59.2 | 1 | 5.88 | 10 | [®] Qc |
| Laboratory Cont | rol Sample (L | CS) | | | 7 | GI |
| (LCS) R3631692-2 03/ | 16/21 09:00 | | | | | |
| | Spike Amount | | LCS Rec. | | ualifier s | AI |
| Analyte | % | % | % | % | | Al |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | [| Sc |
| | | | | | | |

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| Wahar Haves & Associates - CA | 21058 | I 1326377 | 03/19/21 10/37 | 32 of 41 |

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|---|---|---|--------------------------------|----------------------------------|---------------------|--|--|
| WG16348 | UU lethod 2540 G-20 | 11 | | | | TY CONTROL SUMMARY 26377-04,05,06,07,08,09,10,11,12,13 | |
| Method Blank | | | | | | | la de la companya de |
| (MB) R3631725-1 03 | | | | | | | ГСр |
| (, | MB Result | MB Qualifier | MB MDL | MB RDL | | | 2 |
| Analyte | % | | % | % | | | ² Tc |
| Total Solids | 0.00100 | | | | | | |
| | | | | | | | ³ Ss |
| 1 1226277 OF C | Original Sample | (OS) D. | nlicato / | (DLID) | | | |
| | | | | | | | |
| | | 1 / | | . , | | | ⁴ Cn |
| | 03/16/21 12:56 • (DUP |) R3631725-3 | 03/16/21 12 | 2:56 | | NIIP PPN | ⁴Cn |
| | |) R3631725-3 | | . , | DUP Qualifier | DUP RPO Limits | |
| (OS) L1326377-05 (| 03/16/21 12:56 • (DUP |) R3631725-3 | 03/16/21 12 | 2:56 DUP RPD % | DUP Qualifier | | 4Cn |
| (OS) L1326377-05 (Analyte | 03/16/21 12:56 • (DUP Original Result |) R3631725-3 : DUP Result | 03/16/21 12 | 2:56 DUP RPD | DUP Qualifier | Limits | ⁵ Sr |
| (OS) L1326377-05 (Analyte | 03/16/21 12:56 • (DUP Original Result |) R3631725-3 : DUP Result % | 03/16/21 12 Dilution | 2:56 DUP RPD % | DUP Qualifier | Limits % | |
| (OS) L1326377-05 C Analyte Total Solids | 03/16/2112:56 • (DUP Original Result % 84.4 |) R3631725-3 : DUP Result % 84.5 | 03/16/21 12 Dilution | 2:56 DUP RPD % | DUP Qualifier | Limits % | ⁵ Sr |
| (OS) L1326377-05 C Analyte Total Solids Laboratory Co | 03/16/21 12:56 • (DUP Original Result % 84.4 ntrol Sample (L |) R3631725-3 : DUP Result % 84.5 | 03/16/21 12 Dilution | 2:56 DUP RPD % | DUP Qualifier | Limits % | ⁵ Sr |
| (OS) L1326377-05 C Analyte Total Solids Laboratory Co | 03/16/21 12:56 • (DUP Original Result % 84.4 ntrol Sample (L 03/16/21 12:56 |) R3631725-3 : DUP Result % 84.5 | 03/16/21 12 Dilution | 2:56 DUP RPD % 0.118 | | Limits % 10 | °Sr °Oc |
| (OS) L1326377-05 C Analyte Total Solids Laboratory Co (LCS) R3631725-2 C | 03/16/21 12:56 • (DUP Original Result % 84.4 ntrol Sample (L |) R3631725-3 : DUP Result % 84.5 | 03/16/21 12 Dilution | 2:56 DUP RPD % 0.118 | | Limits % 10 | ⁵ Sr |
| (OS) L1326377-05 C Analyte Total Solids | 03/16/21 12:56 • (DUP Original Result % 84.4 ntrol Sample (L 03/16/21 12:56 Spike Amount |) R3631725-3 : DUP Result % 84.5 | O3/16/2112 Dilution 1 LCS Rec. | 2:56 DUP RPD % 0.118 Rec. Lim | nits <u>LCS Qua</u> | Limits % 10 | ⁸ Sr ⁹ Qc |
| (OS) L1326377-05 C Analyte Total Solids Laboratory Co (LCS) R3631725-2 C Analyte | 03/16/21 12:56 • (DUP Original Result % 84.4 ntrol Sample (L 03/16/21 12:56 Spike Amount % |) R3631725-3 : DUP Result % 84.5 CS) LCS Result % | Dilution 1 LCS Rec. | 2:56 DUP RPD % 0.118 Rec. Lim % | nits <u>LCS Qua</u> | Limits % 10 | Sr °ac |

| Method Blank | (MB) | | | | | 1 Cp |
|--|---|---|--------------------------|-----------------------------------|----------|---------------------------------|
| (MB) R3631724-1 0 | | | | | | |
| Analyte | MB Result | MB Qualifier | MB MDL % | MB RDL % | | ² Tc |
| Total Solids | 0.00300 | | | | | |
| | | | | | | 3Ss |
| | | | | | | |
| L1326377-16 C | Original Sample | (OS) • Dup | olicate (D | DUP) | | 4 |
| | Original Sample 03/16/21 12:45 • (DUP) | | | | | ⁴ Cn |
| | | R3631724-3 C | | | DUP RPD | 5 |
| (OS) L1326377-16 (| 03/16/21 12:45 • (DUP) | R3631724-3 C | 3/16/21 12: | 45 | | ⁴ Cn ⁵ Sr |
| (OS) L1326377-16 (Analyte | 03/16/2112:45 • (DUP) Original Result | R3631724-3 C | 3/16/21 12: | 45 DUP RPD DUP Qualifier | Limits | ⁵ Sr |
| (OS) L1326377-16 (Analyte | 03/16/2112:45 • (DUP) Original Result % | R3631724-3 C DUP Result % | 03/16/21 12: Dilution | 45 DUP RPD DUP Qualifier | Limits % | 5 |
| (OS) L1326377-16 (Analyte Total Solids | 03/16/2112:45 • (DUP) Original Result % | R3631724-3 C DUP Result % 82.7 | 03/16/21 12: Dilution | 45 DUP RPD DUP Qualifier | Limits % | 5Sr 6Qc |
| (OS) L1326377-16 (Analyte Total Solids Laboratory Cc | 03/16/21 12:45 • (DUP) Original Result % 82:1 | R3631724-3 C DUP Result % 82.7 | 03/16/21 12: Dilution | 45 DUP RPD DUP Qualifier | Limits % | ⁵ Sr |
| (OS) L1326377-16 (Analyte Total Solids | 03/16/21 12:45 • (DUP) Original Result % 82:1 | R3631724-3 C DUP Result % 82.7 | 03/16/21 12: Dilution | .45 DUP RPD DUP Qualifier % 0.719 | % 10 | 5Sr 6Qc |

| ACCOUNT: | PROJECT: | SDG: | DATE/TIME: | PAGE: | ACCOUNT: | PROJECT: | SDG: | DATE/TIME: | PAGE: |
|--------------------------------|----------|----------|----------------|----------|--------------------------------|----------|----------|----------------|----------|
| Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 33 of 41 | Weber, Hayes & Associates - CA | 2t058 | L1326377 | 03/18/21 10:37 | 34 of 41 |

| WG16348 | | | | Q | UALIT | Y CONTROL SUMMARY | |
|--|---|---|--------------------------------|----------------------|----------------------|-------------------|-------------------|
| Total Solids by M | ethod 2540 G-20 | 11 | | | | L1326377-24 | |
| Method Blank | (MB) | | | | | | ¹cr |
| (MB) R3631722-1 03 | | | | | | | |
| | MB Result | MB Qualifier | MB MDL | | | | 2_ |
| Analyte | % | | % | % | | | |
| Total Solids | 0.000 | | | | | | 3 |
| | | | | | | | [*] Ss |
| | | | | | | | |
| 11326381-02 0 | riginal Sample | (OS) • Dur | olicate (| 'DUP) | | | <u> </u> |
| L1326381-02 C | | | | | | | |
| | 3/16/21 11:32 • (DUP) | R3631722-3 0 | 3/16/21 11:3 | 32 | | DIR GRO | ^⁴ Cr |
| | 3/16/21 11:32 • (DUP) Original Result | R3631722-3 0 DUP Result | | 32 | DUP Qualifier | DUP RPD Limits | E |
| (OS) L1326381-02 0 | 3/16/21 11:32 • (DUP) | R3631722-3 0 DUP Result % | 3/16/21 11:3 | 32 DUP RPD % | DUP Qualifier | | = |
| | 3/16/21 11:32 • (DUP) Original Result | R3631722-3 0 DUP Result | 3/16/21 11:3 | 32 DUP RPD | DUP Qualifier | Limits | ⁵ Sr |
| (OS) L1326381-02 0 | 3/16/21 11:32 • (DUP) Original Result | R3631722-3 0 DUP Result % | 3/16/21 11:3 Dilution | 32 DUP RPD % | DUP Qualifier | Limits % | ⁵ Sr |
| (OS) L1326381-02 O Analyte Total Solids | 3/16/21 11:32 • (DUP) Original Result % 89.0 | R3631722-3 O DUP Result % 87.1 | 3/16/21 11:3 Dilution | 32 DUP RPD % | <u>DUP Qualifier</u> | Limits % | ⁵ Sr |
| (OS) L1326381-02 O Analyte Total Solids Laboratory Co | 3/16/21 11:32 • (DUP) Original Result % 89.0 | R3631722-3 O DUP Result % 87.1 | 3/16/21 11:3 Dilution | 32 DUP RPD % | DUP Qualifier | Limits % | ⁵ Sr |
| (OS) L1326381-02 O Analyte Total Solids Laboratory Co | 3/16/21 11:32 • (DUP) Original Result % 89.0 ntrol Sample (L) 3/16/21 11:32 | R3631722-3 0 DUP Result 87.1 CS) | 3/16/21 11:3 Dilution | DUP RPD % 2.22 | | Limits %. | ⁵ Sr |
| (OS) L1326381-02 O Analyte Total Solids Laboratory Co (LCS) R3631722-2 O | 3/16/21 11:32 • (DUP) Original Result % 89.0 ntrol Sample (L) 3/16/21 11:32 Spike Amount | R3631722-3 O DUP Result % 87.1 CS) | 03/16/21 11:3 Dilution 1 | DUP RPD % 2.22 | | Limits %. | E |
| (OS) L1326381-02 O Analyte Total Solids | 3/16/21 11:32 • (DUP) Original Result % 89.0 ntrol Sample (L) 3/16/21 11:32 | R3631722-3 0 DUP Result 87.1 CS) | 3/16/21 11:3 Dilution | DUP RPD % 2.22 | | Limits %. | ssr cac rgl |

| Metals (ICPMS) b | by Method 6020 | | | L132637 | 7-01,02,03,04 | 1,05,06,07,08,0 | 9,10,11,12 | ,13,14,15,16,1 | 7,18,19 | | | | | |
|--|--|---|---|---|---------------|-----------------|------------|----------------|--------------|---------------|-----|------------|---|----------------|
| Method Blank | (MB) | | | | | | | | | | | | | 10 |
| (MB) R3631049-1 0 | 03/16/21 00:24 | | | | | | | | | | | | | |
| | MB Result | MB Qualifier | MB MDL | MB RDL | | | | | | | | | | 2_ |
| Analyte | mg/kg | | mg/kg | mg/kg | | | | | | | | | | [*] T |
| Lead | U | | 0.0990 | 2.00 | | | | | | | | | | _ |
| | | | | | | | | | | | | | | l*s |
| | | | | | | | | | | | | | | - |
| Laboratory Co | antral Cample // / | CC) | | | | | | | | | | | | Ľ |
| | ontrol Sample (Lo | CS) | | | | | | | | | | | | 4 |
| | 03/16/21 00:28 | | | | | | | | | | | | | |
| (LCS) R3631049-2 | 03/16/21 00:28 Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier | : | | | | | | | | |
| (LCS) R3631049-2 Analyte | 03/16/21 00:28 Spike Amount mg/kg | LCS Result | % | % | LCS Qualifier | | | | | | | | | |
| (LCS) R3631049-2 Analyte | 03/16/21 00:28 Spike Amount | LCS Result | | | LCS Qualifier | : | | | | | | | | 4 |
| (LCS) R3631049-2 Analyte | 03/16/21 00:28 Spike Amount mg/kg | LCS Result | % | % | LCS Qualifier | : | | | | | | | | |
| (LCS) R3631049-2 Analyte Lead | 03/16/21 00:28 Spike Amount mg/kg 100 | LCS Result mg/kg 96.1 | % 96.1 | % 80.0-120 | | • | | | | | | | | 4 C |
| (LCS) R3631049-2 Analyte Lead L1326377-01 (| 03/16/21 00:28 Spike Amount mg/kg 100 Original Sample | LCS Result mg/kg 96.1 | % 96.1 rix Spike (M | % 80.0-120 IS) • Matrix | x Spike Du | plicate (MSI | D) | | | | | | | 5 5 |
| (LCS) R3631049-2 Analyte Lead L1326377-01 (| 03/16/21 00:28 Spike Amount mg/kg 100 Driginal Sample 03/16/21 00:31 • (MS) R | LCS Result mg/kg 96.1 (OS) • Matr 3631049-5 03 | % 96.1 rix Spike (M 8/16/21 00:41 • (N | % 80.0-120 IS) • Matrix MSD) R363104 | x Spike Du | plicate (MSI | D) | | | | | | | 4 C |
| (LCS) R3631049-2 Analyte Lead L1326377-01 (| 03/16/21 00:28 Spike Amount mg/kg 100 Driginal Sample 03/16/21 00:31 • (MS) R | LCS Result mg/kg 96.1 | % 96.1 rix Spike (M 8/16/21 00:41 • (N | % 80.0-120 IS) • Matrix MSD) R363104 | x Spike Du | plicate (MSI | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits | 5 | 5 5 |

PROJECT: 2t058 SDG: L1326377 DATE/TIME: 03/18/21 10:37 PAGE: 36 of 41

| Metals (ICPMS) t | y Method 6020 | | | | <u>L1</u> | 326377-20,21,2 | 2,23,24 | | | | | | |
|----------------------------|--|----------------------------------|--------------------|---------------------|----------------|----------------|---------------|------------------|--------------|---------------|----------|------------|---------------|
| Method Blank | : (MB) | | | | | | | | | | | | 1 |
| MB) R3631186-1 03 | 3/16/21 09:50 | | | | | | | | | | | | [|
| | MB Result | MB Qualifier | MB MDL | MB RDL | | | | | | | | | 2 |
| Analyte | mg/kg | | mg/kg | mg/kg | | | | | | | | | |
| .ead | U | | 0.0990 | 2.00 | | | | | | | | | |
| | | | | | | | | | | | | | |
| aboraton/ Co | ontrol Sample (LO | CC1 | | | | | | | | | | | L |
| | | 50) | | | | | | | | | | | l |
| LCS) R3631186-2 (| 03/16/21 09:53 Spike Amount | 1000 | LCS Rec. | Rec. Limits | 1000 100 | | | | | | | | L |
| Analyte | Spike Amount mg/kg | mg/kg | % | Kec. Limits | LCS Qualifier | | | | | | | | |
| Lead | 100 | 90.5 | 90.5 | 80.0-120 | | | | | | | | | |
| | 100 | 30.3 | 30.3 | 00.0 120 | | | | | | | | | |
| | | | | | | | | | | | | | |
| | Original Sample | (OS) • Mat | rix Spike | (MS) · Matr | ix Spike Du | plicate (MS | D) | | | | | | |
| _1326390-02 | | | | AACD) DOCOSS | 36-6 03/16/211 | 0:11 | | | | | | | |
| | , | R3631186-5 03 | 3/16/21 10:07 | | | | | | | | | PPP 11 14 | |
| L1326390-02 | 03/16/21 09:57 • (MS) | R3631186-5 03 Original Result | | MSD Result | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits | |
| | 03/16/21 09:57 • (MS) | | | | | MSD Rec. % | Dilution | Rec. Limits % | MS Qualifier | MSD Qualifier | RPD % | % | 8 |
| OS) L1326390-02 | 03/16/21 09:57 • (MS) Spike Amount | Original Result | MS Result | MSD Result | MS Rec. | | Dilution 5 | | MS Qualifier | MSD Qualifier | | | |
| OS) L1326390-02 Analyte | 03/16/21 09:57 • (MS) Spike Amount mg/kg | Original Result mg/kg | MS Result mg/kg | MSD Result mg/kg | MS Rec. % | % | | % | MS Qualifier | MSD Qualifier | % | % | |

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GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional guestions please contact your project representative

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrx, Sample Preservation, Field Banks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

| Appreviations a | and Definitions |
|-----------------|--|
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| MDL | Method Detection Limit. |
| MDL (dry) | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| RDL (dry) | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and patiently is discussion of possible implications of the Qualifier is the Case National Conference of the Cas |

| | potentially a discussion of possible implications of the addition in the case retrieve in applicable. |
|--------|--|
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column any state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |

| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
|---------------------------------|------------------------------|
|---------------------------------|------------------------------|

| | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol |
|---------------------|---|
| Case Narrative (Cn) | observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will |
| | he a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report |

This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. Quality Control Summary (Qc)

This is the document created in the field when your samples were initially collected. This is used to verify the time and Sample Chain of Custody (Sc)

date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. Sample Results (Sr)

This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. Sample Summary (Ss)

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.

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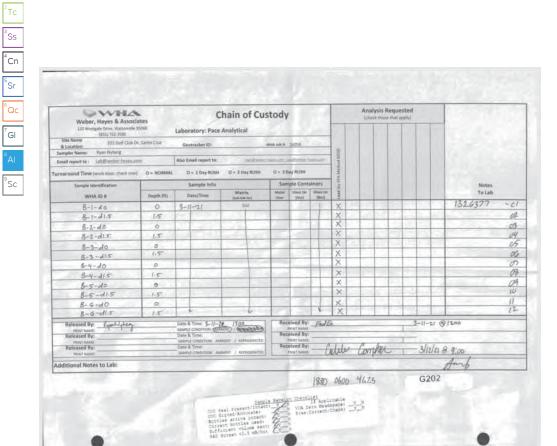
ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

| Alabama | 40660 | Nebraska | NE-OS-15-05 |
|-------------------------------|-------------|--------------------|------------------|
| laska | 17-026 | Nevada | TN000032021-1 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey-NELAP | TN002 |
| California | 2932 | New Mexico 1 | TN00003 |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina 1 | DW21704 |
| eorgia | NELAP | North Carolina 3 | 41 |
| Seorgia ¹ | 923 | North Dakota | R-140 |
| daho | TN00003 | Ohio-VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| ndiana | C-TN-01 | Oregon | TN200002 |
| owa | 364 | Pennsylvania | 68-02979 |
| Cansas | E-10277 | Rhode Island | LA000356 |
| Kentucky 16 | KY90010 | South Carolina | 84004002 |
| Kentucky ² | 16 | South Dakota | n/a |
| ouisiana | Al30792 | Tennessee 1 4 | 2006 |
| ouisiana | LA018 | Texas | T104704245-20-18 |
| Maine | TN00003 | Texas ⁵ | LAB0152 |
| Maryland | 324 | Utah | TN000032021-11 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 110033 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 998093910 |
| Montana | CERT0086 | Wyoming | A2LA |
| A2LA - ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA - ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| EPA-Crypto | TN00003 | | |

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

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^{*} Not all certifications held by the laboratory are applicable to the results reported in the attached report.

^{*} Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

| Weber, Hayes & Ass 120 Westgate Drive, Watson | Laboratory: Pace | Chain of Cus | tody | | | | Analysis Re- | | | | | |
|---|------------------|-----------------------|-------------------|----------------|---|--------------------|--------------|---------|----------|----------------|--|--|
| Site Name 333 Golf C & Location: Sampler Name: Ryan Nyberg | Geotracker ID: | | PHA July II | 21058 | | 10 | | | 150 | | | |
| Email report to : Lith@wither-lith | es a market | Also Email report to: | (stediese) | PRI (2003) | ed entro | MATERIAL PROPERTY. | 000 00 | | | | | |
| urnaround Time (work days: check | ore): O = NORMA | U = 1 Day RUSH | O = 2 Day RUSH | O = 3 Day RUSH | | | Metho | | | | | |
| Sample Identification | | Sample Info | Sample Containers | | | 1 2 | | | Notes | | | |
| WHA ID # | Depth (ft) | Date/Time Matrix. | | | Metal Glass Fas Glass Sar Liner (Ann) (Box) | | | | | To Lab | | |
| 8-7-do | 0 | 3-11-21 | Soll | - | | Str | X | 1013 | | 13 26377 /3 | | |
| B-7-d15 | 1.5 | | | | -39 | | × | | | 14 | | |
| B-8-do | 0 | | | | 18. | | X | | | 15 | | |
| B-8-d15 | 1.5 | | 1000 | | | | X | | | 16 | | |
| 8-9-10 | 0 | The Property | | | | | × | | 1100 | 17 | | |
| B-9-d1.5 | 1.5 | | | | 119 | | X | | | 17 | | |
| B-10-d0 | 0 | | | - | | | x | | | 19 | | |
| 8-10-41-5 | 1.5 | 1 | | 100 | | | X | | | 20 | | |
| B-11-d0 | 0 | | | | | | x | | S | 21 | | |
| B-11-d1.5 | 1.5 | | | | | | X | | | 22 | | |
| 8-12-20 | 0 | | | | 483 | | X | | S(F) (B) | 23 | | |
| B-12-d1.5 | 1.5 | | + | | - | | X | | | 24 | | |
| Released By: Emanbat HINT NAME Released By: PRINT NAME Released By: | ery. | Date & Time: | MINN HANGEATED | Reci | eived By: selved By: selved By: selved By: | - | allie I | Correta | 3-11-21 | 6 1300 6 1% | | |

1886 0600 4673

OC Sail Fream Little of The Tribution of Tribut

| Previous Testing Res | ults in the Vicinity - | RMD, August 2020 |
|----------------------|------------------------|------------------|
| | | |
| | | |
| | | |
| | | |

PRELIMINARY ENDANGERMENT ASSESSMENT REPORT

Pogonip Farm and Garden 333 Golf Club Drive Santa Cruz, California

01-DTSC-002

Prepared For: California Environmental Protection Agency Department of Toxic Substances Control 700 Heinz Avenue Berkeley, California 94710

Contract No. 19-T4727

Prepared By:



1371 Oakland Boulevard, Suite 200 Walnut Creek, California 94596

August 10, 2020

Day well Douglas Whichard **Project Scientist**

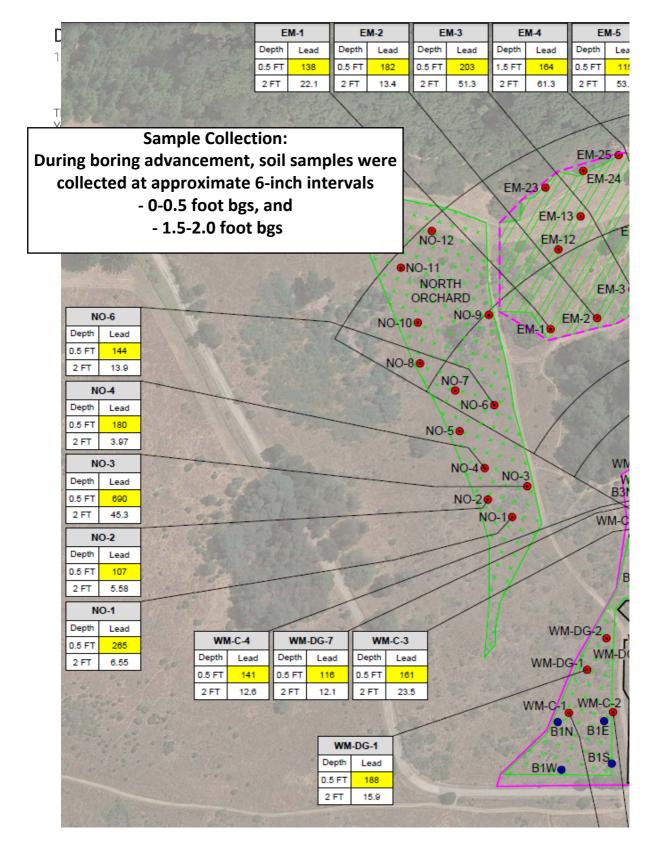
wymouse

lvy Inouye

Principal Toxicologist

Khaled Rahman,

Principal Hydroged



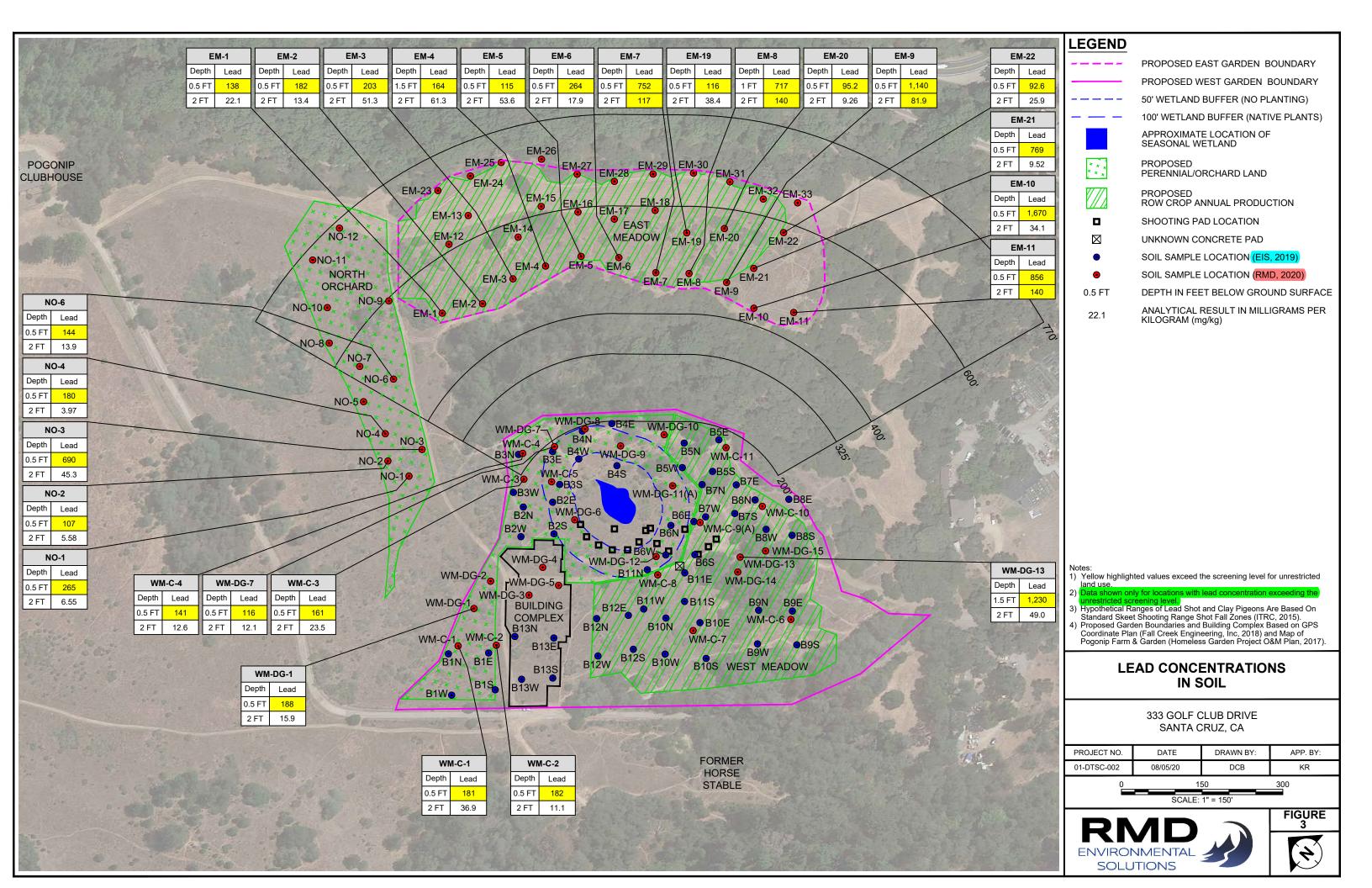


Table 1 Metals in Soil Pogonip Farm and Garden Santa Cruz, California

| | Sample ID | Date | Sample Depth | Depth Shot Observed | XRF Reading | Notes | Antimony | Antimony | | Arsenic | | | Lead | | Zinc | |
|--|---------------|-----------|-----------------|------------------------|---------------------|--------------------------|----------|----------|--------|---------|--------|--------------|----------------|--|--------------|----|
| WHAC-1457 \$715000 | | | (feet bgs) | (feet bgs) | | round Level ¹ | | | | | | | (mg/kg) 140 | | | |
| WMC-C1-0.5 \$1/3/2000 00.5 \$22 | | | | | /el ² 31 | | | | | | 80 | | 23,000 | | | |
| WMC-1-0.5 | | | | Con | nmercial Scre | ening Level ² | | | 0.36 | | 47,000 | | 320 | | 350,000 | |
| WMC-C-120 S112000 O.05 O.05 O.09 O.09 O.09 O.00 | WM C-1-0.5' | 5/13/2020 | 0.05 | 1 | 222 | | | | 2.63 | 1 | 12.3 | Т | 181 | 1 | 23.9 | T |
| WM C 2 9 F | | | | | | | - | , | - | | - | | | | - | |
| WM.C-2 22 \$5/13/2020 15-2 264 | | 5/13/2020 | | | | | | J | | J | | | | | 15.3 | |
| WM.C. S. ST1/12/200 C. S. 244 | | | | | | Duplicate | 1.57 | J | 2.45 | | 7.54 | | | | 13.6 | |
| WMAC-6-12 | | | | | | | 1 23 | | 21/ | | 9.38 | | | | 53.6 | |
| WM.C-61-05 ST13/2000 0.05 348 0.083 J 1.72 J 6.96 1.141 WM.C-6.05 ST13/2000 0.05 93 0.568 J 1.58 J 77.7 01 76.9 01 WM.C-6.05 ST13/2000 0.05 93 0.568 J 1.58 J 77.7 01 76.9 01 WM.C-6.05 ST14/2000 0.05 30 0.987 J 2.251 4.73 8.57 01 WM.C-6.05 ST14/2000 0.05 313 0.785 J 2.251 4.73 8.57 01 WM.C-6.05 ST14/2000 0.05 313 0.785 J 2.251 4.73 8.57 01 WM.C-6.05 ST14/2000 0.05 315 0.897 J 2.261 4.73 8.57 01 WM.C-6.05 ST14/2000 0.05 315 0.897 J 2.261 4.73 8.57 01 WM.C-6.05 ST14/2000 0.05 4.5 1.147 J 2.269 8.57 1.181 WM.C-6.05 ST14/2000 0.05 4.5 1.147 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.5 1.147 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.5 1.147 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.5 4.147 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.6 4.22 2.274 1.141 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.6 4.22 2.274 1.141 J 2.269 8.57 1.188 WM.C-6.05 ST14/2000 0.05 4.6 4.22 2.274 4.10 | | | | | | | | J | | J | | | | | - | |
| WM-C-0.0 | | | | | | | 0.683 | J | 1.92 | J | 6.96 | | | | 15 | |
| WM.C.O.S. \$140200 0.05 30 | | | | | | | | | | | | | | | - | |
| WM-C-0-05 | | | | | | | | | | J | | 01 | | 01 | 78.5 19.7 | 01 |
| WM.C.G.O.S. S140200 | | | | | | | | | | | | | | | 19.7 59.1 | |
| WM-C-0-A-1 | | | | | | | | | | | | | | | 31.0 | |
| WM-G-11-05 | | | | | | | | J | | J | | | | | 18.6 | |
| WM-DG-1-05 | | | 0 - 0.5 | | | | 1.65 | J | | | | | 27.0 | | 26.6 | |
| WM-DG-1-2 | | | | | | | | | | | | <u> </u> | | <u> </u> | 24.3 | |
| WM-DQ-2-0.5 | | | | | | | | J | | | | 1 | | <u> </u> | 16.4 | |
| WM.DG.3.05 | | | | | | | | | | | | 1 | | | 12.9 | |
| WM.DQ-5-02 51/32020 | | | | | | | | J | | J | | L | | | 23.0 | |
| WM-DG-6-02 57/3/2020 | | | | | | | | | | | | | | | 28.3 | |
| WM-DG-7-22 S1/3/2020 | | | | | | | | | | J | | 1 | | | 23.1 | |
| WM.DG-92 | | | | | | | | | | | | | | 1 | 18.5 17.0 | |
| WM.DG-8-05 | | | | | | | | J | | J | | | | | 17.0 | |
| WM.DG:10.05' S/13/2020 | | | | | | | | J | | J | | | | | 21.0 | |
| WM-DG-11-0.5 S/14/2020 | WM-DG-9-0.5' | | 0 - 0.5 | | 28 | | <2.31 | | 1.52 | J | 299 | | 17.5 | | 91.1 | |
| WM-DG-11-0.5-DUP | | | | | | | | J | | | | | | | 25.0 | |
| WM-DG-114-11 S/15/2020 0.5 - 1 16 | | | | 0.5.0 | | D li t . | | | | | | | | | 689 | |
| WM.DG-12-0.5 S714/2020 0-0.5 0 | | | | 0.5-2 | | Duplicate | | J | | | | | | | 75.8 15.6 | |
| WM-DG-13-1.5' S/14/2020 1-1.5 1-2 33 3.33 3.33 3.61 B 214 49.0 | | | | | | | | J | | | | | | | 51.6 | |
| WM-DG-13-2' S714/2020 1.5-2 33 3.33 3.33 3.34 8 214 49.0 WM-DG-14-05' S714/2020 0.0.5 19 0.817 J 2.82 8 8.28 13.8 J WM-DG-15.05' S714/2020 0.0.5 23 1.80 J 2.17 B,J 76.9 23.8 J J J J J J J J J | WM-DG-13-1.5' | | | 1.2 | | | | J | | | | | | | 28,500 | |
| WM-DG-15-0.5' 5/14/2020 | | | | 1-2 | | | | | | | | | | | 2,770 | |
| North Orchard Strike North Orchard Strike North Orchard North Orch | | | | | | | | | | | | | | | 40.8 303 | |
| NO-1-0.5' 5/14/2020 0-0.5 225 3.54 3.05 8 6.32 265 NO-1-2' 5/14/2020 1.5 - 2 225 - | WWI-DG-15-0.5 | 3/14/2020 | 0 - 0.3 | <u> </u> | 23 | | | | 2.17 | D,J | 70.9 | | 23.0 | 1 | 303 | 1 |
| NO-2-0.5' | NO-1-0.5' | 5/14/2020 | 0 - 0.5 | | 225 | | | | 3.05 | В | 6.32 | Τ | 265 | ī | 24.0 | Т |
| NO-2-2' | | | | | | | - | | i | | - | | 6.55 | | - | |
| NO-3-0.5' 5/14/2020 0 - 0.5 863 6.94 4.77 B 11.3 620 | | | | | | | 1.65 | J | 1.94 | B,J | 8.14 | | | | 17.6 | |
| NO-3-2' 5/14/2020 1.5 - 2 35 | | | | | | | | | - 4 77 | D | | | | | 21.5 | |
| NO-4-0.5' 5/14/2020 0-0.5 211 2.03 J 1.60 B,J 8.16 180 NO-4-2' 5/14/2020 1.5-2 16 - - 3.97 NO-5-0.5' 5/14/2020 0-0.5 10 1.08 J 1.57 B,J 50.8 40.0 NO-6-0.5' 5/14/2020 0-0.5 118 1.97 J 2.32 B,J 23.2 144 NO-6-2' 5/14/2020 0-0.5 43 0.926 J 1.91 B,J 8.08 29.8 NO-8-0.5' 5/14/2020 0-0.5 43 0.926 J 1.91 B,J 8.08 29.8 NO-8-0.5' 5/15/2020 0-0.5 31 0.928 J <2.46 18.9 18.5 NO-9-0.5' 5/15/2020 0-0.5 37 1.51 J 1.70 B,J 14.4 20.0 NO-10-0.5' 5/15/2020 0-0.5 17 <2.33 <2.33 18.0 14.0 NO-11-0.5' 5/15/2020 0-0.5 18 1.04 J 0.655 J 15.0 14.5 NO-12-0.5' 5/15/2020 0-0.5 21 0.718 J <2.42 17.1 10.5 NO-12-0.5' 5/12/2020 0-0.5 153 1.93 J 2.42 24.6 182 EM-2-0.5' 5/12/2020 0-0.5 153 1.93 J 2.42 24.6 182 EM-2-2' 5/12/2020 1.5-2 15 - - 2.21 2.87 2.87 3.23 16.6 203 EM-3-2' 5/12/2020 1.5-2 24 - - - - - 13.4 EM-4-1.5' 5/12/2020 1.5-2 24 - - | | | | | | | | | 4.77 | ь | | | | | | |
| NO-5-0.5' | | | | | | | 2.03 | J | 1.60 | B,J | 8.16 | | | | 15.7 | |
| NO-6-0.5' 5/14/2020 0-0.5 118 1.97 J 2.32 B.J 23.2 144 NO-6-2' 5/14/2020 1.5-2 14 13.9 NO-7-0.5' 5/14/2020 0-0.5 43 0.926 J 1.91 B.J 8.08 29.8 NO-8-0.5' 5/15/2020 0-0.5 31 0.928 J <2.46 18.9 18.5 NO-9-0.5' 5/14/2020 0-0.5 37 1.51 J 1.70 B.J 14.4 20.0 NO-10-0.5' 5/15/2020 0-0.5 17 <2.33 <2.33 18.0 14.0 NO-11-0.5' 5/15/2020 0-0.5 18 1.04 J 0.655 J 15.0 14.5 NO-12-0.5' 5/15/2020 0-0.5 21 0.718 J <2.42 17.1 10.5 NO-12-0.5' 5/12/2020 0-0.5 21 0.718 J <2.42 17.1 10.5 NO-12-0.5' 5/12/2020 0-0.5 119 2.34 2.42 63.1 138 NO-12-0.5' 5/12/2020 1.5-2 39 1.51 1.9 1.9 2.42 24.6 182 1.9 | | | | | | | | | | | | | | | - | |
| NO-6-2' 5/14/2020 1.5 - 2 14 - - - | | | | | | | | | | | | | | ļ | 44.2 | |
| NO-7-0.5' 5/14/2020 0 - 0.5 43 0.926 J 1.91 B,J 8.08 29.8 | | | | | | | | J | | R'1 | | 1- | | | 41.8 | - |
| NO-8-0.5' 5/15/2020 0 - 0.5 31 0.928 J <2.46 18.9 18.5 NO-9-0.5' 5/14/2020 0 - 0.5 39 1.51 J 1.70 B _o J 14.4 20.0 NO-10-0.5' 5/15/2020 0 - 0.5 17 <2.33 <2.33 18.0 14.0 NO-11-0.5' 5/15/2020 0 - 0.5 18 1.04 J 0.655 J 15.0 14.5 NO-12-0.5' 5/15/2020 0 - 0.5 21 0.718 J <2.42 17.1 10.5 NO-12-0.5' 5/15/2020 0 - 0.5 21 0.718 J <2.42 17.1 10.5 NO-12-0.5' 5/15/2020 0 - 0.5 119 2.34 2.42 63.1 138 NO-12-0.5' 5/12/2020 1.5 - 2 39 2.4 2.42 24.6 182 NO-12-0.5' 5/12/2020 0 - 0.5 153 1.93 J 2.42 24.6 182 NO-12-0.5' 5/12/2020 0 - 0.5 153 1.93 J 2.42 24.6 182 NO-12-0.5' 5/12/2020 0 - 0.5 153 1.93 J 2.42 24.6 182 NO-12-0.5' 5/12/2020 0 - 0.5 155 1.93 J 2.87 3.23 16.6 203 NO-12-0.5' 5/12/2020 1.5 - 2 15 1.5 | | | | | | | | J | | B,J | | 1 | | | 24.8 | |
| NO-10-0.5' 5/15/2020 0 - 0.5 17 <2.33 <2.33 18.0 14.0 | | | | | | | | | | ,- | | | | | 23.1 | |
| NO-11-0.5' 5/15/2020 0 - 0.5 18 | | | | | | | | J | | B,J | | | 20.0 | | 26.7 | |
| NO-12-0.5' 5/15/2020 0 - 0.5 21 0.718 J <2.42 17.1 10.5 East Meadow | | | | | | | | | | | | | | | 27.5 | |
| East Meadow EM-1-0.5' | | | | | | | | - | | J | | 1 | | ļ | 26.8 | - |
| EM-1-0.5' 5/12/2020 0 - 0.5 119 2.34 2.42 63.1 138 EM-1-2' 5/12/2020 1.5 - 2 39 - - - 22.1 EM-2-0.5' 5/12/2020 0 - 0.5 153 1.93 J 2.42 24.6 182 EM-2-2' 5/12/2020 1.5 - 2 15 - - - - 13.4 EM-3-0.5' 5/12/2020 1.5 - 2 15 - - - 13.4 - EM-3-0.5' 5/12/2020 1.5 - 2 24 - - - 51.3 - EM-3-2' 5/12/2020 1.5 - 2 24 - - - 51.3 - EM-4-1.5' 5/12/2020 1.5 - 2 47 - - - 51.8 164 EM-4-2' 5/12/2020 1.5 - 2 47 - - - 61.3 - EM-5-0.5' 5/12/2020 0 - 0.5 139 2.51 3.21 19.1 115 - - 53.6 - - | NO-12-0.5' | 5/15/2020 | 0 - 0.5 | | 21 | <u> </u> | | | <2.42 | | 17.1 | | 10.5 | _ | 49.8 | |
| EM-1-2' 5/12/2020 1.5-2 39 - - - 22.1 22.1 EM-2-0.5' 5/12/2020 0-0.5 153 1.93 J 2.42 24.6 182 EM-2-2' 5/12/2020 1.5-2 15 - - - 13.4 - EM-3-0.5' 5/12/2020 0-0.5 219 2.87 3.23 16.6 203 - EM-3-2' 5/12/2020 1.5-2 24 - - - 51.3 - EM-4-1.5' 5/12/2020 1.5-1.5 166 5.15 4.58 15.8 164 - EM-4-2' 5/12/2020 1.5-2 47 - - - 61.3 - EM-5-0.5' 5/12/2020 1.5-2 95 - - - 53.6 - - 53.6 - - - 53.6 - - - 53.6 - - - - - - - - - - - - - - - - | EM-1-0 5' | 5/12/2020 | 0-05 | | 119 | | | | 2.42 | | 63.1 | П | 138 | | 69.6 | T |
| EM-2-0.5' 5/12/2020 0 - 0.5 153 1.93 J 2.42 24.6 182 EM-2-2' 5/12/2020 1.5 - 2 15 - - - 13.4 - EM-3-0.5' 5/12/2020 0 - 0.5 219 2.87 3.23 16.6 203 - EM-3-2' 5/12/2020 1.5 - 2 24 - - - 51.3 - EM-4-1.5' 5/12/2020 1 - 1.5 166 5.15 4.58 15.8 164 - EM-4-2' 5/12/2020 1.5 - 2 47 - - - 61.3 - EM-5-0.5' 5/12/2020 1.5 - 2 95 - - - 53.6 - EM-6-0.5' 5/12/2020 1.5 - 2 95 - - - 53.6 - EM-6-0.5' 5/12/2020 1.5 - 2 83 - - - 17.9 - EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 252 | | | | | | | - | | | | - | | | | - | |
| EM-3-0.5' 5/12/2020 0 - 0.5 219 2.87 3.23 16.6 203 EM-3-2' 5/12/2020 1.5 - 2 24 - - - 51.3 EM-4-1.5' 5/12/2020 1.5 - 2 24 - - - 51.3 EM-4-1.5' 5/12/2020 1.5 - 2 47 - - - 61.3 EM-5-0.5' 5/12/2020 0 - 0.5 139 2.51 3.21 19.1 115 EM-5-2' 5/12/2020 1.5 - 2 95 - - - 53.6 EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 252 | EM-2-0.5' | 5/12/2020 | 0 - 0.5 | | 153 | | 1.93 | J | 2.42 | | 24.6 | | 182 | | 31.0 | |
| EM-3-2' 5/12/2020 1.5 - 2 24 - - 51.3 EM-4-1.5' 5/12/2020 1 - 1.5 166 5.15 4.58 15.8 164 EM-4-2' 5/12/2020 1.5 - 2 47 - - - 61.3 EM-5-0.5' 5/12/2020 0 - 0.5 139 2.51 3.21 19.1 115 EM-5-2' 5/12/2020 0 - 0.5 95 - - - - 53.6 EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 252 | | | | | | | | | | | | | | | - | |
| EM-4-1.5' 5/12/2020 1 - 1.5 166 5.15 4.58 15.8 164 EM-4-2' 5/12/2020 1.5 - 2 47 - - - 61.3 EM-5-0.5' 5/12/2020 0 - 0.5 139 2.51 3.21 19.1 115 EM-5-2' 5/12/2020 1.5 - 2 95 - - - 53.6 EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 252 | | | | | | | | | | | | 1 | | | 20.4 | |
| EM-4-2' 5/12/2020 1.5 - 2 47 - - - 61.3 EM-5-0.5' 5/12/2020 0 - 0.5 139 2.51 3.21 19.1 115 EM-5-2' 5/12/2020 1.5 - 2 95 - - - 53.6 EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 252 | | | | | | | | | | | | 1- | | | 25.3 | 1 |
| EM-5-2' 5/12/2020 1.5 - 2 95 - - - 53.6 EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 752 | | | | | | | | | | | | | | | - | L |
| EM-6-0.5' 5/12/2020 0 - 0.5 372 3.46 3.91 19.9 264 EM-6-2' 5/12/2020 1.5 - 2 83 - - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 752 | | 5/12/2020 | | | | | 2.51 | | 3.21 | | 19.1 | | 115 | | 26.4 | |
| EM-6-2' 5/12/2020 1.5 - 2 83 - - - 17.9 EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 Z52 | | | | | | | | | | | | <u> </u> | | <u> </u> | - | |
| EM-7-0.5' 5/12/2020 0 - 0.5 758 17.0 9.58 21.1 <u>752</u> | | | | | | | | | | | | 1 | | <u> </u> | 28.8 | - |
| | | | | | | | | | | | | 1 | | 1 | 30.7 | 1 |
| EM-7-2' 5/12/2020 1.5 - 2 46 - - - 117 | EM-7-2' | 5/12/2020 | 1.5 - 2 | | 46 | | - | | - | | - | | 117 | | - | L |
| EM-8-1' 5/12/2020 0.5 - 1 549 11.8 8.69 14.7 Z1Z | EM-8-1' | 5/12/2020 | | | 549 | | 11.8 | | 8.69 | | 14.7 | | | | 31.1 | |

Table 1 Metals in Soil Pogonip Farm and Garden

Santa Cruz, California

| EM-9-2' 5/ EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-11-2' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | estricted (Resi | idential) Scre | round Level ¹ eening Level ² eening Level ² | (mg/kg) 6 31 470 5.46 | | (mg/kg) 11 0.11 0.36 6.71 | | (mg/kg) 63 3,100 47,000 | (mg/kg) 43 80 320 | (mg/kg) 140 23,000 350,000 |
|---|--|---|--|--|--|-----------------------------------|-----|---------------------------------------|--------|----------------------------------|----------------------------|-------------------------------------|
| EM-9-2' 5/ EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-11-2' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | | idential) Screenmercial Screen | ening Level ² | 31 470 5.46 | | 0.11 0.36 | | 3,100 | 80 | 23,000 |
| EM-9-2' 5/ EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-11-2' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | | 1,227 168 2,973 | | 470 5.46 | | 0.36 | | | | |
| EM-9-2' 5/ EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-11-2' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | Com | 1,227 168 2,973 15 | eening Level ² | 5.46 | | | | 47,000 | 320 | 350 000 |
| EM-9-2' 5/ EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-11-2' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | | 168 2,973 15 | | - | L I | 671 | | | | , |
| EM-10-0.5' 5/ EM-10-2' 5/ EM-11-0.5' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-12-0.5' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | | 2,973 15 | | | | 0./ 1 | | 10.7 | <u>1.140</u> | 22.1 |
| EM-10-2' 5/ EM-11-0.5' 5/ EM-11-2' 5/ EM-12-0.5' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 1.5 - 2 0 - 0.5 1.5 - 2 0 - 0.5 | | 15 | | | | | | | 81.9 | |
| EM-11-0.5' 5/ EM-11-2' 5/ EM-12-0.5' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 1.5 - 2 0 - 0.5 | | | | 6.07 | | 8.44 | | 12.6 | <u>1,670</u> | 29.0 |
| EM-11-2' 5/ EM-12-0.5' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/12/2020 5/14/2020 5/15/2020 5/14/2020 | 1.5 - 2 0 - 0.5 | | 569 | | | | | | - | 34.1 | - |
| EM-12-0.5' 5/ EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/14/2020 5/15/2020 5/14/2020 | 0 - 0.5 | | 0.4 | | 3.78 | | 7.16 | | 24.4 | 856 | 36.2 |
| EM-13-0.5' 5/ EM-14-0.5' 5/ | 5/15/2020 5/14/2020 | | | 94 | | - 0.44 | | - | _ | - | 140 | - |
| EM-14-0.5' 5/ | 5/14/2020 | | | 31 24 | | <2.44 | | 3.04 0.554 | В | 38.6 9.98 | 9.15 11.2 | 98.3 25.4 |
| | | 0 - 0.5 | | | | 0.815 | J | | J | | | _ |
| | - /1 / /2020 | 0 - 0.5 | | 38 | Donlinet | 1.58 | J | 2.92 | B B | 12.5 | 33.0 | 44.5 |
| | 5/14/2020 5/15/2020 | 0 - 0.5 0 - 0.5 | | 26 | Duplicate | 2.14 1.12 | J | 2.80 1.72 | .J | 14.0 13.0 | 32.5 16.1 | 55.3 33.0 |
| | | | | | | | | | | | | |
| | 5/15/2020 | 0 - 0.5 | | 42 | | 1.00 | J | 1.33 | J | 14.0 | 24.6 | 37.3 |
| | 5/15/2020 | 0 - 0.5 | | 47 | | 1.50 | J | 1.13 | J | 13.8 | 40.3 | 35.0 |
| | 5/15/2020 | 0 - 0.5 | | 39 | | 3.29 | | 2.35 | | 11.2 | 44.5 | 30.5 |
| | 5/14/2020 | 0 - 0.5 | | 167 | | 3.13 | | 3.57 | В | 12.7 | 116 | 46.0 |
| | 5/14/2020 | 1.5 - 2 | | 64 | | = | | - | | - | 38.4 | |
| | 5/15/2020 | 0 - 0.5 | | 58 | | <2.53 | | 2.07 | J | 20.5 | 95.2 | 33.4 |
| | 5/15/2020 | 1.5 - 2 | | 10 | | = | | = | | = | 9.26 | - |
| | 5/14/2020 | 0 - 0.5 | | 776 | | 10.0 | | 6.12 | | 7.16 | <u>768</u> | 28.7 |
| EM-21-0.5'-DUP 5/ | 5/14/2020 | 0 - 0.5 | | 776 | Duplicate | 6.85 | | 5.65 | В | 7.33 | <u>769</u> | 30.6 |
| EM-21-2' 5/ | 5/14/2020 | 1.5 - 2 | | 17 | | - | | - | | - | 9.52 | - |
| | 5/15/2020 | 0 - 0.5 | | 100 | | <2.28 | | 2.39 | | 12.3 | 92.6 | 22.8 |
| EM-22-2' 5/ | 5/15/2020 | 1.5 - 2 | | 17 | | - | | - | | - | 25.9 | - |
| EM-23-0.5' 5/ | 5/15/2020 | 0 - 0.5 | | 29 | | 0.932 | J | 1.24 | J | 12.8 | 10.7 | 26.0 |
| EM-24-0.5' 5/ | 5/15/2020 | 0 - 0.5 | | 33 | | 0.886 | J | 0.686 | J | 9.50 | 9.18 | 26.8 |
| EM-25-0.5' 5/ | 5/15/2020 | 0 - 0.5 | | 30 | | 0.786 | J | 0.810 | J | 12.2 | 10.3 | 28.7 |
| EM-26-0.5' 5/ | 5/15/2020 | 0 - 0.5 | | 19 | | 0.656 | J | 1.02 | J | 11.7 | 10.8 | 25.1 |
| EM-27-0.5' 5/ | 5/15/2020 | 0 - 0.5 | 1 | 34 | i i | 1.02 | J | 0.823 | J | 13.6 | 6.12 | 26.4 |
| EM-28-0.5' 5/ | 5/15/2020 | 0 - 0.5 | | 29 | i | 0.813 | J | 0.865 | J | 14.4 | 14.3 | 31.9 |
| EM-29-0.5' 5/ | 5/15/2020 | 0 - 0.5 | † i | 31 | i i | 0.720 | J | 1.02 | J | 10.8 | 17.8 | 36.8 |
| | 5/15/2020 | 0 - 0.5 | | 31 | | <2.25 | | 2.52 | | 21.9 | 18.0 | 24.1 |
| | 5/15/2020 | 0 - 0.5 | t | 33 | 1 | <2.30 | | 2.07 | J | 9.94 | 15.4 | 19.1 |
| | 5/15/2020 | 0 - 0.5 | | 18 | | <2.34 | | 2.01 | J | 13.8 | 37.4 | 23.0 |
| | 5/15/2020 | 0 - 0.5 | | 17 | | <2.25 | | 2.23 | J | 8.74 | 12.3 | 19.0 |

Soil samples sieved using No. 10 sieve and metals analyzed using USEPA Method 6010B.

Analytes detected above laboratory reporting limit are emboldened.

Analytes detected above background level and Unrestricted (Residential) Screening Level are highlighted.

Analytes detected above background level and Commercial Screening Level are underlined.

bgs = Below ground surface. mg/kg = Milligrams per kilogram.

= Not analyzed.

Je = The same analyte is found in the associated blank.

J = The identification of the analyte is acceptable; the reported value is an estimate.

J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

O1 = The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

1 Lawrence Berkeley National Laboratory (LBNL, 2009), was used to establish acceptable upper estimate background concentrations for metals with the exception of arsenic. For arsenic, the background level represents the established background level for San Francisco Bay Region of 11 mg/kg (Duvergé, 2011).

² In order of priority, the screening level represents the Department of Toxic Substances Control (DTSC)-modified screening level (DTSC, 2020) followed by U.S. Environmental Protection Agency (USEPA) Regional Screening Level (RSL; USEPA, 2020).

DTSC, 2020. Human Health Risk Assessment (HHRA) Note Number 3. June.

Duvergé, 2011. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region. December.

LBNL, 2009. Analysis of Background Distributions of Metals in Soil at Lawrence Berkeley National Laboratory. Revised April.

USEPA, 2020. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). May.

APPENDIX B

SOIL SCREENING LEVELS FOR HYPOTHETICAL RECREATIONAL TRAIL USER RECEPTOR AND HYPOTHETICAL UNAUTHORIZED CAMPER RECEPTOR

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B.1.0 SOIL SCREENING LEVELS FOR HYPOTHETICAL RECREATIONAL TRAIL USER RECEPTOR AND HYPOTHETICAL UNAUTHORIZED CAMPER RECEPTOR

Based on current and anticipated future land use as a recreational area, the recreational trail user receptor and unauthorized camper receptor were included in the conceptual site model (CSM; Section 3.0 of this Report). The recreational trail user is a long-term receptor that may include visitors using the recreational trails and the unauthorized camper receptor is a long-term receptor camping at the Site. Although camping is prohibited at the Site, at the request of the County, the on-Site unauthorized camper receptor was included in the CSM and risk-based screening levels were developed for this receptor. The following exposure pathways were included in the development of soil screening levels (SLs) for lead and polycyclic aromatic hydrocarbons (PAHs):

- Incidental ingestion of soil;
- Dermal contact with soil; and
- Inhalation of dust in outdoor air.

B.1.1 Lead

Unlike other chemicals, toxicokinetic models are used to predict blood lead concentrations to determine if exposure to lead poses adverse noncarcinogenic effects to receptors and to develop soil screening levels (SLs) for lead.

B.1.1.1 Risk Characterization for Lead

The human health screening evaluation (HHSE) for lead for the hypothetical recreational trail user receptor is discussed in Section 5.0 of this Report.

For the hypothetical unauthorized camper receptor, the exposure pathways are incomplete due to the implementation of engineering controls to mitigate unauthorized camping at the Site. Regardless, as noted in the 2019 *Phase I Environmental Site Assessment* (Phase I; Weber, Hayes & Associates [WHA], 2019) and during Site visits, unauthorized camp sites have been observed within the ravine area. As discussed in Section 5.1 of this Report, the exposure point concentrations (EPCs) for surface and shallow soil samples collected from the ravine area were 884 milligrams per kilogram (mg/kg) and 170 mg/kg, respectively. These lead EPCs for surface soil and shallow soil do not exceed the unauthorized camper soil SLs of 1,800 mg/kg and 1,080 mg/kg for 14-day and 28-day exposure frequencies, respectively. In the event of

unauthorized camping within the ravine area, lead does not pose an adverse noncarcinogenic risk to the hypothetical unauthorized camper receptor.

B.1.1.2 Screening Levels for Lead

Neither the U.S. Environmental Protection Agency (USEPA) nor the California Environmental Protection Agency (CalEPA) publishes toxicity values for lead; therefore, blood-lead models are used to predict blood lead concentrations and develop soil SLs for lead. This section describes the blood-lead model used to develop lead soil SLs for the hypothetical recreational trail user receptor and hypothetical unauthorized camper receptor.

DTSC LeadSpread 8 Model

The DTSC LeadSpread 8 model (DTSC, 2011) calculates several blood lead concentrations, including the median, 90th, 95th, 98th, and 99th percentile estimates for the predicted distribution. Additionally, the model calculates the concentration in exterior soil and interior dust that will result in a 90th percentile estimate of blood lead equal to the target increase in children's blood lead level of concern by 1 microgram per deciliter (µg/dL; CalEPA benchmark incremental change criterion for lead). This target concentration is referred to as "PRG-90". DTSC LeadSpread 8 addresses child exposures only and is recommended by DTSC for evaluating lead exposure under unrestricted land use. In the model, DTSC indicates that non-residential scenarios may involve fewer than seven days per week for exposure frequency. This model was used to develop soil screening levels for lead for the following non-residential receptors:

- Hypothetical Recreational Trail User Receptor This receptor is assumed to visit the Site
 one day per week (52 days per year). Therefore, the exposure frequency in the model is
 reduced from seven days per week (default) to one day per week. Based on this model,
 the soil SL for lead is 540 mg/kg.
- Hypothetical Unauthorized Camper Receptor Since camping is prohibited, the exposure frequency of this receptor is unknown. Based on best professional judgment, two exposure frequencies were considered. For one exposure scenario, this receptor is assumed to camp at the Site for 14 days per year. This is consistent with the Bureau of Land Management (BLM) yearly recreational exposure frequency for a recreational visitor, which includes a range of possible activities including camping (BLM, 2017). For the second exposure scenario, the exposure frequency was doubled to be 28 days per year. Therefore, the exposure frequency in the model is reduced from seven days per week (default) to 0.3 day per week and 0.5 day per week, which is equivalent to 14 days per

year and 28 days per year, respectively. Based on this model, the soil SLs for lead are 1,800 mg/kg and 1,080 mg/kg for 14-day and 28-day exposure frequencies, respectively.

The LeadSpread 8 model worksheets for the receptors described above are provided in Attachment B1.

B.1.2 Polycyclic Aromatic Hydrocarbons (PAHs)

Using data from the exposure and toxicity assessments, human noncancer adverse health effects (hazard index [HI]) and excess cancer risks from potential exposure to PAHs in shallow soil (0 to 2 feet below ground surface [bgs]) were estimated. Then, using the HI and excess cancer risk estimates, soil EPCs, and USEPA and CalEPA target HI and excess cancer risk, risk-based soil SLs were estimated for PAHs.

B.1.2.1 Risk Characterization for PAHs

This section summarizes the approach used to estimate noncancer adverse health effects and excess cancer risks from assumed exposure to PAHs in shallow soil. The risk characterization equations for each potentially complete and significant exposure pathway are presented in Attachment B2. The input parameters for the risk characterization equations are summarized below:

- All detected PAHs were retained as chemicals of potential concern (COPCs, Table B-1);
- Instead of an average exposure scenario (central tendency exposure [CTE]), an upper-bound exposure scenario was evaluated (otherwise referred to as a reasonable maximum exposure [RME]). The RME scenario assumes mostly conservative upper-bound intake assumptions (e.g., 90th or 95th percentile for nearly all intake assumptions) and upper-bound estimates of chemical concentrations;
- Chemical doses were estimated on the basis of a number of intake assumptions, also referred to as exposure factors, including EPCs, exposure frequency, exposure duration, body weight, and other parameters. Consistent with the parameters used for the development of soil SLs for lead, the exposure parameters are as follows:
 - Hypothetical Recreational Trail User Receptor Eight hours a day, one day per week (52 days per year) for a period of 26 years (as both a child [6 years] and an adult [20 years]). Potential exposures for this receptor are expected to occur from time spent outdoors only.

O Hypothetical Unauthorized Camper Receptor – For this receptor, two potential exposure scenarios were evaluated: (1) 24 hours a day for 14 days per year and (2) 24 hours a day for 28 days per year. Both scenarios are for an exposure period of 26 years (as both a child [6 years] and an adult [20 years]). Potential exposures for this receptor are expected to occur from time spent outdoors only.

The intake assumptions for these receptors are summarized in Tables B-2, B-3, and B-4.

- The EPCs are conservative estimates of the chemical concentration in shallow soil. It is unlikely that a potential receptor will spend the entire exposure duration of 26 years residing over maximum detected concentrations in shallow soil. Therefore, it is appropriate to statistically evaluate the shallow soil data on an area-wide basis and consider a 95-percent upper confidence limit of the mean (95UCL) concentration as an appropriate EPC. A USEPA software package, ProUCL Version 5.1, was used to estimate the upper confidence limit of the mean concentration (UCL; [typically the 95UCL, but sometimes the 97.5UCL or 99UCL, depending on the data set]). The ProUCL output spreadsheets are presented in Attachment B3. Consistent with USEPA (1989) procedures, the lesser of the maximum detected concentration and the 95UCL was selected as shallow soil EPCs. The soil EPCs for PAHs are presented on Table B-1.
- Toxicity values are combined with exposure factors to estimate adverse noncancer health effects and excess cancer risks. Toxicity values include oral reference doses (RfDs), inhalation reference concentrations (RfCs), oral slope factors (SFs), and inhalation unit risk factors (IURs). Toxicity values were selected in accordance with Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals rule (Health and Safety Code [HSC] §25300 et seq., "Chapter 6.8"; Toxicity Criteria Rule) and DTSC (2019) Note Number 10. The toxicity values are presented on Tables B-5 and B-6.

The parameters described above were used in risk characterization equations (Attachment B2) to estimate noncancer HI and excess cancer risks as described in the following sections.

Noncancer Adverse Health Effects - Hazard Quotient and Hazard Index

Noncarcinogenic effects are typically evaluated by comparing an exposure level over a specified time period, with an RfD or RfC based on a similar time period. To estimate noncancer effects, the intake is divided by the RfD or RfC. The resulting value is referred to as a hazard quotient (HQ).

Exposures to multiple chemicals were evaluated by summing the HQs for each chemical for each exposure pathway to estimate the HI, using the following equation:

$$HI_p = \sum_{i=1}^n HQ_{i,p}$$

Where:

HI_p = HI for the receptor's exposure to n chemicals via pathway p (unitless);

n = Number of chemicals (i.e., detected PAHs); and

 $HQ_{i,p} = HQ$ for chemical i for exposure pathway p (unitless).

A HI less than or equal to one indicates that no adverse noncancer health effects are expected to occur (USEPA, 1989). Consistent with methods used by USEPA (2021), the HI presented for the receptors is based on the child receptor, which is higher than the HI for the corresponding adult receptor. This is conservative because it assumes higher daily intake rates, lower body weight, and chronic toxicity values. The summation of HIs across age groups (i.e., child and adult) is inappropriate because noncancer hazard is not cumulative over time, as is assumed for cancer risk (USEPA, 2021).

Excess Cancer Risk

SFs/IURs were used to estimate the potential excess cancer risk associated with exposure to individual COPCs. Consistent with USEPA (1989) risk assessment guidelines, the SF/IUR was multiplied by the chronic daily intake averaged over 70 years to estimate lifetime excess cancer risk. The resulting values are referred to as excess cancer risks. These potential excess cancer risks are compared to CalEPA's risk management range of 1×10^{-6} to 1×10^{-4} . The CalEPA threshold value of one-in-one million (1×10^{-6}) represents the lower end (most stringent) of the CalEPA's risk management range and is the point of departure for risk management decisions for the receptors.

The potential cancer risks from exposure to multiple chemicals were then estimated by summing the excess cancer risks for each chemical for a given exposure pathway using the following equation:

$$CR_p = \sum_{i=1}^{n} CR_{i,p}$$

Where:

CR_p = Excess cancer risk for the receptor's exposure to n chemicals via pathway p (unitless);

n = Number of chemicals (i.e., detected PAHs); and

 $CR_{i,p}$ = Excess cancer risk for chemical i for exposure pathway p (unitless).

Consistent with methods used by USEPA (2021), the excess cancer risk estimates for the receptors are the sum of the excess cancer risk estimates for the child and adult receptors.

The results of this risk characterization process for the hypothetical recreational trail user receptor are presented on Table B-7 and summarized in the following table:

| Media | Exposure Pathway | Hazard Index (HI) | Cancer Risk (CR) | Comments |
|-----------------------------------|--|----------------------|----------------------|---|
| Shallow Soil (0 to 2 feet bgs) | Direct Exposure -Ingestion -Dermal Contact -Inhalation of Dust | 0.05 | 4 x 10 ⁻⁶ | HI does not exceed target level of 1. CR exceeds target level of 1 x 10 ⁻⁶ . Individual HIs for all COPCs do not exceed 1 (see Table B-7). Individual CRs for all COPCs do not exceed 1 x 10 ⁻⁶ (see Table B-7). |

The HI does not exceed the USEPA and CalEPA target level of one; therefore, PAHs do not pose adverse noncancer effects to the hypothetical recreational trail user receptor. The excess cancer risk is within CalEPA's risk management range of 1 x 10^{-6} to 1 x 10^{-4} . The individual excess cancer risks for PAHs do not exceed 1 x 10^{-6} . Benzo(a)pyrene and dibenz(a,h)anthracene are the primary contributors to the excess cancer risk, each with an estimated cancer risk of 1 x 10^{-6} . They account for 63% of the total excess cancer risk. Individual excess cancer risks for all other PAHs are less than 1 x 10^{-6} .

The results of this risk characterization process for the hypothetical unauthorized camper receptor are presented on Tables B-8 and B-9 and summarized in the following table:

| Media | Exposure Pathway | Hazard Index (HI) | Cancer Risk (CR) | Comments |
|-----------------------------------|--|----------------------|----------------------|---|
| Shallow Soil (0 to 2 feet bgs) | Direct Exposure -Ingestion -Dermal Contact -Inhalation of Dust (Exposure frequency of 14 days per year) | 0.01 | 1 x 10 ⁻⁶ | HI does not exceed target level of 1. CR does not exceed target level of 1 x 10 ⁻⁶ . Individual HIs for all COPCs do not exceed 1 (see Table B-8). Individual CRs for all COPCs do not exceed 1 x 10 ⁻⁶ (see Table B-8). |
| Shallow Soil (0 to 2 feet bgs) | Direct Exposure -Ingestion -Dermal Contact -Inhalation of Dust (Exposure frequency of 28 days per year) | 0.02 | 2 x 10 ⁻⁶ | HI does not exceed target level of 1. CR exceeds target level of 1 x 10 ⁻⁶ . Individual HIs for all COPCs do not exceed 1 (see Table B-9). Individual CRs for all COPCs do not exceed 1 x 10 ⁻⁶ (see Table B-9). |

The HIs do not exceed the USEPA and CalEPA target level of one; therefore, PAHs do not pose adverse noncancer effects to the hypothetical recreational trail user receptor and hypothetical

unauthorized camper receptor. The excess cancer risk is within CalEPA's risk management range of 1×10^{-6} to 1×10^{-6} . The individual excess cancer risks for PAHs do not exceed 1×10^{-6} .

B.1.2.2 Screening Levels for PAHs

Using the HI and excess cancer risk estimates, source EPCs, and USEPA and CalEPA target HI of one and target excess cancer risk of 1 x 10^{-6} , a soil SL was estimated using the equations in the following sections.

Soil SL - Noncarcinogenic Effects

$$Soil \ SL_{nc} = \frac{HI_T \times EPC_{i,p}}{HI_{i,p}}$$

Where:

Soil SL_{nc}= Soil SL for noncarcinogenic effects for chemical i via pathway p (mg/kg);

 HI_T = Target HI of one (unitless);

EPC_{i,p}= Exposure point concentration for soil for chemical i via pathway p (mg/kg); and

 $HI_{i,p}$ = HI for chemical i via pathway p (unitless).

Soil SL - Carcinogenic Effects

$$Soil SL_c = \frac{CR_T \times EPC_{i,p}}{CR_{i,p}}$$

Where:

Soil SL_{nc}= Soil SL for carcinogenic effects for chemical i via pathway p (mg/kg);

 CR_T = Target excess cancer risk of 1 x 10⁻⁶ (unitless);

EPC_{i,p}= Exposure point concentration for soil for chemical i via pathway p (mg/kg); and

 $CR_{i,p}$ = Excess cancer risk for chemical i via pathway p (unitless).

The recreation trail user soil SLs for PAHs are presented on Table B-7. The unauthorized camper soil SLs for PAHs under the two exposure scenarios (i.e., exposure frequencies of 14 days per year and 28 days per year) are presented on Tables B-8 and B-9.

B.2.0 SUMMARY

Based on current and anticipated future land use in the Lower Main Meadow, Pogonip Open Space as a recreational area, the recreational trail user receptor and the unauthorized camper receptor were included in the CSM, and risk-based screening levels were developed.

Exposures to lead are evaluated separately from other COPCs by using toxicokinetic models to predict blood lead concentrations and soil SLs. The HHSE for lead for the hypothetical recreational trail user receptor is discussed in Section 5.0 of this Report. For the hypothetical unauthorized camper receptor, lead EPCs for surface soil and shallow soil in the ravine area do not exceed the unauthorized camper soil SLs of 1,800 mg/kg and 1,080 mg/kg for 14-day and 28-day exposure frequencies, respectively. In the event of unauthorized camping within the ravine area, lead does not pose an adverse noncarcinogenic risk to the hypothetical unauthorized camper receptor.

Based on the evaluation of potential human health risks to the recreational trail user receptor and the unauthorized camper receptor from exposure to PAHs, the HIs do not exceed the USEPA and CalEPA target level of one and the excess cancer risks are within CalEPA's risk management range of 1 x 10^{-6} to 1 x 10^{-4} . The individual excess cancer risks for PAHs detected in soil do not exceed 1 x 10^{-6} .

Since there are no published soil SLs for recreational receptors, Site-specific risk-based soil SLs were developed for use at the Site. The soil SLs for lead and PAHs detected in shallow soil at the Site are summarized in the following table.

| | So | il Screening Levels (mg/ | /kg) |
|----------------------|----------------------------------|--------------------------|------------------------|
| COPC | Recreational Trail User Receptor | Unauthorized C | amper Receptor |
| Primary Exposure | 8 hours/day | 24 hours/day | 24 hours/day |
| Assumptions | 52 days/year | 14 days/year, | 28 days/year |
| | 26 years (adult/child) | 26 years (adult/child) | 26 years (adult/child) |
| Lead | 540 | 1,800 | 1,080 |
| Anthracene | 120,000 | 430,000 | 220,000 |
| Acenaphthene | 23,000 | 87,000 | 43,000 |
| Benz(a)anthracene | 45 | 170 | 84 |
| Benzo(a)pyrene | 4.5 | 17.0 | 8.4 |
| Benzo(b)fluoranthene | 45 | 170 | 84 |

| | So | il Screening Levels (mg/ | /kg) |
|-----------------------|-------------------------------------|--------------------------|------------------------|
| COPC | Recreational Trail User Receptor | Unauthorized C | amper Receptor |
| Primary Exposure | 8 hours/day | 24 hours/day | 24 hours/day |
| Assumptions | 52 days/year | 14 days/year, | 28 days/year |
| | 26 years (adult/child) | 26 years (adult/child) | 26 years (adult/child) |
| Benzo(g,h,i)perylene | NE | NE | NE |
| Benzo(k)fluoranthene | 450 | 1,700 | 840 |
| Chrysene | 4,500 | 17,000 | 8,400 |
| Dibenz(a,h)anthracene | 1.1 | 4.1 | 2.1 |
| Fluoranthene | NE | NE | NE |
| Fluorene | 16,000 | 58,000 | 29,000 |
| Indeno(1,2,3- | | | |
| c,d)pyrene | 45 | 170 | 84 |
| Phenanthrene | NE | NE | NE |
| Pyrene | 12,000 | 43,000 | 22,000 |
| Naphthalene | 38 | 140 | 70 |
| 1-Methylnaphthalene | 160 | 580 | 290 |
| 2-Methylnaphthalene | 1,600 | 5,800 | 2,900 |

Notes:

NE = No toxicity values are available; therefore, risk-based screening level was not estimated.

B.3.0 REFERENCES

- Bureau of Land Management (BLM), 2017. BLM Technical Memorandum, Screening Assessment Approaches for Metals in Soil at BLM HazMat/AML Sites. September 2017 Update.
- Department of Toxic Substances Control (DTSC), 2011. User's Guide to LeadSpread 8 and Recommendations for Evaluation of Lead Exposures in Adults. Department of Toxic Substances Control. September.
- DTSC, 2019. Human Health Risk Assessment Note Number 10: Required Toxicity Criteria under sections 69021(a), (b), and (c) of the Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals Rule and Specification of DTSC-Recommended Toxicity Criteria for Other Analytes Evaluated in Human Health Risk Assessments, Screening-Levels, and Remediation-Goal Calculations. February 25.
- U.S. Environmental Protection Agency (USEPA), 1989. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A. Interim Final. Solid Waste and Emergency Response. December.
- USEPA, 2021. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). May.
- Weber, Hayes & Associates (WHA), 2019. Phase I Environmental Site Assessment for Recreational Open Space Property. November 19.



Table B-1
Statistical Summary of Shallow Soil (0 to 2 feet bgs) Analytical Data - West Meadow

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Chemical | Number of Samples | Number of Detections | Frequency of Detection | Arithmetic Mean of Detected (mg/kg) | Standard Deviation of Detected (mg/kg) | Minimum Detected Concentration (mg/kg) | Maximum Detected Concentration (mg/kg) | 95UCL ¹ (mg/kg) | Soil EPC ² (mg/kg) |
|--|-------------------------|----------------------------|------------------------------|---|--|--|--|--------------------------------------|----------------------------------|
| Polynuclear Aromatic Hydrocarbons (PAHs) | | | | | | | | | |
| Anthracene | 31 | 12 | 39% | 0.20 | 0.30 | 0.00491 | 0.986 | 0.21 | 0.21 |
| Acenaphthene | 31 | 10 | 32% | 0.13 | 0.20 | 0.00499 | 0.651 | 0.13 | 0.13 |
| Benz(a)anthracene | 31 | 23 | 74% | 1.4 | 2.6 | 0.00212 | 8.45 | 3.6 | 3.6 |
| Benzo(a)pyrene | 31 | 26 | 84% | 1.8 | 3.7 | 0.00239 | 11.7 | 7.7 | 7.7 |
| Benzo(b)fluoranthene | 31 | 29 | 94% | 1.9 | 4.1 | 0.00244 | 14.8 | 9.0 | 9.0 |
| Benzo(g,h,i)perylene | 31 | 25 | 81% | 1.0 | 1.9 | 0.00215 | 7.52 | 1.9 | 1.9 |
| Benzo(k)fluoranthene | 31 | 18 | 58% | 0.85 | 1.4 | 0.00264 | 4.02 | 1.8 | 1.8 |
| Chrysene | 31 | 21 | 68% | 1.9 | 3.2 | 0.00297 | 9.86 | 4.5 | 4.5 |
| Dibenz(a,h)anthracene | 31 | 15 | 48% | 0.71 | 1.3 | 0.00377 | 4.45 | 1.0 | 1.0 |
| Fluoranthene | 31 | 21 | 68% | 1.6 | 2.9 | 0.00273 | 11.1 | 3.9 | 3.9 |
| Fluorene | 31 | 9 | 29% | 0.054 | 0.086 | 0.00249 | 0.260 | 0.053 | 0.053 |
| Indeno(1,2,3-c,d)pyrene | 31 | 21 | 68% | 1.1 | 1.9 | 0.00213 | 6.25 | 1.7 | 1.7 |
| Phenanthrene | 31 | 14 | 45% | 0.68 | 1.2 | 0.00295 | 4.14 | 0.90 | 0.90 |
| Pyrene | 31 | 22 | 71% | 1.5 | 3.0 | 0.00280 | 11.8 | 2.7 | 2.7 |
| Naphthalene | 31 | 9 | 29% | 0.57 | 1.5 | 0.00491 | 4.68 | 1.2 | 1.2 |
| 1-Methylnaphthalene | 31 | 5 | 16% | 0.026 | 0.028 | 0.0106 | 0.0762 | 0.028 | 0.028 |
| 2-Methylnaphthalene | 31 | 5 | 16% | 0.037 | 0.041 | 0.0133 | 0.110 | 0.038 | 0.038 |

Notes:

95UCL = 95 Percent Upper Confidence Limit of the Arithmetic Mean.

EPC = Exposure point concentration.

mg/kg = Milligrams per kilogram.

References:

USEPA. 1989. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A. Interim Final. Solid Waste and Emergency Response. December.

¹ A U.S. Environmental Protection Agency (USEPA) software package, ProUCL Version 5.1, was used to estimate the upper confidence limit of the mean concentration (UCL; [typically the 95UCL, but sometimes the 97.5UCL or 99UCL, depending on the data set]).

² Consistent with USEPA (1989) procedures, when evaluating a reasonable maximum exposure scenario the lesser of the maximum detected concentration and the 95UCL was selected as the appropriate soil EPC for comparison with the screening level.

Table B-2 Exposure Intake Assumptions for Hypothetical Recreational Trail User Receptor¹

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Parameter | Acronym | Value | Unit | Source |
|---|---------|----------|-------------------------|------------------|
| Target Cancer Risk | TR | 1.00E-06 | Unitless | DTSC, 2019 |
| Target Hazard Index | THI | 1 | Unitless | DTSC, 2019 |
| Child | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 2,190 | days | DTSC, 2019 |
| Exposure Duration | ED | 6 | years | BPJ ³ |
| Exposure Frequency | EF | 52 | days/year | BPJ⁴ |
| Exposure Time | ET | 8 | hours/day | BPJ ⁵ |
| Body Weight | BW | 15 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 200 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 2,373 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.2 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m³/kg | DTSC, 2019 |
| Adult | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 7,300 | days | DTSC, 2019 |
| Exposure Duration | ED | 20 | years | BPJ ³ |
| Exposure Frequency | EF | 52 | day/year | BPJ⁴ |
| Exposure Time | ET | 8 | hours/day | BPJ ⁵ |
| Body Weight | BW | 80 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 100 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 6,032 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.07 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m ³ /kg | DTSC, 2019 |

Notes:

kg = kilograms. mg/day = milligrams per day. cm² = square centimeters. mg/cm²-day = milligrams per square centimeter per day.

m³/kg = cubic meters per kilogram.

References:

DTSC. 2015. Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control. October.

DTSC. 2019. Human Health Risk Assessment Note Number 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. April 9.

¹ Hypothetical recreational trail user receptor includes visitors and trespassers, which are expected to spend entire exposure duration outdoors.

² Based on a 70 year lifetime.

Best professional judgment. Recreational receptor is expected to spend time as both a child and adult recreator receptor over a lifetime

⁴ Best professional judgment. Recreational receptor was assumed to visit one day per week.

⁵ Best professional judgment. Recreational receptor was assumed to visit 8 hours a day.

⁶ In accordance with DTSC (2015), the dermal absorption fraction for polynuclear aromatic hydrocarbons can be assumed to be 0.15.

⁷ In the absence of a PEF for the recreational scenario, the PEF was assumed to be the same value used for residential and industrial scenarios (DTSC, 2019).

Table B-3 Exposure Intake Assumptions for Hypothetical Camper Receptor with an Exposure Frequency of 14 days per year¹

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Parameter | Acronym | Value | Unit | Source |
|---|---------|----------|-------------------------|------------------------|
| Target Cancer Risk | TR | 1.00E-06 | Unitless | DTSC. 2019 |
| Target Hazard Index | THI | 1 | Unitless | DTSC, 2019 |
| Child | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 2,190 | days | DTSC, 2019 |
| Exposure Duration | ED | 6 | years | BPJ^3 |
| Exposure Frequency | EF | 14 | days/year | BLM, 2017 ⁴ |
| Exposure Time | ET | 24 | hours/day | BPJ ⁵ |
| Body Weight | BW | 15 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 200 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 2,373 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.2 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m ³ /kg | DTSC, 2019 |
| Adult | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 7,300 | days | DTSC, 2019 |
| Exposure Duration | ED | 20 | years | BPJ ³ |
| Exposure Frequency | EF | 14 | day/year | BLM, 2017 ⁴ |
| Exposure Time | ET | 24 | hours/day | BPJ ⁵ |
| Body Weight | BW | 80 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 100 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 6,032 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.07 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m ³ /kg | DTSC, 2019 |

Notes:

kg = kilograms. mg/day = milligrams per day. cm² = square centimeters. mg/cm²-day = milligrams per square centimeter per day.

m³/kg = cubic meters per kilogram.

References:

BLM. 2017. BLM Technical Memorandum, Screening Assessment Approaches for Metals in Soil at BLM HazMat/AML Sites. September 2017 Update.

DTSC. 2015. Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control. October.

DTSC. 2019. Human Health Risk Assessment Note Number 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. April 9.

¹ Hypothetical camper receptor are expected to spend entire exposure duration outdoors.

² Based on a 70 year lifetime.

³ Best professional judgment. Recreational receptor is expected to spend time as both a child and adult recreator receptor over a lifetime

⁴ In accordance with the Bureau of Land Management (BLM) yearly recreational exposure frequency for recreational visitor, which includes a range of possible activities, including camping (BLM, 2017).

⁵ Best professional judgment. Recreational receptor was assumed to camp at the site 24 hours a day.

⁶ In accordance with DTSC (2015), the dermal absorption fraction for polynuclear aromatic hydrocarbons can be assumed to be 0.15.

⁷ In the absence of a PEF for the recreational scenario, the PEF was assumed to be the same value used for residential and industrial scenarios (DTSC, 2019).

Table B-4 Exposure Intake Assumptions for Hypothetical Camper Receptor with an Exposure Frequency of 28 days per year¹

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Parameter | Acronym | Value | Unit | Source |
|---|---------|----------|-------------------------|------------------|
| Target Cancer Risk | TR | 1.00E-06 | Unitless | DTSC, 2019 |
| Target Hazard Index | THI | 1 | Unitless | DTSC, 2019 |
| Child | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 2,190 | days | DTSC, 2019 |
| Exposure Duration | ED | 6 | years | BPJ ³ |
| Exposure Frequency | EF | 28 | days/year | BPJ⁴ |
| Exposure Time | ET | 24 | hours/day | BPJ ⁵ |
| Body Weight | BW | 15 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 200 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 2,373 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.2 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m ³ /kg | DTSC, 2019 |
| Adult | | | | |
| Averaging Time (carcinogens) ² | ATc | 25,550 | days | DTSC, 2019 |
| Averaging Time (noncarcinogens) | ATn | 7,300 | days | DTSC, 2019 |
| Exposure Duration | ED | 20 | years | BPJ ³ |
| Exposure Frequency | EF | 28 | day/year | BPJ⁴ |
| Exposure Time | ET | 24 | hours/day | BPJ ⁵ |
| Body Weight | BW | 80 | kg | DTSC, 2019 |
| Soil Ingestion Rate | IRs | 100 | mg/day | DTSC, 2019 |
| Skin Surface Area | SA | 6,032 | cm ² | DTSC, 2019 |
| Soil Adherence Factor | AF | 0.07 | mg/cm ² -day | DTSC, 2019 |
| Dermal Absorption Factor ⁶ | ABS | 0.15 | unitless | DTSC, 2019 |
| Particulate Emission Factor ⁷ | PEF | 1.32E+09 | m³/kg | DTSC, 2019 |

Notes:

kg = kilograms. mg/day = milligrams per day. cm² = square centimeters. mg/cm²-day = milligrams per square centimeter per day. m³/kg = cubic meters per kilogram.

¹ Hypothetical camper receptor are expected to spend entire exposure duration outdoors.

References:

BLM. 2017. BLM Technical Memorandum, Screening Assessment Approaches for Metals in Soil at BLM HazMat/AML Sites. September 2017 Update.

DTSC. 2015. Preliminary Endangerment Assessment Guidance Manual. Department of Toxic Substances Control. October.

DTSC. 2019. Human Health Risk Assessment Note Number 1, Recommended DTSC Default Exposure Factors for Use in Risk Assessment at California Hazardous Waste Sites and Permitted Facilities. April 9.

² Based on a 70 year lifetime.

Best professional judgment. Recreational receptor is expected to spend time as both a child and adult recreator receptor over a lifetime

⁴ Best professional judgment. As an upperbound evaluation, the Bureau of Land Management (BLM) yearly recreational exposure frequency for recreational visitor of 14 days per year (BLM, 2017) was doubled to 24 days per year.

⁵ Best professional judgment. Recreational receptor was assumed to camp at the site 24 hours a day.

⁶ In accordance with DTSC (2015), the dermal absorption fraction for polynuclear aromatic hydrocarbons can be assumed to be 0.15.

⁷ In the absence of a PEF for the recreational scenario, the PEF was assumed to be the same value used for residential and industrial scenarios (DTSC, 2019).

Table B-5 Toxicity Values - Reference Doses/Reference Concentrations¹

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| | Or | al Reference Dose (R | fD) ² | GI | ABS | Inhalation Reference Concentration (RfC) | | | |
|----------------------------------|-----------------------------|-------------------------------|------------------|---------------------|-------------|--|-------------------------------|-------------|--|
| Chemical | Value (mg/kg-day) | Target Organ(s)/ System(s) | Source | Value (unitless) | Source | Value (μg/m³) | Target Organ(s)/ System(s) | Source | |
| Polycyclic Aromatic Hydrocarbons | | | | | | | | | |
| Anthracene | 3.0E-01 | None | USEPA, 2021 | 1 | USEPA, 2004 | 1.2E+03 | RTR | USEPA, 2021 | |
| Acenaphthene | 6.0E-02 | Liver | USEPA, 2021 | 1 | USEPA, 2004 | 2.4E+02 | RTR | USEPA, 2021 | |
| Benz(a)anthracene | | | | 1 | USEPA, 2004 | | | | |
| Benzo(a)pyrene | 3.0E-04 | Developmental | USEPA, 2021 | 1 | USEPA, 2004 | 2.0E-03 | Developmental | USEPA, 2021 | |
| Benzo(b)fluoranthene | | | | 1 | USEPA, 2004 | | | | |
| Benzo(g,h,i)perylene | | | | 1 | USEPA, 2004 | | | | |
| Benzo(k)fluoranthene | | | | 1 | USEPA, 2004 | | | | |
| Chrysene | | | | 1 | USEPA, 2004 | | | | |
| Dibenz(a,h)anthracene | | | | 1 | USEPA, 2004 | | | | |
| Fluoranthene | 4.0E-02 | Liver, Blood | USEPA, 2021 | 1 | USEPA, 2004 | | | | |
| Fluorene | 4.0E-02 | Blood | USEPA, 2021 | 1 | USEPA, 2004 | 1.6E+02 | RTR | USEPA, 2021 | |
| Indeno(1,2,3-c,d)pyrene | | | | 1 | USEPA, 2004 | | | | |
| Phenanthrene | | | | 1 | USEPA, 2004 | | | | |
| Pyrene | 3.0E-02 | Kidney | USEPA, 2021 | 1 | USEPA, 2004 | 1.2E+02 | RTR | USEPA, 2021 | |
| Naphthalene | 2.0E-02 | Other (body weight) | USEPA, 2021 | 1 | USEPA, 2004 | 3.0E+00 | Nervous, Respiratory | USEPA, 2021 | |
| 1-Methylnaphthalene | 7.0E-02 | Respiratory | ATSDR, 2021 | 1 | USEPA, 2004 | 2.8E+02 | RTR | ATSDR, 2021 | |
| 2-Methylnaphthalene | 4.0E-03 | Respiratory | USEPA, 2021 | 1 | USEPA, 2004 | 1.6E+01 | RTR | USEPA, 2021 | |

Notes:

GIABS = Gastrointestinal absorption factor.

RTR = route to route extrapolation.

mg/kg-day = milligrams per kilogram body weight per day.

--= not available.

 μ g/m³ = micrograms per cubic meter.

References:

ATSDR. 2021. Minimal Risk Levels (MRLs). August.

DTSC. 2019. Human Health Risk Assessment Note Number 10: Required Toxicity Criteria under sections 69021(a), (b), and (c) of the Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals Rule and Specification of DTSC-Recommended Toxicity Criteria for Other Analytes Evaluated in Human Health Risk Assessments, Screening-Levels, and Remediation-Goal Calculations. February 25.

USEPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final. Office of Superfund Remediation and Technology Innovation. July.

USEPA. 2021. Integrated Risk Information System (IRIS). On-line computer database. Last accessed September.

¹ Toxicity values were selected in accordance with Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals rule and DTSC (2019) Note Number 10.

² In the absence of dermal toxicity values the oral reference doses were multiplied by the gastrointestinal absorption (GIABS) factor and used to evaluate dermal exposure.

Table B-6 Toxicity Values - Slope Factors/Inhalation Unit Risk Factors¹

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Chemical | Oral Slope | Factor (SF) ² | GIA | ABS | Inhalation Unit | Risk Factor (IUR) |
|----------------------------------|------------------------------------|--------------------------|---------------------|-------------|---------------------------------------|--------------------|
| | Value (mg/kg-day) ⁻¹ | Source | Value (unitless) | Source | Value (μg/m³) ⁻¹ | Source |
| Polycyclic Aromatic Hydrocarbons | | | | | | |
| Anthracene | | | 1 | USEPA, 2004 | | |
| Acenaphthene | | | 1 | USEPA, 2004 | | |
| Benz(a)anthracene | 1.0E-01 | USEPA, 2021a | 1 | USEPA, 2004 | 1.1E-04 | OEHHA, 2021 |
| Benzo(a)pyrene | 1.0E+00 | USEPA, 2021c | 1 | USEPA, 2004 | 1.1E-03 | OEHHA, 2021 |
| Benzo(b)fluoranthene | 1.0E-01 | USEPA, 2021a | 1 | USEPA, 2004 | 1.1E-04 | OEHHA, 2021 |
| Benzo(g,h,i)perylene | | | 1 | USEPA, 2004 | | |
| Benzo(k)fluoranthene | 1.0E-02 | USEPA, 2021a | 1 | USEPA, 2004 | 1.1E-04 | OEHHA, 2021 |
| Chrysene | 1.0E-03 | USEPA, 2021a | 1 | USEPA, 2004 | 1.1E-05 | OEHHA, 2021 |
| Dibenz(a,h)anthracene | 4.1E+00 | OEHHA, 2021 | 1 | USEPA, 2004 | 1.2E-03 | OEHHA, 2021 |
| Fluoranthene | | | 1 | USEPA, 2004 | | |
| Fluorene | | | 1 | USEPA, 2004 | | |
| Indeno(1,2,3-c,d)pyrene | 1.0E-01 | USEPA, 2021a | 1 | USEPA, 2004 | 1.1E-04 | OEHHA, 2021 |
| Phenanthrene | | | 1 | USEPA, 2004 | | |
| Pyrene | | | 1 | USEPA, 2004 | | |
| Naphthalene | 1.2E-01 | OEHHA, 2021 | 1 | USEPA, 2004 | 3.4E-05 | OEHHA, 2021 |
| 1-Methylnaphthalene | 2.9E-02 | USEPA, 2021b | 1 | USEPA, 2004 | 7.3E-06 | (RTR) USEPA, 2021b |
| 2-Methylnaphthalene | | | 1 | USEPA, 2004 | | |

Notes:

GIABS = Gastrointestinal absorption factor.

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

mg/kg-day = milligrams per kilogram body weight per day.

--= not available.

References:

DTSC. 2019. Human Health Risk Assessment Note Number 10: Required Toxicity Criteria under sections 69021(a), (b), and (c) of the Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals Rule and Specification of DTSC-Recommended Toxicity Criteria for Other Analytes Evaluated in Human Health Risk Assessments, Screening-Levels, and Remediation-Goal Calculations. February 25.

OEHHA. 2021. Toxicity Criteria Database. On-line computer database. Last accessed September.

USEPA. 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). Final. Office of Superfund Remediation and Technology Innovation. July.

USEPA. 2021a. Regional Screening Level (RSL) Summary Table (TR=1E-6, HQ=1). May

USEPA. 2021b. Provisional Peer-Reviewed Toxicity Values (PPRTV). On-line computer database. Last accessed September.

USEPA. 2021c. Integrated Risk Information System (IRIS). On-line computer database. Last accessed September.

¹ Toxicity values were selected in accordance with *Toxicity Criteria for Human Health Risk Assessments, Screening Levels, and Remediation Goals* rule and DTSC (2019) Note Number 10.

² In the absence of dermal toxicity values the oral slope factors were divided by the gastrointestinal absorption (GIABS) factor and used to evaluate dermal exposure.

Table B-7

Total Risk Characterization for the Hypothetical Recreational Trail User Receptor Direct Exposure to COPCs in Soil (0 to 2 feet bgs)

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Chemical of Potential Concern Child Resident Receptor Polycyclic Aromatic Hydrocarbons Anthracene Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene Dibenz(a,h)anthracene | Exposure Point Concentration (C _{soil}) (mg/kg) 2.04E-01 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 1.37E+00 | Chronic Oral Reference Dose (cRfDo) (mg/kg-day) 3.00E-01 6.00E-02 3.00E-04 | Carcinogenic Ef Chronic Inhalation Reference Concentration (cRfCi) (µg/m³) 1.20E+03 2.40E+02 2.00E-03 | Hazard Quotient (HQ) (unitless) 2 E-06 5 E-06 | Oral Slope Factor (SFo) (mg/kg-day) ⁻¹ | rcinogenic Effection Inhalation Unit Risk Factor (URF) (μg/m³) ⁻¹ | Excess Cancer Risk (unitless) | Noncarcinogenic Effects ¹ (mg/kg) | Carcinogenic Effects ² (mg/kg) | Soil SL ¹ (mg/kg) |
|---|---|--|---|---|--|--|-------------------------------------|--|--|---------------------------------|
| Anthracene Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 2.04E-01 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 3.00E-01 6.00E-02 3.00E-04 | 1.20E+03 2.40E+02 2.00E-03 | 2 E-06 5 E-06 | | ,, | (unitiess) | (mg/kg) | (mg/kg) | (mg/kg) |
| Anthracene Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 6.00E-02 3.00E-04 | 2.40E+02 2.00E-03 | 5 E-06 | | | | | | |
| Anthracene Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 6.00E-02 3.00E-04 | 2.40E+02 2.00E-03 | 5 E-06 | | | | | l | |
| Anthracene Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 6.00E-02 3.00E-04 | 2.40E+02 2.00E-03 | 5 E-06 | | | | | | |
| Acenaphthene Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 1.24E-01 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 6.00E-02 3.00E-04 | 2.40E+02 2.00E-03 | 5 E-06 | | | | 1.2E+05 | | 1.2E+05 |
| Benz(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 3.51E+00 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 3.00E-04 | 2.00E-03 | | | | | 2.3E+04 | | 2.3E+04 |
| Benzo(a)pyrene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 5.28E+00 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | 3.00E-04 | 2.00E-03 | | 1.00E-01 | 1.10E-04 | 8 E-08 | 2.52+04 | 4.5E+01 | 4.5E+01 |
| Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 8.74E+00 2.73E+00 1.72E+00 4.33E+00 | | | 5 E-02 | 1.00E+00 | 1.10E-04 1.10E-03 | 1 E-06 | 1.2E+02 | 4.5E+00 | 4.5E+00 |
| Benzo(g,h,i)perylene Benzo(k)fluoranthene Chrysene | 2.73E+00 1.72E+00 4.33E+00 | | | 5 E-02 | | | | 1.26+02 | | |
| Benzo(k)fluoranthene Chrysene | 1.72E+00 4.33E+00 | | | | 1.00E-01 | 1.10E-04 | 2 E-07 | | 4.5E+01 | 4.5E+01 |
| Chrysene | 4.33E+00 | | | | | | 4 F 00 | | 4.55.00 | |
| • | | | | | 1.00E-02 | 1.10E-04 | 4 E-09 | | 4.5E+02 | 4.5E+02 |
| L)ihenz(a h)anthracene | 1.37E+00 | | | | 1.00E-03 | 1.10E-05 | 1 E-09 | | 4.5E+03 | 4.5E+03 |
| , · · · | 0 0 1 = 0 0 | | | | 4.10E+00 | 1.20E-03 | 1 E-06 | | 1.1E+00 | 1.1E+00 |
| Fluoranthene | 3.81E+00 | 4.00E-02 | | 2 E-04 | | | | | | |
| Fluorene | 5.09E-02 | 4.00E-02 | 1.60E+02 | 3 E-06 | | | | 1.6E+04 | | 1.6E+04 |
| Indeno(1,2,3-c,d)pyrene | 2.50E+00 | | | | 1.00E-01 | 1.10E-04 | 6 E-08 | | 4.5E+01 | 4.5E+01 |
| Phenanthrene | 8.72E-01 | | | | | | | | | |
| Pyrene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 3 E-04 | | | | 1.2E+04 | | 1.2E+04 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 1 E-04 | 1.20E-01 | 3.40E-05 | 3 E-08 | 7.8E+03 | 3.8E+01 | 3.8E+01 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 1 E-06 | 2.90E-02 | 7.25E-06 | 2 E-10 | 2.7E+04 | 1.6E+02 | 1.6E+02 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 2 E-05 | | | | 1.6E+03 | | 1.6E+03 |
| Adult Resident Receptor | | | | | | | | | | |
| Polycyclic Aromatic Hydrocarbons | | | | | | | | | | |
| Anthracene | 2.04E-01 | 3.00E-01 | 1.20E+03 | 2 E-07 | | | | 1.0E+06 | | 1.0E+06 |
| Acenaphthene | 1.24E-01 | 6.00E-02 | 2.40E+02 | 6 E-07 | | | | 2.1E+05 | | 2.1E+05 |
| Benz(a)anthracene | 3.51E+00 | 0.00L 0Z | 2.402.02 | | 1.00E-01 | 1.10E-04 | 3 E-08 | 2.12.00 | 1.2E+02 | 1.2E+02 |
| Benzo(a)pyrene | 5.28E+00 | 3.00E-04 | 2.00E-03 | 5 E-03 | 1.00E+00 | 1.10E-04 1.10E-03 | 4 E-07 | 1.0E+03 | 1.2E+01 | 1.2E+02 |
| Benzo(b)fluoranthene | 8.74E+00 | 3.00E-04 | 2.00E-03 | 5 =-03 | 1.00E+00 1.00E-01 | 1.10E-03 1.10E-04 | 7 E-08 | 1.02+03 | 1.2E+01 1.2E+02 | 1.2E+01 |
| Benzo(g,h,i)perylene | 2.73E+00 | | | | 1.00E-01 | 1.10E-04 | 7 = -00 | | 1.26+02 | 1.26+02 |
| Benzo(k)fluoranthene | 1.72E+00 | | | | 1.00E-02 | 1.10E-04 | 1 E-09 | | 1.2E+03 | 1.2E+03 |
| Chrysene | 4.33E+00 | | | | 1.00E-02 1.00E-03 | 1.10E-04 1.10E-05 | 4 E-10 | | 1.2E+03 1.2E+04 | 1.2E+03 1.2E+04 |
| , | 4.33E+00 1.37E+00 | | | | 4.10E-03 | 1.10E-05 1.20E-03 | 4 E-10 5 E-07 | | 1.2E+04 2.9E+00 | 1.2E+04 2.9E+00 |
| Dibenz(a,h)anthracene Fluoranthene | 3.81E+00 | 4.00E-02 | | 3 E-05 | 4.10E+00 | | | | | |
| | | | | | | | | 1 45.05 | | 1 45 105 |
| Fluorene | 5.09E-02 | 4.00E-02 | 1.60E+02 | 4 E-07 | | | | 1.4E+05 | 4.05.00 | 1.4E+05 |
| Indeno(1,2,3-c,d)pyrene | 2.50E+00 | | | | 1.00E-01 | 1.10E-04 | 2 E-08 | | 1.2E+02 | 1.2E+02 |
| Phenanthrene | 8.72E-01 | | 4.005.00 | 4 5 05 | | | | 4.05.05 | | 4.05.05 |
| Pyrene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 4 E-05 | | | | 1.0E+05 | | 1.0E+05 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 2 E-05 | 1.20E-01 | 3.40E-05 | 1 E-08 | 6.9E+04 | 1.0E+02 | 1.0E+02 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 1 E-07 | 2.90E-02 | 7.25E-06 | 7 E-11 | 2.4E+05 | 4.1E+02 | 4.1E+02 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 3 E-06 | | | | 1.4E+04 | | 1.4E+04 |
| | | Tatal | Hazard Index = | 5 E-02 | Total Ever- | Cancer Risk = | 4 E-06 | | <u>, </u> | |

Notes:

mg/kg = milligrams per kilogram.

mg/kg-day = milligrams per kilogram body weight per day.

μg/m³ = micrograms per cubic meter.

--= not available or not applicable. No toxicity values are available; therefore, value was not estimated

2 E-06

6.32 E-01

¹ Soil SL represents the lower of the SLs based on noncarcinogenic and carcinogenic effects.

² Consistent with methods used by USEPA, the HI presented for the hypothetical recreational trail user receptor is based on the child receptor.

¹ Consistent with methods used by USEPA, the excess cancer risk estimates for the hypothetical recreational trail user receptor are the sum of the excess cancer risk estimates for the child and adult receptors.

Table B-8

Total Risk Characterization for the Hypothetical Camper Receptor Direct Exposure to COPCs in Soil (0 to 2 feet bgs) with an Exposure Frequency of 14 days per year

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| | Noncarcinogenic Effects | | | fects | Ca | rcinogenic Effe | cts | Risk-Based Soil Screening Level (SL) | | |
|---|---|--|---|---------------------------------------|--|--|-------------------------------------|--|---|----------------------|
| Chemical of Potential Concern | Exposure Point Concentration (C _{soil}) (mg/kg) | Chronic Oral Reference Dose (cRfDo) (mg/kg-day) | Chronic Inhalation Reference Concentration (cRfCi) (µg/m³) | Hazard Quotient (HQ) (unitless) | Oral Slope Factor (SFo) (mg/kg-day) ⁻¹ | Inhalation Unit Risk Factor (URF) (µg/m ³) ⁻¹ | Excess Cancer Risk (unitless) | Noncarcinogenic Effects ¹ (mg/kg) | Carcinogenic Effects ² (mg/kg) | Soil SL ¹ |
| | (Hig/kg) | (mg/kg day) | (F9/) | (unitiess) | (mg/ng ddy) | (μ9/) | (dilitiess) | (mg/kg) | (mg/kg) | (mg/kg) |
| Child Resident Receptor Polycyclic Aromatic Hydrocarbons Anthracene | 2.04E-01 | 3.00E-01 | 1.20E+03 | 5 E-07 | | | | 4.3E+05 | | 4.3E+05 |
| Acenaphthene | 1.24E-01 | 6.00E-01 | 2.40E+02 | 1 E-06 | | | | 4.3E+05 8.7E+04 | | 4.3E+05 8.7E+04 |
| Benz(a)anthracene | 3.51E+00 | | | | 1.00E-01 | 1.10E-04 | 2 E-08 | | 1.7E+02 | 1.7E+02 |
| Benzo(a)pyrene | 5.28E+00 | 3.00E-04 | 2.00E-03 | 1 E-02 | 1.00E+00 | 1.10E-03 | 3 E-07 | 4.3E+02 | 1.7E+01 | 1.7E+01 |
| Benzo(b)fluoranthene | 8.74E+00 | | | | 1.00E-01 | 1.10E-04 | 5 E-08 | | 1.7E+02 | 1.7E+02 |
| Benzo(g,h,i)perylene | 2.73E+00 | | | | | | | | | |
| Benzo(k)fluoranthene | 1.72E+00 | | | | 1.00E-02 | 1.10E-04 | 1 E-09 | | 1.7E+03 | 1.7E+03 |
| Chrysene | 4.33E+00 1.37E+00 | | | | 1.00E-03 4.10E+00 | 1.10E-05 | 3 E-10 | | 1.7E+04 4.1E+00 | 1.7E+04 4.1E+00 |
| Dibenz(a,h)anthracene Fluoranthene | 3.81E+00 | 4.00E-02 | | 7 E-05 | 4.10E+00 | 1.20E-03 | 3 E-07 | | 4.1E+00 | 4.1E+00 |
| Fluorene | 5.09E-02 | 4.00E-02 4.00E-02 | 1.60E+02 | 9 E-07 | | | | 5.8E+04 | | 5.8E+04 |
| Indeno(1,2,3-c,d)pyrene | 2.50E+00 | 4.00L-02 | 1.00L+02 | 9 L-07 | 1.00E-01 | 1.10E-04 | 1 E-08 | J.0L+04 | 1.7E+02 | 1.7E+02 |
| Phenanthrene | 8.72E-01 | | | | 1.002 01 | 1.102 04 | | | 1.72.02 | 1.7 2 - 02 |
| Pyrene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 9 E-05 | | | | 4.3E+04 | | 4.3E+04 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 4 E-05 | 1.20E-01 | 3.40E-05 | 8 E-09 | 2.9E+04 | 1.4E+02 | 1.4E+02 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 3 E-07 | 2.90E-02 | 7.25E-06 | 5 E-11 | 1.0E+05 | 5.8E+02 | 5.8E+02 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 6 E-06 | | | | 5.8E+03 | | 5.8E+03 |
| Adult Resident Receptor | | | | | | | | | | |
| Polycyclic Aromatic Hydrocarbons | | | | | | | | | | |
| Anthracene | 2.04E-01 | 3.00E-01 | 1.20E+03 | 5 E-08 | | | | 3.8E+06 | | 3.8E+06 |
| Acenaphthene | 1.24E-01 | 6.00E-02 | 2.40E+02 | 2 E-07 | | | | 7.7E+05 | | 7.7E+05 |
| Benz(a)anthracene | 3.51E+00 | | | | 1.00E-01 | 1.10E-04 | 8 E-09 | | 4.5E+02 | 4.5E+02 |
| Benzo(a)pyrene | 5.28E+00 | 3.00E-04 | 2.00E-03 | 1 E-03 | 1.00E+00 | 1.10E-03 | 1 E-07 | 3.6E+03 | 4.5E+01 | 4.5E+01 |
| Benzo(b)fluoranthene | 8.74E+00 | | | | 1.00E-01 | 1.10E-04 | 2 E-08 | | 4.5E+02 | 4.5E+02 |
| Benzo(g,h,i)perylene | 2.73E+00 | | | | | | | | | |
| Benzo(k)fluoranthene | 1.72E+00 | | | | 1.00E-02 | 1.10E-04 | 4 E-10 | | 4.5E+03 | 4.5E+03 |
| Chrysene | 4.33E+00 | | | | 1.00E-03 | 1.10E-05 | 1 E-10 | | 4.5E+04 | 4.5E+04 |
| Dibenz(a,h)anthracene | 1.37E+00 | | | | 4.10E+00 | 1.20E-03 | 1 E-07 | | 1.1E+01 | 1.1E+01 |
| Fluoranthene | 3.81E+00 | 4.00E-02 | 4.005.00 | 7 E-06 | | | | | | |
| Fluorene | 5.09E-02 2.50E+00 | 4.00E-02 | 1.60E+02 | 1 E-07 | 1.00E-01 | 1.10E-04 | 6 E-09 | 5.1E+05 | 4.5E+02 | 5.1E+05 4.5E+02 |
| Indeno(1,2,3-c,d)pyrene Phenanthrene | 8.72E-01 | | | | 1.00E-01 | 1.10E-04 | 6 E-09 | | 4.5E+U2 | 4.5E+02 |
| Prienantinene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 1 E-05 | | | | 3.8E+05 | | 3.8E+05 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 4 E-06 | 1.20E-01 | 3.40E-05 | 3 E-09 | 2.5E+05 | 3.7E+02 | 3.7E+02 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 3 E-08 | 2.90E-02 | 7.25E-06 | 2 E-11 | 8.9E+05 | 1.5E+03 | 1.5E+03 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 7 E-07 | | | | 5.1E+04 | | 5.1E+04 |
| | <u> </u> | T. 4.1 | Hazard Index = | 1 E-02 | T. (1) F | Cancer Risk = | 1 E-06 | | | |

Notes:

mg/kg = milligrams per kilogram.

mg/kg-day = milligrams per kilogram body weight per day.

 μ g/m³ = micrograms per cubic meter.

--- = not available or not applicable. No toxicity values are available; therefore, value was not estimated

6 E-07

6.32 E-01

¹ Soil SL represents the lower of the SLs based on noncarcinogenic and carcinogenic effects.

² Consistent with methods used by USEPA, the HI presented for the hypothetical recreational trail user receptor is based on the child receptor.

¹ Consistent with methods used by USEPA, the excess cancer risk estimates for the hypothetical recreational trail user receptor are the sum of the excess cancer risk estimates for the child and adult receptors.

Table B-9

Total Risk Characterization for the Hypothetical Camper Receptor Direct Exposure to COPCs in Soil (0 to 2 feet bgs) with an Exposure Frequency of 28 days per year

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| | | Non | carcinogenic Ef | fects | Ca | rcinogenic Effe | cts | Risk-Bas | ed Soil Screening L | evel (SL) |
|---|---|---|---|---------------------------------------|--|-----------------------------------|-------------------------------------|--|---|----------------------|
| Chemical of Potential Concern | Exposure Point Concentration (C _{soil}) (mg/kg) | Chronic Oral Reference Dose (cRfDo) | Chronic Inhalation Reference Concentration (cRfCi) (µg/m³) | Hazard Quotient (HQ) (unitless) | Oral Slope Factor (SFo) (mg/kg-day) ⁻¹ | Inhalation Unit Risk Factor (URF) | Excess Cancer Risk (unitless) | Noncarcinogenic Effects ¹ (mg/kg) | Carcinogenic Effects ² (mg/kg) | Soil SL ¹ |
| | (mg/kg) | (mg/kg-day) | (μg/III) | (unitiess) | (Hg/kg-day) | (μg/π) | (unitiess) | (mg/kg) | (mg/kg) | (mg/kg) |
| Child Resident Receptor Polycyclic Aromatic Hydrocarbons Anthracene | 2.04E-01 | 3.00E-01 | 1.20E+03 | 9 E-07 | | | | 2.2E+05 | | 2.2E+05 |
| Acenaphthene | 1.24E-01 | 6.00E-01 | 2.40E+02 | 3 E-06 | | | | 4.3E+04 | | 4.3E+04 |
| Benz(a)anthracene | 3.51E+00 | 0.00L-02 | 2.40L+02 | 3 L-00 | 1.00E-01 | 1.10E-04 | 4 E-08 | 4.3L+04 | 8.4E+01 | 8.4E+01 |
| Benzo(a)pyrene | 5.28E+00 | 3.00E-04 | 2.00E-03 | 2 E-02 | 1.00E+00 | 1.10E-04 1.10E-03 | 6 E-07 | 2.1E+02 | 8.4E+00 | 8.4E+00 |
| | 8.74E+00 | 3.00⊑-04 | 2.00E-03 | 2 E-02 | | | 1 E-07 | 2.16+02 | | |
| Benzo(b)fluoranthene Benzo(g,h,i)perylene | 8.74E+00 2.73E+00 | | | | 1.00E-01 | 1.10E-04 | 1 E-07 | | 8.4E+01 | 8.4E+01 |
| Benzo(k)fluoranthene | 1.72E+00 | | | | 1.00E-02 | 1.10E-04 | 2 E-09 | | 8.4E+02 | 8.4E+02 |
| Chrysene | 4.33E+00 | | | | 1.00E-02 1.00E-03 | 1.10E-04 1.10E-05 | 2 E-09 5 E-10 | | 8.4E+02 8.4E+03 | 8.4E+02 8.4E+03 |
| Dibenz(a,h)anthracene | 1.37E+00 | | | | 4.10E+00 | 1.10E-03 1.20E-03 | 7 E-07 | | 2.1E+00 | 2.1E+00 |
| Fluoranthene | 3.81E+00 | 4.00E-02 | | 1 E-04 | 4.10L+00 | 1.20L-03 | | | 2.12+00 | 2.12+00 |
| Fluorene | 5.09E-02 | 4.00E-02 4.00E-02 | 1.60E+02 | 2 E-06 | | | | 2.9E+04 | | 2.9E+04 |
| Indeno(1,2,3-c,d)pyrene | 2.50E+00 | 4.00L 0Z | 1.002.02 | 2 2 00 | 1.00E-01 | 1.10E-04 | 3 E-08 | 2.52.04 | 8.4E+01 | 8.4E+01 |
| Phenanthrene | 8.72E-01 | | | | 1.002 01 | 1.102 04 | 0 2 00 | | 0.42.01 | |
| Pyrene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 2 E-04 | | | | 2.2E+04 | | 2.2E+04 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 8 E-05 | 1.20E-01 | 3.40E-05 | 2 E-08 | 1.4E+04 | 7.0E+01 | 7.0E+01 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 5 E-07 | 2.90E-02 | 7.25E-06 | 1 E-10 | 5.0E+04 | 2.9E+02 | 2.9E+02 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 1 E-05 | | 7.202 00 | | 2.9E+03 | | 2.9E+03 |
| Adult Resident Receptor | | | | | | | | | | |
| Polycyclic Aromatic Hydrocarbons | 2.04E-01 | 3.00E-01 | 1.20E+03 | 1 E-07 | | | | 1.9E+06 | | 1.9E+06 |
| Anthracene | 1.24E-01 | 6.00E-01 | | 3 E-07 | | | | | | 3.8E+05 |
| Acenaphthene | 3.51E+00 | 6.00E-02 | 2.40E+02 | 3 E-07 | 1.00E-01 | 1.10E-04 | 2 E-08 | 3.8E+05 | 2.2E+02 | 3.6E+05 2.2E+02 |
| Benz(a)anthracene Benzo(a)pyrene | 5.28E+00 | 3.00E-04 | 2.00E-03 | 3 E-03 | 1.00E+00 | 1.10E-04 1.10E-03 | 2 E-08 2 E-07 | 1.8E+03 | 2.2E+02 2.2E+01 | 2.2E+02 2.2E+01 |
| Benzo(b)fluoranthene | 8.74E+00 | 3.00⊑-04 | 2.00E-03 | 3 E-03 | 1.00E+00 1.00E-01 | 1.10E-03 1.10E-04 | 4 E-08 | 1.02+03 | 2.2E+01 2.2E+02 | 2.2E+01 2.2E+02 |
| Benzo(g,h,i)perylene | 2.73E+00 | | | | 1.002-01 | 1.102-04 | 4 L-00 | | 2.2L+02 | 2.2L+02 |
| Benzo(k)fluoranthene | 1.72E+00 | | | | 1.00E-02 | 1.10E-04 | 8 E-10 | | 2.2E+03 | 2.2E+03 |
| Chrysene | 4.33E+00 | | | | 1.00E-03 | 1.10E-05 | 2 E-10 | | 2.2E+04 | 2.2E+04 |
| Dibenz(a,h)anthracene | 1.37E+00 | | | | 4.10E+00 | 1.20E-03 | 3 E-07 | | 5.5E+00 | 5.5E+00 |
| Fluoranthene | 3.81E+00 | 4.00E-02 | | 1 E-05 | | | | | | |
| Fluorene | 5.09E-02 | 4.00E-02 | 1.60E+02 | 2 E-07 | | | | 2.6E+05 | | 2.6E+05 |
| Indeno(1,2,3-c,d)pyrene | 2.50E+00 | | | | 1.00E-01 | 1.10E-04 | 1 E-08 | | 2.2E+02 | 2.2E+02 |
| Phenanthrene | 8.72E-01 | | | | | | | | | |
| Pyrene | 3.95E+00 | 3.00E-02 | 1.20E+02 | 2 E-05 | | | | 1.9E+05 | | 1.9E+05 |
| Naphthalene | 1.12E+00 | 2.00E-02 | 3.00E+00 | 9 E-06 | 1.20E-01 | 3.40E-05 | 6 E-09 | 1.3E+05 | 1.9E+02 | 1.9E+02 |
| 1-Methylnaphthalene | 2.77E-02 | 7.00E-02 | 2.80E+02 | 6 E-08 | 2.90E-02 | 7.25E-06 | 4 E-11 | 4.5E+05 | 7.7E+02 | 7.7E+02 |
| 2-Methylnaphthalene | 3.72E-02 | 4.00E-03 | 1.60E+01 | 1 E-06 | | | | 2.6E+04 | | 2.6E+04 |
| | | Total | Hazard Index = | 2 E-02 | Total Excess | Cancer Risk = | 2 E-06 | | | |

Notes:

mg/kg = milligrams per kilogram.

mg/kg-day = milligrams per kilogram body weight per day.

 μ g/m³ = micrograms per cubic meter.

--- = not available or not applicable. No toxicity values are available; therefore, value was not estimated

1 E-06

6.32 E-01

¹ Soil SL represents the lower of the SLs based on noncarcinogenic and carcinogenic effects.

² Consistent with methods used by USEPA, the HI presented for the hypothetical recreational trail user receptor is based on the child receptor.

¹ Consistent with methods used by USEPA, the excess cancer risk estimates for the hypothetical recreational trail user receptor are the sum of the excess cancer risk estimates for the child and adult receptors.

ATTACHMENT B1 LEADSPREAD 8 WORKSHEETS

LeadSpread 8 for the Hypothetical Recreational Trail User Receptor

LEAD RISK ASSESSMENT SPREADSHEET 8 CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Click here for ABBREVIATED INSTRUCTIONS FOR LEADSPREAD 8

| INPUT | |
|--------------------------|-------|
| MEDIUM | LEVEL |
| Lead in Soil/Dust (ug/g) | 540 |
| Respirable Dust (ug/m³) | 1.5 |

| OUTPUT | | | | | | |
|--|------|------|------|------|------|--------|
| Percentile Estimate of Blood Pb (ug/dl) PRG-90 | | | | | | |
| | 50th | 90th | 95th | 98th | 99th | (ug/g) |
| BLOOD Pb, CHILD | 0.5 | 1.0 | 1.2 | 1.4 | 1.6 | 540 |
| BLOOD Pb, PICA CHILD | 1.1 | 2.0 | 2.4 | 2.9 | 3.3 | 271 |

| EXPOSURE PARAMETERS | | | | | |
|-------------------------------------|--------------------|----------|--|--|--|
| | units | children | | | |
| Days per week | days/wk | 1 | | | |
| Geometric Standard Deviation | | 1.6 | | | |
| Blood lead level of concern (ug/dl) | | 1 | | | |
| Skin area, residential | cm ² | 2900 | | | |
| Soil adherence | ug/cm ² | 200 | | | |
| Dermal uptake constant | (ug/dl)/(ug/day) | 0.0001 | | | |
| Soil ingestion | mg/day | 100 | | | |
| Soil ingestion, pica | mg/day | 200 | | | |
| Ingestion constant | (ug/dl)/(ug/day) | 0.16 | | | |
| Bioavailability | unitless | 0.44 | | | |
| Breathing rate | m³/day | 6.8 | | | |
| Inhalation constant | (ug/dl)/(ug/day) | 0.192 | | | |

| PATHWAYS | | | | | | | |
|----------------|-------------------|---------|----------|--------|---------|----------|--|
| CHILDREN | typical with pica | | | | | | |
| | Pathwa | ay cont | ribution | Pathwa | ay cont | ribution | |
| Pathway | PEF | ug/dl | percent | PEF | ug/dl | percent | |
| Soil Contact | 8.3E-6 | 0.00 | 1% | | 0.00 | 0% | |
| Soil Ingestion | 1.0E-3 | 0.54 | 99% | 2.0E-3 | 1.09 | 100% | |
| Inhalation | 2.8E-7 | 0.00 | 0% | | 0.00 | 0% | |

Click here for REFERENCES

Hypothetical Camper Receptor

$$Days \ perweek = \frac{EF (days/year)}{52 \ (weeks/year)}$$

EF = Exposure Frequency = 52 days per year (BLM, 2017)
Recreational trail user receptor was assumed to visit one day per week.

LeadSpread 8 for the Hypothetical Unauthorized Camper Receptor with an Exposure Frequency of 14 days per year

LEAD RISK ASSESSMENT SPREADSHEET 8
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Click here for ABBREVIATED INSTRUCTIONS FOR LEADSPREAD 8

| INPUT | |
|--------------------------|-------|
| MEDIUM | LEVEL |
| Lead in Soil/Dust (ug/g) | 1800 |
| Respirable Dust (ug/m³) | 1.5 |

| OUTPUT | | | | | | |
|---|------|------|------|------|------|--------|
| Percentile Estimate of Blood Pb (ug/dl) PRG-9 | | | | | | PRG-90 |
| | 50th | 90th | 95th | 98th | 99th | (ug/g) |
| BLOOD Pb, CHILD | 0.5 | 1.0 | 1.2 | 1.4 | 1.6 | 1799 |
| BLOOD Pb, PICA CHILD | 1.1 | 2.0 | 2.4 | 2.9 | 3.3 | 903 |

| EXPOSURE PARAMETERS | | | | | |
|-------------------------------------|--------------------|----------|--|--|--|
| | units | children | | | |
| Days per week | days/wk | 0.3 | | | |
| Geometric Standard Deviation | | 1.6 | | | |
| Blood lead level of concern (ug/dl) | | 1 | | | |
| Skin area, residential | cm ² | 2900 | | | |
| Soil adherence | ug/cm ² | 200 | | | |
| Dermal uptake constant | (ug/dl)/(ug/day) | 0.0001 | | | |
| Soil ingestion | mg/day | 100 | | | |
| Soil ingestion, pica | mg/day | 200 | | | |
| Ingestion constant | (ug/dl)/(ug/day) | 0.16 | | | |
| Bioavailability | unitless | 0.44 | | | |
| Breathing rate | m³/day | 6.8 | | | |
| Inhalation constant | (ug/dl)/(ug/day) | 0.192 | | | |

| PATHWAYS | | | | | | | |
|----------------|----------------------|-------|---------|--------|---------|----------|--|
| CHILDREN | typical with pica | | | | | | |
| | Pathway contribution | | | Pathwa | ay cont | ribution | |
| Pathway | PEF | ug/dl | percent | PEF | ug/dl | percent | |
| Soil Contact | 2.5E-6 | 0.00 | 1% | | 0.00 | 0% | |
| Soil Ingestion | 3.0E-4 | 0.54 | 99% | 6.0E-4 | 1.09 | 100% | |
| Inhalation | 8.4E-8 | 0.00 | 0% | | 0.00 | 0% | |

Click here for REFERENCES

Hypothetical Camper Receptor

Days per week =
$$\frac{EF (days/year)}{52 (weeks/year)}$$

EF = Exposure Frequency = 14 days per year (BLM, 2017)

In accordance with the Bureau of Land Management (BLM) yearly recreational exposure frequency for recreational visitor, which includes a range of possible activities, including campling (BLM, 2017).

Reference:

BLM. 2017. BLM Technical Memorandum, Screening Assessment Approaches for Metals in Soil at BLM HazMat/AML Sites. September 2017 Update.

LeadSpread 8 for the Hypothetical Unauthorized Camper Receptor - Upper Bound Exposure with an Exposure Frequency of 28 days per year

LEAD RISK ASSESSMENT SPREADSHEET 8

CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

Click here for ABBREVIATED INSTRUCTIONS FOR LEADSPREAD 8

| INPUT | |
|--------------------------|-------|
| MEDIUM | LEVEL |
| Lead in Soil/Dust (ug/g) | 1080 |
| Respirable Dust (ug/m³) | 1.5 |

| OUTPUT | | | | | | |
|---|------|------|------|------|------|--------|
| Percentile Estimate of Blood Pb (ug/dl) | | | | | | PRG-90 |
| | 50th | 90th | 95th | 98th | 99th | (ug/g) |
| BLOOD Pb, CHILD | 0.5 | 1.0 | 1.2 | 1.4 | 1.6 | 1079 |
| BLOOD Pb, PICA CHILD | 1.1 | 2.0 | 2.4 | 2.9 | 3.3 | 542 |

| EXPOSURE PARAMETERS | | | | | |
|-------------------------------------|--------------------|----------|--|--|--|
| | units | children | | | |
| Days per week | days/wk | 0.5 | | | |
| Geometric Standard Deviation | | 1.6 | | | |
| Blood lead level of concern (ug/dl) | | 1 | | | |
| Skin area, residential | cm ² | 2900 | | | |
| Soil adherence | ug/cm ² | 200 | | | |
| Dermal uptake constant | (ug/dl)/(ug/day) | 0.0001 | | | |
| Soil ingestion | mg/day | 100 | | | |
| Soil ingestion, pica | mg/day | 200 | | | |
| Ingestion constant | (ug/dl)/(ug/day) | 0.16 | | | |
| Bioavailability | unitless | 0.44 | | | |
| Breathing rate | m³/day | 6.8 | | | |
| Inhalation constant | (ug/dl)/(ug/day) | 0.192 | | | |

| PATHWAYS | | | | | | |
|----------------|-------------------|---------|----------|--------|---------|----------|
| CHILDREN | typical with pica | | | | ca | |
| | Pathw | ay cont | ribution | Pathwa | ay cont | ribution |
| Pathway | PEF | ug/dl | percent | PEF | ug/dl | percent |
| Soil Contact | 4.1E-6 | 0.00 | 1% | | 0.00 | 0% |
| Soil Ingestion | 5.0E-4 | 0.54 | 99% | 1.0E-3 | 1.09 | 100% |
| Inhalation | 1.4E-7 | 0.00 | 0% | | 0.00 | 0% |

Click here for REFERENCES

Hypothetical Camper Receptor

$$Days \ perweek = \frac{EF (days/year)}{52 \ (weeks/year)}$$

EF = Exposure Frequency = 14 days per year (BLM, 2017)

As an upperbound evaluation, the Bureau of Land Management (BLM) yearly recreational exposure frequency for recreational visitor of 14 days per year (BLM, 2017) was doubled to 24 days per year.

Reference:

BLM. 2017. BLM Technical Memorandum, Screening Assessment Approaches for Metals in Soil at BLM HazMat/AML Sites. September 2017 Update.

ATTACHMENT B2 RISK CHARACTERIZATION EQUATIONS

Risk Characterization Equations for Direct Exposure to COPCs in Soil

Noncarcinogenic Effects

Incidental Ingestion of Soil

$$Hazard\ Quotient = \frac{EPC_{soil} \times EF \times ED \times \left(\frac{1}{RfD}\right) \times \left(\frac{IRs}{10^6\,mg/kg}\right)}{BW \times ATn}$$

Dermal Contact with Soil

$$Hazard\ Quotient = \frac{EPC_{soil} \times EF \times ED \times \left(\frac{1}{RfD \times GIABS}\right) \times \left(\frac{SA \times AF \times ABS}{10^6\ mg/kg}\right)}{BW \times ATn}$$

Inhalation of Fugitive Dust in Outdoor Air from Soil

$$Hazard\ Quotient = \frac{EPC_{soil} \times EF \times ED \times ET \times \frac{1\ day}{24\ hours} \times \left(\frac{1}{RfC \times 0.001\ mg/\mu g}\right) \times \left(\frac{1}{PEF}\right)}{ATn}$$

Carcinogenic Effects

Incidental Ingestion of Soil

$$Excess \ Cancer \ Risk = \frac{EPC_{soil} \times EF \times ED \times SF \times \left(\frac{IRs}{10^6 \ mg/kg}\right)}{BW \times ATc}$$

Dermal Contact with Soil

$$Excess \ Cancer \ Risk = \frac{EPC_{soil} \times EF \times ED \times \left(\frac{SF}{GIABS}\right) \times \left(\frac{SA \times AF \times ABS}{10^6 \ mg/kg}\right)}{BW \times ATc}$$

Inhalation of Fugitive Dust in Outdoor Air from Soil

$$Excess \ Cancer \ Risk = \frac{EPC_{soil} \times EF \times ED \times ET \times \frac{1 \ day}{24 \ hours} \times \left(\frac{IUR}{0.001 \ mg/\mu g}\right) \times \left(\frac{1}{PEF}\right)}{ATc}$$

Definitions

EPC_{soil} = Exposure Point Concentration for Shallow Soil (mg/kg)

ATc = Averaging Time – Carcinogens (days)

ATn = Averaging Time – Noncarcinogens (days)

EF = Exposure Frequency (days/year)

ED = Exposure Duration (year)

ET = Exposure Time (hours/day)

BW = Body Weight (kg)

IRs = Soil Ingestion Rate (mg/day)

SA = Skin Surface Area (cm²)

AF = Soil Adherence Factor (mg/cm²-day)

ABS = Dermal Absorption Factor (unitless)

PEF = Particulate Emission Factor (m³/kg)

RfD = Oral Reference Dose (mg/kg-day)

RfC = Inhalation Reference Concentration (µg/m³)

SF = Oral Slope Factor (mg/kg-day)⁻¹

IUR = Inhalation Unit Risk Factor $(\mu g/m^3)^{-1}$

GIABS = Gastrointestinal absorption factor (unitless)

ATTACHMENT B3

PROUCL OUTPUT

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| General Sta 31 12 12 0.00491 0.986 0.087 | Number of Distinct Observations Number of Non-Detects | 31 |
|--|---|---|
| 31 12 12 0.00491 0.986 | Number of Distinct Observations Number of Non-Detects | |
| 31 12 12 0.00491 0.986 | Number of Distinct Observations Number of Non-Detects | |
| 12 12 0.00491 0.986 | Number of Non-Detects | |
| 12 0.00491 0.986 | | 19 |
| 0.00491 0.986 | Number of Distinct Non-Detects | 19 |
| 0.986 | Minimum Non-Detect | 0.00639 |
| | Maximum Non-Detect | 0.00752 |
| | Percent Non-Detects | 61.29% |
| 0.204 | SD Detects | 0.295 |
| 0.0794 | CV Detects | 1.446 |
| 2.056 | Kurtosis Detects | 4.243 |
| | | 1.77! |
| | 52 3 | |
| mal GOF Test o | on Detects Only | |
| 0.716 | Shapiro Wilk GOF Test | |
| 0.859 | Detected Data Not Normal at 5% Significance Level | |
| 0.269 | Lilliefors GOF Test | |
| 0.243 | Detected Data Not Normal at 5% Significance Level | |
| ata Not Normal | at 5% Significance Level | |
| | | |
| | · | |
| **** | | 0.0376 |
| | , , | 0.154 |
| | ` '' | 0.145 |
| | · · | 0.247 |
| | | 0.246 |
| 0.317 | 99% KM Chebyshev UCL | 0.457 |
| E Taete on Date | acted Observations Only | |
| | - | |
| 0.781 | _ | evel |
| 0.234 | | |
| 0.258 | <u> </u> | _evel |
| pear Gamma Di | | |
| | | |
| a Statistics on D | Detected Data Only | |
| 0.545 | k star (bias corrected MLE) | 0.464 |
| 0.375 | Theta star (bias corrected MLE) | 0.44 |
| 13.08 | nu star (bias corrected) | 11.14 |
| 0.204 | | |
| | | |
| | <u> </u> | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | 0.0851 |
| | | 0.01 |
| | | 2.383 |
| | ` ' | 0.432 |
| | | 0.197 |
| | nu star (bias corrected) | 26.77 |
| | A.F | .=- |
| | | 15.51 |
| 0.143 | 95% Gamma Adjusted UCL (use when n<50) | 0.147 |
| | 0.716 0.859 0.269 0.243 Data Not Normal Using Normal C 0.0824 0.201 0.146 0.144 0.195 0.317 DF Tests on Det 0.414 0.781 0.234 0.258 pear Gamma D 13.08 0.204 DS Statistics on E 13.08 0.204 DS Statistics using the set has > 50% No. Small such as <1 method may yield in the set has set in the method may yield in the set has set in the method may yield in the set has set in the method may yield in the set has set in the method may yield in the set in the set has set in the method may yield in the set in the | Treat GOF Test on Detects Only 0.716 Shapiro Wilk GOF Test 0.859 Detected Data Not Normal at 5% Significance Level 0.269 Lilliefors GOF Test 0.243 Detected Data Not Normal at 5% Significance Level 1. Para Normal Critical Values and other Nonparametric UCLs 1. Para Normal Critical Values and other Nonparametric UCLs 1. Para Normal Critical Values and other Nonparametric UCLs 1. Para Normal Significance Level 1. Para Normal Significance UCL 1. Para Normal Signific |

$\label{prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil} \\$

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Estimate | es of Gamma Para | ameters using KM Estimates | |
|--|--------------------|---|--------|
| Mean (KM) | 0.0824 | SD (KM) | 0.201 |
| Variance (KM) | 0.0402 | SE of Mean (KM) | 0.0376 |
| k hat (KM) | 0.169 | k star (KM) | 0.174 |
| nu hat (KM) | 10.45 | nu star (KM) | 10.78 |
| theta hat (KM) | 0.488 | theta star (KM) | 0.474 |
| 80% gamma percentile (KM) | 0.0999 | 90% gamma percentile (KM) | 0.248 |
| 95% gamma percentile (KM) | 0.439 | 99% gamma percentile (KM) | 0.979 |
| | | | |
| | Gamma Kaplan-N | leier (KM) Statistics | |
| Approximate Chi Square Value (10.78, α) | 4.433 | Adjusted Chi Square Value (10.78, β) | 4.208 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.2 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.211 |
| | | | |
| · · | | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.938 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.859 | Detected Data appear Lognormal at 5% Significance Leve | el |
| Lilliefors Test Statistic | 0.182 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.243 | Detected Data appear Lognormal at 5% Significance Leve | 9 |
| Detected | Data appear Log | normal at 5% Significance Level | |
| Lognor | mal DOS Statistics | Using Imputed Non-Detects | |
| Mean in Original Scale | | Mean in Log Scale | -4.483 |
| SD in Original Scale | 0.204 | SD in Log Scale | 1.771 |
| 95% t UCL (assumes normality of ROS data) | 0.144 | 95% Percentile Bootstrap UCL | 0.146 |
| 95% BCA Bootstrap UCL | 0.18 | 95% Bootstrap t UCL | 0.248 |
| 95% H-UCL (Log ROS) | 0.167 | 30% 2000 149 1002 | 0.2-10 |
| | | | |
| Statistics using KM es | stimates on Logge | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -4.253 | KM Geo Mean | 0.0142 |
| KM SD (logged) | 1.604 | 95% Critical H Value (KM-Log) | 3.224 |
| KM Standard Error of Mean (logged) | 0.305 | 95% H-UCL (KM -Log) | 0.132 |
| KM SD (logged) | 1.604 | 95% Critical H Value (KM-Log) | 3.224 |
| KM Standard Error of Mean (logged) | 0.305 | | |
| | | <u> </u> | |
| | DL/2 St | atistics | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | 0.0811 | Mean in Log Scale | -4.533 |
| SD in Original Scale | 0.204 | SD in Log Scale | 1.804 |
| 95% t UCL (Assumes normality) | 0.143 | 95% H-Stat UCL | 0.174 |
| DL/2 is not a recomm | ended method, p | rovided for comparisons and historical reasons | |
| New | | untur Francisco (IO) Obstatura | |
| • | | ution Free UCL Statistics | |
| Detected Date | a appear Gamma | Distributed at 5% Significance Level | |
| | hetsennus | UCL to Use | |
| Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | | 332 233 | |
| k<=1) | 0.211 | | |
| | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | vided to help the user to select the most appropriate 95% UCL. | |
| ** * * | | a size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| | | ts; for additional insight the user may want to consult a statistician. | |
| nowever, simulations results will not cover all | Real World data se | is, for additional insigniture user may want to consult a statistician. | |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| ACENAPHTHENE | | | |
|---|--|--|---|
| | 01 | On all all a | |
| Total Number of Observations | General S | Number of Distinct Observations | 29 |
| Number of Detects | 10 | Number of Distinct Observations Number of Non-Detects | 2. |
| Number of Distinct Detects | 10 | Number of Distinct Non-Detects | 20 |
| Minimum Detect | 0.00499 | Minimum Non-Detect | 0.00639 |
| Maximum Detect | 0.651 | Maximum Non-Detect | 0.00053 |
| Variance Detects | 0.0384 | Percent Non-Detects | 67.74% |
| Mean Detects | 0.131 | SD Detects | 0.196 |
| Median Detects | 0.0815 | CV Detects | 1.50 |
| Skewness Detects | 2.481 | Kurtosis Detects | 6.663 |
| Mean of Logged Detects | -3.053 | SD of Logged Detects | 1.65 |
| | | | |
| ! | Normal GOF Test | t on Detects Only | |
| Shapiro Wilk Test Statistic | 0.664 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.842 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.334 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.262 | Detected Data Not Normal at 5% Significance Level | |
| Detecte | d Data Not Norm | al at 5% Significance Level | |
| Korton Malay (GA) Obsta | d | Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.0456 | <u> </u> | 0.0229 |
| KM SD | | KM Standard Error of Mean | 0.0229 |
| | 0.121 | 95% KM (BCA) UCL | 0.0838 |
| 95% KM (t) UCL 95% KM (z) UCL | 0.0844 | 95% KM (Percentile Bootstrap) UCL 95% KM Bootstrap t UCL | 0.0838 |
| 90% KM (2) UCL | 0.0832 | 95% KM Chebyshev UCL | 0.150 |
| 97.5% KM Chebyshev UCL | 0.114 | 99% KM Chebyshev UCL | 0.145 |
| 97.5% RIVI Chebyshev OCL | 0.100 | 33 /0 INVI CHEDYSHEV UCL | 0.273 |
| <u> </u> | I. | · | |
| Gamma | GOF Tests on De | etected Observations Only | |
| Gamma A-D Test Statistic | GOF Tests on De | , , | |
| | | etected Observations Only | e Level |
| A-D Test Statistic | 0.418 | etected Observations Only Anderson-Darling GOF Test | e Level |
| A-D Test Statistic 5% A-D Critical Value | 0.418 0.768 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.418 0.768 0.199 0.279 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data | 0.418 0.768 0.199 0.279 appear Gamma | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data | 0.418 0.768 0.199 0.279 appear Gamma | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level | e Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | e Level 0.491 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Qai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.491 0.266 |
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| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Rear (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detects | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 ROS Statistics use ata set has > 50% N s is small such as | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when star of detects For such situations, GR | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 a ROS Statistics us sta set has > 50% N s is small such as 4 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only A star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 a ROS Statistics us sta set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects ADS with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs | 0.491 0.266 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 a ROS Statistics us sta set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. | 0.491 0.266 9.826 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 IROS Statistics us sta set has > 50% N s is small such as OS method may yi specially true when Vs and UCLs may | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates | 0.491 0.266 9.826 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detects For such situations, GR This is es For gamma distributed detected data, BT Minimum | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 1ROS Statistics us ata set has > 50% N is is small such as a cosmologically true when Vs and UCLs may 0.00499 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean | 0.491 0.266 9.826 0.0488 0.01 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used detected for such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 I ROS Statistics us ata set has > 50% N s is small such as a COS method may yi specially true when Vs and UCLs may 0.00499 0.651 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects ADs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median | 0.491 0.266 9.826 0.0488 0.0488 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when de GROS may not be used when desert of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 I ROS Statistics us ata set has > 50% N s is small such as a ROS method may ye specially true when Vs and UCLs may 0.00499 0.651 0.122 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) Sing Imputed Non-Detects IDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV | 0.491 0.266 9.826 0.0488 0.01 2.488 0.538 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 I ROS Statistics us ata set has > 50% N s is small such as COS method may yi specially true when Vs and UCLs may 0.00499 0.651 0.122 0.573 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level I Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.491 0.266 9.826 0.0489 0.01 2.488 0.530 0.0907 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 a ROS Statistics us ata set has > 50% N s is small such as a 80S method may yi specially true when Vs and UCLs may 0.00499 0.6551 0.122 0.573 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) Sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.491 0.266 9.826 0.0489 0.01 2.488 0.539 0.0907 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) | 0.418 0.768 0.199 0.279 appear Gamma mma Statistics on 0.607 0.215 12.13 0.131 I ROS Statistics us ata set has > 50% N is is small such as COS method may yi specially true when Vs and UCLs may 0.00499 0.651 0.122 0.573 0.0854 35.51 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) Sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | |

$\label{prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil} \\$

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| | s of Gamma Parame | eters using rim estimates | |
|---|--|--|--------------------------|
| Mean (KM) | 0.0456 | SD (KM) | 0.121 |
| Variance (KM) | 0.0146 | SE of Mean (KM) | 0.0229 |
| k hat (KM) | 0.143 | k star (KM) | 0.15 |
| nu hat (KM) | 8.852 | nu star (KM) | 9.329 |
| theta hat (KM) | 0.32 | theta star (KM) | 0.303 |
| 80% gamma percentile (KM) | 0.0498 | 90% gamma percentile (KM) | 0.135 |
| 95% gamma percentile (KM) | 0.251 | 99% gamma percentile (KM) | 0.586 |
| | Gamma Kaplan-Mele | er (KM) Statistics | |
| Approximate Chi Square Value (9.33, α) | 3.527 | Adjusted Chi Square Value (9.33, β) | 3.33 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.121 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.128 |
| | | | |
| <u> </u> | | tected Observations Only | |
| Shapiro Wilk Test Statistic | 0.923 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.842 | Detected Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.214 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.262 | Detected Data appear Lognormal at 5% Significance Level | |
| Detected | Data appear Lognor | rmal at 5% Significance Level | |
| Lamon | I DOO Oodedee I Ie | along Imported Non Detecto | |
| | | sing imputed Non-Detects | E 064 |
| Mean in Original Scale | 0.0438 | Mean in Log Scale | -5.064 1.691 |
| SD in Original Scale 95% t UCL (assumes normality of ROS data) | 0.123 | SD in Log Scale 95% Percentile Bootstrap UCL | 0.0808 |
| 95% LUCE (assumes normality of ROS data) 95% BCA Bootstrap UCL | 0.0814 | 95% Bootstrap t UCL | 0.0808 |
| 95% H-UCL (Log ROS) | 0.0743 | 95% Boolstrap (OCL | 0.107 |
| 93/811-0CE (Lug1103) | 0.0743 | | |
| Statistics using KM as | timates on Logged C | Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -4.552 | KM Geo Mean | 0.0105 |
| KM SD (logged) | 1.366 | 95% Critical H Value (KM-Log) | 2.892 |
| KM Standard Error of Mean (logged) | 0.26 | 95% H-UCL (KM -Log) | 0.0552 |
| KM SD (logged) | 1.366 | 95% Critical H Value (KM-Log) | |
| | | | 2.892 |
| KM Standard Error of Mean (logged) | 0.26 | , , | 2.892 |
| | 0.26 | | 2.892 |
| KM Standard Error of Mean (logged) | 0.26 DL/2 Statis | | 2.892 |
| KM Standard Error of Mean (logged) DL/2 Normal | DL/2 Statis | stics DL/2 Log-Transformed | |
| KM Standard Error of Mean (logged) DL/2 Normal Mean in Original Scale | DL/2 Statis | stics DL/2 Log-Transformed Mean in Log Scale | -4.826 |
| KM Standard Error of Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale | 0.0445 0.123 | DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) | 0.0445 0.123 0.082 | DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) | 0.0445 0.123 0.082 | DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm | 0.0445 0.123 0.082 ended method, provi | DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL | -4.826 1.538 0.063 |
| Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm | 0.0445 0.123 0.082 ended method, provi | Stics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Aded for comparisons and historical reasons | -4.826 1.538 |
| Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm | 0.0445 0.123 0.082 ended method, provi | DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Vided for comparisons and historical reasons on Free UCL Statistics | -4.826 1.538 |
| Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm | 0.0445 0.123 0.082 ended method, provi | Stics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics stributed at 5% Significance Level | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm Nong Detected Date Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | DL/2 Statis 0.0445 0.123 0.082 ended method, provi | Stics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics stributed at 5% Significance Level | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 ls not a recomm | 0.0445 0.123 0.082 ended method, provi | Stics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics stributed at 5% Significance Level | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm Nong Detected Date Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | 0.0445 0.123 0.082 ended method, provi | Stics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics stributed at 5% Significance Level | -4.826 1.538 |
| MM Standard Error of Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm Nong Detected Date Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) Note: Suggestions regarding the selection of | 0.0445 0.123 0.082 ended method, provide a appear Gamma Dis Suggested UC 0.128 | Bitics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics Estributed at 5% Significance Level CL to Use ed to help the user to select the most appropriate 95% UCL. | -4.826 1.538 |
| MM Standard Error of Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm Nong Detected Date Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) Note: Suggestions regarding the selection of Recommendations are | DL/2 Statis 0.0445 0.123 0.082 ended method, provi parametric Distributio a appear Gamma Dis Suggested UC 0.128 a 95% UCL are provide are based upon data siz | Bitics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics Stributed at 5% Significance Level CL to Use ed to help the user to select the most appropriate 95% UCL. ze, data distribution, and skewness. | -4.826 1.538 |
| Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomm Nonp Detected Date Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) Note: Suggestions regarding the selection of Recommendations at These recommendations are based upon the | DL/2 Statis 0.0445 0.123 0.082 ended method, provide a appear Gamma Dis Suggested UC 0.128 a 95% UCL are provide are based upon data size are sults of the simulation | Bitics DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Added for comparisons and historical reasons on Free UCL Statistics Estributed at 5% Significance Level CL to Use ed to help the user to select the most appropriate 95% UCL. | -4.826 1.538 |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| O(A)ANTHRACENE | | | |
|---|--|---|---|
| ОСУДИТИНОСТЬ | | | |
| | General Stat | · · · · · | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 23 | Number of Non-Detects | |
| Number of Distinct Detects | 23 | Number of Distinct Non-Detects | |
| Minimum Detect | 0.00212 | Minimum Non-Detect | 0.0064 |
| Maximum Detect | 8.45 | Maximum Non-Detect | 0.0074 |
| Variance Detects | 6.503 | Percent Non-Detects | 25.819 |
| Mean Detects | 1.42 | SD Detects | 2.5 |
| Median Detects | 0.0544 | CV Detects | 1.79 |
| Skewness Detects | 1.725 | Kurtosis Detects | 1.7 |
| Mean of Logged Detects | -2.517 | SD of Logged Detects | 2.95 |
| N | ormal GOF Test on | n Detects Only | |
| Shapiro Wilk Test Statistic | 0.621 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.914 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.408 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.18 | Detected Data Not Normal at 5% Significance Level | |
| Detected | Data Not Normal a | at 5% Significance Level | |
| Vanian Major //A/I Statistic | nucina Normal Cri | itical Values and other Nonparametric UCLs | |
| KM Mean | 1.054 | KM Standard Error of Mean | 0.41 |
| KM SD | 2.236 | | |
| | | 95% KM (BCA) UCL | 1.83 |
| 95% KM (t) UCL | 1.751 | 95% KM (Percentile Bootstrap) UCL | 1.75 |
| 95% KM (z) UCL | 1.73 2.286 | 95% KM Bootstrap t UCL | 2.12 |
| | | | 2.84 |
| 90% KM Chebyshev UCL | | 95% KM Chebyshev UCL | |
| 97.5% KM Chebyshev UCL | 3.619 | 99% KM Chebyshev UCL | 5.14 |
| 97.5% KM Chebyshev UCL | 3.619 | · · | |
| 97.5% KM Chebyshev UCL | 3.619 | 99% KM Chebyshev UCL | |
| 97.5% KM Chebyshev UCL | 3.619 | 99% KM Chebyshev UCL | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic | 3.619 FOF Tests on Detection 1.447 | 99% KM Chebyshev UCL cted Observations Only Anderson-Darling GOF Test | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value | 3.619 COF Tests on Detect 1.447 0.874 | 99% KM Chebyshev UCL cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 3.619 XOF Tests on Detect 1.447 0.874 0.212 0.199 | 99% KM Chebyshev UCL cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data | 3.619 1.447 0.874 0.212 0.199 Not Gemme Distrib | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le buted at 5% Significance Level | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level | 5.1 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data K hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level etected Data Only k star (bias corrected MLE) | 5.1 evel 0.24 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data k hat (MLE) Theta hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level estected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 5.1 evel 0.24 5.80 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data K hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level etected Data Only k star (bias corrected MLE) | 5.1 evel 0.24 5.80 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data k hat (MLE) Theta hat (MLE) nu hat (MLE) | 3.619 IOF Tests on Detect 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level estected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 5.1 evel 0.24 5.80 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 3.619 ROF Tests on Detect 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level stected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 5.1 evel 0.24 5.80 |
| 97.5% KM Chebyshev UCL Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Gamma K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects s with many tied observations at multiple DLs | 5.1- evel 0.24 5.80 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using uset has > 50% NDs s small such as <1.0 | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le puted at 5% Significance Level Star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects s with many tied observations at multiple DLs D, especially when the sample size is small (e.g., <15-20) | 5.1 evel 0.24 5.80 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO | 3.619 20F Tests on Detect 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 20S Statistics using set has > 50% NDs s small such as <1.0 S method may yield | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Duted at 5% Significance Level Star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects swith many tied observations at multiple DLs O, especially when the sample size is small (e.g., <15-20) | 5.1- evel 0.24 5.80 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is espec | 3.619 20F Tests on Detect 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 20S Statistics using set has > 50% NDs s small such as <1.0 S method may yield exially true when the | 99% KM Chebyshev UCL Cted Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Duted at 5% Significance Level Start (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects s with many tied observations at multiple DLs O, especially when the sample size is small (e.g., <15-20) Incorrect values of UCLs and BTVs s sample size is small. | 5.1- evel 0.24 5.80 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs s small such as <1.0 S method may yield cially true when the | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Les Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Les Outed at 5% Significance Level Star (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In ustar (bias corrected) In ustar (bias corrected) Significance Level Computed Non-Detects Significance Level Computed Von-Detects Significance Level A star (bias corrected) Discorrected MLE) Significance Level Computed Non-Detects Significance Level A star (bias corrected MLE) Discorrected MLE) Computed Von-Detects Significance Level Computed Von-Detects Significance Level Computed Volume Corrected MLE) Computed Volume | 5.1 evel 0.24 5.80 11.2 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Ream k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs s small such as <1.0 S method may yield ecially true when the s and UCLs may be o 0.00212 | Petected Data Not Gamma Distributed at 5% Significance Letted Data Only A star (bias corrected MLE) | 5.1 evel 0.24 5.80 11.2 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Reamma G Gamma G Gamma G K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs s small such as <1.0 S method may yield ecially true when the s and UCLs may be c 0.00212 8.45 | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Duted at 5% Significance Level Selected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects with many tied observations at multiple DLs O, especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 5.1 evel 0.24 5.80 11.2 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Gamma G K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using 1.55 the second of the sec | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Letter Data Significance Letter Data Significance Letter Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) g imputed Non-Detects swith many tied observations at multiple DLs of especially when the sample size is small (e.g., <15-20) Incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV | 5.1 evel 0.24 5.80 11.2 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Gamma G K hat (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using 1 set has > 50% NDs 1 s s small such as <1.0 1 s method may yield 2 set and UCLs may be of 0.00212 0.00212 0.231 | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter (Significance Letter) Detected Data Not Gamma Distributed at 5% Significance Letter (Data Significance Letter) Detected Data Only In star (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) The star (bias corrected MLE) The star (bias corrected MLE) Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only 5.1 evel 0.24 5.80 11.2 1.05 0.0 2.15 0.2 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data K hat (MLE) Theta hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using uset has > 50% NDs s small such as <1.0 S method may yield acially true when the s and UCLs may be of 0.00212 8.45 2.272 0.231 4.567 | 299% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter (Significance Letter) Detected Data Not Gamma Distributed at 5% Significance Letter (Data Significance Letter) Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Discorrected Maccorrected Maccorrected Maccorrected Maccorrected Maccorrected) Discorrect values of UCLs and BTVs Example size is small. Computed using gamma distribution on KM estimates Mean Median CV Restar (bias corrected MLE) Theta star (bias corrected MLE) | 5.1 evel 0.24 5.80 11.2 1.05 0.0 2.15 0.2 4.58 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Gamma G K hat (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs s small such as <1.0 S method may yield exically true when the s and UCLs may be of 0.00212 8.45 2.272 0.231 4.567 14.34 | 99% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter (Significance Letter) Detected Data Not Gamma Distributed at 5% Significance Letter (Data Significance Letter) Detected Data Only In star (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) The star (bias corrected MLE) The star (bias corrected MLE) Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only In star (bias corrected MLE) Deserting Significance Level Detected Data Only 5.1 evel 0.24 5.80 11.2 1.05 0.0 2.15 0.2 4.58 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data K hat (MLE) Theta hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using uset has > 50% NDs s small such as <1.0 S method may yield acially true when the s and UCLs may be or 0.00212 8.45 2.272 0.231 4.567 | 299% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter (Significance Letter) Detected Data Not Gamma Distributed at 5% Significance Letter (Data Significance Letter) Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Discorrected Maccorrected Maccorrected Maccorrected Maccorrected Maccorrected) Discorrect values of UCLs and BTVs Example size is small. Computed using gamma distribution on KM estimates Mean Median CV Restar (bias corrected MLE) Theta star (bias corrected MLE) | 5.1 evel 0.24 5.80 11.2 1.05 0.0 2.15 0.2 4.58 |
| Gamma G A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data I Gamma G K hat (MLE) Theta hat (MLE) Mean (detects) Gamma F GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is esper For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) In uhat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) | 3.619 1.447 0.874 0.212 0.199 Not Gamma Distrib ma Statistics on De 0.248 5.725 11.41 1.42 ROS Statistics using set has > 50% NDs s small such as <1.0 S method may yield exically true when the s and UCLs may be of 0.00212 8.45 2.272 0.231 4.567 14.34 | 299% KM Chebyshev UCL Cited Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Letter (Significance Letter) Detected Data Not Gamma Distributed at 5% Significance Letter (Data Significance Letter) Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Discorrected Maccorrected Maccorrected Maccorrected Maccorrected Maccorrected) Discorrect values of UCLs and BTVs Example size is small. Computed using gamma distribution on KM estimates Mean Median CV Restar (bias corrected MLE) Theta star (bias corrected MLE) | 5.1a |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Estimate | s of Gamma Para | ameters using KM Estimates | |
|---|----------------------|--|-------------|
| Mean (KM) | 1.054 | SD (KM) | 2.236 |
| Variance (KM) | 5 | SE of Mean (KM) | 0.411 |
| k hat (KM) | 0.222 | k star (KM) | 0.222 |
| nu hat (KM) | 13.78 | nu star (KM) | 13.78 |
| theta hat (KM) | 4.742 | theta star (KM) | 4.742 |
| 80% gamma percentile (KM) | 1.462 | 90% gamma percentile (KM) | 3.184 |
| 95% gamma percentile (KM) | 5.279 | 99% gamma percentile (KM) | 10.95 |
| | • | , | |
| | Gamma Kaplan-M | leier (KM) Statistics | |
| Approximate Chi Square Value (13.78, α) | 6.424 | Adjusted Chi Square Value (13.78, β) | 6.145 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 2.262 | 95% Gamma Adjusted KM-UCL (use when n<50) | 2.365 |
| | | | |
| · · · · · · · · · · · · · · · · · · · | | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.894 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.914 | Detected Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.152 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.18 | Detected Data appear Lognormal at 5% Significance Leve | |
| Detected Data | appear Approxim | ate Lognormal at 5% Significance Level | |
| Lagran | | Hele a broade d New Bods de | |
| • | | Using Imputed Non-Detects | 0.000 |
| Mean in Original Scale | 1.054 | Mean in Log Scale | -3.323 |
| SD in Original Scale | 2.273 | SD in Log Scale | 2.886 |
| 95% t UCL (assumes normality of ROS data) | 1.747 | 95% Percentile Bootstrap UCL | 1.761 |
| 95% BCA Bootstrap UCL | 1.904 35.92 | 95% Bootstrap t UCL | 2.015 |
| 95% H-UCL (Log ROS) | 35.92 | | |
| Statistics using KM es | timates on Logge | nd Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.365 | KM Geo Mean | 0.0346 |
| KM SD (logged) | 2.877 | 95% Critical H Value (KM-Log) | 5.189 |
| KM Standard Error of Mean (logged) | 0.53 | 95% H-UCL (KM -Log) | 33.13 |
| KM SD (logged) | 2.877 | 95% Critical H Value (KM-Log) | 5.189 |
| KM Standard Error of Mean (logged) | 0.53 | 3, | |
| | | | |
| | DL/2 St | atistics | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | 1.054 | Mean in Log Scale | -3.326 |
| SD in Original Scale | 2.273 | SD in Log Scale | 2.888 |
| 95% t UCL (Assumes normality) | 1.747 | 95% H-Stat UCL | 36.17 |
| DL/2 is not a recomm | ended method, p | rovided for comparisons and historical reasons | |
| | | | |
| | | ution Free UCL Statistics | · |
| Detected Data appe | ar Approximate L | ognormal Distributed at 5% Significance Level | |
| | | | |
| | | UCL to Use | |
| 97.5% KM (Chebyshev) UCL | 3.619 | | |
| Man O Toronto | - 0E0/ LIQI | and deliver the reserve and a selection of the second seco | |
| ** * * | | vided to help the user to select the most appropriate 95% UCL. | |
| | | size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| nowever, simulations results will not cover all | nedi vvoria data sel | ts; for additional insight the user may want to consult a statistician. | |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| BENZO(A)PYRENE | | | |
|--|--|--|---|
| * - | | | |
| | | | |
| | General | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 26 | Number of Non-Detects | Ę |
| Number of Distinct Detects | 26 | Number of Distinct Non-Detects | Ę |
| Minimum Detect | 0.00239 | Minimum Non-Detect | 0.00644 |
| Maximum Detect | 11.7 | Maximum Non-Detect | 0.00741 |
| Variance Detects | 13.75 | Percent Non-Detects | 16.13% |
| Mean Detects | 1.848 | SD Detects | 3.708 |
| Median Detects | 0.0747 | CV Detects | 2.006 |
| Skewness Detects | 1.964 | Kurtosis Detects | 2.43 |
| Mean of Logged Detects | -2.61 | SD of Logged Detects | 3.057 |
| | N | Ave Date de Cale | |
| Shapiro Wilk Test Statistic | 0.555 | st on Detects Only Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.92 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.425 | Lillefors GOF Test | |
| 5% Lilliefors Critical Value | 0.423 | Detected Data Not Normal at 5% Significance Level | |
| | _ | nal at 5% Significance Level | |
| | 04 244 1101110111 | and a to to digital and a control | |
| Kaplan-Meier (KM) Statis | stics using Norma | I Critical Values and other Nonparametric UCLs | |
| KM Mean | 1.551 | KM Standard Error of Mean | 0.622 |
| KM SD | 3.398 | 95% KM (BCA) UCL | 2.686 |
| 95% KM (t) UCL | 2.607 | 95% KM (Percentile Bootstrap) UCL | 2.626 |
| 95% KM (z) UCL | 2.575 | 95% KM Bootstrap t UCL | 3.159 |
| 90% KM Chebyshev UCL | 3.418 | 95% KM Chebyshev UCL | 4.264 |
| 97.5% KM Chebyshev UCL | 5.438 | 99% KM Chebyshev UCL | 7.743 |
| | I | <u> </u> | |
| Gamma | a GOF Tests on D | etected Observations Only | |
| A-D Test Statistic | 1.896 | | |
| | 1.050 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.889 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I | Level |
| | | - | Level |
| 5% A-D Critical Value | 0.889 | Detected Data Not Gamma Distributed at 5% Significance I | |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.889 0.231 0.189 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF | |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da | 0.889 0.231 0.189 Ita Not Gamma Di | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level | |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da | 0.889 0.231 0.189 ta Not Gamma Di | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level Detected Data Only | Level |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da | 0.889 0.231 0.189 Ita Not Gamma Di | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level | Level |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.224 8.253 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level n Detected Data Only k star (bias corrected MLE) | 0.224 8.253 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.224 8.253 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gather Common Co | 0.889 0.231 0.189 amma Statistics or 0.224 8.244 11.66 1.848 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level n Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.224 8.253 |
| S% A-D Critical Value K-S Test Statistic S% K-S Critical Value Detected De R hat (MLE) Theta hat (MLE) Mean (detects) Gamm | 0.889 0.231 0.189 1ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects | 0.224 8.253 |
| S% A-D Critical Value K-S Test Statistic S% K-S Critical Value Detected Da Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when or | 0.889 0.231 0.189 Ita Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% f | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs | 0.224 8.253 |
| S% A-D Critical Value K-S Test Statistic S% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when co | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u lata set has > 50% I ts is small such as | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | 0.224 8.253 |
| S% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when cate of GROS may not be used when kstar of detects For such situations, G | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% I ts is small such as ROS method may y | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs | 0.224 8.253 |
| S% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when c GROS may not be used when kstar of detec For such situations, Gi This is e | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u tts is small such as ROS method may y especially true wher | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs the sample size is small. | 0.224 8.253 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when company of the co | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% I ts is small such as ROS method may y especially true wher | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs the sample size is small. | 0.224 8.253 11.65 |
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| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when can grow any not | 0.889 0.231 0.189 0.289 0.294 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% I ts is small such as ROS method may be specially true wher TVs and UCLs may 0.00239 11.7 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs In the sample size is small. Viel computed using gamma distribution on KM estimates Mean Median | 0.224 8.253 11.65 1.552 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Gat k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamm GROS may not be used when care GROS may not be used when kstar of detect For such situations, Gat This is each of the care of | 0.889 0.231 0.189 0.289 0.294 0.224 0.224 0.224 0.224 0.244 0.11.66 0.848 0.00239 0.00239 0.00239 0.00239 0.00239 0.00239 0.00239 0.00239 0.00239 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs the sample size is small. v be computed using gamma distribution on KM estimates Mean Median CV | 0.224 8.253 11.65 1.552 0.01 2.226 |
| S% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when can be used when can be used when kstar of detects For such situations, G This is ear of gamma distributed detected data, B Minimum Maximum SD k hat (MLE) | 0.889 0.231 0.189 Ita Not Gamma Di Ita Not Gam | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. Very be computed using gamma distribution on KM estimates Mean Median CV K star (bias corrected MLE) | 0.224 8.253 11.65 1.552 0.01 2.226 0.216 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da Reference of the state of the state of detects of the state of detects of the state | 0.889 0.231 0.189 Ita Not Gamma Di Ita Not Gam | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) | 1.552 0.216 0.224 8.253 11.65 1.552 0.216 0.216 7.172 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when kstar of detected when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations of the situation of the si | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% I ts is small such as ROS method may y especially true wher TVs and UCLs may 0.00239 11.7 3.454 0.216 7.193 13.38 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. Very be computed using gamma distribution on KM estimates Mean Median CV K star (bias corrected MLE) | 0.224 8.253 11.65 1.552 0.01 2.226 0.216 7.172 |
| S% A-D Critical Value K-S Test Statistic S% K-S Critical Value Detected Da R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when companies of the state of detect for such situations, Ging the state of the | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% f ts is small such as ROS method may y especially true wher TVs and UCLs may 0.00239 11.7 3.454 0.216 7.193 13.38 0.0413 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected MLE) sing Imputed Non-Detects NDs with many tied observations at multiple DLs < 1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs the sample size is small. to be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.224 8.253 11.65 1.552 0.01 2.226 0.216 7.172 13.41 |
| 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Da R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when kstar of detected when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations, Gross may not be used when kstar of detected by the situations of the situation of the si | 0.889 0.231 0.189 ta Not Gamma Di amma Statistics or 0.224 8.244 11.66 1.848 a ROS Statistics u data set has > 50% I ts is small such as ROS method may y especially true wher TVs and UCLs may 0.00239 11.7 3.454 0.216 7.193 13.38 | Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) | |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Estimate | es of Gamma Par | ameters using KM Estimates | |
|---|----------------------|---|--------|
| Mean (KM) | 1.551 | SD (KM) | 3.398 |
| Variance (KM) | 11.55 | SE of Mean (KM) | 0.622 |
| k hat (KM) | 0.208 | k star (KM) | 0.21 |
| nu hat (KM) | 12.91 | nu star (KM) | 13 |
| theta hat (KM) | 7.445 | theta star (KM) | 7.397 |
| 80% gamma percentile (KM) | 2.093 | 90% gamma percentile (KM) | 4.69 |
| 95% gamma percentile (KM) | 7.892 | 99% gamma percentile (KM) | 16.64 |
| | | | |
| | Gamma Kaplan-N | Neier (KM) Statistics | |
| Approximate Chi Square Value (13.00, α) | 5.891 | Adjusted Chi Square Value (13.00, β) | 5.626 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 3.422 | 95% Gamma Adjusted KM-UCL (use when n<50) | 3.583 |
| | 1 | - | |
| Lognor | mal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.874 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.92 | Detected Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.17 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.17 | Detected Data appear Lognormal at 5% Significance Level | |
| Detected Data | appear Approxim | ate Lognormal at 5% Significance Level | |
| | | | |
| Lognon | mai ROS Statistic | s Using Imputed Non-Detects | |
| Mean in Original Scale | 1.551 | Mean in Log Scale | -3.054 |
| SD in Original Scale | 3.454 | SD in Log Scale | 2.974 |
| 95% t UCL (assumes normality of ROS data) | 2.604 | 95% Percentile Bootstrap UCL | 2.651 |
| 95% BCA Bootstrap UCL | 2.832 | 95% Bootstrap t UCL | 3.34 |
| 95% H-UCL (Log ROS) | 71.78 | | |
| | | | |
| | | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.103 | KM Geo Mean | 0.0449 |
| KM SD (logged) | 2.971 | 95% Critical H Value (KM-Log) | 5.34 |
| KM Standard Error of Mean (logged) | 0.545 | 95% H-UCL (KM -Log) | 67.03 |
| KM SD (logged) | 2.971 | 95% Critical H Value (KM-Log) | 5.34 |
| KM Standard Error of Mean (logged) | 0.545 | | |
| | DI /0 O | ia tistics | |
| DL/2 Normal | DL/2 S | DL/2 Log-Transformed | |
| Mean in Original Scale | 1.551 | Mean in Log Scale | -3.102 |
| SD in Original Scale | 3.454 | SD in Log Scale | 3.015 |
| 95% t UCL (Assumes normality) | 2.604 | 95% H-Stat UCL | 83.32 |
| , | | rovided for comparisons and historical reasons | |
| | ondoa moaroa, p | novidod for companisons and mobilical roasons | |
| None | parametric Distrib | oution Free UCL Statistics | |
| | | ognormal Distributed at 5% Significance Level | - |
| | •• | <u> </u> | |
| | Suggested | UCL to Use | |
| 99% KM (Chebyshev) UCL | 7.743 | | |
| , , , | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | |
| These recommendations are based upon th | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |
| | | | |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| ENZO(B)FLUORANTHENE | | | |
|--|--|--|--|
| | | | |
| | General Stat | istics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 29 | Number of Non-Detects | |
| Number of Distinct Detects | 29 | Number of Distinct Non-Detects | : |
| Minimum Detect | 0.00244 | Minimum Non-Detect | 0.0072 |
| Maximum Detect | 14.8 | Maximum Non-Detect | 0.0074 |
| Variance Detects | 17.21 | Percent Non-Detects | 6.452% |
| Mean Detects | 1.901 | SD Detects | 4.14 |
| Median Detects | 0.0169 | CV Detects | 2.18 |
| Skewness Detects | 2.261 | Kurtosis Detects | 3.97 |
| Mean of Logged Detects | -2.843 | SD of Logged Detects | 3.06 |
| ' | l | | |
| No Shapiro Wilk Test Statistic | rmal GOF Test on 0.525 | Detects Only Shapiro Wilk GOF Test | |
| • | | - | |
| 5% Shapiro Wilk Critical Value | 0.926 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.433 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.161 | Detected Data Not Normal at 5% Significance Level | |
| Detected | Data Not Normal a | at 5% Significance Level | |
| Kaplan-Meier (KM) Statistics | using Normal Cri | itical Values and other Nonparametric UCLs | |
| KM Mean | 1.779 | KM Standard Error of Mean | 0.726 |
| KM SD | 3.97 | 95% KM (BCA) UCL | 3.104 |
| 95% KM (t) UCL | 3.011 | 95% KM (Percentile Bootstrap) UCL | 3.05 |
| 95% KM (z) UCL | 2.973 | 95% KM Bootstrap t UCL | 3.669 |
| 90% KM Chebyshev UCL | 3.956 | 95% KM Chebyshev UCL | 4.942 |
| 97.5% KM Chebyshev UCL | 6.311 | 99% KM Chebyshev UCL | 9 |
| | | | |
| | | cted Observations Only | |
| A-D Test Statistic | 2.537 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.898 | Detected Data Not Gamma Distributed at 5% Significance Le | evel |
| K-S Test Statistic | 0.225 | | |
| | | Kolmogorov-Smirnov GOF | |
| 5% K-S Critical Value | 0.18 | Detected Data Not Gamma Distributed at 5% Significance Le | evel |
| | | <u> </u> | evel |
| Detected Data N | | Detected Data Not Gamma Distributed at 5% Significance Level | evel |
| Detected Data N | lot Gamma Distrib | Detected Data Not Gamma Distributed at 5% Significance Level outed at 5% Significance Level otected Data Only | |
| Detected Data N Gamm k hat (MLE) | na Statistics on De | Detected Data Not Gamma Distributed at 5% Significance Level outed at 5% Significance Level otected Data Only k star (bias corrected MLE) | 0.21 |
| Detected Data N Gamm k hat (MLE) Theta hat (MLE) | na Statistics on De 0.21 9.07 | Detected Data Not Gamma Distributed at 5% Significance Level puted at 5% Significance Level etected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.21 ⁻ 9.014 |
| Detected Data N Gamm k hat (MLE) | na Statistics on De | Detected Data Not Gamma Distributed at 5% Significance Level outed at 5% Significance Level otected Data Only k star (bias corrected MLE) | 0.21 ⁻ 9.014 |
| Camn k hat (MLE) Theta hat (MLE) nu hat (MLE) | na Statistics on De 0.21 9.07 12.16 | Detected Data Not Gamma Distributed at 5% Significance Level puted at 5% Significance Level etected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.21 ⁻ 9.014 |
| Gamma R | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Only Restricted Data Only Restricted Data Only Restricted Data Only In user (bias corrected MLE) In user (bias corrected) In user (bias corrected) In user (bias corrected) | 0.21 ⁻ 9.014 |
| Camma R Gamma R Gamma R Gamma R Gamma R GROS may not be used when data | 0.21 | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs | 0.211 9.014 12.23 |
| Gamma R GROS may not be used when kstar of detects is | 0.21 9.07 12.16 1.901 000 Statistics using set has > 50% NDs small such as < 1.0 | Detected Data Not Gamma Distributed at 5% Significance Level Data Significance Level Reference Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In usual (bias corrected) | 0.21 ⁻ 9.014 |
| Gamm k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 G method may yield | Detected Data Not Gamma Distributed at 5% Significance Level State of Data Only Respected D | 0.211 9.014 |
| Gamma R Gamma R K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 S method may yield cially true when the | Detected Data Not Gamma Distributed at 5% Significance Level State of Data Conty Respected Data Conty Respe | 0.21 ⁻ 9.014 |
| Gamma R K hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 6 method may yield cially true when the and UCLs may be of an UCLs may | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Conly Restricted Data Conly Restrict | 0.21 ⁻ 9.01 ² 12.23 |
| Gamma R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 6 method may yield cially true when the and UCLs may be 0.00244 | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs o, especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean | 0.21 ⁻ 9.01 ² 12.23 1.778 |
| Gamma R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 6 method may yield cially true when the and UCLs may be 0.00244 14.8 | Detected Data Not Gamma Distributed at 5% Significance Level Potected Data Conly Research (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) purputed Non-Detects with many tied observations at multiple DLs pospecially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 0.21 9.01 12.23 1.779 0.010 |
| Gamma R k hat (MLE) Theta hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 method may yield cially true when the and UCLs may be 0.00244 14.8 4.036 | Detected Data Not Gamma Distributed at 5% Significance Level Potected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs Despecially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. Computed using gamma distribution on KM estimates Mean Median CV | 0.21 9.01- 12.23 1.77- 0.010 2.26 |
| Gamma R k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 6 method may yield cially true when the and UCLs may be 0.00244 14.8 | Detected Data Not Gamma Distributed at 5% Significance Level Potected Data Conly Research (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) purputed Non-Detects with many tied observations at multiple DLs pospecially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 0.21 9.01- 12.2: 1.77- 0.010 2.26 0.20 |
| Gamma R k hat (MLE) Theta hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 method may yield cially true when the and UCLs may be 0.00244 14.8 4.036 | Detected Data Not Gamma Distributed at 5% Significance Level Potected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs Despecially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. Computed using gamma distribution on KM estimates Mean Median CV | 0.21 9.01- 12.2: 1.779 0.010 2.26 0.20 8.52 |
| Gamma R hat (MLE) Theta hat (MLE) Theta hat (MLE) Nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) | 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 method may yield cially true when the and UCLs may be of 0.00244 14.8 4.036 0.207 8.588 12.84 | Detected Data Not Gamma Distributed at 5% Significance Level Potected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In provided Non-Detects With many tied observations at multiple DLs Despecially when the sample size is small (e.g., <15-20) Discorrect values of UCLs and BTVs Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despecially when the sample size is small (e.g., <16-20) Despeci | 0.21 9.01- 12.2: 1.779 0.010 2.26 0.20 8.52 |
| Gamma R k hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) The mu hat (MLE) Mean (detects) Gamma R GROS may not be used when data: GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) | na Statistics on De 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 S method may yield cially true when the and UCLs may be of 0.00244 14.8 4.036 0.207 8.588 | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) Display to the star (bias corrected MLE) Theta star (bias corrected MLE) | 0.21 ⁻ 9.014 12.23 1.779 0.0102 2.266 0.205 8.528 |
| Gamma R k hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) The mu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) nu hat (MLE) | 0.21 9.07 12.16 1.901 OS Statistics using set has > 50% NDs small such as <1.0 method may yield cially true when the and UCLs may be of 0.00244 14.8 4.036 0.207 8.588 12.84 | Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Conly Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) nu star (bias corrected) Display to the star (bias corrected MLE) Display to the star (bias corrected MLE) Theta star (bias corrected MLE) | 0.211 9.014 |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

| Estimate | s of Gamma Par | ameters using KM Estimates | |
|---|----------------------|---|--------|
| Mean (KM) | 1.779 | SD (KM) | 3.97 |
| Variance (KM) | 15.76 | SE of Mean (KM) | 0.726 |
| k hat (KM) | 0.201 | k star (KM) | 0.203 |
| nu hat (KM) | 12.44 | nu star (KM) | 12.57 |
| theta hat (KM) | 8.862 | theta star (KM) | 8.771 |
| 80% gamma percentile (KM) | 2.361 | 90% gamma percentile (KM) | 5.38 |
| 95% gamma percentile (KM) | 9.132 | 99% gamma percentile (KM) | 19.44 |
| | | | |
| | Gamma Kaplan-N | feier (KM) Statistics | |
| Approximate Chi Square Value (12.57, α) | 5.607 | Adjusted Chi Square Value (12.57, β) | 5.349 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 3.989 | 95% Gamma Adjusted KM-UCL (use when n<50) | 4.181 |
| | ı. | - | |
| Lognor | mal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.854 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.926 | Detected Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.198 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.161 | Detected Data Not Lognormal at 5% Significance Level | |
| Detecte | d Data Not Logno | ormal at 5% Significance Level | |
| | | | |
| Lognon | mal ROS Statistics | Using Imputed Non-Detects | |
| Mean in Original Scale | 1.779 | Mean in Log Scale | -3.005 |
| SD in Original Scale | 4.036 | SD in Log Scale | 3.029 |
| 95% t UCL (assumes normality of ROS data) | 3.009 | 95% Percentile Bootstrap UCL | 2.992 |
| 95% BCA Bootstrap UCL | 3.408 | 95% Bootstrap t UCL | 3.675 |
| 95% H-UCL (Log ROS) | 98.44 | | |
| | | | |
| | | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.024 | KM Geo Mean | 0.0486 |
| KM SD (logged) | 2.997 | 95% Critical H Value (KM-Log) | 5.383 |
| KM Standard Error of Mean (logged) | 0.548 | 95% H-UCL (KM -Log) | 82.53 |
| KM SD (logged) | 2.997 | 95% Critical H Value (KM-Log) | 5.383 |
| KM Standard Error of Mean (logged) | 0.548 | | |
| | DL/2 S | and all an | |
| DL/2 Normal | DL/2 S | | |
| | 1.779 | DL/2 Log-Transformed Mean in Log Scale | -3.021 |
| Mean in Original Scale SD in Original Scale | 4.036 | SD in Log Scale | 3.043 |
| 95% t UCL (Assumes normality) | 3.009 | 95% H-Stat UCL | 103.6 |
| , | | rovided for comparisons and historical reasons | 100.0 |
| | onaoa moaroa, p | TOTAGG TOT COMPANISONS AND MISSINGEN TO ASSOCIA | |
| None | parametric Distrib | ution Free UCL Statistics | |
| | | e Distribution at 5% Significance Level | |
| | | | |
| | Suggested | UCL to Use | |
| 99% KM (Chebyshev) UCL | 9 | | |
| , , , | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | wided to help the user to select the most appropriate 95% UCL. | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | |
| These recommendations are based upon th | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |
| | | | |

Lower Main Meadow Pogonip Open Space 501 Golf Club Drive, Santa Cruz, California

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|--|---|--|--|
| à,H,I)PERYLENE | | | |
| Ge | eneral Sta | atistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 25 | Number of Non-Detects | |
| Number of Distinct Detects | 25 | Number of Distinct Non-Detects | |
| Minimum Detect 0. | .00215 | Minimum Non-Detect | 0.0064 |
| Maximum Detect | 7.52 | Maximum Non-Detect | 0.0074 |
| Variance Detects | 3.783 | Percent Non-Detects | 19.35% |
| Mean Detects | 0.995 | SD Detects | 1.94 |
| | 0.0751 | CV Detects | 1.95 |
| Skewness Detects | 2.247 | Kurtosis Detects | 4.72 |
| Mean of Logged Detects | -2.743 | SD of Logged Detects | 2.80 |
| Normal G | OF Test o | on Detects Only | |
| Shapiro Wilk Test Statistic | 0.591 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.918 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.387 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.173 | Detected Data Not Normal at 5% Significance Level | |
| Detected Data No | ot Normal | l at 5% Significance Level | |
| Kaplan-Meler (KM) Statistics using | Normal C | Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.803 | KM Standard Error of Mean | 0.32 |
| KM SD | 1.756 | 95% KM (BCA) UCL | 1.36 |
| 95% KM (t) UCL | 1.349 | 95% KM (Percentile Bootstrap) UCL | 1.34 |
| 95% KM (z) UCL | 1.332 | 95% KM Bootstrap t UCL | 1.71 |
| 90% KM Chebyshev UCL | 1.768 | 95% KM Chebyshev UCL | 2.20 |
| · · · · · · · · · · · · · · · · · · · | | , | |
| 97.5% KM Chebyshev UCL | 2.813 | 99% KM Chebyshev UCL | 4.00 |
| 97.5% KM Chebyshev UCL | 2.813 | 99% KM Chebyshev UCL | 4.00 |
| Gamma GOF Test | ts on Dete | ected Observations Only | 4.00 |
| Gamma GOF Test A-D Test Statistic | ts on Dete | ected Observations Only Anderson-Darling GOF Test | |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value | 1.504 0.872 | ected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I | |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic | 1.504 0.872 0.188 | ected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF | Level |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 1.504 0.872 0.188 0.191 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance | Level |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 1.504 0.872 0.188 0.191 | ected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF | Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. | 1.504 0.872 0.188 0.191 Gamma I | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance | Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. | 1.504 0.872 0.188 0.191 Gamma I | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level | Level |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati | 1.504 0.872 0.188 0.191 Gamma I | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level | Level e Level |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) | 1.504
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0.188
0.191
Gamma I | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) | Level Description
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) | ts on Dete
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Gamma I
stics on D
0.258
3.854 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | Level Description
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 1.504 0.872 0.188 0.191 Gamma I 0.258 3.854 12.9 0.995 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | Level Description
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati | ts on Dets 1.504 0.872 0.188 0.191 Gamma I 0.258 3.854 12.9 0.995 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | Level De Level 0.25 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati | ts on Dete
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15tics usin
> 50% ND | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) and star (bias corrected) mg Imputed Non-Detects Distribution at 5% Significance Level | Level Description
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati | ts on Dete 1.504 0.872 0.188 0.191 Gamma I 0.258 3.854 12.9 0.995 tistics usin > 50% ND such as <1. | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | Level Description
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati GROS may not be used when data set has a GROS may not be used when kstar of detects is small set. | ts on Deta 1.504 0.872 0.188 0.191 Gamma I stics on D 0.258 3.854 12.9 0.995 tistics usin > 50% ND such as <1. d may yield | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) significance Level Detected Data Only Restar (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) nu star (bias corrected) | Level Description
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| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati GROS may not be used when data set has a GROS may not be used when kstar of detects is small s For such situations, GROS metho This is especially tru For gamma distributed detected data, BTVs and UC | ts on Deta 1.504 0.872 0.188 0.191 Gamma I stics on D 0.258 3.854 12.9 0.995 tistics usin > 50% ND such as <1. d may yield ue when the | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs the sample size is small. | Level 0.25 3.91 12.6 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma ROS Stati GROS may not be used when data set has a GROS may not be used when kstar of detects is small s For such situations, GROS metho This is especially tru For gamma distributed detected data, BTVs and UC | 1.504 1.504 0.872 0.188 0.191 Gamma I stics on D 0.258 3.854 12.9 0.995 tistics usin > 50% ND: such as <1. d may yield ue when the | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) on star (bias corrected) lo, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs the sample size is small. e computed using gamma distribution on KM estimates | 0.25 3.91 12.6 |
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| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data set has a GROS may not be used when kstar of detects is small set of such situations, GROS methon This is especially true For gamma distributed detected data, BTVs and UCC Minimum 0. Maximum | ts on Deta 1.504 0.872 0.188 0.191 Gamma I Sistics on D 0.258 3.854 12.9 0.995 such as <1. d may yield use when the CLs may be 0.00215 7.52 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs the sample size is small. the computed using gamma distribution on KM estimates Mean Median | 0.25 3.91 12.6 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data set has a GROS may not be used when kstar of detects is small set for such situations, GROS methon This is especially tru For gamma distributed detected data, BTVs and UC Minimum 0. Maximum SD | ts on Deta 1.504 0.872 0.188 0.191 Gamma I Sistics on D 0.258 3.854 12.9 0.995 such as <1. d may yield use when the CLs may be county be county be county be county be county. | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) and Imputed Non-Detects Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) nu star (bias corrected) Indicate (bias corrected) Detected Data Only Restar (bias corrected MLE) nu star (bias corrected) Indicate (bias corrected) Detected Data Only Restar (bias corrected MLE) nu star (bias corrected) Indicate (bias corrected) Restar (bias corrected) Net (bias corrected) Restar (bias corrected) Restar (bias corrected) Net (bias corrected) Restar (bias | 0.25 3.91 12.6 0.80 0.0 2.21 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data set has a GROS may not be used when data set has set of detects is small set of set of the set o | ts on Deta 1.504 0.872 0.188 0.191 Gamma I 0.258 3.854 12.9 0.995 1550% ND: such as <1. d may yield use when the CLs may be 0.00215 7.52 1.784 0.247 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In ustar (bias corrected) | 0.25 3.91 12.6 0.80 0.0 2.21 0.24 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data set has a GROS may not be used when data set has set has set of detects is small set of set of the set of t | ts on Dete 1.504 0.872 0.188 0.191 Gamma I 0.258 3.854 12.9 0.995 12.9 0.995 such as <1. d may yield use when the CLs may be 0.00215 7.52 1.784 0.247 3.26 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In star (bias corrected MLE) Theta star (bias corrected MLE) | 0.25 3.91 12.6 0.80 0.0 2.21 0.24 |
| Gamma GOF Test A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data follow Appr. Gamma Stati k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when data set has a GROS may not be used when data set has a GROS may not be used when kstar of detects is small a For such situations, GROS method This is especially true For gamma distributed detected data, BTVs and UC Minimum O. Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) nu hat (MLE) Adjusted Level of Significance (β) | ts on Deta 1.504 0.872 0.188 0.191 Gamma I Stics on D 0.258 3.854 12.9 0.995 12.9 0.995 14stics usin > 50% ND such as <1. d may yield ue when the CLs may be 0.00215 7.52 1.784 0.247 3.26 15.29 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In star (bias corrected MLE) Theta star (bias corrected MLE) | Level E Level 0.25 |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|--|-----------------------|---|-----------------|
| Mean (KM) | 0.803 | SD (KM) | 1.756 |
| Variance (KM) | 3.082 | SE of Mean (KM) | 0.322 |
| k hat (KM) | 0.209 | k star (KM) | 0.21 |
| nu hat (KM) | 12.97 | nu star (KM) | 13.05 |
| theta hat (KM) | 3.839 | theta star (KM) | 3.816 |
| 80% gamma percentile (KM) | 1.085 | 90% gamma percentile (KM) | 2.428 |
| 95% gamma percentile (KM) | 4.082 | 99% gamma percentile (KM) | 8.598 |
| | | - | |
| | Gamma Kaplan-N | Meler (KM) Statistics | |
| Approximate Chi Square Value (13.05, α) | 5.924 | Adjusted Chi Square Value (13.05, β) | 5.658 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 1.768 | 95% Gamma Adjusted KM-UCL (use when n<50) | 1.851 |
| | | <u>.</u> | |
| Logno | rmal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.891 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.918 | Detected Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.194 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.173 | Detected Data Not Lognormal at 5% Significance Level | |
| Detecte | d Data Not Logn | ormal at 5% Significance Level | |
| | | | |
| Lognor | mal ROS Statistic | s Using Imputed Non-Detects | |
| Mean in Original Scale | 0.803 | Mean in Log Scale | -3.222 |
| SD in Original Scale | 1.784 | SD in Log Scale | 2.697 |
| 95% t UCL (assumes normality of ROS data) | 1.347 | 95% Percentile Bootstrap UCL | 1.372 |
| 95% BCA Bootstrap UCL | 1.529 | 95% Bootstrap t UCL | 1.693 |
| 95% H-UCL (Log ROS) | 16.89 | | |
| | | | |
| Statistics using KM es | stimates on Logg | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.296 | KM Geo Mean | 0.037 |
| KM SD (logged) | 2.717 | 95% Critical H Value (KM-Log) | 4.933 |
| KM Standard Error of Mean (logged) | 0.5 | 95% H-UCL (KM -Log) | 17.16 |
| KM SD (logged) | 2.717 | 95% Critical H Value (KM-Log) | 4.933 |
| KM Standard Error of Mean (logged) | 0.5 | | |
| | | | |
| DI Ø Normal | DL/2 S | | |
| DL/2 Normal | 0.803 | DL/2 Log-Transformed | 2 207 |
| Mean in Original Scale | | Mean in Log Scale | -3.307 2.767 |
| SD in Original Scale 95% t UCL (Assumes normality) | 1.765 | SD in Log Scale 95% H-Stat UCL | 21.14 |
| , , , , | _ | provided for comparisons and historical reasons | 21.14 |
| DEZ ISTICTA TOCOTION | ienaea mealoa, p | novided for companisons and measured reasons | |
| Non | narametric Distrib | oution Free UCL Statistics | |
| | • | Gamma Distributed at 5% Significance Level | |
| 333332321 др | | | |
| | Suggested | UCL to Use | |
| Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | | | |
| k<=1) | | | |
| | <u> </u> | | |
| When a data set follows an | approximate (e.g., r | ormal) distribution passing one of the GOF test | |
| | | distribution (e.g., gamma) passing both GOF tests in ProUCL | |
| | • | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | |
| These recommendations are based upon the | ne results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |
| L | | | |

| (K)FLUORANTHENE | | | |
|--|--|--|---------------------------------------|
| | General Sta | atietice | |
| Total Number of Observations | 31 | Number of Distinct Observations | |
| Number of Detects | 18 | Number of Non-Detects | |
| Number of Distinct Detects | 18 | Number of Distinct Non-Detects | |
| Minimum Detect | 0.00264 | Minimum Non-Detect | 0.006 |
| Maximum Detect | 4.02 | Maximum Non-Detect | 0.00 |
| Variance Detects | 1.922 | Percent Non-Detects | 41.9 |
| Mean Detects | 0.852 | SD Detects | 1. |
| Median Detects | 0.0815 | CV Detects | 1. |
| Skewness Detects | 1.617 | Kurtosis Detects | 1. |
| Mean of Logged Detects | -2.228 | SD of Logged Detects | 2 |
| Wealton Logged Detects | -2.220 | OD OI LOGGED DELECTS | |
| | Normal GOF Test o | | |
| Shapiro Wilk Test Statistic | 0.662 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.897 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.367 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.202 | Detected Data Not Normal at 5% Significance Level | |
| Detecte | d Data Not Normal | l at 5% Significance Level | |
| Kaplan-Meler (KM) Statis | tics using Normal C | Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.496 | KM Standard Error of Mean | 0 |
| KM SD | 1.109 | 95% KM (BCA) UCL | 0 |
| 95% KM (t) UCL | 0.844 | 95% KM (Percentile Bootstrap) UCL | 0 |
| 95% KM (z) UCL | 0.833 | 95% KM Bootstrap t UCL | 1 |
| 90% KM Chebyshev UCL | 1.111 | 95% KM Chebyshev UCL | 1 |
| 97.5% KM Chebyshev UCL | 1.776 | 99% KM Chebyshev UCL | 2 |
| | | · · | |
| Gamma | GOF Tests on Dete | acted Observations Only | |
| Gamma A-D Test Statistic | GOF Tests on Dete | ected Observations Only Anderson-Darling GOF Test | |
| | | <u>-</u> | el |
| A-D Test Statistic | 0.881 | Anderson-Darling GOF Test | el |
| A-D Test Statistic 5% A-D Critical Value | 0.881 0.836 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.881 0.836 0.26 0.22 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Level Kolmogorov-Smirnov GOF | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat | 0.881 0.836 0.26 0.22 a Not Gamma Distri | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat | 0.881 0.836 0.26 0.22 a Not Gamma Distr | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smlrnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only | el |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) | 0.881 0.836 0.26 0.22 a Not Gamma Distrimma Statistics on D 0.329 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) | 0.881 0.836 0.26 0.22 a Not Gamma Distrimma Statistics on D 0.329 2.593 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) | 0.881 0.836 0.26 0.22 a Not Gamma Distrimma Statistics on D 0.329 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.881 0.836 0.26 0.22 a Not Gamma Distri mma Statistics on D 0.329 2.593 11.83 0.852 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.881 0.836 0.26 0.22 a Not Gamma Distrima Statistics on D 0.329 2.593 11.83 0.852 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat | 0.881 0.836 0.26 0.22 a Not Gamma Distrima Statistics on D 0.329 2.593 11.83 0.852 a ROS Statistics using the state of the | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev. Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Cnly k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) ng imputed Non-Detects Detected Data Won-Detects Detected Data Cnly | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Gate Mana (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamme GROS may not be used when kstar of detects | 0.881 0.836 0.26 0.22 a Not Gamma Distribution Distributi | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev. Kolmogorov-Smlrnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev. ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamme GROS may not be used when dat GROS may not be used when kstar of detects For such situations, GR | 0.881 0.836 0.26 0.22 a Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev. Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev. Potected Data Not Gamma Distributed at 5% Significance Lev. Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamme GROS may not be used when dat GROS may not be used when kstar of detects For such situations, GF This is es | 0.881 0.836 0.26 0.22 a Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev. Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev. Potected Data Not Gamma Distributed at 5% Significance Lev. Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs ne sample size is small. | el 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamme GROS may not be used when de GROS may not be used when kstar of detect For such situations, GF This is ee For gamma distributed detected data, BT | 0.881 0.836 0.26 0.22 a Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) nu star (bias corrected) log imputed Non-Detects Dos with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs ne sample size is small. e computed using gamma distribution on KM estimates | 0 : |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is ee For gamma distributed detected data, BT Minimum | 0.881 0.836 0.26 0.22 a Not Gamma Distrima Statistics on D 0.329 2.593 11.83 0.852 a ROS Statistics using atta set has > 50% ND is is small such as <1 ROS method may yield specially true when the Vs and UCLs may be 0.00264 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) nu star (bias corrected) so with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs ne sample size is small. e computed using gamma distribution on KM estimates Mean | 0 1 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is set For gamma distributed detected data, BT Minimum Maximum | 0.881 0.836 0.26 0.22 a Not Gamma Distrima Statistics on D 0.329 2.593 11.83 0.852 a ROS Statistics using at a set has > 50% ND is is small such as <1 ROS method may yield specially true when the Vs and UCLs may be 0.00264 4.02 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smlrnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) nu star (bias corrected) lo, sepecially when the sample size is small (e.g., <15-20) Id incorrect values of UCLs and BTVs ne sample size is small. e computed using gamma distribution on KM estimates Mean Median | 0 : 1 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Genme GROS may not be used when de GROS may not be used when de For such situations, GF This is ee For gamma distributed detected data, BT Minimum Maximum SD | 0.881 0.836 0.26 0.22 a Not Gamma Distrima Statistics on D 0.329 2.593 11.83 0.852 a ROS Statistics using at a set has > 50% ND is is small such as <1 ROS method may yiel specially true when the Vs and UCLs may be 0.00264 4.02 1.126 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) nu star (bias corrected) ld incorrect values of UCLs and BTVs ne sample size is small. e computed using gamma distribution on KM estimates Mean Median CV | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when dated when dated when detected the statistics of the st | 0.881 0.836 0.26 0.22 2 Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) In gimputed Non-Detects So with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Ind incorrect values of UCLs and BTVs the sample size is small. the computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when detected when detected when detected between the state of detects For such situations, GF This is est For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.881 0.836 0.26 0.22 2 Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) In gimputed Non-Detects Dos with many tied observations at multiple DLs In generally when the sample size is small (e.g., <15-20) In gample size is small. In general gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) | 0 1 1 0 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Read (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) GROS may not be used when dated when dated when detects For such situations, GF This is ear For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) | 0.881 0.836 0.26 0.22 2 Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) In gimputed Non-Detects So with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) Ind incorrect values of UCLs and BTVs the sample size is small. the computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when dat GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is est For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) Adjusted Level of Significance (β) | 0.881 0.836 0.26 0.22 2 Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev. Kolmogorov-Smlrnov GOF Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Not Gamma Distributed at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In ustar (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected) | 0 1 1 2 0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Read (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) GROS may not be used when dated when dated when detects For such situations, GF This is ear For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) | 0.881 0.836 0.26 0.22 2 Not Gamma Distriction District | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lev- Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lev- ributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) nu star (bias corrected) In gimputed Non-Detects Dos with many tied observations at multiple DLs In generally when the sample size is small (e.g., <15-20) In gample size is small. In general gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) | C 2 2 C |

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|---|----------------------|---|--------|
| Mean (KM) | 0.496 | SD (KM) | 1.109 |
| Variance (KM) | 1,229 | SE of Mean (KM) | 0.205 |
| k hat (KM) | 0.2 | k star (KM) | 0.203 |
| nu hat (KM) | 12.43 | nu star (KM) | 12.56 |
| theta hat (KM) | 2.476 | theta star (KM) | 2.45 |
| 80% gamma percentile (KM) | 0.658 | 90% gamma percentile (KM) | 1.501 |
| 95% gamma percentile (KM) | 2.549 | 99% gamma percentile (KM) | 5.427 |
| | | | |
| | Gamma Kaplan-N | Neier (KM) Statistics | |
| Approximate Chi Square Value (12.56, α) | 5.599 | Adjusted Chi Square Value (12.56, β) | 5.341 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 1.114 | 95% Gamma Adjusted KM-UCL (use when n<50) | 1.167 |
| | 1 | - | |
| Lognor | rmal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.925 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.897 | Detected Data appear Lognormal at 5% Significance Leve | al . |
| Lilliefors Test Statistic | 0.145 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.202 | Detected Data appear Lognormal at 5% Significance Leve | el . |
| Detected | Data appear Log | normal at 5% Significance Level | |
| | | | |
| Lognor | mal ROS Statistics | s Using Imputed Non-Detects | |
| Mean in Original Scale | 0.496 | Mean in Log Scale | -3.614 |
| SD in Original Scale | 1.127 | SD in Log Scale | 2.499 |
| 95% t UCL (assumes normality of ROS data) | 0.84 | 95% Percentile Bootstrap UCL | 0.848 |
| 95% BCA Bootstrap UCL | 0.935 | 95% Bootstrap t UCL | 1.017 |
| 95% H-UCL (Log ROS) | 4.961 | | |
| | | | |
| | | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.622 | KM Geo Mean | 0.0267 |
| KM SD (logged) | 2.473 | 95% Critical H Value (KM-Log) | 4.545 |
| KM Standard Error of Mean (logged) | 0.463 | 95% H-UCL (KM -Log) | 4.429 |
| KM SD (logged) | 2.473 0.463 | 95% Critical H Value (KM-Log) | 4.545 |
| KM Standard Error of Mean (logged) | 0.463 | | |
| | DL/2 S | tatietice | |
| DL/2 Normal | DL/2 G | DL/2 Log-Transformed | |
| Mean in Original Scale | 0.496 | Mean in Log Scale | -3.667 |
| SD in Original Scale | | SD in Log Scale | 2.542 |
| 95% t UCL (Assumes normality) | 0.84 | 95% H-Stat UCL | 5.614 |
| ` | | rovided for comparisons and historical reasons | |
| | | • | |
| Non | parametric Distrib | ution Free UCL Statistics | |
| Detected Data | appear Lognorn | nal Distributed at 5% Significance Level | |
| | | | |
| | Suggested | UCL to Use | |
| 97.5% KM (Chebyshev) UCL | 1.776 | | |
| | <u> </u> | - | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | |
| These recommendations are based upon the | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |

| General Sta | atistics | |
|--------------------|--|--|
| 31 | Number of Distinct Observations | 3. |
| 21 | Number of Non-Detects | 10 |
| 21 | Number of Distinct Non-Detects | 10 |
| 0.00297 | Minimum Non-Detect | 0.00644 |
| 9.86 | Maximum Non-Detect | 0.00752 |
| 10.52 | Percent Non-Detects | 32.26% |
| 1.916 | SD Detects | 3.24 |
| 0.172 | CV Detects | 1.693 |
| 1.561 | Kurtosis Detects | 1.04 |
| -1.953 | SD of Logged Detects | 2.857 |
| | | |
| | | |
| | | |
| 0.908 | | |
| | | |
| | | |
| Data Not Normal | at 5% Significance Level | |
| | | |
| | · | |
| | | 0.507 |
| | ` ' | 2.238 |
| | , ,,, | 2.179 |
| | · · · · · · · · · · · · · · · · · · · | 2.681 |
| | - | 3.509 |
| 4.465 | 99% KM Chebyshev UCL | 6.342 |
| OF T D | and Observations Only | |
| | | |
| | | 1 |
| | | evei |
| | <u> </u> | |
| | | evei |
| Not Gamma Distri | ibued 813% Signilicance Level | |
| ma Statistica en D | Oats ated Date Only | |
| | | 0.263 |
| | , , | 7.29 |
| | , , | 11.04 |
| | nu star (blas correcteu) | 11.04 |
| 1.910 | | |
| OS Statistics usin | ng Imputed Non-Detects | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 0.00297 | | 1.301 |
| | | 0.0122 |
| | | 2.151 |
| 0.234 | k star (bias corrected MLE) | 0.233 |
| | , , | 5.592 |
| 5.566 | Theta star (bias corrected MLF) | |
| 5.566 14.49 | Theta star (bias corrected MLE) nu star (bias corrected) | |
| | | |
| 14.49 | | 14.42 |
| 14.49 0.0413 | nu star (bias corrected) | 14.42 |
| | 21 21 21 21 21 0.00297 9.86 10.52 1.916 0.172 1.561 -1.953 0.008 0.398 0.188 0.398 0.188 0.398 0.188 0.398 0.188 0.398 0.188 0.398 0.188 0.4465 0.229 0.2754 2.159 2.133 2.82 4.465 0.861 0.222 0.207 0.277 11.32 1.916 0.277 11.32 1.916 0.28 Statistics using set has > 50% ND on the second of the se | 21 Number of Non-Detects 21 Number of Distinct Non-Detects 0.000297 Minimum Non-Detect 0.000297 Minimum Non-Detect 0.000297 Minimum Non-Detect 0.000297 Meximum Non-Detect 1.052 Percent Non-Detects 1.052 Percent Non-Detects 1.051 SD Detects 1.051 CV Detects 1.051 Kurtosis Detects 1.052 SD of Logged Detects 1.053 SD of Logged Detects 1.056 Shapiro Wilk GOF Test 1.050 Detected Data Not Normal at 5% Significance Level 1.058 Detected Data Not Normal at 5% Significance Level 1.058 Detected Data Not Normal at 5% Significance Level 1.059 KM Standard Error of Mean 1.059 KM Standard Error of Mean 1.059 KM Standard Error of Mean 1.059 Significance Level 1.059 Significance Level 1.050 Significance L |

| Estimate | s of Gamma Par | ameters using KM Estimates | |
|---|--------------------|---|---------------------------------------|
| Mean (KM) | 1.299 | SD (KM) | 2.754 |
| Variance (KM) | 7.586 | SE of Mean (KM) | 0.507 |
| k hat (KM) | 0.222 | k star (KM) | 0.222 |
| nu hat (KM) | 13.79 | nu star (KM) | 13.79 |
| theta hat (KM) | 5.839 | theta star (KM) | 5.84 |
| 80% gamma percentile (KM) | 1.802 | 90% gamma percentile (KM) | 3.923 |
| 95% gamma percentile (KM) | 6.504 | 99% gamma percentile (KM) | 13.49 |
| | | | |
| | Gamma Kaplan-N | Meier (KM) Statistics | |
| Approximate Chi Square Value (13.79, α) | 6.429 | Adjusted Chi Square Value (13.79, β) | 6.15 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 2.787 | 95% Gamma Adjusted KM-UCL (use when n<50) | 2.913 |
| | <u> </u> | - | |
| Lognor | mal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.911 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.908 | Detected Data appear Lognormal at 5% Significance Leve | al . |
| Lilliefors Test Statistic | 0.144 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.188 | Detected Data appear Lognormal at 5% Significance Leve | el |
| Detected | Data appear Log | normal at 5% Significance Level | |
| | | | |
| Lognori | mal ROS Statistic | s Using Imputed Non-Detects | |
| Mean in Original Scale | 1.299 | Mean in Log Scale | -3.095 |
| SD in Original Scale | 2.8 | SD in Log Scale | 2.876 |
| 95% t UCL (assumes normality of ROS data) | 2.152 | 95% Percentile Bootstrap UCL | 2.174 |
| 95% BCA Bootstrap UCL | 2.336 | 95% Bootstrap t UCL | 2.563 |
| 95% H-UCL (Log ROS) | 43.07 | | |
| | | | |
| * | | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.089 | KM Geo Mean | 0.0456 |
| KM SD (logged) | 2.828 | 95% Critical H Value (KM-Log) | 5.11 |
| KM Standard Error of Mean (logged) | 0.523 | 95% H-UCL (KM -Log) | 34.78 |
| KM SD (logged) | 2.828 0.523 | 95% Critical H Value (KM-Log) | 5.11 |
| KM Standard Error of Mean (logged) | 0.523 | | |
| | DL/2 S | tatietice | |
| DL/2 Normal | DE/2 0 | DL/2 Log-Transformed | |
| Mean in Original Scale | 1.299 | Mean in Log Scale | -3.143 |
| SD in Original Scale | 2.8 | SD in Log Scale | 2.918 |
| 95% t UCL (Assumes normality) | 2.152 | 95% H-Stat UCL | 50.13 |
| DL/2 is not a recomm | ended method, p | rovided for comparisons and historical reasons | |
| | | · | |
| Nong | parametric Distrib | ution Free UCL Statistics | |
| Detected Data | appear Lognorn | nal Distributed at 5% Significance Level | |
| | | | |
| | Suggested | UCL to Use | |
| 97.5% KM (Chebyshev) UCL | 4.465 | | |
| | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | · · · · · · · · · · · · · · · · · · · |
| Recommendations | are based upon dat | a size, data distribution, and skewness. | <u> </u> |
| · · · · · · · · · · · · · · · · · · · | | ulation studies summarized in Singh, Maichle, and Lee (2006). | <u> </u> |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |

| DIBENZ(A,H)ANTHRACENE | | | |
|--|--|---|---|
| | General S | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 15 | Number of Non-Detects | 16 |
| Number of Distinct Detects | 15 | Number of Distinct Non-Detects | 16 |
| Minimum Detect | 0.00377 | Minimum Non-Detect | 0.00639 |
| Maximum Detect | 4.45 | Maximum Non-Detect | 0.00752 |
| Variance Detects | 1.6 | Percent Non-Detects | 51.61% |
| Mean Detects | 0.707 | SD Detects | 1.26 |
| Median Detects | 0.0661 | CV Detects | 1.79 |
| Skewness Detects | 2.275 | Kurtosis Detects | 5.1 |
| Mean of Logged Detects | -2.063 | SD of Logged Detects | 2.082 |
| | N | | |
| Shapiro Wilk Test Statistic | Normal GOF Tes | st on Detects Only Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.881 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.311 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.22 | Detected Data Not Normal at 5% Significance Level | |
| Detecti | - | nal at 5% Significance Level | |
| | | | |
| Kaplan-Meier (KM) Statis | tics using Normal | l Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.344 | KM Standard Error of Mean | 0.171 |
| KM SD | 0.92 | 95% KM (BCA) UCL | 0.669 |
| 95% KM (t) UCL | 0.634 | 95% KM (Percentile Bootstrap) UCL | 0.649 |
| 95% KM (z) UCL | 0.625 | 95% KM Bootstrap t UCL | 1.031 |
| 90% KM Chebyshev UCL | 0.857 | 95% KM Chebyshev UCL | 1.089 |
| 97.5% KM Chebyshev UCL | 1,412 | 99% KM Chebyshev UCL | 2.045 |
| 57.570 NW Grisbyshev GCL | | 99 % NW Chebyshev OCL | 2.010 |
| , | | , | |
| Gamm | a GOF Tests on De | etected Observations Only | 2.0.0 |
| Gamme A-D Test Statistic | a GOF Tests on De | etected Observations Only Anderson-Darling GOF Test | |
| Gemmi A-D Test Statistic 5% A-D Critical Value | a GOF Tests on De 0.793 0.817 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance | |
| Gemmi A-D Test Statistic 5% A-D Critical Value K-S Test Statistic | 0.793 0.817 0.232 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF | e Level |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.793 0.817 0.232 0.237 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance | e Level |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.793 0.817 0.232 0.237 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF | e Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected date | 0.793 0.817 0.232 0.237 0 appear Gamma | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance | e Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected date | 0.793 0.817 0.232 0.237 0 appear Gamma | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level | e Level |
| Gamm A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data | a GOF Tests on Do 0.793 0.817 0.232 0.237 a appear Gamma | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level | e Level E Level 0.353 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected date k hat (MLE) | 0.793 0.817 0.232 0.237 0.237 0.238 0.237 0.238 0.238 0.238 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected date k hat (MLE) Theta hat (MLE) | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma mma Statistics on 0.386 1.832 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data K hat (MLE) Theta hat (MLE) nu hat (MLE) | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gatter of the control | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 | etected Observations Only Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | e Level |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gate k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detects | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Ref (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when star of detect | a GOF Tests on Do | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Distributed at 5% Significance Level A Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Resident (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) Gamma GROS may not be used when detects For such situations, Gi | a GOF Tests on Do | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | e Level e Level 0.353 2.001 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detects For such situations, Gill This is e | a GOF Tests on Do | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs | e Level 0.353 2.001 10.56 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detects For such situations, Gill This is e | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics use tata set has > 50% N ts is small such as a set of the s | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs the sample size is small. We computed using gamma distribution on KM estimates Mean | 0.353 2.001 10.59 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected date Detected date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detected date GROS may not be used when kstar of detected for such situations, Girls is each of the such as a second of the such as a for gamma distributed detected data, B' Minimum Maximum | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us state set has > 50% N ts is small such as ROS method may y specially true when IVs and UCLs may 0.00377 4.45 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs in the sample size is small. If be computed using gamma distribution on KM estimates Mean Median | 0.353 2.001 10.59 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Research Research Research Research Gamma GROS may not be used when defended and the state of detection of the state of | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics use lata set has > 50% N ts is small such as as ROS method may y specially true when IVs and UCLs may 0.00377 4.45 0.934 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only A star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) field incorrect values of UCLs and BTVs in the sample size is small. If be computed using gamma distribution on KM estimates Mean Median Median CV | 0.353 2.001 10.59 0.347 0.01 2.60 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Reference of the statistic statis | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us ata set has > 50% N ts is small such as ROS method may y specially true when TVs and UCLs may 0.00377 4.45 0.934 0.298 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only A star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs in the sample size is small. If be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.353 2.00° 10.59 0.347 0.0° 2.66 0.29° |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Reference of the state of the st | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us at set has > 50% N ts is small such as ROS method may y specially true when TVs and UCLs may 0.00377 4.45 0.934 0.298 1.165 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Distributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs At the sample size is small. A be computed using gamma distribution on KM estimates Mean Median CV R star (bias corrected MLE) Theta star (bias corrected MLE) | 0.353 2.00° 10.56 0.347 0.0° 2.66 0.29° |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Residual Statistic 5% K-S Critical Value Detected data Residual Statistic Gamma Gamma GROS may not be used when detected with the state of detection of the statistic of the s | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us at set has > 50% N ts is small such as ROS method may y specially true when IVs and UCLs may 0.00377 4.45 0.934 0.298 1.165 18.47 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Detected Data Only A star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs in the sample size is small. If be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.353 2.00° 10.56 0.347 0.0° 2.66 0.29° |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Residual Statistic S% K-S Critical Value Detected data Residual Statistic Gamma Gamma GROS may not be used when detected with the state of detection of the statistic stati | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us tata set has > 50% N ts is small such as ROS method may y specially true when IVs and UCLs may 0.00377 4.45 0.934 0.298 1.165 18.47 0.0413 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. The computed using gamma distribution on KM estimates Mean Median CV Restar (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) | 0.353 2.001 10.59 0.347 0.01 2.69 0.291 1.194 18.02 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data Residual Statistic 5% K-S Critical Value Detected data Residual Statistic Gamma Gamma GROS may not be used when detected with the state of detection of the statistic statis | a GOF Tests on D 0.793 0.817 0.232 0.237 a appear Gamma amma Statistics on 0.386 1.832 11.57 0.707 a ROS Statistics us at set has > 50% N ts is small such as ROS method may y specially true when IVs and UCLs may 0.00377 4.45 0.934 0.298 1.165 18.47 | Anderson-Darling GOF Test Detected data appear Gamma Distributed at 5% Significance Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance Distributed at 5% Significance Level Distributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs At the sample size is small. A be computed using gamma distribution on KM estimates Mean Median CV R star (bias corrected MLE) Theta star (bias corrected MLE) | 0.353 2.001 10.59 0.347 0.01 2.69 0.291 |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|--|-----------------------|---|--------|
| Mean (KM) | 0.344 | SD (KM) | 0.92 |
| Variance (KM) | 0.846 | SE of Mean (KM) | 0.171 |
| k hat (KM) | 0.14 | k star (KM) | 0.148 |
| nu hat (KM) | 8.667 | nu star (KM) | 9.161 |
| theta hat (KM) | 2.46 | theta star (KM) | 2.327 |
| 80% gamma percentile (KM) | 0.37 | 90% gamma percentile (KM) | 1.017 |
| 95% gamma percentile (KM) | 1.898 | 99% gamma percentile (KM) | 4.461 |
| | l l | 1 | |
| | Gamma Kaplan-N | leier (KM) Statistics | |
| Approximate Chi Square Value (9.16, α) | 3.425 | Adjusted Chi Square Value (9.16, β) | 3.232 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.92 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.975 |
| | | · | |
| Logno | rmal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.957 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.881 | Detected Data appear Lognormal at 5% Significance Leve | |
| Lilliefors Test Statistic | 0.157 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.22 | Detected Data appear Lognormal at 5% Significance Leve | |
| Detected | Data appear Log | normal at 5% Significance Level | |
| | | | |
| Lognor | mal ROS Statistics | Using Imputed Non-Detects | |
| Mean in Original Scale | 0.343 | Mean in Log Scale | -4.373 |
| SD in Original Scale | 0.935 | SD in Log Scale | 2.682 |
| 95% t UCL (assumes normality of ROS data) | 0.628 | 95% Percentile Bootstrap UCL | 0.645 |
| 95% BCA Bootstrap UCL | 0.8 | 95% Bootstrap t UCL | 0.965 |
| 95% H-UCL (Log ROS) | 5.007 | | |
| | | | |
| Statistics using KM es | stimates on Logge | od Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.879 | KM Geo Mean | 0.0207 |
| KM SD (logged) | 2.247 | 95% Critical H Value (KM-Log) | 4.191 |
| KM Standard Error of Mean (logged) | 0.418 | 95% H-UCL (KM -Log) | 1.439 |
| KM SD (logged) | 2.247 | 95% Critical H Value (KM-Log) | 4.191 |
| KM Standard Error of Mean (logged) | 0.418 | | |
| | | | |
| | DL/2 S | | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | | Mean in Log Scale | -3.924 |
| SD in Original Scale | | SD in Log Scale | 2.319 |
| 95% t UCL (Assumes normality) | 0.629 | 95% H-Stat UCL | 1.799 |
| DL/Z is not a recomm | юпава твиоа, р | rovided for comparisons and historical reasons | |
| Non | n a va matria Distrib | ution Free UCL Statistics | |
| · · | | | |
| Detected Date | а арреат Сапппа | Distributed at 5% Significance Level | |
| | Suggested | UCL to Use | |
| Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | | | |
| (use when k<=1 and 15 < n < 50 but k<=1) | | | |
| , | | | |
| Note: Suggestions regarding the selection of | a 95% LICL are pro | vided to help the user to select the most appropriate 95% UCL. | |
| | <u>.</u> | a size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| r nese recommendations are based upon th | | andron oracios summanzed in origin, Malchie, and Lee (2000). | |
| However simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | |

| UORANTHENE | | | |
|---|--|---|---------------------------------------|
| | General Stati | istics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 21 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 21 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.00273 | Minimum Non-Detect | 0.0064 |
| Maximum Detect | 11.1 | Maximum Non-Detect | 0.0075 |
| Variance Detects | 8.374 | Percent Non-Detects | 32.269 |
| Mean Detects | 1.639 | SD Detects | 2.89 |
| Median Detects | 0.123 | CV Detects | 1.76 |
| Skewness Detects | 2.121 | Kurtosis Detects | 4.76 |
| Mean of Logged Detects | -2.084 | SD of Logged Detects | 2.8 |
| | L | <u> </u> | |
| | ormal GOF Test on | <u> </u> | |
| Shapiro Wilk Test Statistic | 0.639 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.908 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.387 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.188 | Detected Data Not Normal at 5% Significance Level | |
| Detected I | Data Not Normal a | t 5% Significance Level | |
| Vanian Major (VAI) Statistics | ueina Normal Cri | tical Values and other Nonparametric UCLs | |
| | | <u> </u> | 0.4 |
| KM Mean | 1.111 | KM Standard Error of Mean | 0.4 |
| KM SD | 2.447 | 95% KM (BCA) UCL | 1.91 |
| 95% KM (t) UCL | 1.876 | 95% KM (Percentile Bootstrap) UCL | 1.89 |
| 95% KM (z) UCL | 1.852 | 95% KM Bootstrap t UCL | 2.4 |
| 90% KM Chebyshev UCL | 2.462 | 95% KM Chebyshev UCL | 3.07 |
| 97.5% KM Chebyshev UCL | 3.923 | 99% KM Chebyshev UCL | 5.59 |
| Gamma G | OF Tests on Detec | ted Observations Only | |
| A-D Test Statistic | 1.105 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.86 | Detected Data Not Gamma Distributed at 5% Significance Lev | rel . |
| K-S Test Statistic | 0.21 | Kolmogorov-Smirnov GOF | |
| 5% K-S Critical Value | 0.207 | Detected Data Not Gamma Distributed at 5% Significance Lev | rel |
| Detected Data it | Not Gamma Distrib | uted at 5% Significance Level | |
| | | | |
| Gamr | ma Statistics on De | tected Data Only | |
| k hat (MLE) | 0.272 | k star (bias corrected MLE) | 0.26 |
| Theta hat (MLE) | 6.029 | These stee (bine commented MLE) | 6.1 |
| nu hat (MLE) | | Theta star (bias corrected MLE) | |
| | 11.42 | nu star (bias corrected) | |
| Mean (detects) | 11.42 1.639 | ` ′ | |
| ` 1 | 1.639 | nu star (bias corrected) | |
| Gamma R | 1.639 | nu star (bias corrected) | |
| GROS may not be used when data | 1.639 OS Statistics using set has > 50% NDs | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs | |
| GROS may not be used when data GROS may not be used when kstar of detects is | 1.639 OS Statistics using set has > 50% NDs s small such as <1.0 | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) | |
| Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS | 1.639 COS Statistics using set has > 50% NDs s small such as <1.0, S method may yield it. | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs | 11.1: |
| Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GRO This is espe | 1.639 OS Statistics using set has > 50% NDs is small such as <1.0. S method may yield iscially true when the second seco | nu star (bias corrected) I Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. | |
| Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs | 1.639 COS Statistics using set has > 50% NDs small such as <1.0. S method may yield is ecially true when the stand UCLs may be compared to the small such as and UCLs may be compared to the small stand using the small st | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates | 11.1 |
| GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum | 1.639 OS Statistics using set has > 50% NDs is small such as <1.0. S method may yield is scially true when the set and UCLs may be conducted to 1.00273 | nu star (bias corrected) I Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean | 11.1 |
| GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum | 1.639 COS Statistics using set has > 50% NDs is small such as <1.0, S method may yield is cially true when the set and UCLs may be conducted to the conducted of the conducted in the conducted | nu star (bias corrected) I Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 1.11 |
| GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD | 1.639 COS Statistics using set has > 50% NDs is small such as <1.0, S method may yield is cially true when the sis and UCLs may be conducted to 1.00273 11.1 2.486 | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV | 11.1 1.11 0.010 2.23 |
| GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum | 1.639 COS Statistics using set has > 50% NDs is small such as <1.0, S method may yield is cially true when the set and UCLs may be conducted to the conducted of the conducted in the conducted | nu star (bias corrected) I Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 11.1 1.11 0.010 2.23 |
| GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD | 1.639 COS Statistics using set has > 50% NDs is small such as <1.0, S method may yield is cially true when the sis and UCLs may be conducted to 1.00273 11.1 2.486 | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV | 11.1 0.010 2.23 0.23 |
| Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) | 1.639 COS Statistics using set has > 50% NDs s small such as <1.0, S method may yield it stally true when the stand UCLs may be conducted to 11.1 1 2.486 0.238 | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 1.11 0.010 2.23 0.23 4.70 |
| Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 1.639 COS Statistics using set has > 50% NDs s small such as <1.0, S method may yield it stated by the collaboration of the collaborat | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 1.11 0.010 2.23 0.23 4.70 |
| Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) nu hat (MLE) | 1.639 OS Statistics using set has > 50% NDs s small such as <1.0, S method may yield is cially true when the stand UCLs may be conducted to 11.1, 2.486 0.238 4.673 14.77 | nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | |

| Estimate | s of Gamma Para | ameters using KM Estimates | |
|---|---------------------------------------|--|--------|
| Mean (KM) | 1.111 | SD (KM) | 2.447 |
| Variance (KM) | 5.986 | SE of Mean (KM) | 0.45 |
| k hat (KM) | 0.206 | k star (KM) | 0.208 |
| nu hat (KM) | 12.79 | nu star (KM) | 12.89 |
| theta hat (KM) | 5.386 | theta star (KM) | 5.346 |
| 80% gamma percentile (KM) | 1.494 | 90% gamma percentile (KM) | 3.361 |
| 95% gamma percentile (KM) | 5.669 | 99% gamma percentile (KM) | 11.98 |
| | • | , | |
| | Gamma Kaplan-M | eier (KM) Statistics | |
| Approximate Chi Square Value (12.89, α) | 5.818 | Adjusted Chi Square Value (12.89, β) | 5.554 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 2.462 | 95% Gamma Adjusted KM-UCL (use when n<50) | 2.579 |
| | | | |
| · · | | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.914 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.908 | Detected Data appear Lognormal at 5% Significance Le | vel |
| Lilliefors Test Statistic | 0.157 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.188 | Detected Data appear Lognormal at 5% Significance Le | vel |
| Detected | Data appear Log | normal at 5% Significance Level | |
| Lognor | | Help a learning New Date ste | |
| * | | Using Imputed Non-Detects | 0.010 |
| Mean in Original Scale | 1.111 | Mean in Log Scale | -3.213 |
| SD in Original Scale | 2.487 | SD in Log Scale | 2.847 |
| 95% t UCL (assumes normality of ROS data) | 1.869 | 95% Percentile Bootstrap UCL | 1.895 |
| 95% BCA Bootstrap UCL | 2.24 33.51 | 95% Bootstrap t UCL | 2.433 |
| 95% H-UCL (Log ROS) | 33.51 | | |
| Statistics using KM es | timates on Logge | d Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.196 | KM Geo Mean | 0.0409 |
| KM SD (logged) | 2.789 | 95% Critical H Value (KM-Log) | 5.048 |
| KM Standard Error of Mean (logged) | 0.515 | 95% H-UCL (KM -Log) | 26.18 |
| KM SD (logged) | 2.789 | 95% Critical H Value (KM-Log) | 5.048 |
| KM Standard Error of Mean (logged) | 0.515 | , J | |
| | ı | | |
| | DL/2 St | atistics | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | 1.111 | Mean in Log Scale | -3.232 |
| SD in Original Scale | 2.487 | SD in Log Scale | 2.864 |
| 95% t UCL (Assumes normality) | 1.869 | 95% H-Stat UCL | 35.5 |
| DL/2 is not a recomm | ended method, p | rovided for comparisons and historical reasons | |
| | | | |
| | | ution Free UCL Statistics | |
| Detected Data | appear Lognorm | al Distributed at 5% Significance Level | |
| | | | |
| | | UCL to Use | |
| 97.5% KM (Chebyshev) UCL | 3.923 | | |
| Navon de la desta de | - 050/ 1101 | did de la | |
| | | vided to help the user to select the most appropriate 95% UCL. | |
| | · · · · · · · · · · · · · · · · · · · | size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| nowever, simulations results will not cover all | nedi vvorio data set | s; for additional insight the user may want to consult a statistician. | |

| FLUORENE | | | |
|--|----------------------|---|---------|
| | 0 | Out de | |
| T. W. J. (0) | | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 30 |
| Number of Detects | 9 | Number of Non-Detects | 22 |
| Number of Distinct Detects | 9 | Number of Distinct Non-Detects | 2.00000 |
| Minimum Detect Maximum Detect | 0.00249 | Minimum Non-Detect Maximum Non-Detect | 0.00639 |
| Variance Detects | 0.26 | Percent Non-Detects | 70.97% |
| Mean Detects | 0.00733 | SD Detects | 0.0856 |
| Median Detects | 0.0241 | CV Detects | 1.57 |
| Skewness Detects | 2.173 | Kurtosis Detects | 4.57 |
| Mean of Logged Detects | -4.011 | SD of Logged Detects | 1.662 |
| Wealt of Logged Detects | -4.011 | OD of Logged Delects | 1.002 |
| | Normal GOF Tes | st on Detects Only | |
| Shapiro Wilk Test Statistic | 0.662 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.829 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.381 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.274 | Detected Data Not Normal at 5% Significance Level | |
| Detect | ed Data Not Norn | nal at 5% Significance Level | |
| Vanian Maiay (VM) Chalde | ation walner Norma | Il Critical Values and other Nonparametric UCLs | |
| | 0.0177 | · | 0.00941 |
| KM Mean KM SD | 0.0177 | KM Standard Error of Mean | 0.00941 |
| | 0.0494 | 95% KM (BCA) UCL | |
| 95% KM (t) UCL 95% KM (z) UCL | 0.0337 | 95% KM (Percentile Bootstrap) UCL 95% KM Bootstrap t UCL | 0.0343 |
| 90% KM Chebyshev UCL | 0.0332 | 95% KM Chebyshev UCL | 0.0587 |
| 97.5% KM Chebyshev UCL | 0.046 | 99% KM Chebyshev UCL | 0.0367 |
| 97.3% (NVI CHEDYSHEV CCL | 0.0703 | 99 % NW Chebysnev OCL | 0.111 |
| Gamm | a GOF Tests on D | Detected Observations Only | |
| A-D Test Statistic | 0.524 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.766 | Detected data appear Gamma Distributed at 5% Significance | e Level |
| K-S Test Statistic | 0.242 | Kolmogorov-Smirnov GOF | |
| 5% K-S Critical Value | 0.293 | Detected data appear Gamma Distributed at 5% Significance | e Level |
| Detected date | a appear Gamma | Distributed at 5% Significance Level | |
| | | | |
| | | n Detected Data Only | |
| k hat (MLE) | 0.567 | k star (bias corrected MLE) | 0.452 |
| Theta hat (MLE) | 0.0959 | Theta star (bias corrected MLE) | 0.12 |
| nu hat (MLE) Mean (detects) | 10.21 0.0544 | nu star (bias corrected) | 8.138 |
| iviean (detects) | 0.0344 | | |
| Gamm | a ROS Statistics u | sing Imputed Non-Detects | |
| GROS may not be used when o | data set has > 50% | NDs with many tied observations at multiple DLs | |
| GROS may not be used when kstar of detec | ts is small such as | <1.0, especially when the sample size is small (e.g., <15-20) | |
| For such situations, G | ROS method may | yield incorrect values of UCLs and BTVs | |
| This is e | especially true when | n the sample size is small. | |
| For gamma distributed detected data, B | TVs and UCLs may | y be computed using gamma distribution on KM estimates | |
| Minimum | 0.00249 | Mean | 0.0229 |
| Maximum | 0.26 | Median | 0.01 |
| SD | 0.0487 | CV | 2.13 |
| k hat (MLE) | 0.893 | k star (bias corrected MLE) | 0.828 |
| Theta hat (MLE) | 0.0256 | Theta star (bias corrected MLE) | 0.0276 |
| nu hat (MLE) | 55.38 | nu star (bias corrected) | 51.35 |
| Adjusted Level of Significance (β) | 0.0413 | | · |
| Approximate Chi Square Value (51.35, α) | 35.89 | Adjusted Chi Square Value (51.35, β) | 35.18 |
| 95% Gamma Approximate UCL (use when n>=50) | 0.0327 | 95% Gamma Adjusted UCL (use when n<50) | 0.0334 |
| | · <u></u> | | |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Gamma Paramete | rs using KM Estimates | |
|--|--|---|
| 0.0177 | SD (KM) | 0.0494 |
| 0.00244 | SE of Mean (KM) | 0.00941 |
| 0.128 | k star (KM) | 0.138 |
| 7.963 | nu star (KM) | 8.526 |
| 0.138 | theta star (KM) | 0.129 |
| 0.0179 | 90% gamma percentile (KM) | 0.0518 |
| 0.099 | 99% gamma percentile (KM) | 0.239 |
| | | |
| | • | |
| | * | 2.863 |
| 0.0496 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.0527 |
| 005 T D | to d Observed to a Oak | |
| | <u> </u> | |
| | <u> </u> | |
| | | |
| | | |
| | | |
| appear Logiloilli | arato a significance Level | |
| ROS Statistics Using | Imputed Non-Detects | |
| | · · | -5.304 |
| | | 1.212 |
| | • | 0.0337 |
| 0.0434 | · · | 0.105 |
| 0.0188 | 3503 2303 247 253 | |
| | L | |
| tes on Logged Dat | a and Assuming Lognormal Distribution | |
| -5.359 | KM Geo Mean | |
| | | 0.00471 |
| 1.208 | 95% Critical H Value (KM-Log) | 0.00471 2.681 |
| 1.208 0.232 | 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) | |
| | ` ** | 2.681 |
| 0.232 | 95% H-UCL (KM -Log) | 2.681 0.0176 |
| 0.232 1.208 | 95% H-UCL (KM -Log) | 2.681 0.0176 |
| 0.232 1.208 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) | 2.681 0.0176 |
| 0.232 1.208 0.232 DL/2 Statistic | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) s DL/2 Log-Transformed | 2.681 0.0176 2.681 |
| 0.232 1.208 0.232 DL/2 Statistic | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale | 2.681 0.0176 2.681 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL | 2.681 0.0176 2.681 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL od for comparisons and historical reasons | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL dd for comparisons and historical reasons Free UCL Statistics | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL od for comparisons and historical reasons | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide metric Distribution pear Gamma Distri | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide metric Distribution pear Gamma Distri | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide metric Distribution pear Gamma Distri | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ed method, provide metric Distribution pear Gamma Distri Suggested UCL 0.0527 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ed for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ad method, provide metric Distribution pear Gamma Distri Suggested UCL 0.0527 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL od for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level | 2.681 0.0176 2.681 -5.187 1.151 |
| 0.232 1.208 0.232 DL/2 Statistic 0.0182 0.0501 0.0335 ad method, provided metric Distribution pear Gamma Distri Suggested UCL 0.0527 | 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 8 DL/2 Log-Transformed Mean in Log Scale 95% H-Stat UCL od for comparisons and historical reasons Free UCL Statistics buted at 5% Significance Level to Use | 2.681 0.0176 2.681 -5.187 1.151 |
| | 0.00244 0.128 7.963 0.138 0.0179 0.099 ma Kaplan-Meler (3.043 0.0496 GOF Test on Detect 0.907 0.829 0.197 0.274 a appear Lognorma ROS Statistics Using 0.0179 0.0502 0.0332 0.0434 0.0188 | 0.00244 SE of Mean (KM) 0.128 k star (KM) 7.963 nu star (KM) 0.138 theta star (KM) 0.0179 90% gamma percentile (KM) 0.099 99% gamma percentile (KM) 0.099 99% gamma percentile (KM) ma Kaplan-Meier (KM) Statistics 3.043 Adjusted Chi Square Value (8.53, β) 0.0496 95% Gamma Adjusted KM-UCL (use when n<50) GOF Test on Detected Observations Only 0.907 Shapiro Wilk GOF Test 0.829 Detected Data appear Lognormal at 5% Significance Level 0.197 Lilllefors GOF Test 0.274 Detected Data appear Lognormal at 5% Significance Level a appear Lognormal at 5% Significance Level BROS Statistics Using Imputed Non-Detects 0.0179 Mean in Log Scale 0.0502 SD in Log Scale 0.0332 95% Percentile Bootstrap UCL |

| IDENO(1,2,3-CD)PYRENE | | | |
|--|--|---|---|
| | | - 11 | |
| T | General | | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 21 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 21 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.00213 | Minimum Non-Detect | 0.0064 |
| Maximum Detect | 6.25 3.542 | Maximum Non-Detect Percent Non-Detects | 0.0075 32.269 |
| Variance Detects Mean Detects | 1.088 | SD Detects | 1.88 |
| Median Detects Median Detects | 0.112 | CV Detects | 1.00 |
| Skewness Detects | 1.769 | Kurtosis Detects | 2.0 |
| Mean of Logged Detects | -2.299 | SD of Logged Detects | 2.70 |
| Weal of Logged Detects | -2.299 | 3D 01 Logget Pelects | 2.70 |
| | | t on Detects Only | |
| Shapiro Wilk Test Statistic | 0.644 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.908 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.378 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.188 | Detected Data Not Normal at 5% Significance Level | |
| Detecte | d Data Not Norm | nal at 5% Significance Level | |
| Kaplan-Meier (KM) Statist | tics using Normal | l Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.738 | KM Standard Error of Mean | 0.29 |
| KM SD | 1.594 | 95% KM (BCA) UCL | 1.24 |
| 95% KM (t) UCL | 1.236 | 95% KM (Percentile Bootstrap) UCL | 1.2 |
| 95% KM (z) UCL | 1.221 | 95% KM Bootstrap t UCL | 1.47 |
| 90% KM Chebyshev UCL | 1.618 | 95% KM Chebyshev UCL | 2.01 |
| 97.5% KM Chebyshev UCL | 2.571 | 99% KM Chebyshev UCL | 3.65 |
| | | | |
| Gamma | GOF Tests on Do | etected Ohservations Only | |
| Gamma A-D Test Statistic | GOF Tests on De | etected Observations Only Anderson-Darling GOF Test | |
| | | - | Level |
| A-D Test Statistic | 0.996 | Anderson-Darling GOF Test | _evel |
| A-D Test Statistic 5% A-D Critical Value | 0.996 0.85 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.996 0.85 0.196 0.206 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol | 0.996 0.85 0.196 0.206 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol | 0.996 0.85 0.196 0.206 Illow Appr. Gamm | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level | e Level |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol | 0.996 0.85 0.196 0.206 Ilow Appr. Gammer mma Statistics on 0.291 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) | Level 0.28 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol | 0.996 0.85 0.196 0.206 Ilow Appr. Gammer mma Statistics on 0.291 3.74 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol | 0.996 0.85 0.196 0.206 Ilow Appr. Gammer mma Statistics on 0.291 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level Detected Data Only k star (bias corrected MLE) | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.996 0.85 0.196 0.206 llow Appr. Gamm mma Statistics on 0.291 3.74 12.22 1.088 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level 1 Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma | 0.996 0.85 0.196 0.206 llow Appr. Gamma 0.291 3.74 12.22 1.088 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level 1 Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data | 0.996 0.85 0.196 0.206 1llow Appr. Gamma mma Statistics on 0.291 3.74 12.22 1.088 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Gain k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detects | 0.996 0.85 0.196 0.206 0.206 Illow Appr. Gammi mma Statistics on 0.291 3.74 12.22 1.088 I ROS Statistics us ata set has > 50% N s is small such as | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR | 0.996 0.85 0.196 0.206 llow Appr. Gammi mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics use at a set has > 50% N s is small such as y ROS method may y | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) irield incorrect values of UCLs and BTVs | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es | 0.996 0.85 0.196 0.206 lilow Appr. Gammi mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics us at a set has > 50% N s is small such as ROS method may y specially true when | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) iteld incorrect values of UCLs and BTVs the sample size is small. | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when date GROS may not be used when kstar of detects For such situations, GR This is set For gamma distributed detected data, BT | 0.996 0.85 0.196 0.206 0.206 lilow Appr. Gamm: mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics us stata set has > 50% N s is small such as ROS method may y specially true when Vs and UCLs may | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) irield incorrect values of UCLs and BTVs ithe sample size is small. | 0.28 3.8 11. |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when date GROS may not be used when kstar of detects For such situations, GR This is see For gamma distributed detected data, BT Minimum | 0.996 0.85 0.196 0.206 0.206 llow Appr. Gamm: mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics us at a set has > 50% N s is small such as ROS method may y specially true when Vs and UCLs may 0.00213 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean | 0.28 3.8 11. |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when date GROS may not be used when kstar of detects For such situations, GR This is see For gamma distributed detected data, BT Minimum Maximum | 0.996 0.85 0.196 0.206 0.206 llow Appr. Gamm. mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics use ata set has > 50% N s is small such as a ROS method may y specially true when Vs and UCLs may 0.00213 6.25 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median | 0.28 3.8 11 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Gai k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when date GROS may not be used when date GROS may not be used when star of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD | 0.996 0.85 0.196 0.206 0.206 llow Appr. Gamm. mma Statistics on 0.291 3.74 12.22 1.088 a ROS Statistics use ata set has > 50% N s is small such as as ROS method may y specially true when Vs and UCLs may 0.00213 6.25 1.62 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) itield incorrect values of UCLs and BTVs the sample size is small. The computed using gamma distribution on KM estimates Mean Median CV | 0.28 3.8 11 0.7 0.7 0.0 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Real (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) | 0.996 0.85 0.196 0.206 0.206 0.206 0.206 0.201 3.74 12.22 1.088 0.87 0.88 0.891 0.99 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ideld incorrect values of UCLs and BTVs it the sample size is small. The computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.26 3.8 11 0.7 0.7 0.0 2.18 0.25 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Rear (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.996 0.85 0.196 0.206 0.206 0.206 0.206 0.201 3.74 12.22 1.088 0.85 Statistics us at a set has > 50% N is is small such as 80S method may y specially true when Vs and UCLs may 0.00213 6.25 1.62 0.258 2.871 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) iteld incorrect values of UCLs and BTVs the sample size is small. the computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.26 3.8 111 0.7 0.7 0.0 2.18 0.25 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Rear (MLE) Theta hat (MLE) Theta hat (MLE) Mean (detects) GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.996 0.85 0.196 0.206 0.206 0.206 0.206 0.201 3.74 12.22 1.088 0.88 0.891 0.891 0.2 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ideld incorrect values of UCLs and BTVs it the sample size is small. The computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.28 3.8 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Rear (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when de GROS may not be used when de GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) nu hat (MLE) nu hat (MLE) Adjusted Level of Significance (β) | 0.996 0.85 0.196 0.206 0.206 0.206 0.206 0.201 3.74 12.22 1.088 0.291 3.74 12.22 1.088 0.88 0.00213 6.25 1.62 0.258 2.871 15.98 0.0413 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) iteld incorrect values of UCLs and BTVs the sample size is small. Decomputed using gamma distribution on KM estimates Mean Median CV Restar (bias corrected MLE) Theta star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) | 0.28 3.8 11. 0.7 0.0 2.18 0.25 2.9 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected data fol Rear Management (MLE) Theta hat (MLE) The Mean (detects) GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) The Mean (MLE) The Mean (MLE) The Mean Maximum Maximum SD K hat (MLE) The Maximum The Max | 0.996 0.85 0.196 0.206 0.206 0.206 0.206 0.201 3.74 12.22 1.088 0.88 0.891 0.891 0.2 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected data appear Gamma Distributed at 5% Significance a Distribution at 5% Significance Level In Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) iteld incorrect values of UCLs and BTVs the sample size is small. the computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.28 3.8 111 0.7 0.0 2.18 0.25 |

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|--|----------------------------|--|--------|
| Mean (KM) | 0.738 | SD (KM) | 1.594 |
| Variance (KM) | 2.542 | SE of Mean (KM) | 0.293 |
| k hat (KM) | 0.214 | k star (KM) | 0.215 |
| nu hat (KM) | 13.29 | nu star (KM) | 13.34 |
| theta hat (KM) | 3.444 | theta star (KM) | 3.432 |
| 80% gamma percentile (KM) | 1.008 | 90% gamma percentile (KM) | 2.231 |
| 95% gamma percentile (KM) | 3.73 | 99% gamma percentile (KM) | 7.809 |
| | | <u> </u> | |
| | | Neier (KM) Statistics | |
| Approximate Chi Square Value (13.34, α) | 6.12 | Adjusted Chi Square Value (13.34, β) | 5.848 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 1.609 | 95% Gamma Adjusted KM-UCL (use when n<50) | 1.683 |
| Logno | rmal COE Tast on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.918 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.908 | Detected Data appear Lognormal at 5% Significance Leve | ı |
| Lilliefors Test Statistic | 0.908 | Lillefors GOF Test | 1 |
| 5% Lilliefors Critical Value | 0.134 | Detected Data appear Lognormal at 5% Significance Leve | ı |
| | | Inormal at 5% Significance Level | |
| 500000 | Data appoar Log | mornial at 0 % significance cover | |
| Lognor | mal ROS Statistics | Using Imputed Non-Detects | |
| Mean in Original Scale | 0.738 | Mean in Log Scale | -3.282 |
| SD in Original Scale | 1.621 | SD in Log Scale | 2.641 |
| 95% t UCL (assumes normality of ROS data) | 1.232 | 95% Percentile Bootstrap UCL | 1.249 |
| 95% BCA Bootstrap UCL | 1.295 | 95% Bootstrap t UCL | 1.543 |
| 95% H-UCL (Log ROS) | 12.51 | · | |
| | | L. | |
| Statistics using KM es | stimates on Logge | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.356 | KM Geo Mean | 0.0349 |
| KM SD (logged) | 2.664 | 95% Critical H Value (KM-Log) | 4.848 |
| KM Standard Error of Mean (logged) | 0.493 | 95% H-UCL (KM -Log) | 12.82 |
| KM SD (logged) | 2.664 | 95% Critical H Value (KM-Log) | 4.848 |
| KM Standard Error of Mean (logged) | 0.493 | | |
| | DI 00 | catanta. | |
| DI Ø Normal | DL/2 S | | |
| DL/2 Normal | 0.720 | DL/2 Log-Transformed | 2 270 |
| Mean in Original Scale | | Mean in Log Scale SD in Log Scale | -3.378 |
| SD in Original Scale | 1.621 | SD In Log Scale 95% H-Stat UCL | 2.721 |
| 95% t UCL (Assumes normality) | 1.232 | | 10.09 |
| DEIZ IS HOLZ ISCONINI | ended medica, p | rovided for comparisons and historical reasons | |
| Non | parametric Distrib | ution Free UCL Statistics | |
| Detected Data appo | ear Approximate | Gamma Distributed at 5% Significance Level | |
| | | | |
| | Suggested | UCL to Use | |
| Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | 1.683 | | |
| k<=1) | | | |
| | | | |
| | | ormal) distribution passing one of the GOF test | |
| When applicable, it is suggested to use a l | JCL based upon a c | listribution (e.g., gamma) passing both GOF tests in ProUCL | |
| Note: Suggestions reporting the salestics of | 2 05% LICL 252 255 | wided to help the upor to select the most engraprists 050/ LICI | |
| ** * * | | wided to help the user to select the most appropriate 95% UCL. | |
| | | a size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). ts; for additional insight the user may want to consult a statistician. | |
| However, Simulations results will not cover all | r vear vv or iti tiatid Se | to, for additional morgini the door may want to consult a statistician. | |

| PHENANTHRENE | | | |
|--|---------------------|---|---------|
| | General | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3 |
| Number of Detects | 14 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 14 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.00295 | Minimum Non-Detect | 0.0063 |
| Maximum Detect | 4.14 | Maximum Non-Detect | 0.21 |
| Variance Detects | 1.447 | Percent Non-Detects | 54.849 |
| Mean Detects | 0.675 | SD Detects | 1.20 |
| Median Detects | 0.0878 | CV Detects | 1.78 |
| Skewness Detects | 2.309 | Kurtosis Detects | 5.23 |
| Mean of Logged Detects | -2.349 | SD of Logged Detects | 2.3 |
| | l. | , | |
| | | st on Detects Only | |
| Shapiro Wilk Test Statistic | 0.633 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.874 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.318 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.226 | Detected Data Not Normal at 5% Significance Level | |
| Detect | ed Data Not Norn | nal at 5% Significance Level | |
| Kaplan-Meier (KM) Stati | stics using Norma | al Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.308 | KM Standard Error of Mean | 0.15 |
| KM SD | 0.847 | 95% KM (BCA) UCL | 0.61 |
| 95% KM (t) UCL | 0.576 | 95% KM (Percentile Bootstrap) UCL | 0.5 |
| 95% KM (z) UCL | 0.567 | 95% KM Bootstrap t UCL | 1.05 |
| 90% KM Chebyshev UCL | 0.781 | 95% KM Chebyshev UCL | 0.99 |
| 97.5% KM Chebyshev UCL | 1.294 | 99% KM Chebyshev UCL | 1.87 |
| 37.576 Tall Chasyshev 332 | 1.201 | 35 % Tun Chasyshov GGE | 1.07 |
| Gamm | a GOF Tests on D | Detected Observations Only | |
| A-D Test Statistic | 0.561 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.823 | Detected data appear Gamma Distributed at 5% Significance | e Level |
| K-S Test Statistic | 0.21 | Kolmogorov-Smirnov GOF | |
| 5% K-S Critical Value | 0.246 | Detected data appear Gamma Distributed at 5% Significance | e Level |
| Detected date | a appear Gamma | a Distributed at 5% Significance Level | |
| | | | |
| | | n Detected Data Only | |
| k hat (MLE) | 0.345 | k star (bias corrected MLE) | 0.31 |
| Theta hat (MLE) | 1.957 | Theta star (bias corrected MLE) | 2.11 |
| nu hat (MLE) | 9.653 | nu star (bias corrected) | 8.91 |
| Mean (detects) | 0.675 | | |
| Gamm | a ROS Statistics u | using Imputed Non-Detects | |
| GROS may not be used when o | data set has > 50% | NDs with many tied observations at multiple DLs | |
| GROS may not be used when kstar of detec | ts is small such as | <1.0, especially when the sample size is small (e.g., <15-20) | |
| For such situations, G | ROS method may | yield incorrect values of UCLs and BTVs | |
| This is e | especially true whe | n the sample size is small. | |
| For gamma distributed detected data, B | TVs and UCLs ma | y be computed using gamma distribution on KM estimates | |
| Minimum | 0.00295 | Mean | 0.3 |
| Maximum | 4.14 | Median | 0.0 |
| SD | 0.86 | CV | 2.77 |
| k hat (MLE) | 0.287 | k star (bias corrected MLE) | 0.28 |
| Theta hat (MLE) | 1.079 | Theta star (bias corrected MLE) | 1.10 |
| nu hat (MLE) | 17.82 | nu star (bias corrected) | 17.4 |
| Adjusted Level of Significance (β) | 0.0413 | · | |
| Approximate Chi Square Value (17.43, α) | 8.981 | Adjusted Chi Square Value (17.43, β) | 8.64 |
| 95% Gamma Approximate UCL (use when n>=50) | 0.602 | 95% Gamma Adjusted UCL (use when n<50) | 0.62 |
| | | | |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Estimates | s of Gamma Paramete | ers using KM Estimates | |
|--|--|--|--|
| Mean (KM) | 0.308 | SD (KM) | 0.847 |
| Variance (KM) | 0.718 | SE of Mean (KM) | 0.158 |
| k hat (KM) | 0.132 | k star (KM) | 0.141 |
| nu hat (KM) | 8.18 | nu star (KM) | 8.722 |
| theta hat (KM) | 2.332 | theta star (KM) | 2.187 |
| 80% gamma percentile (KM) | 0.317 | 90% gamma percentile (KM) | 0.903 |
| 95% gamma percentile (KM) | 1.714 | 99% gamma percentile (KM) | 4.098 |
| | | | |
| | amma Kaplan-Meier | · · · | |
| Approximate Chi Square Value (8.72, α) | 3.16 | Adjusted Chi Square Value (8.72, β) | 2.976 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.849 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.902 |
| Lognorm | nal GOE Tast on Data | acted Observations Only | |
| Shapiro Wilk Test Statistic | 0.942 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.942 | Detected Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.143 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.226 | Detected Data appear Lognormal at 5% Significance Level | |
| | | nal at 5% Significance Level | |
| | | | |
| Lognorm | al ROS Statistics Usin | ng Imputed Non-Detects | |
| Mean in Original Scale | 0.306 | Mean in Log Scale | -4.358 |
| SD in Original Scale | 0.862 | SD in Log Scale | 2.44 |
| 95% t UCL (assumes normality of ROS data) | 0.569 | 95% Percentile Bootstrap UCL | 0.57 |
| | | | |
| 95% BCA Bootstrap UCL | 0.718 | 95% Bootstrap t UCL | 1.159 |
| , | 0.718 1.861 | 95% Bootstrap t UCL | 1.159 |
| 95% BCA Bootstrap UCL | | 95% Bootstrap t UCL | 1.159 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) | 1.861 | 95% Bootstrap t UCL | |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) | 1.861 mates on Logged Da -4.024 | ata and Assuming Lognormal Distribution KM Geo Mean | 0.0179 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) | 1.861 mates on Logged Da -4.024 2.197 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) | 0.0179 4.113 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) | 0.0179 4.113 1.04 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estir KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) | 0.0179 4.113 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) | 0.0179 4.113 1.04 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estir KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) | 0.0179 4.113 1.04 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM SD (logged) KM SD (logged) KM SD (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) | 0.0179 4.113 1.04 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estil KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed | 0.0179 4.113 1.04 4.113 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estil KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) MEAN STANDARD (logged) MEAN STANDARD (logged) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed Mean in Log Scale | 0.0179 4.113 1.04 4.113 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estil KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM STandard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL | 0.0179 4.113 1.04 4.113 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM estil KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM STandard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed Mean in Log Scale SD in Log Scale | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) EXIST Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 Is not a recomment | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 | cs DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Jed for comparisons and historical reasons | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommentation of the state of the stat | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 nded method, provid | cs DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL Jed for comparisons and historical reasons | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommentation of the state of the stat | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 nded method, provid | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 September 1 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recommentation of the state of the stat | 1.861 mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 nded method, provid | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 Scale SD In Log Scale 95% H-Stat UCL 101 Ided for comparisons and historical reasons 101 Free UCL Statistics 102 Interval of the statistics 103 Interval of the statistics 104 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 106 Interval of the statistics 107 Interval of the statistics 107 Interval of the statistics 108 Interval of the statistics 10 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM ST (logged) KM ST (logged) KM ST (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomment Nonpa Detected Data Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | 1.861 mates on Logged Da | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 Scale SD In Log Scale 95% H-Stat UCL 101 Ided for comparisons and historical reasons 101 Free UCL Statistics 102 Interval of the statistics 103 Interval of the statistics 104 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 106 Interval of the statistics 107 Interval of the statistics 107 Interval of the statistics 108 Interval of the statistics 10 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM STandard Error of Mean (logged) KM Standard Error of Mean (logged) DL/2 Normal Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 Is not a recommental Nonpa | mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 Inded method, provid arametric Distribution appear Gamma Distribution | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 Scale SD In Log Scale 95% H-Stat UCL 101 Ided for comparisons and historical reasons 101 Free UCL Statistics 102 Interval of the statistics 103 Interval of the statistics 104 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 106 Interval of the statistics 107 Interval of the statistics 107 Interval of the statistics 108 Interval of the statistics 10 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM ST (logged) KM ST (logged) KM ST (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomment Nonpa Detected Data Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 Inded method, provid arametric Distribution appear Gamma Distribution | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 Scale SD In Log Scale 95% H-Stat UCL 101 Ided for comparisons and historical reasons 101 Free UCL Statistics 102 Interval of the statistics 103 Interval of the statistics 104 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 106 Interval of the statistics 107 Interval of the statistics 107 Interval of the statistics 108 Interval of the statistics 10 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomment Nonpe Detected Data Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) | 1.861 mates on Logged Da | Ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) 100 Scale SD In Log Scale 95% H-Stat UCL 101 Ided for comparisons and historical reasons 101 Free UCL Statistics 102 Interval of the statistics 103 Interval of the statistics 104 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 105 Interval of the statistics 106 Interval of the statistics 107 Interval of the statistics 107 Interval of the statistics 108 Interval of the statistics 10 | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) KM Standard Error of Mean (logged) KM Standard Error of Mean (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomment Nonpa Detected Data Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) | 1.861 mates on Logged Da | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) CS DL/2 Log-Transformed Mean in Log Scale SD in Log Scale 95% H-Stat UCL ided for comparisons and historical reasons In Free UCL Statistics ributed at 5% Significance Level | 0.0179 4.113 1.04 4.113 -4.02 2.291 |
| 95% BCA Bootstrap UCL 95% H-UCL (Log ROS) Statistics using KM esti KM Mean (logged) KM SD (logged) FOR SD (logged) Mean in Original Scale SD in Original Scale 95% t UCL (Assumes normality) DL/2 is not a recomment Nonpa Petected Data Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1) Note: Suggestions regarding the selection of a Recommendations are based upon the interpretations. | mates on Logged Da -4.024 2.197 0.432 2.197 0.432 DL/2 Statistic 0.31 0.86 0.572 Inded method, provided appear Gamma Distribution appear Gamma Dis | ata and Assuming Lognormal Distribution KM Geo Mean 95% Critical H Value (KM-Log) 95% H-UCL (KM -Log) 95% Critical H Value (KM-Log) 95% Critical H Value (KM-Log) So In Log Scale So In Log Scale 95% H-Stat UCL Ided for comparisons and historical reasons In Free UCL Statistics ributed at 5% Significance Level It to help the user to select the most appropriate 95% UCL. | 0.0179 4.113 1.04 4.113 -4.02 2.291 |

| PYRENE | | | |
|--|---|---|---|
| | | | |
| | General | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 3- |
| Number of Detects | 22 | Number of Non-Detects | 9 |
| Number of Distinct Detects | 22 | Number of Distinct Non-Detects | 9 |
| Minimum Detect | 0.0028 | Minimum Non-Detect | 0.00644 |
| Maximum Detect | 11.8 | Maximum Non-Detect | 0.0074 |
| Variance Detects | 9.213 | Percent Non-Detects | 29.03% |
| Mean Detects | 1.543 | SD Detects | 3.035 |
| Median Detects | 0.0997 | CV Detects | 1.96 |
| Skewness Detects | 2.365 | Kurtosis Detects | 5.64 |
| Mean of Logged Detects | -2.317 | SD of Logged Detects | 2.83 |
| | Normal GOF Tes | st on Detects Only | |
| Shapiro Wilk Test Statistic | 0.589 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.911 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.366 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.184 | Detected Data Not Normal at 5% Significance Level | |
| | | nal at 5% Significance Level | |
| | | · | |
| Kaplan-Meier (KM) Statis | stics using Norma | l Critical Values and other Nonparametric UCLs | |
| KM Mean | 1.096 | KM Standard Error of Mean | 0.477 |
| KM SD | 2.594 | 95% KM (BCA) UCL | 1.955 |
| 95% KM (t) UCL | 1.905 | 95% KM (Percentile Bootstrap) UCL | 1.92 |
| 95% KM (z) UCL | 1.88 | 95% KM Bootstrap t UCL | 2.416 |
| 90% KM Chebyshev UCL | 2.527 | 95% KM Chebyshev UCL | 3.175 |
| 97.5% KM Chebyshev UCL | 4.074 | 99% KM Chebyshev UCL | 5.841 |
| | | | |
| Gamma | a GOF Tests on D | etected Observations Only | |
| A-D Test Statistic | 1.219 | Anderson-Darling GOF Test | |
| 5% A-D Critical Value | 0.869 | Detected Data Not Gamma Distributed at 5% Significance | Level |
| K-S Test Statistic | 0.187 | Kolmogorov-Smirnov GOF | |
| 5% K-S Critical Value | 0.203 | Detected data appear Gamma Distributed at 5% Significance | e Level |
| Detected data fo | llow Appr. Gamm | a Distribution at 5% Significance Level | |
| | | | |
| | | n Detected Data Only | |
| k hat (MLE) | 0.257 | k star (bias corrected MLE) | 0.252 |
| Theta hat (MLE) | 6.001 | Theta star (bias corrected MLE) | 6.114 |
| nu hat (MLE) | 11.31 | nu star (bias corrected) | 11.1 |
| Mana (data da) | 1.543 | | |
| Mean (detects) | | • | |
| , 1 | a ROS Statistics II | eing Imputed Non-Detects | |
| Gamma | | sing Imputed Non-Detects NDs with many tied observations at multiple DLs | |
| GROS may not be used when d | lata set has > 50% l | NDs with many tied observations at multiple DLs | |
| GROS may not be used when d | lata set has > 50% f ts is small such as | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gr | lata set has > 50% It ts is small such as ROS method may y | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) //ield incorrect values of UCLs and BTVs | |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gi This is e | lata set has > 50% to ts is small such as ROS method may y especially true where | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gi This is e | lata set has > 50% to ts is small such as ROS method may y especially true where | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs the sample size is small. | 1.098 |
| GROS may not be used when degrees of detections of the start of the start of the start of detections of the start of t | lata set has > 50% Its is small such as ROS method may y especially true when TVs and UCLs may | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs Ithe sample size is small. Ve computed using gamma distribution on KM estimates | |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gi This is e For gamma distributed detected data, B' Minimum | lata set has > 50% I ts is small such as ROS method may y especially true wher TVs and UCLs may 0.0028 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. The computed using gamma distribution on KM estimates Mean | 0.0124 |
| Gemming GROS may not be used when dignored GROS may not be used when kstar of detection for such situations, GROS may not be used when kstar of detection for such situations, GROS may not be used when kstar of detection for such situations, GROS may not be used when kstar of detection for such situations and situation for such situations and such situations are such situations. | lata set has > 50% It ts is small such as ROS method may y especially true wher TVs and UCLs may 0.0028 11.8 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs It he sample size is small. It be computed using gamma distribution on KM estimates Mean Median | 0.012 ⁴ 2.40° |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, GI This is e For gamma distributed detected data, B' Minimum Maximum SD | lata set has > 50% Its is small such as ROS method may y specially true when TVs and UCLs may 0.0028 11.8 2.636 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. The computed using gamma distribution on KM estimates Mean Median CV | 0.012 ⁴ 2.401 0.232 |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gi This is e For gamma distributed detected data, B' Minimum Maximum SD k hat (MLE) | lata set has > 50% Its is small such as ROS method may y specially true wher TVs and UCLs may 0.0028 11.8 2.636 0.234 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs In the sample size is small. In the computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.012 ² 2.401 0.232 4.722 |
| GROS may not be used when d GROS may not be used when kstar of detect For such situations, Gi This is e For gamma distributed detected data, B' Minimum Maximum SD k hat (MLE) Theta hat (MLE) | lata set has > 50% Its is small such as ROS method may y specially true wher TVs and UCLs may 0.0028 11.8 2.636 0.234 4.7 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs In the sample size is small. v be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.0124 2.401 0.232 4.722 |
| GROS may not be used when degrees and stributed detected data, B' Minimum Maximum SD k hat (MLE) Theta hat (MLE) nu hat (MLE) | lata set has > 50% t ts is small such as ROS method may y especially true wher TVs and UCLs may 0.0028 11.8 2.636 0.234 4.7 14.48 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) vield incorrect values of UCLs and BTVs In the sample size is small. v be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 1.098 0.0124 2.401 0.232 4.722 14.41 |
| GROS may not be used when degrees and stributed detected data, B' Minimum Maximum SD k hat (MLE) Theta hat (MLE) Adjusted Level of Significance (β) | lata set has > 50% t ts is small such as ROS method may y especially true wher TVs and UCLs may 0.0028 11.8 2.636 0.234 4.7 14.48 0.0413 | NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) rield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected) | 0.0124 2.401 0.232 4.722 14.41 |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|--|------------------------|---|--------|
| Mean (KM) | 1.096 | SD (KM) | 2.594 |
| Variance (KM) | 6.729 | SE of Mean (KM) | 0.477 |
| k hat (KM) | 0.179 | k star (KM) | 0.183 |
| nu hat (KM) | 11.07 | nu star (KM) | 11.33 |
| theta hat (KM) | 6.139 | theta star (KM) | 5.997 |
| 80% gamma percentile (KM) | 1.373 | 90% gamma percentile (KM) | 3.308 |
| 95% gamma percentile (KM) | 5.777 | 99% gamma percentile (KM) | 12.68 |
| | Oamma Kanlan A | Inter (IAI) Obstalen | |
| Approximate Chi Square Value (11.33, α) | 4.79 | Heler (KM) Statistics Adjusted Chi Square Value (11.33, β) | 4.555 |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 2.593 | 95% Gamma Adjusted KM-UCL (use when n<50) | 2.727 |
| 33% daimia Approximate NVI-33E (use Whem is -30) | 2.000 | 30% Camina Adjusted Net-OCE (use when 11130) | 2.727 |
| Logno | rmal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.915 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.911 | Detected Data appear Lognormal at 5% Significance Lev | el |
| Lilliefors Test Statistic | 0.149 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.184 | Detected Data appear Lognormal at 5% Significance Lev | el |
| Detected | Data appear Log | normal at 5% Significance Level | |
| | | | |
| Lognor | mal ROS Statistics | Using Imputed Non-Detects | |
| Mean in Original Scale | 1.096 | Mean in Log Scale | -3.272 |
| SD in Original Scale | 2.637 | SD in Log Scale | 2.814 |
| 95% t UCL (assumes normality of ROS data) | 1.9 | 95% Percentile Bootstrap UCL | 1.904 |
| 95% BCA Bootstrap UCL | 2.203 | 95% Bootstrap t UCL | 2.574 |
| 95% H-UCL (Log ROS) | 27.15 | | |
| | | | |
| • | | od Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -3.256 | KM Geo Mean | 0.0386 |
| KM SD (logged) | 2.758 | 95% Critical H Value (KM-Log) | 4.998 |
| KM Standard Error of Mean (logged) | 0.509 | 95% H-UCL (KM -Log) | 21.43 |
| KM SD (logged) KM Standard Error of Mean (logged) | 2.758 0.509 | 95% Critical H Value (KM-Log) | 4.998 |
| TWO Claimaded Error of Michael (1099904) | 0.000 | | |
| | DL/2 S | atistics | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | 1.096 | Mean in Log Scale | -3.284 |
| SD in Original Scale | 2.637 | SD in Log Scale | 2.824 |
| 95% t UCL (Assumes normality) | 1.9 | 95% H-Stat UCL | 28.1 |
| DL/2 is not a recomm | ended method, p | rovided for comparisons and historical reasons | |
| | | | |
| | | ution Free UCL Statistics Gamma Distributed at 5% Significance Level | |
| ревоской рага арр | ear Approximate | Salillia Distributed at 5 % Significance Level | |
| | Suggested | UCL to Use | |
| Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but | | | |
| k<=1) | | | |
| | <u>ı</u> | L | |
| When a data set follows an a | approximate (e.g., n | ormal) distribution passing one of the GOF test | |
| When applicable, it is suggested to use a | JCL based upon a c | istribution (e.g., gamma) passing both GOF tests in ProUCL | |
| | | | |
| *** | | wided to help the user to select the most appropriate 95% UCL. | |
| | | a size, data distribution, and skewness. | |
| | | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| nowever, simulations results will not cover all | i vedi vvoi iu uala se | ts; for additional insight the user may want to consult a statistician. | |

| APHTHALENE | | | |
|--|--|--|--|
| | | | |
| | General Stati | stics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 2 |
| Number of Detects | 9 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 9 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.00491 | Minimum Non-Detect | 0.021 |
| Maximum Detect | 4.68 | Maximum Non-Detect | 0.025 |
| Variance Detects | 2.382 | Percent Non-Detects | 70.97% |
| Mean Detects | 0.573 | SD Detects | 1.54 |
| Median Detects | 0.0141 | CV Detects | 2.69 |
| Skewness Detects | 2.976 | Kurtosis Detects | 8.88 |
| Mean of Logged Detects | -3.234 | SD of Logged Detects | 2.21 |
| No. | rmal GOF Test on | Detects Only | |
| Shapiro Wilk Test Statistic | 0.432 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.829 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.454 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.274 | Detected Data Not Normal at 5% Significance Level | |
| Detected [| Data Not Normal a | t 5% Significance Level | |
| Kaplan-Meler (KM) Statistics | using Normal Cri | tical Values and other Nonparametric UCLs | |
| KM Mean | 0.173 | KM Standard Error of Mean | 0.157 |
| KM SD | 0.825 | 95% KM (BCA) UCL | 0.472 |
| 95% KM (t) UCL | 0.44 | 95% KM (Percentile Bootstrap) UCL | 0.467 |
| 95% KM (z) UCL | 0.431 | 95% KM Bootstrap t UCL | 11.24 |
| 90% KM Chebyshev UCL | 0.644 | 95% KM Chebyshev UCL | 0.858 |
| 97.5% KM Chebyshev UCL | 1.154 | 99% KM Chebyshev UCL | 1.736 |
| · L | | | |
| | | ted Observations Only | |
| A-D Test Statistic | 1.346 0.822 | Anderson-Darling GOF Test | · al |
| 5% A-D Critical Value K-S Test Statistic | 0.822 | Detected Data Not Gamma Distributed at 5% Significance Lev Kolmogorov-Smirnov GOF | vei |
| 5% K-S Critical Value | 0.304 | Detected Data Not Gamma Distributed at 5% Significance Lev | vol |
| | | uted at 5% Significance Level | VCI |
| Doubling Page 1 | Tot Gailling Distrib | awa ato w oigiiiiloanoo Eovoi | |
| | | | |
| Gamn | na Statistics on De | tected Data Only | |
| Gamm k hat (MLE) | na Statistics on De | tected Data Only k star (bias corrected MLE) | 0.25 |
| | | · · · · · · · · · · · · · · · · · · · | |
| k hat (MLE) | 0.263 | k star (bias corrected MLE) | 2.296 |
| k hat (MLE) Theta hat (MLE) | 0.263 2.177 | k star (bias corrected MLE) Theta star (bias corrected MLE) | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.263 2.177 4.737 0.573 | k star (bias corrected MLE) Theta star (bias corrected MLE) | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R | 0.263 2.177 4.737 0.573 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs s small such as <1.0. S method may yield it | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0, 6 method may yield icially true when the scale in th | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0, 6 method may yield icially true when the scale in th | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. | 2.296 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs | 0.263 2.177 4.737 0.573 CS Statistics using set has > 50% NDs s small such as <1.0 S method may yield icially true when the and UCLs may be of and UCLs may be of and UCLs may be of a set of the set | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. | 2.296 4.49° |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gemma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0 Smethod may yield icially true when the and UCLs may be conducted to 0.00491 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean | 2.29(4.49) 0.17: |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data: GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0 Smethod may yield icially true when the and UCLs may be conducted to 0.00491 4.68 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median | 2.29(4.49) 0.173 0.00 4.838 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0 Smethod may yield icially true when the and UCLs may be concept to 0.00491 4.68 0.838 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV | 2.29(4.49) 0.17; 0.00 4.83; 0.278 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0 method may yield icially true when the small UCLs may be conducted and UCLs may be conducted | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.173 0.01 4.835 0.276 0.625 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0, 6 method may yield icially true when the cand UCLs may be of 0.00491 4.68 0.838 0.283 0.612 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.173 0.01 4.835 0.276 0.625 |
| k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma R GROS may not be used when data GROS may not be used when kstar of detects is For such situations, GROS This is espe For gamma distributed detected data, BTVs Minimum Maximum SD k hat (MLE) Theta hat (MLE) nu hat (MLE) | 0.263 2.177 4.737 0.573 OS Statistics using set has > 50% NDs small such as <1.0, 6 method may yield icially true when the and UCLs may be of 0.00491 4.68 0.838 0.283 0.612 17.58 | k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) Imputed Non-Detects with many tied observations at multiple DLs , especially when the sample size is small (e.g., <15-20) incorrect values of UCLs and BTVs sample size is small. computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.25 2.296 4.491 0.173 0.01 4.835 0.625 17.21 |

$\label{eq:prouch} \textbf{ProUCL Output for Polycyclic Aromatic Hydrocarbons (PAHs) in Soil}$

| Estimat | es of Gamma Par | ameters using KM Estimates | |
|--|-------------------------|--|--------|
| Mean (KM) | 0.173 | SD (KM) | 0.825 |
| Variance (KM) | 0.68 | SE of Mean (KM) | 0.157 |
| k hat (KM) | 0.044 | k star (KM) | 0.0612 |
| nu hat (KM) | 2.728 | nu star (KM) | 3.797 |
| theta hat (KM) | 3.932 | theta star (KM) | 2.825 |
| 80% gamma percentile (KM) | 0.0442 | 90% gamma percentile (KM) | 0.332 |
| 95% gamma percentile (KM) | 0.974 | 99% gamma percentile (KM) | 3.459 |
| | | | |
| | Gamma Kaplan-N 0.643 | Aeler (KM) Statistics | 0.578 |
| Approximate Chi Square Value (3.80, α) 95% Gamma Approximate KM-UCL (use when n>=50) | 1.021 | Adjusted Chi Square Value (3.80, β) 95% Gamma Adjusted KM-UCL (use when n<50) | 1.136 |
| | | (use when k<=1 and 15 < n < 50) | 1.130 |
| 30% damma | Tajubica Tivi OOL | (acc when the first to the cost | |
| Logno | rmal GOF Test on | Detected Observations Only | |
| Shapiro Wilk Test Statistic | 0.848 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.829 | Detected Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.234 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.274 | Detected Data appear Lognormal at 5% Significance Level | |
| Detected | Data appear Log | normal at 5% Significance Level | |
| | | | |
| Lognor | mal ROS Statistic | s Using Imputed Non-Detects | |
| Mean in Original Scale | 0.174 | Mean in Log Scale | -4.212 |
| SD in Original Scale | 0.838 | SD in Log Scale | 1.368 |
| 95% t UCL (assumes normality of ROS data) | 0.43 | 95% Percentile Bootstrap UCL | 0.475 |
| 95% BCA Bootstrap UCL | 0.626 | 95% Bootstrap t UCL | 13.39 |
| 95% H-UCL (Log ROS) | 0.0778 | | |
| Statistics using KM as | etimates on Logge | ed Data and Assuming Lognormal Distribution | |
| KM Mean (logged) | -4.294 | KM Geo Mean | 0.0136 |
| KM SD (logged) | 1.35 | 95% Critical H Value (KM-Log) | 2.87 |
| KM Standard Error of Mean (logged) | 0.291 | 95% H-UCL (KM -Log) | 0.0689 |
| KM SD (logged) | 1.35 | 95% Critical H Value (KM-Log) | 2.87 |
| KM Standard Error of Mean (logged) | 0.291 | 55% Children III Valide (I div 269) | 2.07 |
| , 55 / | | | |
| | DL/2 S | tatistics | |
| DL/2 Normal | | DL/2 Log-Transformed | |
| Mean in Original Scale | 0.174 | Mean in Log Scale | -4.108 |
| SD in Original Scale | 0.838 | SD in Log Scale | 1.278 |
| 95% t UCL (Assumes normality) | 0.43 | 95% H-Stat UCL | 0.0711 |
| DL/2 is not a recomm | ended method, p | provided for comparisons and historical reasons | |
| Non | no so motelo Distelle | widen Eree LICI Stedeler | |
| | | outlon Free UCL Statistics nal Distributed at 5% Significance Level | |
| | appear Logitoni | indi bishibaba ato A diginilarito 2010i | |
| | Suggested | I UCL to Use | |
| 97.5% KM (Chebyshev) UCL | 1.154 | | |
| , | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | |
| These recommendations are based upon the | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | |
| However, simulations results will not cover all | Real World data se | ets; for additional insight the user may want to consult a statistician. | |

| METHYLNAPHTHALENE | | | |
|---|---|--|---|
| | | | |
| | General S | Statistics | |
| Total Number of Observations | 31 | Number of Distinct Observations | 2 |
| Number of Detects | 5 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 5 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.0106 | Minimum Non-Detect | 0.021 |
| Maximum Detect | 0.0762 | Maximum Non-Detect | 0.21 |
| Variance Detects | 7.9088E-4 | Percent Non-Detects | 83.87 |
| Mean Detects | 0.0261 | SD Detects | 0.028 |
| Median Detects | 0.0162 | CV Detects | 1.07 |
| Skewness Detects | 2.181 | Kurtosis Detects | 4.80 |
| Mean of Logged Detects | -3.969 | SD of Logged Detects | 0.8 |
| | Normal GOF Test | t on Detects Only | |
| Shapiro Wilk Test Statistic | 0.638 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.762 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.433 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.343 | Detected Data Not Normal at 5% Significance Level | |
| Detecte | d Data Not Norm | al at 5% Significance Level | |
| Kaplan-Meler (KM) Statis | tics using Normal | Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.0157 | KM Standard Error of Mean | 0.0027 |
| KM SD | 0.0116 | 95% KM (BCA) UCL | 0.020 |
| 95% KM (t) UCL | 0.0204 | 95% KM (Percentile Bootstrap) UCL | 0.020 |
| 95% KM (z) UCL | 0.0202 | 95% KM Bootstrap t UCL | 0.022 |
| 90% KM Chebyshev UCL | 0.0239 | 95% KM Chebyshev UCL | 0.027 |
| 97.5% KM Chebyshev UCL | 0.0328 | 99% KM Chebyshev UCL | 0.04 |
| 37.370 KIVI CHEDYSHEV UCL | 0.0020 | 99% KIVI Chebyshev UCL | 0.04 |
| , | | · | 0.04 |
| Gamma | a GOF Tests on De | etected Observations Only | 0.04 |
| Gamma A-D Test Statistic | a GOF Tests on De | etected Observations Only Anderson-Darling GOF Test | |
| Gamma A-D Test Statistic 5% A-D Critical Value | 0.834 0.686 | etected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L | |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic | 0.834 0.686 | etected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.834 0.686 0.411 0.361 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.834 0.686 0.411 0.361 | etected Observations Only Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date | 0.834 0.686 0.411 0.361 0.410 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date | 0.834 0.686 0.411 0.361 0.410 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Ga | 0.834 0.686 0.411 0.361 ba Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) | 0.834 0.686 0.411 0.361 ta Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) | 0.834 0.686 0.411 0.361 ta Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.834 0.686 0.411 0.361 ta Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.834 0.686 0.411 0.361 ta Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level I Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat | 0.834 0.686 0.411 0.361 ta Not Gamma Dis 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when kstar of detects | 0.834 0.686 0.411 0.361 ta Not Gamma Dis 0.0155 16.89 0.0261 a ROS Statistics us at a set has > 50% N s is small such as e | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detect For such situations, GR | 0.834 0.686 0.411 0.361 ba Not Gamma Dis 0.0155 16.89 0.0261 a ROS Statistics us at set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level I Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detect For such situations, GF This is es | 0.834 0.686 0.411 0.361 ba Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detect For such situations, GF This is es | 0.834 0.686 0.411 0.361 ba Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detects For such situations, GF This is est For gamma distributed detected data, BT | 0.834 0.686 0.411 0.361 ba Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us at a set has > 50% h is is small such as s ROS method may yi specially true when rVs and UCLs may | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is es For gamma distributed detected data, BT Minimum | 0.834 0.686 0.411 0.361 ta Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as a ROS method may yi specially true when IVs and UCLs may 0.01 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance I Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance I stributed at 5% Significance Level Detected Data Not Gamma Distributed at 5% Significance I to Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when dat GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is es For gamma distributed detected data, BT Minimum Maximum SD | 0.834 0.686 0.411 0.361 10 Not Gamma Dis 1.689 0.0155 16.89 0.0261 10 ROS Statistics use at a set has > 50% Nos is is small such as a ROS method may yill specially true when IVs and UCLs may 0.01 0.0762 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level A Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects ADs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median | .evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Dat Ga k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when dat GROS may not be used when dat GROS may not be used when kstar of detect For such situations, GF This is es For gamma distributed detected data, BT Minimum Maximum | 0.834 0.686 0.411 0.361 ta Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as < ROS method may yi specially true when TVs and UCLs may 0.01 0.0762 0.0118 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level A Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV | 0.80 0.032 8.00 0.015 0.015 0.72 4.26 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when detected data, BT This is est For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) | 0.834 0.686 0.411 0.361 ta Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as < ROS method may yi specially true when rVs and UCLs may 0.01 0.0762 0.0118 4.693 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level A Detected Data Only R star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.016 0.013 0.072 4.26 |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when kstar of detect For such situations, GF This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) | 0.834 0.686 0.411 0.361 ba Not Gamma Dis mma Statistics on 1.689 0.0155 16.89 0.0261 a ROS Statistics us ata set has > 50% N s is small such as a ROS method may yi specially true when TVs and UCLs may 0.01 0.0762 0.0118 4.693 0.00347 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | _evel |
| Gamma A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gamma k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) GROS may not be used when kstar of detect For such situations, GF This is ee For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.834 0.686 0.411 0.361 0.801 0.801 0.801 0.801 0.801 0.801 0.801 0.801 0.801 0.801 0.0155 0.0261 0.802 0.0261 0.802 0.0261 0.802 0.0261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 0.00261 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance L Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance L stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing imputed Non-Detects NDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) ield incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.86 0.032 8.08 0.016 0.013 0.72 4.26 0.0038 |

| Estimate | s of Gamma Par | ameters using KM Estimates | | |
|---|----------------------|---|---------|--|
| Mean (KM) | 0.0157 | SD (KM) | 0.0116 | |
| Variance (KM) | 1.3366E-4 | SE of Mean (KM) | 0.00274 | |
| k hat (KM) | 1.847 | k star (KM) | 1.689 | |
| nu hat (KM) | 114.5 | nu star (KM) | 104.7 | |
| theta hat (KM) | 0.00851 | theta star (KM) | 0.0093 | |
| 80% gamma percentile (KM) | 0.024 | 90% gamma percentile (KM) | 0.0318 | |
| 95% gamma percentile (KM) | 0.0393 | 99% gamma percentile (KM) | 0.0562 | |
| | | | | |
| C | 3amma Kaplan-N | Meier (KM) Statistics | | |
| Approximate Chi Square Value (104.75, α) | 82.13 | Adjusted Chi Square Value (104.75, β) | 81.02 | |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.02 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.0203 | |
| | | <u> </u> | | |
| Lognor | mal GOF Test on | Detected Observations Only | | |
| Shapiro Wilk Test Statistic | 0.762 | Shapiro Wilk GOF Test | | |
| 5% Shapiro Wilk Critical Value | 0.762 | Detected Data Not Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | 0.364 | Lilliefors GOF Test | | |
| 5% Lilliefors Critical Value | 0.343 | Detected Data Not Lognormal at 5% Significance Level | | |
| Detected | d Data Not Logno | ormal at 5% Significance Level | | |
| | | | | |
| Lognorr | | s Using Imputed Non-Detects | | |
| Mean in Original Scale | 0.0164 | Mean in Log Scale | -4.208 | |
| SD in Original Scale | 0.0115 | SD in Log Scale | 0.366 | |
| 95% t UCL (assumes normality of ROS data) | 0.0199 | 95% Percentile Bootstrap UCL | 0.0203 | |
| 95% BCA Bootstrap UCL | 0.0227 | 95% Bootstrap t UCL | 0.0273 | |
| 95% H-UCL (Log ROS) | 0.018 | | | |
| | | | | |
| · | | ed Data and Assuming Lognormal Distribution | | |
| KM Mean (logged) | -4.259 | KM Geo Mean | 0.0141 | |
| KM SD (logged) | 0.373 | 95% Critical H Value (KM-Log) | 1.838 | |
| KM Standard Error of Mean (logged) | 0.129 | 95% H-UCL (KM -Log) | 0.0172 | |
| KM SD (logged) | 0.373 0.129 | 95% Critical H Value (KM-Log) | 1.838 | |
| KM Standard Error of Mean (logged) | 0.129 | | | |
| | DL/2 S | tatietice | | |
| DL/2 Normal | | DL/2 Log-Transformed | | |
| Mean in Original Scale | 0.017 | Mean in Log Scale | -4.314 | |
| SD in Original Scale | 0.0204 | SD in Log Scale | 0.522 | |
| 95% t UCL (Assumes normality) | 0.0232 | 95% H-Stat UCL | 0.0185 | |
| ` | ended method, p | rovided for comparisons and historical reasons | | |
| | | | | |
| Nonp | arametric Distrib | ution Free UCL Statistics | | |
| Data do not fol | llow a Discernible | Distribution at 5% Significance Level | | |
| | | | | |
| | Suggested | UCL to Use | | |
| 95% KM (Chebyshev) UCL | 0.0277 | | | |
| | | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | | |
| Recommendations a | are based upon data | a size, data distribution, and skewness. | | |
| These recommendations are based upon the | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | | |
| However, simulations results will not cover all F | Real World data se | ts; for additional insight the user may want to consult a statistician. | | |

| METHYLNAPHTHALENE | | | |
|---|---|---|---|
| | | | |
| | General S | | |
| Total Number of Observations | 31 | Number of Distinct Observations | 2 |
| Number of Detects | 5 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 5 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.0133 | Minimum Non-Detect | 0.021 |
| Maximum Detect Variance Detects | 0.11 | Maximum Non-Detect | 0.21 83.87 |
| Variance Detects Mean Detects | 0.00168 | Percent Non-Detects | |
| Median Detects Median Detects | 0.0369 | SD Detects CV Detects | 0.04 |
| Skewness Detects | 2,203 | CV Detects Kurtosis Detects | 4.88 |
| | -3.643 | | 0.82 |
| Mean of Logged Detects | -3.043 | SD of Logged Detects | 0.04 |
| | Normal GOF Test | - | |
| Shapiro Wilk Test Statistic | 0.624 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.762 | Detected Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.446 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.343 | Detected Data Not Normal at 5% Significance Level | |
| Detected | d Data Not Norma | al at 5% Significance Level | |
| Kaplan-Meier (KM) Statisti | ics using Normal | Critical Values and other Nonparametric UCLs | |
| KM Mean | 0.0212 | KM Standard Error of Mean | 0.0037 |
| KM SD | 0.0168 | 95% KM (BCA) UCL | 0.027 |
| 95% KM (t) UCL | 0.0276 | 95% KM (Percentile Bootstrap) UCL | 0.027 |
| 95% KM (z) UCL | 0.0274 | 95% KM Bootstrap t UCL | 0.03 |
| 90% KM Chebyshev UCL | 0.0325 | 95% KM Chebyshev UCL | 0.037 |
| 97.5% KM Chebyshev UCL | 0.0448 | 99% KM Chebyshev UCL | 0.058 |
| | | | |
| Gamma | GOF Tests on De | etected Observations Only | |
| Gamma A-D Test Statistic | GOF Tests on De | otected Observations Only Anderson-Darling GOF Test | |
| | | <u> </u> | evel |
| A-D Test Statistic | 0.917 | Anderson-Darling GOF Test | evel |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.917 0.686 0.437 0.361 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value | 0.917 0.686 0.437 0.361 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date | 0.917 0.686 0.437 0.361 a Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le | |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date | 0.917 0.686 0.437 0.361 a Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le tributed at 5% Significance Level | evel |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar k hat (MLE) | 0.917 0.686 0.437 0.361 a Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) | evel 0.77 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar | 0.917 0.686 0.437 0.361 a Not Gamma Dis | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only | 0.77 0.043 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar k hat (MLE) Theta hat (MLE) | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.7 0.04 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Ger k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.77 0.043 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Ger k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) | 0.917 0.686 0.437 0.361 a Not Gamma Dissemma Statistics on 1.606 0.023 16.06 0.0369 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when date | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects Des with many tied observations at multiple DLs | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when kstar of detects | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us ta set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects Des with many tied observations at multiple DLs 11.0, especially when the sample size is small (e.g., <15-20) | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gemma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Aributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) In ustar (bias corrected) Sing Imputed Non-Detects IDs with many ited observations at multiple DLs \$1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Garr k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < OS method may yic | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Aributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects IDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Gar k hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tata set has > 50% N s is small such as < OS method may yie specially true when to | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Aributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) Sing Imputed Non-Detects IDs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates | 0.77 0.047 7.75 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < OS method may yic | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le Aributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected) sing Imputed Non-Detects IDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. | 0.77 0.047 7.75 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when das GROS may not be used when das GROS may not be used when das GROS may not be used detected data, BT Minimum | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us ta set has > 50% N s is small such as < OS method may yid pecially true when to Vs and UCLs may to | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) string imputed Non-Detects IDs with many tied observations at multiple DLs c1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean | 0.77 0.047 7.75 0.018 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BTO Minimum Maximum SD | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us ta set has > 50% N s is small such as < OS method may yie specially true when to Vs and UCLs may to 0.01 0.011 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) string imputed Non-Detects IDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median | 0.77 0.047 7.75 0.019 0.019 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when da GROS may not be used when da GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us ta set has > 50% N s is small such as < OS method may yie specially true when to Vs and UCLs may to 0.01 0.11 0.0175 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo Stributed at 5% Significance Level Detected Data Only k star (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) Sing Imputed Non-Detects IDs with many tied observations at multiple DLs <1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) | 0.77 0.047 7.75 0.019 0.019 0.99 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) nu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) Theta hat (MLE) | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < OS method may yid pecially true when t Vs and UCLs may I 0.01 0.11 0.0175 3.444 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Le Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Le stributed at 5% Significance Level Detected Data Noty Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) In star (bias corrected) String Imputed Non-Detects In sepecially when the sample size is small (e.g., <15-20) and in sepecially when the sample size is small (e.g., <15-20) and in sepecially when the sample size is small (e.g., <15-20) and in sepecially when the sample size is small (e.g., <15-20) Restar (bias corrected) Mean Median CV | 0.77 0.047 7.75 0.015 0.015 0.90 3.13 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Data Rear k hat (MLE) Theta hat (MLE) Inu hat (MLE) Mean (detects) Gamma GROS may not be used when data GROS may not be used when data GROS may not be used when kstar of detects For such situations, GR This is es For gamma distributed detected data, BT Minimum Maximum SD k hat (MLE) | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < OS method may yie pecially true when to Vs and UCLs may to 0.01 0.11 0.0175 3.444 0.00561 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo Aributed at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) IDs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.77 0.047 |
| A-D Test Statistic 5% A-D Critical Value K-S Test Statistic 5% K-S Critical Value Detected Date Detected Date R hat (MLE) Theta hat (MLE) Mean (detects) Gamma GROS may not be used when dated share of detects For such situations, GR This is est For gamma distributed detected data, BTO Maximum Maximum SD k hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) Theta hat (MLE) | 0.917 0.686 0.437 0.361 a Not Gamma Dis mma Statistics on 1.606 0.023 16.06 0.0369 ROS Statistics us tta set has > 50% N s is small such as < OS method may yie specially true when to Vs and UCLs may to 0.01 0.11 0.0175 3.444 0.00561 213.5 | Anderson-Darling GOF Test Detected Data Not Gamma Distributed at 5% Significance Lo Kolmogorov-Smirnov GOF Detected Data Not Gamma Distributed at 5% Significance Lo Aributed at 5% Significance Level Detected Data Only Restar (bias corrected MLE) Theta star (bias corrected MLE) nu star (bias corrected MLE) nu star (bias corrected) IDs with many tied observations at multiple DLs 1.0, especially when the sample size is small (e.g., <15-20) eld incorrect values of UCLs and BTVs the sample size is small. be computed using gamma distribution on KM estimates Mean Median CV k star (bias corrected MLE) Theta star (bias corrected MLE) | 0.77 0.047 7.75 0.015 0.015 0.90 3.13 |

| Estimate | s of Gamma Par | ameters using KM Estimates | | |
|---|----------------------|---|-----------|--|
| Mean (KM) | 0.0212 | SD (KM) | 0.0168 | |
| Variance (KM) | 2.8171E-4 | SE of Mean (KM) | 0.00379 | |
| k hat (KM) | 1.588 | k star (KM) | 1.456 | |
| nu hat (KM) | 98.46 | nu star (KM) | 90.27 | |
| theta hat (KM) | 0.0133 | theta star (KM) | A) 0.0145 | |
| 80% gamma percentile (KM) | 0.0328 | 90% gamma percentile (KM) | 0.044 | |
| 95% gamma percentile (KM) | 0.0557 | 99% gamma percentile (KM) | 0.0811 | |
| | | | | |
| | Gamma Kaplan-N | Meier (KM) Statistics | | |
| Approximate Chi Square Value (90.27, α) | 69.36 | Adjusted Chi Square Value (90.27, β) | 68.34 | |
| 95% Gamma Approximate KM-UCL (use when n>=50) | 0.0275 | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.0279 | |
| | | | | |
| Lognor | mal GOF Test on | Detected Observations Only | | |
| Shapiro Wilk Test Statistic | 0.751 | Shapiro Wilk GOF Test | | |
| 5% Shapiro Wilk Critical Value | 0.762 | Detected Data Not Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | 0.394 | Lilliefors GOF Test | | |
| 5% Lilliefors Critical Value | 0.343 | Detected Data Not Lognormal at 5% Significance Level | | |
| Detecte | d Data Not Logno | ormal at 5% Significance Level | | |
| | | | | |
| | | s Using Imputed Non-Detects | | |
| Mean in Original Scale | 0.0213 | Mean in Log Scale | -3.959 | |
| SD in Original Scale | 0.0168 | SD in Log Scale | 0.373 | |
| 95% t UCL (assumes normality of ROS data) | 0.0264 | 95% Percentile Bootstrap UCL | 0.0271 | |
| 95% BCA Bootstrap UCL | 0.0308 | 95% Bootstrap t UCL | 0.0404 | |
| 95% H-UCL (Log ROS) | 0.0232 | | | |
| | | | | |
| | | ed Data and Assuming Lognormal Distribution | | |
| KM Mean (logged) | -3.969 | KM Geo Mean | 0.0189 | |
| KM SD (logged) | 0.376 | 95% Critical H Value (KM-Log) | 1.84 | |
| KM Standard Error of Mean (logged) | 0.125 | 95% H-UCL (KM -Log) | 0.023 | |
| KM Standard France (Mannell) | 0.376 0.125 | 95% Critical H Value (KM-Log) | 1.84 | |
| KM Standard Error of Mean (logged) | 0.125 | | | |
| | DL/2 S | tatietice | | |
| DL/2 Normal | DLIZG | DL/2 Log-Transformed | | |
| Mean in Original Scale | 0.0187 | Mean in Log Scale | -4.262 | |
| SD in Original Scale | 0.0242 | SD in Log Scale | 0.574 | |
| 95% t UCL (Assumes normality) | 0.0242 | 95% H-Stat UCL | 0.0205 | |
| · ` ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' | | rovided for comparisons and historical reasons | | |
| | ,, | | | |
| None | arametric Distrib | oution Free UCL Statistics | | |
| • | | e Distribution at 5% Significance Level | | |
| | | · | | |
| | Suggested | UCL to Use | | |
| 95% KM (Chebyshev) UCL | 0.0377 | | | |
| | | | | |
| Note: Suggestions regarding the selection of | a 95% UCL are pro | ovided to help the user to select the most appropriate 95% UCL. | | |
| Recommendations | are based upon data | a size, data distribution, and skewness. | | |
| These recommendations are based upon the | e results of the sim | ulation studies summarized in Singh, Maichle, and Lee (2006). | | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | | |
| However, simulations results will not cover all | Real World data se | ts; for additional insight the user may want to consult a statistician. | | |

APPENDIX C

FIELD DATASHEETS



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| BORING NUMBER: EM:34 GPS COORDINATES: 36*59*33.03*N 122*2*10.96*W LOCATION ON SITE East Meadow visible? | | | OLU | LOGGED & SAMPLED BY: | B. Angulo | | DATE: 8/3/21 | |
|--|--------|---------|-------------------|--|---------------------|-------------|-----------------------|------------------------|
| Soil Description Lead shot visible? | | | | | | | | |
| 1245 0 | BORIN | G NUI | | EM-34 GPS COORDINATES: 36°59'33.03"N 122°2'10.96"W | LOCATION ON SITE: E | ast Meadow | TIME: | 1230 |
| 1245 0 | e e | ŧ | ple | 6.15 | | Lead shot | XRF Ana | lysis |
| 1240 0.5 | Ë | | Sam | · | | visible? | Lead Conc. (ppm) | Sample # |
| 1.0 | 1245 | 0 | \times | (SM) Silty sand, brown (10YR 5/3), moist, very loose, fine-grained sand, non | -plastic, no odor. | NO | 687 | AUG 02-44 |
| 1250 1.5 | | 0.5 | | | | NO | 784 | AUG 02-45 |
| Solid Description Continue of the continue | | 1.0 | | | | NO | 48 | AUG 02-46 |
| BORING NUMBER: EM-35 GPS COORDINATES: 36*59*32.50*N 122*2*10.30*W LOCATION ON SITE: East Meadow visible? Constitution | 1250 | 1.5 | X | | | NO | 56 | AUG 02-47 |
| BORING NUMBER: EM-35 GPS COORDINATES: 36°59°32.50°N 122°2°10.30°W LOCATION ON SITE: East Meadow visible? Part | | 2.0 | | | | | | |
| BORING NUMBER: EM-35 GPS COORDINATES: 36°59'32.50°N 122°2'10.30°W LOCATION ON SITE East Meadow Lead shot visible? Part Part | | 2.5 | | | | | | |
| Soil Description Lead shot visible? 1340 0 | | 3.0 | | | | | | |
| Soil Description Lead shot visible? 1340 0 | OBIN | G NIIII | MDED. | EM 25 | LOCATION ON SITE. | Fort Monday | TIME: | 1325 |
| 1340 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non-plastic, no odor. NO NO NO NO NO NO NO N | | | | EIVI-35 GF3 COORDINATES: 30 39 32.30 IN 122 2 10.30 W | LOCATION ON SITE: E | ast Meadow | XRF Ana | |
| 1340 0 | Time | Depth | Sample Interva | Soil Description | | | Lead Conc. | Sample # |
| NO NO NO NO NO NO NO NO | 1340 | 0 | X | | , non-plastic, no | NO | 1,822 1,631 | AUG 02-52 AUG 02-53 |
| NO | | 0.5 | | | | NO | 485 | AUG 02-54 |
| Soil Description Soil Description Soil Description NO | | 1.0 | | | | NO | 48 | AUG 02-55 |
| 2.5 End of boring at 2 feet bgs. | 1345 | 1.5 | X | | | NO | 147 | AUG 02-56 |
| BORING NUMBER: EM-36 GPS COORDINATES: 36°59'32.00"N 122°2'9.99"W LOCATION ON SITE: East Meadow BORING NUMBER: EM-36 GPS COORDINATES: 36°59'32.00"N 122°2'9.99"W LOCATION ON SITE: East Meadow Soil Description Lead shot visible? 1215 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO 1220 1.5 NO 2.5 End of boring at 2 feet bgs. | | 2.0 | | | | | | |
| BORING NUMBER: EM-36 GPS COORDINATES: 36°59'32.00"N 122°2'9.99"W LOCATION ON SITE: East Meadow Lead shot visible? Soil Description NO (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO 1220 1.5 2.5 End of boring at 2 feet bgs. | | 2.5 | | | | | | |
| Soil Description Lead shot visible? 1215 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO 1.0 1.0 2.0 End of boring at 2 feet bgs. | | 3.0 | | | | | | |
| Soil Description Lead shot visible? 1215 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO 1.0 1.0 1.20 1.5 End of boring at 2 feet bgs. | | | • | | | | | |
| 1215 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO NO 1.0 1.20 2.5 End of boring at 2 feet bgs. | BORIN | | | EM-36 GPS COORDINATES: 36°59'32.00"N 122°2'9.99"W | LOCATION ON SITE: E | ast Meadow | TIME: | 1200 |
| 1215 0 (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. NO NO 1.0 1.20 2.5 End of boring at 2 feet bgs. | a B | pth | nple | Soil Description | | | XRF Ana Lead Conc. | Ī |
| 1215 | F | ڡۜ | Sar | | | visible? | (ppm) | Sample # |
| 1.0 NO NO NO 2.0 End of boring at 2 feet bgs. | 1215 | 0 | X | | l, non plastic, no | NO | 1,572 1,579 | AUG 02-38 AUG 02-39 |
| 1220 1.5 NO NO 2.0 End of boring at 2 feet bgs. | | 0.5 | | | | NO | 78 | AUG 02-40 |
| 2.0 NO | | 1.0 | | | | NO | 25 | AUG 02-41 |
| 2.5 End of boring at 2 feet bgs. | 1220 | 1.5 | X | | | NO | 64 | AUG 02-42 |
| | | 2.0 | | | | | | |
| | | 2.5 | | | | | | |
| 3.0 | | 3.0 | | 5 | | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| BORIN | IG NUI | MBER: | EM-37 GPS COORDINATES: 36°59'31.22"N 122°2'9.90"W | LOCATION ON SITE: E | ast Meadow | TIME: | 1053 |
|-------|--------|--------------------|---|---------------------|--------------------|---------------------|------------------------|
| Φ | £ | ole ral | | | Lead shot | XRF Ana | alysis |
| Time | Depth | Sample Interval | Soil Description | | visible? | Lead Conc. (ppm) | Sample # |
| 1115 | 0 | \times | (SW) Well graded sand, grayish brown (10YR 5/2), dry, very loose, fine-grain plastic, no odor. | ed sand, non- | NO | 955 725 | AUG 02-32 AUG 02-33 |
| | 0.5 | | | | NO | 83 | AUG 02-34 |
| | 1.0 | | | | NO | 39 | AUG 02-35 |
| 1120 | 1.5 | \times | | | NO | 13 | AUG 02-36 |
| | 2.0 | | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | |
| | 3.0 | | backiiii boffing with son cuttings. | | | | |
| BORIN | IG NUI | MBER: | EM-38 GPS COORDINATES: 36°59'30.46"N 122°2'9.32"W | LOCATION ON SITE: E | ast Meadow | TIME: | 1014 |
| | | | | | | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | | Lead shot visible? | Lead Conc. (ppm) | Sample # |
| 1045 | 0 | X | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose sand, coarse gravel, non-plastic, no odor. | e, fine-grained | NO | 499 | AUG 02-28 |
| | 0.5 | | | | NO | 370 | AUG 02-29 |
| | 1.0 | | | | NO | 137 | AUG 02-30 |
| 1050 | 1.5 | \times | | | NO | 48 | AUG 02-31 |
| | 2.0 | | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | |
| | 3.0 | | | | | | |
| BORIN | IG NUI | MBER: | EM-39 GPS COORDINATES: 36°59'31.20"N 122°2'8.41"W | LOCATION ON SITE: E | ast Meadow | TIME: | 0942 |
| Φ | th | ole | | | Lead shot | XRF Ana | alysis |
| Time | Depth | Sample Interval | Soil Description | | visible? | Lead Conc. (ppm) | Sample # |
| 1005 | 0 | \times | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose sand, coarse gravel, non-plastic, no odor. | e, fine-grained | NO | 519 | AUG 02-23 |
| | 0.5 | | | | NO | 214 | AUG 02-24 |
| | 1.0 | | | | NO | 211 | AUG 02-25 |
| 1010 | 1.5 | \times | | | NO | 285 | AUG 02-27 |
| | 2.0 | | | | | | |
| | 2.5 | 1 | End of boring at 2 feet bgs. | | | | |
| | 3.0 | | Backfill boring with soil cuttings. | <u> </u> | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| | | | LOGGED & SAMM LED DT. B. Aliguio | | | |
|-------|--------|--------------------|---|---------------------------------------|---------------------|-----------|
| BORIN | IG NUI | MBER: | EM-40 GPS COORDINATES: 36°59'30.56"N 122°2'8.14"W LOCATION ON | SITE: East Meadow | TIME: | 0908 |
| | | | | l l l l l l l l l l l l l l l l l l l | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | Lead shot | Lead Conc. | ilysis |
| F | ۵ | Sar Inte | | visible? | (ppm) | Sample # |
| 0935 | 0 | \times | (SW) Well graded sand, grayish brown (10YR 5/2), moist, very loose, fine-grained sand, medium to coarse gravel, non-plastic, no odor. | NO | 245 | AUG 02-19 |
| | 0.5 | | | NO | 125 | AUG 02-20 |
| | 1.0 | | | NO | 18 | AUG 02-21 |
| 0940 | 1.5 | \times | | NO | 16 | AUG 02-22 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | 3.0 | | Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| | | ' | | | | |
| BORIN | IG NUI | MBER: | R-1 GPS COORDINATES: 36°59'35.38"N 122°2'14.95"W LOCATION ON | SITE: Ravine | 8/4/21 TIME: | 0720 |
| е | £ | ole val | | Lead shot | XRF Ana | lysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 0745 | 0 | X | (SM) Silty sand, grayish brown (10YR 5/2), moist, very loose, fine-grained sand, non-plast odor. | ic, no | 226 | AUG 02-66 |
| | 0.5 | | | NO | 57 | AUG 02-67 |
| | 1.0 | | | NO | 52 | AUG 02-68 |
| 0750 | 1.5 | X | | NO | 131 | AUG 02-69 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | | | Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| | | • | | | | |
| BORIN | IG NUI | MBER: | R-2 GPS COORDINATES: 36°59'34.62" N 122°2'13.35"W LOCATION ON | SITE: Ravine | 8/4/21 TIME: | 1044 |
| e . | ţ | ple val | 6.15 | Lead shot | XRF Ana | lysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| | 0 | \times | (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-plastic, no odor. | NO | 28 | AUG 02-89 |
| 1055 | 0.5 | | | NO | 21 | AUG 02-90 |
| | 1.0 | | Mottled with yellowish red (5YR 4/6). | NO | 4 | AUG 02-91 |
| | 1.5 | X | | NO | 4 | AUG 02-92 |
| 1100 | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | DACKTIII DOTING WITH SOII CUTTINGS. | | | |
| | | <u> </u> | | l | 1 | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| DODIN | C NIII | MDED | D.2 | | TINAE | 4200 |
|-------|--------|--------------------|--|-----------------------|-------------------------|------------------------|
| | | MBER: | | Ravine | TIME: | 1300 |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | Lead Conc. | Sample # |
| 1315 | 0 | \times | (SM) Silty sand, brown (10YR 5/3), moist, very loose, fine-grained sand, medium coarse gravel, non-plastic, no odor. | NO | 810 | AUG 02-48 |
| | 0.5 | | | NO | 19 | AUG 02-49 |
| | 1.0 | | | NO | 11 | AUG 02-50 |
| 1320 | 1.5 | \times | | NO | 12 | AUG 02-51 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| | | l | | | | |
| BORIN | | MBER: | R-4 GPS COORDINATES: 36°59'34.52"N 122°2'14.34"W LOCATION ON SITE: | Ravine | 8/4/21 TIME: | 0843 |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | XRF Ana | Sample # |
| 0900 | 0 | <u> </u> | (SM) Silty sand, dark brown (10YR 3/3), moist, very loose, fine-grained sand, non-plastic, no odor. | NO | (ppm) 1,302 1,027 | AUG 02-71 AUG 02-72 |
| | 0.5 | | ouor. | NO | 73 | AUG 02-72 |
| | 1.0 | | | NO | 16 | AUG 02-75 |
| 0905 | 1.5 | X | | NO | 16 | AUG 02-76 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| BODIN | C NIII | MDED. | R-5 GPS COORDINATES: 36°59'33.56"N 122°2'13.00"W LOCATION ON SITE: | Pavina | 8/4/21 TIME: | 1110 |
| | | MBER: | R-5 GF3 COORDINATES, 30 37 33,30 N 122 2 13,00 W | Lead shot | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. | Sample # |
| 1130 | 0 | X | (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coarse gravel, non-plastic, no odor. | NO | 234 | AUG 02-93 |
| | 0.5 | | | NO | 49 | AUG 02-94 |
| | 1.0 | | | NO | 35 | AUG 02-95 |
| 1135 | 1.5 | X | | NO | 18 | AUG 02-96 |
| | 2.0 | | | | | |
| | | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| | Sample gg Interval :3 | R-6 GPS COORDINATES: 36°59'32.53"N 122°2'11.73"W Lo | OCATION ON SITE: R | avine | | TIME: | 1350 |
|---------|---|--|---|--|---|--|---|
| O Depth | | | OCATION ON SITE: R | avine | | TIME: | 1350 |
| 0 | Sample Interval | Soil Description | | | | | |
| 0 | Sam | | | Lead shot | | XRF Ana | lysis |
| | | , | | visible? | | Conc. om) | Sample # |
| 0.5 | \times | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, non-plastic, no odor. | fine-grained | NO | 62 | 28 | AUG 02-57 |
| | | | | NO | 54 | 10 | AUG 02-58 |
| 1.0 | | | | NO | 15 | 55 | AUG 02-59 |
| 2.0 | \times | | | NO | 29 | 90 | AUG 02-60 |
| 2.5 | | End of boring at 2 feet bgs. | | | | | |
| | | Backfill boring with soil cuttings. | | | | | |
| 3.0 | | | | | | | |
| NUN | MBER: | R-7 GPS COORDINATES: 36°59'30.97"N 122°2'10.64"W | OCATION ON SITE: R | avine | 8/4/21 | TIME: | 1414 |
| | | | | | | | |
| Dept | Samp Interv | Soil Description | | visible? | Lead | Conc. | Sample # |
| 0 | \times | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, coarse gravel, non-plastic, no odor. | fine-grained | NO | 45 | 54 | AUG 02- 113 |
| 0.5 | | | | NO | 15 | 51 | AUG 02- 114 |
| 1.0 | | | | NO | 2 | 2 | AUG 02- 115 |
| 1.5 | X | | | NO | 3 | 3 | AUG 02- 116 |
| 2.0 | | | | | | | |
| 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | | |
| 3.0 | | 3 | | | | | |
| | | | | | | | |
| | | R-8 GPS COORDINATES: 36°59'29.35"N 122°2'10.32"W | OCATION ON SITE: R | avine | | | 1312 |
| pth | nple erval | Soil Description | | Lead shot | | | 1 |
| ۵ | Sar Inte | , | | visible? | | | Sample # |
| 0 | | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, coarse gravel, non-plastic, no odor. (20,80,0,0). | fine-grained | NO | | | AUG 02- 105 |
| 0.5 | | | | NO | 7 | 9 | AUG 02- 106 |
| 1.0 | X | | | NO | 9 | 8 | AUG 02- 107 |
| 1.5 | X | | | NO | 9 | 3 | AUG 02- 108 |
| 2.0 | | | | | | | |
| 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | | |
| 3.0 | | Sackin borning with son cuttings. | | | | | |
| () | 0 0.5 1.0 1.5 2.0 2.5 3.0 1.0 1.5 2.0 2.5 1.0 2.5 1.0 1.5 1.0 1.5 1.5 1.0 1.5 1.5 1.0 1.5 1.5 1.0 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 | NUMBER: 9 and 10 | NUMBER: R-7 GPS COORDINATES: 36°59'30.97"N 122°2'10.64"W (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, coarse gravel, non-plastic, no odor. End of boring at 2 feet bgs. Backfill boring with soil cuttings. NUMBER: R-8 GPS COORDINATES: 36°59'29.35"N 122°2'10.32"W Soil Description (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, coarse gravel, non-plastic, no odor. (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, sand, coarse gravel, non-plastic, no odor. (20,80,0,0). | NUMBER: R-7 GPS COORDINATES: 36*59*30.97*N 122*2*10.64*W Soil Description | NUMBER: R-7 GPS COORDINATES: 36*59*30.97*N 122*2*10.44*W LOCATION ON SITE: Ravine Lead shot visible? Soil Description Solid Description Solid Description NO NO NO NO NO NO NO NO NO N | NUMBER: R-7 GPS COORDINATES: 36*59*30.97*N 122*2*10.64*W LOCATION ON SITE: Ravine 8/4/21 Comparison of Comparis | NUMBER: R-7 GPS COORDINATES: 36*59*30.97*N 122*2*10.64*W COCATION ON SITE Ravine 8/4/21 TIME: XRF Ana Lead Shot visible? |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| | | | EGGED & SAIM LED DIT | | | |
|-------|----------|--------------------|--|--------------------|--------------|-----------|
| BORIN | IG NUI | MBFR: | R-9 GPS COORDINATES: 36°59'33.35"N 122°2'14.40"W LOCATION ON | SITE: Ravine | TIME: | 0908 |
| | | | | | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | Lead Conc. | Sample # |
| 0920 | 0 | <u> </u> | (SM) Silty sand, dark brown (10YR 3/3), moist, very loose, fine-grained sand, non-plastic, | no NO | (ppm) 182 | AUG 02-77 |
| | 0.5 | | odor. | NO | 31 | AUG 02-78 |
| | 1.0 | | | NO | 6 | AUG 02-79 |
| 0925 | 1.5 | X | | NO | 11 | AUG 02-80 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| BODIA | IG NUI | MDED | PAGE CONTROLLATE AVERNING SOUR ASSESSED AVERNING AVERNING SOURCE OF THE STATE OF TH | CITE. David | TIME: | 0926 |
| BOKIN | 1 | | R-10 GPS COORDINATES: 36°59'32.29"N 122°2'13.24"W LOCATION ON | Si i E: Ravine | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | Lead Conc. | Sample # |
| | 0 | s <u>-</u> | (SM) Silty sand, dark brown (10YR 3/3), moist, very loose, fine-grained sand, non-plastic, i | 20 | (ppm) | 1 |
| 0935 | | \times | odor. | NO NO | 86 | AUG 02-81 |
| | 0.5 | | | NO | 23 | AUG 02-82 |
| | 1.0 | | | NO | 5 | AUG 02-83 |
| 0940 | 1.5 | \times | | NO | 3 | AUG 02-84 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | | | | |
| BORIN | IG NUI | MRFR: | R-11 GPS COORDINATES: 36°59'31.19"N 122°2'12.33"W LOCATION ON | SITE: Ravine | TIME: | 0949 |
| | _ | | | | XRF Ana | |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | Lead Conc. | Sample # |
| 1000 | 0 | X | (SM) Silty sand, dark brown (10YR 3/3), very loose, fine-grained sand, non-plastic, no odo | r. NO | 93 | AUG 02-85 |
| | 0.5 | | | NO | 18 | AUG 02-86 |
| | 1.0 | | | NO | 6 | AUG 02-87 |
| 1010 | 1.5 | X | | NO | 20 | AUG 02-88 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | Dockin Doring with son cuttings. | | | + |
| | <u>I</u> | <u> </u> | <u> </u> | | L | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| | EN | SOLU | LOGGED & SAMPLED BY: B. Angulo | | DATE: 8/4/21 | |
|-------|-------|--------------------|--|--------------------|---------------------|--------------------------|
| BORIN | IG NU | MBER: | R-12 GPS COORDINATES: 36°59'29.90"N 122°2'11.64"W LOCATION ON | SITE: Ravine | TIME: | 1337 |
| Ð | £ | ole /al | | Lead shot | XRF Ar | nalysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 1405 | 0 | \times | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), moist, very loose, fine-grai sand, coarse gravel, non-plastic, no odor. | ned NO | 61 | AUG 02-109 |
| | 0.5 | | | NO | 19 | AUG 02-110 |
| | 1.0 | | | NO | 50 | AUG 02-111 |
| 1410 | 1.5 | X | | NO | 28 | AUG 02-112 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | 3.0 | | Backfill boring with soil cuttings. | | | |
| | | | | | | |
| BORIN | IG NU | MBER: | R-13 GPS COORDINATES: 36°59'34.08"N 122°2'16.14"W LOCATION ON | SITE: Ravine | 8/5/21 TIME: | 0905 |
| ā | ŧ | ple val | | Lead shot | XRF Ar | nalysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 0910 | 0 | \times | (SW) Well graded sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non plastic, no odor. | NO NO | 741 | AUG 02-141 |
| | 0.5 | | | NO | 69 | AUG 02-142 |
| | 1.0 | | | NO | 22 | AUG 02-143 |
| 0915 | 1.5 | X | | NO | 17 | AUG 02-144 |
| | 2.0 | | | | | |
| · | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| | 3.0 | | Backini borning with son cuttings. | | | |
| | | | | | | |
| BORIN | IG NU | MBER: | | SITE: Ravine | 8/5/21 TIME: | 1010 |
| Time | Depth | Sample Interval | Soil Description | Lead shot visible? | XRF Ar | Sample # |
| 1020 | 0 | W = | (SW) Well graded sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coa | rse NO | (ppm) 1,075 | AUG 02-145 |
| | 0.5 | | gravel, non-plastic, no odor. | NO | 1,038 | AUG 02-146 AUG 02-147 |
| | 1.0 | | | NO | 6 | AUG 02-148 |
| 1030 | 1.5 | | | NO | 6 | AUG 02-149 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | 3.0 | | Backfill boring with soil cuttings. | | | |
| | | <u></u> | | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| BORING N BE 1 0900 0.5 1.6 0905 1.5 2.6 | Sample Sample S. | Soil Description (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coarse gravel, non-plastic, no odor. End of boring at 2 feet bgs. Backfill boring with soil cuttings. | Lead shot visible? NO NO NO NO | Area TIME: XRF An Lead Conc. (ppm) 19 15 11 14 14 14 14 14 14 | 0800 nalysis Sample # AUG 02-15 AUG 02-16 AUG 02-17 AUG 02-18 |
|---|--|--|------------------------------------|---|---|
| 0900 0 0.5 1.0 0905 1.5 | .5 .0 .0 .5 .5 .0 | Soil Description (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coarse gravel, non-plastic, no odor. End of boring at 2 feet bgs. | Lead shot visible? NO NO NO | XRF An Lead Conc. (ppm) 19 15 | Sample # AUG 02-15 AUG 02-16 AUG 02-17 |
| 0900 0 0.5 1.0 0905 1.5 | .5 .0 .0 .5 .5 .0 | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coarse gravel, non-plastic, no odor. End of boring at 2 feet bgs. | visible? NO NO NO | (ppm) 19 15 11 | AUG 02-15 AUG 02-16 AUG 02-17 |
| 0900 0.5 1.0 0905 1.5 2.0 | .5 | sand, coarse gravel, non-plastic, no odor. End of boring at 2 feet bgs. | NO NO | 15 | AUG 02-16 AUG 02-17 |
| 1.0 0905 1.5 2.0 | .0 .5 .5 .5 | | NO | 11 | AUG 02-17 |
| 0905 1.5 | .5 | | | | |
| 2.0 | .0 | | NO | 14 | AUG 02-18 |
| | .5 | | | | |
| 2.5 | | | | | |
| ! | .0 | Backfill boring with soil cuttings. | | | |
| 3.0 | | | | | |
| | | | | | |
| BORING N | NUMBER: | T-2 GPS COORDINATES: 36°59'31.12"N 122°26'.55"W LOCATION O | N SITE: Trail Area | 8/4/21 TIME: | 1228 |
| Time Depth | Sample Interval | Sail Description | Lead shot | XRF An | alysis |
| Tir | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 1240 0 | | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, cobbles, non-plastic, no odor. | NO | 23 | AUG 02-97 |
| 0.5 | .5 | | NO | 9 | AUG 02-98 |
| 1.0 | .0 | | NO | 5 | AUG 02-99 |
| 1245 | .5 | | NO | 6 | AUG 02-100 |
| 2.0 | .0 | | | | |
| 2.5 | .5 | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| 3.0 | .0 | | | | |
| | | | | | |
| BORING N | | T-3 GPS COORDINATES: 36°59'31.12"N 122°26'.55"W LOCATION O | N SITE: Trail Area | 8/4/21 TIME: | 1248 |
| Time Depth | Sample Interval | Soil Description | Lead shot visible? | Lead Conc. | Sample # |
| 1305 | | (SW) Well graded sand with gravel, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, coarse gravel, non-plastic, no odor. | NO | 384 | AUG 02-101 |
| 0.5 | .5 | 3.2.3, no., p. 2.3.4, no. | NO | 329 | AUG 02-102 |
| 1.0 | .0 | | NO | 31 | AUG 02-103 |
| 1310 | .5 | | NO | 8 | AUG 02-104 |
| 2.0 | .0 | | | | |
| 2.5 | .5 | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |
| 3.0 | .0 | | | | |



Task 1

PROJECT NUMBER AND TASK: 01-POG-002

| | S | SOLU | LOGGED & SAMPLED BY: B. Angulo | ı | DATE: 1/11/202 | 22 |
|-------|-------|--------------------|--|----------------------|---------------------|---------------------|
| BORIN | G NUI | MBER: | T-4 GPS COORDINATES: 36°59.479'N 122°02.118'W LOCATION ON SITE: I | Emma McCrary Trail A | Area TIME: | 0825 |
| Φ | £ | ole val | | Lead shot | XRF An | alysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 0840 | 0 | | (SM) Silty sand, dark brown (7.5YR 3/2), loose, fine-grained sand, non-plastic, no odor, roots. | NO | 48 | JAN 11-5 |
| | 0.5 | | | NO | 22 | JAN 11-6 |
| | 1.0 | | (MH) Sandy silt, dark brown (7.5YR 3/2), soft, fine-grained sand, low plasticty, no odor, roots. | NO | 16 | JAN 11-7 |
| 0845 | 1.5 | | Wet. | NO | 15 | JAN 11-8 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | 3.0 | | Backfill boring with soil cuttings. | | | |
| | | | | | | |
| ORIN | G NUI | MBER: | T-5 GPS COORDINATES: 36°59'468'N 122°02.136'W LOCATION ON SITE: I | Emma McCrary Trail A | Area TIME: | 0855 |
| ē | ŧ | ple val | | Lead shot | XRF An | alysis |
| Time | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 910 | 0 | X | (SM) Silty sand, very dark gray (7.5YR 3/1), moist, loose, fine-grained sand, non-plastic, no odor, roots. | NO | 99 | JAN 11-13 |
| | 0.5 | | | NO | 27 | JAN 11-14 |
| | 1.0 | | (MH) Sandy silt, very dark gray (7.5YR 3/1), wet, soft, fine-grained sand, low plasticity, no odor, roots. | NO | 25 | JAN 11-15 |
| 915 | 1.5 | X | 345,7,5546. | NO | 13 | JAN 11-16 |
| | 2.0 | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. | | | |
| | 3.0 | | Backfill boring with soil cuttings. | | | |
| | | | | | | |
| ORIN | G NUI | MBER: | T-6 GPS COORDINATES: 36°59.474'N 122°02.161'W LOCATION ON SITE: I | Emma McCrary Trail A | Area TIME: | 0918 |
| e l | ţ | ple | A 11 - 1 - 1 - 1 | Lead shot | XRF An | alysis |
| Ξ | Depth | Sample Interval | Soil Description | visible? | Lead Conc. (ppm) | Sample # |
| 940 | 0 | X | (SM) Silty sand, very dark gray (7.5YR 3/1), moist, loose, fine-grained sand, non-plastic, no odor. | NO | 152/489/91 | JAN 11- 19/20/21 |
| | 0.5 | | | NO | 22 | JAN 11-22 |
| | 1.0 | | (MH) Sandy silt, very dark gray (7.5YR 3/1), wet, soft, fine-grained sand, low plasticity, no odor. | NO | 17 | JAN 11-23 |
| 945 | 1.5 | X | | NO | 12 | JAN 11-24 |
| | 2.0 | | | | | |
| | | 1 | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | |



PROJECT NUMBER AND TASK: 01-POG-002 Task 1

| BORIN | IG NU | MBER: 1 | Γ-7 GPS COORDINATES: 36°59.453'N 122°02.173'W LC | OCATION ON SITE: E | mma McCrary Trail | Area TIME: | 0947 |
|-------|-------|--------------------|--|--------------------|-------------------|---------------------|--------------|
| ψ. | £ | ole val | | | Lead shot | XRF | Analysis |
| Time | Depth | Sample Interval | Soil Description | | visible? | Lead Conc. (ppm) | Sample # |
| 0955 | 0 | \times | (ML) Sandy silt, dark brown (7.5YR 3/2), loose, soft, fine-grained sand, non-pla | astic, no odor. | NO | 107/82 | JAN 11-25/26 |
| | 0.5 | | | | NO | 54 | JAN 11-27 |
| | 1.0 | | (MH) Sandy silt, dark brown (7.5YR 3/2), wet, soft, fine-grained sand, low plast | ticty, no odor. | NO | 14 | JAN 11-28 |
| 1000 | 1.5 | X | | | NO | 33 | JAN 11-29 |
| | 2.0 | | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | |
| | 3.0 | | | | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| | 5 | SOLU | TIONS | | LOGGED & SAMPLED BY: | | B. Angulo | | DATE: 8/5/21 | |
|-------|-------|--------------------|--|-------------------|--|---------|---------------------|---------------|---------------------|------------|
| BORIN | G NUI | MBER: | NO-13 | GPS COORDIN | IATES: 36°59'35.93"N 122°2'18.18"' | N | LOCATION ON SITE: I | North Orchard | TIME: | 0828 |
| d) | æ | a e | | | | | • | Lead shot | XRF Ar | alysis |
| Time | Depth | Sample Interval | | | Soil Description | | | visible? | Lead Conc. (ppm) | Sample # |
| 0840 | 0 | X | (SM) Silty sand, gra odor. | ayish brown (10YR | 5/2), dry, very loose, fine-grain | ed sand | l, non-plastic, no | NO | 14 | AUG 02-133 |
| | 0.5 | | | | | | | NO | 3 | AUG 02-134 |
| | 1.0 | | | | | | | NO | 3 | AUG 02-135 |
| 0845 | 1.5 | X | | | | | | NO | 3 | AUG 02-136 |
| | 2.0 | | | | | | | | | |
| | 2.5 | | | | of boring at 2 feet bgs. I boring with soil cuttings. | | | | | |
| | 3.0 | | | | | | | | | |
| | | | | | | | | | | |
| BORIN | G NUI | MBER: | NO-14 | GPS COORDINATES: | 36°59'34.93"N 122°2'18.55"W | | LOCATION ON SITE: I | North Orchard | TIME: | 0848 |
| d) | £ | al e | | | | | • | Lead shot | XRF Ar | alysis |
| Time | Depth | Sample Interval | | | Soil Description | | | visible? | Lead Conc. (ppm) | Sample # |
| 0855 | 0 | \times | (SW) Well graded : plastic, no odor. (1 | | n (10YR 5/2), dry, very loose, f | ne-grai | ned sand, non | NO | 56 | AUG 02-137 |
| | 0.5 | | | | | | | NO | 19 | AUG 02-138 |
| | 1.0 | | | | | | | NO | 5 | AUG 02-139 |
| 0900 | 1.5 | X | | | | | | NO | 4 | AUG 02-140 |
| | 2.0 | | | | | | | | | |
| | 2.5 | | | | of boring at 2 feet bgs. I boring with soil cuttings. | | | | | |
| | 3.0 | | | | | | | | | |



PROJECT NUMBER AND TASK: 01-POG-001 Task:2.2

| ORIN | IG NU | MBER: | WM-16 GPS COORDINATES: 36°59'33.22"N 122°2'19.72"W LOCA | CATION ON SITE: V | Vest Meadow | TIME: | 0755 |
|----------------------|------------------|--------------------------|---|-------------------|--------------------------------|-------------------------------------|-------------------------------|
| ø | ţ | ole val | | | Lead shot | XRF An | alysis |
| Time | Depth | Sample Interval | Soil Description | | visible? | Lead Conc. (ppm) | Sample # |
| 0800 | 0 | 1 X I | (SM) Silty sand, grayish brown (10YR 5/2), dry, very loose, fine-grained sand, non odor. | on-plastic, no | NO | 133 | AUG 02-12 |
| | 0.5 | | | | NO | 6 | AUG 02-13 |
| | 1.0 | | | | NO | 6 | AUG 02-13 |
| 0805 | 1.5 | \times | | | NO | 5 | AUG 02-13 |
| | 2.0 | | | | | | |
| | 2.5 | | End of boring at 2 feet bgs. Backfill boring with soil cuttings. | | | | |
| | | | | L | | | |
| | 3.0 | | | - | | | |
| | 3.0 | | | | | | |
| BORIN | | MBER: | | CATION ON SITE: V | Vest Meadow | TIME: | 0738 |
| | IG NU | | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA | CATION ON SITE: V | Vest Meadow Lead shot | XRF An | |
| ORIN e E II | Depth Depth | Sample gg Interval :3 | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA | | | | |
| Time | IG NU | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA | | Lead shot | XRF An | alysis Sample # |
| Time | IG NU Hada O O.5 | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA Soil Description (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-p | | Lead shot visible? | XRF An Lead Conc. (ppm) | alysis |
| Time | O 0.5 | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA Soil Description (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-podor. | | Lead shot visible? | XRF An Lead Conc. (ppm) | Sample # AUG 02-12 |
| ية 0745 | 0 0.5 1.0 | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA Soil Description (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-p | | Lead shot visible? NO NO | XRF An Lead Conc. (ppm) 18 | Sample # |
| ية 0745 | O 0.5 | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA Soil Description (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-podor. | | Lead shot visible? NO NO NO | XRF An Lead Conc. (ppm) 18 7 ND | AUG 02-12 AUG 02-12 AUG 02-12 |
| | 0 0.5 1.0 | Sample Interval | WM-17 GPS COORDINATES: 36°59'32.64"N 122°2'21.09"W LOCA Soil Description (SM) Silty sand, grayish brown (10YR 5/2), moist, loose, fine-grained sand, non-podor. | | Lead shot visible? NO NO NO | XRF An Lead Conc. (ppm) 18 7 ND | AUG 02-12 AUG 02-12 AUG 02-12 |

APPENDIX D

XRF DATA

| Reading # | Boring | Depth | Date | Time | Units | Lead |
|-----------|----------|------------|----------|---------|-------|---------------|
| reading " | Location | (feet bgs) | Dute | Time | Onics | Concentration |
| 15 | T-1 | 0.5 | 8/2/2021 | 8:54:07 | PPM | 19 |
| 16 | | 1 | 8/2/2021 | 8:57:13 | PPM | 15 |
| 17 | | 1.5 | 8/2/2021 | 8:59:15 | PPM | 11 |
| 18 | | 2 | 8/2/2021 | 9:00:50 | PPM | 14 |
| 19 | EM-40 | 0.5 | 8/2/2021 | 8:54:05 | PPM | 245 |
| 20 | | 1 | 8/2/2021 | 8:56:26 | PPM | 125 |
| 21 | | 1.5 | 8/2/2021 | 9:04:08 | PPM | 18 |
| 22 | | 2 | 8/2/2021 | 9:06:58 | PPM | 16 |
| 23 | EM-39 | 0.5 | 8/2/2021 | 8:54:54 | PPM | 519 |
| 24 | | 1 | 8/2/2021 | 8:57:14 | PPM | 214 |
| 25 | | 1.5 | 8/2/2021 | 8:59:37 | PPM | 211 |
| 27 | | 2 | 8/2/2021 | 9:01:55 | PPM | 285 |
| 28 | EM-38 | 0.5 | 8/2/2021 | 8:54:32 | PPM | 499 |
| 29 | | 1 | 8/2/2021 | 8:57:22 | PPM | 370 |
| 30 | | 1.5 | 8/2/2021 | 8:59:42 | PPM | 137 |
| 31 | | 2 | 8/2/2021 | 9:02:53 | PPM | 48 |
| 32 | EM-37 | 0.5 | 8/2/2021 | 8:54:38 | PPM | 955 |
| 33 | | 0.5 | 8/2/2021 | 8:56:37 | PPM | 725 |
| 34 | | 1 | 8/2/2021 | 8:58:15 | PPM | 83 |
| 35 | | 1.5 | 8/2/2021 | 8:59:57 | PPM | 39 |
| 36 | | 2 | 8/2/2021 | 9:01:57 | PPM | 13 |
| 38 | EM-36 | 0.5 | 8/2/2021 | 8:54:40 | PPM | 1572 |
| 39 | | 0.5 | 8/2/2021 | 8:56:27 | PPM | 1579 |
| 40 | | 1 | 8/2/2021 | 8:59:00 | PPM | 78 |
| 41 | | 1.5 | 8/2/2021 | 9:00:35 | PPM | 25 |
| 42 | | 2 | 8/2/2021 | 9:04:54 | PPM | 64 |
| 44 | EM-34 | 0.5 | 8/2/2021 | 8:54:14 | PPM | 687 |
| 45 | | 1 | 8/2/2021 | 8:56:22 | PPM | 784 |
| 46 | | 1.5 | 8/2/2021 | 8:58:09 | PPM | 48 |
| 47 | | 2 | 8/2/2021 | 9:04:01 | PPM | 56 |
| 48 | R-3 | 0.5 | 8/2/2021 | 8:55:04 | PPM | 810 |
| 49 | | 1 | 8/2/2021 | 8:56:56 | PPM | 19 |
| 50 | | 1.5 | 8/2/2021 | 8:58:53 | PPM | 11 |
| 51 | | 2 | 8/2/2021 | 9:00:40 | PPM | 12 |
| 52 | EM-35 | 0.5 | 8/2/2021 | 8:55:15 | PPM | 1822 |
| 53 | | 0.5 | 8/2/2021 | 8:57:17 | PPM | 1631 |
| 54 | | 1 | 8/2/2021 | 8:59:12 | PPM | 485 |
| 55 | | 1.5 | 8/2/2021 | 9:01:09 | PPM | 48 |
| 56 | | 2 | 8/2/2021 | 9:03:27 | PPM | 147 |

| Reading # | Boring | Depth | Date | Time | Units | Lead |
|-----------|----------|------------|----------|---------|-------|---------------|
| | Location | (feet bgs) | - 1- 1 | | | Concentration |
| 57 | R-6 | 0.5 | 8/2/2021 | 8:54:18 | PPM | 628 |
| 58 | | 1 | 8/2/2021 | 8:57:32 | PPM | 540 |
| 59 | | 1.5 | 8/2/2021 | 9:12:45 | PPM | 155 |
| 60 | | 2 | 8/2/2021 | 9:15:07 | PPM | 290 |
| 66 | R-1 | 0.5 | 8/2/2021 | 8:55:00 | PPM | 226 |
| 67 | | 1 | 8/2/2021 | 8:57:04 | PPM | 57 |
| 68 | | 1.5 | 8/2/2021 | 8:58:38 | PPM | 52 |
| 69 | | 2 | 8/2/2021 | 9:00:09 | PPM | 131 |
| 71 | R-4 | 0.5 | 8/2/2021 | 8:54:44 | PPM | 1302 |
| 72 | | 0.5 | 8/2/2021 | 8:56:34 | PPM | 1027 |
| 73 | | 1 | 8/2/2021 | 8:58:31 | PPM | 73 |
| 75 | | 1.5 | 8/2/2021 | 9:01:32 | PPM | 16 |
| 76 | | 2 | 8/2/2021 | 9:03:11 | PPM | 16 |
| 77 | R-9 | 0.5 | 8/2/2021 | 8:54:09 | PPM | 182 |
| 78 | | 1 | 8/2/2021 | 8:56:07 | PPM | 31 |
| 79 | | 1.5 | 8/2/2021 | 8:57:51 | PPM | 6 |
| 80 | | 2 | 8/2/2021 | 9:00:58 | PPM | 11 |
| 81 | R-10 | 0.5 | 8/2/2021 | 8:55:00 | PPM | 86 |
| 82 | | 1 | 8/2/2021 | 8:58:21 | PPM | 23 |
| 83 | | 1.5 | 8/2/2021 | 9:00:03 | PPM | 5 |
| 84 | | 2 | 8/2/2021 | 9:03:53 | PPM | 3 |
| 85 | R-11 | 0.5 | 8/2/2021 | 8:54:04 | PPM | 93 |
| 86 | | 1 | 8/2/2021 | 8:55:43 | PPM | 18 |
| 87 | | 1.5 | 8/2/2021 | 8:59:13 | PPM | 6 |
| 88 | | 2 | 8/2/2021 | 9:13:50 | PPM | 20 |
| 89 | R-2 | 0.5 | 8/2/2021 | 8:54:06 | PPM | 28 |
| 90 | | 1 | 8/2/2021 | 8:55:48 | PPM | 21 |
| 91 | | 1.5 | 8/2/2021 | 8:58:49 | PPM | 4 |
| 92 | | 2 | 8/2/2021 | 9:01:29 | PPM | 4 |
| 93 | R-5 | 0.5 | 8/2/2021 | 9:27:21 | PPM | 234 |
| 94 | | 1 | 8/2/2021 | 9:29:32 | PPM | 49 |
| 95 | | 1.5 | 8/2/2021 | 9:31:40 | PPM | 35 |
| 96 | | 2 | 8/2/2021 | 9:33:26 | PPM | 18 |
| 97 | T-2 | 0.5 | 8/2/2021 | 8:54:43 | PPM | 23 |
| 98 | _ | 1 | 8/2/2021 | 8:56:20 | PPM | 9 |
| 99 | | 1.5 | 8/2/2021 | 8:57:51 | PPM | 5 |
| 100 | | 2 | 8/2/2021 | 8:59:27 | PPM | 6 |

| Reading # | Boring | Depth | Date | Time | Units | Lead |
|-----------|----------|------------|----------|---------|--------|---------------------|
| Reading # | Location | (feet bgs) | Date | Tille | Ullits | Concentration |
| 101 | T-3 | 0.5 | 8/2/2021 | 9:08:27 | PPM | 384 |
| 102 | | 1 | 8/2/2021 | 9:11:08 | PPM | 329 |
| 103 | | 1.5 | 8/2/2021 | 9:13:31 | PPM | 31 |
| 104 | | 2 | 8/2/2021 | 9:17:09 | PPM | 8 |
| 105 | R-8 | 0.5 | 8/2/2021 | 8:56:16 | PPM | 67 |
| 106 | | 1 | 8/2/2021 | 8:58:10 | PPM | 79 |
| 107 | | 1.5 | 8/2/2021 | 9:05:33 | PPM | 98 |
| 108 | | 2 | 8/2/2021 | 9:07:43 | PPM | 93 |
| 109 | R-12 | 0.5 | 8/2/2021 | 8:54:51 | PPM | 61 |
| 110 | | 1 | 8/2/2021 | 9:07:26 | PPM | 19 |
| 111 | | 1.5 | 8/2/2021 | 9:15:05 | PPM | 50 |
| 112 | | 2 | 8/2/2021 | 9:18:11 | PPM | 28 |
| 113 | R-7 | 0.5 | 8/2/2021 | 9:39:20 | PPM | 454 |
| 114 | | 1 | 8/2/2021 | 9:40:44 | PPM | 151 |
| 115 | | 1.5 | 8/2/2021 | 9:45:02 | PPM | 22 |
| 116 | | 2 | 8/2/2021 | 9:46:36 | PPM | 33 |
| 125 | WM-17 | 0.5 | 8/2/2021 | 9:06:57 | PPM | 18 |
| 126 | | 1 | 8/2/2021 | 9:08:54 | PPM | 7 |
| 127 | | 1.5 | 8/2/2021 | 9:10:16 | PPM | <lod< td=""></lod<> |
| 128 | | 2 | 8/2/2021 | 9:12:09 | PPM | 3 |
| 129 | WM-16 | 0.5 | 8/2/2021 | 9:21:21 | PPM | 133 |
| 130 | | 1 | 8/2/2021 | 9:23:22 | PPM | 6 |
| 131 | | 1.5 | 8/2/2021 | 9:25:04 | PPM | 6 |
| 132 | | 2 | 8/2/2021 | 9:27:18 | PPM | 5 |
| 133 | NO-13 | 0.5 | 8/2/2021 | 8:54:28 | PPM | 14 |
| 134 | | 1 | 8/2/2021 | 8:56:10 | PPM | 3 |
| 135 | | 1.5 | 8/2/2021 | 8:57:41 | PPM | 3 |
| 136 | | 2 | 8/2/2021 | 8:59:18 | PPM | 3 |
| 137 | NO-14 | 0.5 | 8/2/2021 | 9:06:15 | PPM | 56 |
| 138 | | 1 | 8/2/2021 | 9:08:22 | PPM | 19 |
| 139 | | 1.5 | 8/2/2021 | 9:10:06 | PPM | 5 |
| 140 | | 2 | 8/2/2021 | 9:11:40 | PPM | 4 |
| 141 | R-13 | 0.5 | 8/2/2021 | 8:55:14 | PPM | 741 |
| 142 | | 1 | 8/2/2021 | 8:57:51 | PPM | 69 |
| 143 | | 1.5 | 8/2/2021 | 8:59:32 | PPM | 22 |
| 144 | | 2 | 8/2/2021 | 9:00:46 | PPM | 17 |
| 145 | R-14 | 0.5 | 8/2/2021 | 8:54:02 | PPM | 1075 |
| 146 | | 0.5 | 8/2/2021 | 8:55:36 | PPM | 1038 |
| 147 | | 1 | 8/2/2021 | 8:57:34 | PPM | 34 |
| 148 | | 1.5 | 8/2/2021 | 8:59:48 | PPM | 6 |
| 149 | | 2 | 8/2/2021 | 9:01:12 | PPM | 6 |

| Reading # | Boring Location | Depth (feet bgs) | Date | Time | Units | Lead Concentration |
|-----------|--------------------|-------------------------|-----------|---------|-------|-----------------------|
| 5 | T-4 | 0.5 | 1/11/2022 | 8:25:03 | PPM | 48 |
| 6 | T-4 | 1 | 1/11/2022 | 8:26:56 | PPM | 22 |
| 7 | T-4 | 1.5 | 1/11/2022 | 8:29:12 | PPM | 16 |
| 8 | T-4 | 2 | 1/11/2022 | 8:30:59 | PPM | 15 |
| 9 | T-5 | 0.5 | 1/11/2022 | 8:56:43 | PPM | 160 |
| 10 | T-5 | 0.5 | 1/11/2022 | 9:00:15 | PPM | 236 |
| 11 | T-5 | 0.5 | 1/11/2022 | 9:02:45 | PPM | 64 |
| 12 | T-5 | 0.5 | 1/11/2022 | 9:03:43 | PPM | 126 |
| 13 | T-5 | 0.5 | 1/11/2022 | 9:06:10 | PPM | 99 |
| 14 | T-5 | 1 | 1/11/2022 | 9:07:44 | PPM | 27 |
| 15 | T-5 | 1.5 | 1/11/2022 | 9:09:21 | PPM | 25 |
| 16 | T-5 | 2 | 1/11/2022 | 9:11:24 | PPM | 13 |
| 17 | T-6 | 0.5 | 1/11/2022 | 9:19:05 | PPM | 282 |
| 18 | T-6 | 0.5 | 1/11/2022 | 9:22:24 | PPM | 153 |
| 19 | T-6 | 0.5 | 1/11/2022 | 9:26:33 | PPM | 185 |
| 20 | T-6 | 0.5 | 1/11/2022 | 9:29:26 | PPM | 489 |
| 21 | T-6 | 0.5 | 1/11/2022 | 9:32:27 | PPM | 91 |
| 22 | T-6 | 1 | 1/11/2022 | 9:34:21 | PPM | 22 |
| 23 | T-6 | 1.5 | 1/11/2022 | 9:35:43 | PPM | 17 |
| 24 | T-6 | 2 | 1/11/2022 | 9:38:04 | PPM | 12 |
| 25 | T-7 | 0.5 | 1/11/2022 | 9:48:16 | PPM | 107 |
| 26 | T-7 | 0.5 | 1/11/2022 | 9:50:06 | PPM | 82 |
| 27 | T-7 | 1 | 1/11/2022 | 9:52:29 | PPM | 54 |
| 28 | T-7 | 1.5 | 1/11/2022 | 9:53:59 | PPM | 14 |
| 29 | T-7 | 2 | 1/11/2022 | 9:56:12 | PPM | 33 |

APPENDIX E LABORATORY ANALYTICAL REPORTS



Pace Analytical® ANALYTICAL REPORT

August 13, 2021

RMD Environmental - Walnut Creek, CA

L1387682 Sample Delivery Group:

Samples Received: 08/06/2021

Project Number: 01-POG-001

Description: Pogonip Farm and Garden

Report To: Doug Whichard

1371 Oakland Blvd.

Suite 200

Walnut Creek, CA 94596

Entire Report Reviewed By:

Jordan N Zito

Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com





















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Sc: Sample Chain of Custody

38

| EM-40-0.5' L1387682-03 Solid | | | Collected by B. Angulo | Collected date/time 08/03/21 09:35 | Received da 08/06/21 11:0 | |
|------------------------------------|-----------|----------|---------------------------|------------------------------------|------------------------------|----------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 18:54 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | |
| EM-40-2' L1387682-04 Solid | | | B. Angulo | 08/03/21 09:40 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:12 | LD | Mt. Juliet, TN |
| | | | Collected by | | Received da | te/time |
| EM-39-0.5' L1387682-05 Solid | | | B. Angulo | 08/03/2110:05 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:16 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-39-2' L1387682-06 Solid | | | B. Angulo | 08/03/21 10:10 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:19 | LD | Mt. Juliet, TN |
| EM-38-0.5' L1387682-07 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2110:45 | Received da 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Fotal Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:39 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-38-2' L1387682-08 Solid | | | B. Angulo | 08/03/2110:50 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:42 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | |
| EM-37-0.5' L1387682-09 Solid | | | B. Angulo | 08/03/21 11:15 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:46 | LD | Mt. Juliet, TN |























| EM-37-2' L1387682-10 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2111:20 | Received da 08/06/21 11:0 | |
|------------------------------------|-----------|----------|---------------------------|-----------------------------------|------------------------------|----------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:49 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-36-0.5' L1387682-11 Solid | | | B. Angulo | 08/03/21 12:15 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:53 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-36-2' L1387682-12 Solid | | | B. Angulo | 08/03/21 12:20 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721547 | 1 | 08/12/21 15:09 | 08/12/21 15:19 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 19:57 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-34-1' L1387682-13 Solid | | | B. Angulo | 08/03/2112:45 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:00 | LD | Mt. Juliet, TN |
| EM-34-2' L1387682-14 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2112:50 | Received da 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:04 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| EM-35-0.5' L1387682-15 Solid | | | B. Angulo | 08/03/2113:40 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:07 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | | |
| EM-35-2' L1387682-16 Solid | | | B. Angulo | 08/03/2113:45 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 10 | 08/12/21 08:22 | 08/12/21 20:51 | LD | Mt. Juliet, TN |























| R-3-0.5' L1387682-17 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2113:15 | Received da 08/06/21 11:0 | |
|------------------------------------|-----------|----------|---------------------------|-----------------------------------|---------------------------|----------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:22 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | |
| R-6-0.5' L1387682-19 Solid | | | B. Angulo | 08/03/21 14:30 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:26 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-6-2' L1387682-20 Solid | | | B. Angulo | 08/03/21 14:35 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:29 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-4-0.5' L1387682-23 Solid | | | B. Angulo | 08/04/21 09:00 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| fetals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:33 | LD | Mt. Juliet, TN |
| Г-3-0.5' L1387682-37 Solid | | | Collected by B. Angulo | Collected date/time 08/04/2113:05 | Received da 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:36 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-7-0.5' L1387682-43 Solid | | | B. Angulo | 08/04/21 14:40 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1721548 | 1 | 08/12/21 14:54 | 08/12/21 15:04 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721876 | 5 | 08/12/21 08:22 | 08/12/21 20:41 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | |
| R-13-0.5' L1387682-53 Solid | | | B. Angulo | 08/05/21 09:10 | 08/06/21 11:0 | JU |
| <i>M</i> ethod | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1721549 | 1 | 08/12/21 10:34 | 08/12/21 10:41 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721883 | 5 | 08/12/21 08:23 | 08/12/21 17:25 | JPD | Mt. Juliet, TN |























| R-14-0.5' L1387682-55 Solid | | | Collected by B. Angulo | Collected date/time 08/05/2110:20 | Received date 08/06/21 11:00 | |
|------------------------------------|-----------|----------|---------------------------|-----------------------------------|------------------------------|----------------|
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| Total Solids by Method 2540 G-2011 | WG1721549 | 1 | 08/12/21 10:34 | 08/12/21 10:41 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1721883 | 5 | 08/12/21 08:23 | 08/12/21 17:42 | JPD | Mt. Juliet, TN |





















CASE NARRATIVE

Unless qualified or notated within the narrative below, all sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

¹Cp





















Jordan N Zito

Project Manager

Metals (ICPMS) by Method 6020

The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

| Batch | Lab Sample ID | Analytes |
|-----------|---------------|----------|
| WG1721876 | I 1387682-03 | Lead |

DETECTION SUMMARY

Metals (ICPMS) by Method 6020

| | | | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilutio n | Analysis | Batch |
|------------|---------------|---------|--------------|-----------|-----------|-----------|--------------|------------------|-----------|
| Client ID | Lab Sample ID | Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| EM-40-0.5' | L1387682-03 | Lead | 323 | <u>O1</u> | 0.123 | 2.49 | 5 | 08/12/2021 18:54 | WG1721876 |
| EM-40-2' | L1387682-04 | Lead | 18.6 | | 0.105 | 2.12 | 5 | 08/12/2021 19:12 | WG1721876 |
| EM-39-0.5' | L1387682-05 | Lead | 504 | | 0.106 | 2.14 | 5 | 08/12/2021 19:16 | WG1721876 |
| EM-39-2' | L1387682-06 | Lead | 220 | | 0.114 | 2.31 | 5 | 08/12/2021 19:19 | WG1721876 |
| EM-38-0.5' | L1387682-07 | Lead | 490 | | 0.111 | 2.25 | 5 | 08/12/2021 19:39 | WG1721876 |
| EM-38-2' | L1387682-08 | Lead | 41.3 | | 0.117 | 2.36 | 5 | 08/12/2021 19:42 | WG1721876 |
| EM-37-0.5' | L1387682-09 | Lead | 571 | | 0.102 | 2.07 | 5 | 08/12/2021 19:46 | WG1721876 |
| EM-37-2' | L1387682-10 | Lead | 14.7 | | 0.107 | 2.17 | 5 | 08/12/2021 19:49 | WG1721876 |
| EM-36-0.5' | L1387682-11 | Lead | 2090 | | 0.102 | 2.06 | 5 | 08/12/2021 19:53 | WG1721876 |
| EM-36-2' | L1387682-12 | Lead | 28.6 | | 0.106 | 2.14 | 5 | 08/12/2021 19:57 | WG1721876 |
| EM-34-1' | L1387682-13 | Lead | 637 | | 0.125 | 2.53 | 5 | 08/12/2021 20:00 | WG1721876 |
| EM-34-2' | L1387682-14 | Lead | 37.9 | | 0.134 | 2.70 | 5 | 08/12/2021 20:04 | WG1721876 |
| EM-35-0.5' | L1387682-15 | Lead | 1800 | | 0.105 | 2.12 | 5 | 08/12/2021 20:07 | WG1721876 |
| EM-35-2' | L1387682-16 | Lead | 5810 | | 0.210 | 4.25 | 10 | 08/12/2021 20:51 | WG1721876 |
| R-3-0.5' | L1387682-17 | Lead | 1530 | | 0.126 | 2.54 | 5 | 08/12/2021 20:22 | WG1721876 |
| R-6-0.5' | L1387682-19 | Lead | 573 | | 0.108 | 2.18 | 5 | 08/12/2021 20:26 | WG1721876 |
| R-6-2' | L1387682-20 | Lead | 341 | | 0.106 | 2.13 | 5 | 08/12/2021 20:29 | WG1721876 |
| R-4-0.5' | L1387682-23 | Lead | 1600 | | 0.123 | 2.49 | 5 | 08/12/2021 20:33 | WG1721876 |
| T-3-0.5' | L1387682-37 | Lead | 474 | | 0.111 | 2.24 | 5 | 08/12/2021 20:36 | WG1721876 |
| R-7-0.5' | L1387682-43 | Lead | 456 | | 0.127 | 2.56 | 5 | 08/12/2021 20:41 | WG1721876 |
| R-13-0.5' | L1387682-53 | Lead | 686 | | 0.102 | 2.07 | 5 | 08/12/2021 17:25 | WG1721883 |
| R-14-0.5' | L1387682-55 | Lead | 1220 | | 0.102 | 2.07 | 5 | 08/12/2021 17:42 | WG1721883 |

























Analyte

Lead

SAMPLE RESULTS - 03

Collected date/time: 08/03/21 09:35

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

323

Qualifier

01

MDL (dry)

mg/kg

0.123

RDL (dry)

mg/kg

2.49

Dilution

5

Analysis

date / time

08/12/2021 18:54

Batch

WG1721876

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch | |
|--------------|--------|-----------|----------|------------------|-----------|--|
| Analyte | % | | | date / time | | |
| Total Solids | 80.3 | | 1 | 08/12/2021 15:19 | WG1721547 | |

Тс





















Analyte

Lead

SAMPLE RESULTS - 04

Collected date/time: 08/03/21 09:40

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

18.6

Qualifier

MDL (dry)

mg/kg

0.105

RDL (dry)

mg/kg

2.12

Dilution

5

Analysis

date / time

08/12/2021 19:12

Batch

WG1721876

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 94.3 | | 1 | 08/12/2021 15:19 | WG1721547 |





















Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 93.3 | | 1 | 08/12/2021 15:19 | WG1721547 |





Collected date/time: 08/03/21 10:05

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 504 | | 0.106 | 2.14 | 5 | 08/12/2021 19:16 | WG1721876 |



³Ss













L138

Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 10:10

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 86.6 | | 1 | 08/12/2021 15:19 | WG1721547 |

²Tc



| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 220 | | 0.114 | 2.31 | 5 | 08/12/2021 19:19 | WG1721876 |

















Analyte

Lead

SAMPLE RESULTS - 07

RDL (dry)

mg/kg

2.25

Dilution

5

Analysis

date / time

08/12/2021 19:39

Batch

WG1721876

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

490

Qualifier

MDL (dry)

mg/kg

0.111

Collected date/time: 08/03/21 10:45

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 89.1 | | 1 | 08/12/2021 15:19 | WG1721547 |























Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 10:50

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 84.7 | | 1 | 08/12/2021 15:19 | WG1721547 |





Ss



| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 41.3 | | 0.117 | 2.36 | 5 | 08/12/2021 19:42 | WG1721876 |















Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 96.8 | | 1 | 08/12/2021 15:19 | WG1721547 |





Collected date/time: 08/03/21 11:15

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 571 | | 0.102 | 2.07 | 5 | 08/12/2021 19:46 | WG1721876 |



³Ss











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RMD Environmental - Walnut Creek, CA

Analyte

Lead

SAMPLE RESULTS - 10

Collected date/time: 08/03/21 11:20

Qualifier

MDL (dry)

mg/kg

0.107

Result (dry)

mg/kg

14.7

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 92.3 | | 1 | 08/12/2021 15:19 | WG1721547 |

RDL (dry)

mg/kg

2.17

Dilution

5

Analysis

date / time

08/12/2021 19:49

Batch

WG1721876























Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 12:15

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 96.9 | | 1 | 08/12/2021 15:19 | WG1721547 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|--|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | |
| Lead | 2090 | | 0.102 | 2.06 | 5 | 08/12/2021 19:53 | WG1721876 | |

Collected date/time: 08/03/21 12:20

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 93.4 | | 1 | 08/12/2021 15:19 | WG1721547 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 28.6 | | 0.106 | 2.14 | 5 | 08/12/2021 19:57 | WG1721876 |



Ss









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Collected date/time: 08/03/21 12:45

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 79.1 | | 1 | 08/12/2021 15:04 | WG1721548 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|--|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | |
| Lead | 637 | | 0.125 | 2.53 | 5 | 08/12/2021 20:00 | WG1721876 | |

Collected date/time: 08/03/21 12:50

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 73.9 | | 1 | 08/12/2021 15:04 | WG1721548 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 37.9 | | 0.134 | 2.70 | 5 | 08/12/2021 20:04 | WG1721876 |



Ss











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Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 13:40

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 94.4 | | 1 | 08/12/2021 15:04 | WG1721548 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|--|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | |
| Lead | 1800 | | 0.105 | 2 12 | 5 | 08/12/2021 20:07 | WG1721876 | |

Collected date/time: 08/03/21 13:45

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 94.1 | | 1 | 08/12/2021 15:04 | WG1721548 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch | |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|--|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | | |
| Lead | 5810 | | 0.210 | 4.25 | 10 | 08/12/2021 20:51 | WG1721876 | |

Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 13:15

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 78.8 | | 1 | 08/12/2021 15:04 | WG1721548 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 1530 | | 0.126 | 2.54 | 5 | 08/12/2021 20:22 | WG1721876 |



Ss









Ğl





Collected date/time: 08/03/21 14:30

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 91.5 | | 1 | 08/12/2021 15:04 | WG1721548 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | <u>Batch</u> |
|---------|--------------|-----------|-----------|-----------|----------|------------------|--------------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 573 | | 0.108 | 2.18 | 5 | 08/12/2021 20:26 | WG1721876 |

Collected date/time: 08/03/21 14:35

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 93.8 | | 1 | 08/12/2021 15:04 | WG1721548 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 341 | | 0.106 | 2.13 | 5 | 08/12/2021 20:29 | WG1721876 |



Ss















Collected date/time: 08/04/21 09:00

L1387682

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 80.2 | | 1 | 08/12/2021 15:04 | WG1721548 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | <u>Batch</u> |
|---------|--------------|-----------|-----------|-----------|----------|------------------|--------------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 1600 | | 0.123 | 2.49 | 5 | 08/12/2021 20:33 | WG1721876 |

















Total Solids by Method 2540 G-2011

Collected date/time: 08/04/21 13:05

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 89.1 | | 1 | 08/12/2021 15:04 | WG1721548 |

















Ğl





| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|------------------|
| Analyte | % | | | date / time | |
| Total Solids | 89.1 | | 1 | 08/12/2021 15:04 | <u>WG1721548</u> |

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | <u>Batch</u> |
|---------|--------------|-----------|-----------|-----------|----------|------------------|--------------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 474 | | 0.111 | 2.24 | 5 | 08/12/2021 20:36 | WG1721876 |

Collected date/time: 08/04/21 14:40

L1387682

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 78.1 | | 1 | 08/12/2021 15:04 | WG1721548 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 456 | | 0.127 | 2.56 | 5 | 08/12/2021 20:41 | WG1721876 |













Ğl





L138768

Total Solids by Method 2540 G-2011

Collected date/time: 08/05/21 09:10

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 96.8 | | 1 | 08/12/2021 10:41 | WG1721549 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 686 | | 0.102 | 2.07 | 5 | 08/12/2021 17:25 | WG1721883 |

















Collected date/time: 08/05/21 10:20

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 96.8 | | 1 | 08/12/2021 10:41 | WG1721549 |



| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 1220 | | 0.102 | 2.07 | 5 | 08/12/2021 17:42 | WG1721883 |

















QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1387682-03,04,05,06,07,08,09,10,11,12

Method Blank (MB)

| (MB) R3691588-1 08 | 3/12/21 15:19 | | | |
|--------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | % | | % | % |
| Total Solids | 0.00100 | | | |



L1387682-03 Original Sample (OS) • Duplicate (DUP)

| | 001 | 14007000 00 | 08/12/21 15:19 • | | DOCO1500 0 | 00/40/04 45:40 |
|-----|-------|---------------|------------------|-------------------|---------------|-----------------|
| - 1 | () \ | 11 13×76×7=03 | 118/11/11/15/19 | $H \cap H \cap H$ | 1 2 3691588=3 | 118/17/71 15:19 |
| - 1 | - | 1 1307 002 03 | 00/12/21 10.10 | (00) | 11130313003 | 00/12/21 10.10 |

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|-----------------|------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 80.3 | 79.4 | 1 | 1.07 | | 10 |



[†]Cn

⁶Sr

Laboratory Control Sample (LCS)

| (1 (5) | D3601 | 1588-2 | 09/12/ | 21 15.10 |
|--------|-------|--------|--------|----------|
| (LC2) | R309 | 1588-2 | U8/12/ | ZT 15:15 |

| (LCS) 1(3031300-2 00/12/ | 21 15.15 | | | | |
|--------------------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |





QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1387682-13,14,15,16,17,19,20,23,37,43

Method Blank (MB)

| (MB) R3691583-1 C | (MB) R3691583-1 08/12/2115:04 | | | | | | | |
|-------------------|-------------------------------|--------------|--------|--------|--|--|--|--|
| | MB Result | MB Qualifier | MB MDL | MB RDL | | | | |
| Analyte | % | | % | % | | | | |
| Total Solids | 0.000 | | | | | | | |

³Ss

L1387682-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1387682-17 08/12/21 15:04 • (DUP) R3691583-3 08/12/21 15:04

| | Original Res | ult DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|--------------|----------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 78.8 | 78.4 | 1 | 0.491 | | 10 |

⁴Cn



Laboratory Control Sample (LCS)

(LCS) R3691583-2 08/12/21 15:04

| (200) 110001000 2 00/12/ | 20.0 . | | | | |
|--------------------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |





QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1387682-53,55

Method Blank (MB)

| (MB) R3691553-1 08 | (MB) R3691553-1 08/12/21 10:41 | | | | | | | | |
|--------------------|--------------------------------|--------------|--------|--------|--|--|--|--|--|
| | MB Result | MB Qualifier | MB MDL | MB RDL | | | | | |
| Analyte | % | | % | % | | | | | |
| Total Solids | 0.000 | | | | | | | | |

²Tc

Тс



[†]Cn

Laboratory Control Sample (LCS)

| (LCS) R3691553-2 08/12/2 | 21 10:41 | | | | |
|--------------------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |













QUALITY CONTROL SUMMARY

L1387682-03,04,05,06,07,08,09,10,11,12,13,14,15,16,17,19,20,23,37,43

(MB) R3691487-1 08/12/21 18:47

Metals (ICPMS) by Method 6020

Method Blank (MB)

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---------|-----------|--------------|--------|--------|
| Analyte | mg/kg | | mg/kg | mg/kg |
| Lead | U | | 0.0990 | 2.00 |







Laboratory Control Sample (LCS)

(LCS) R3691487-2 08/12/21 18:50

| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---------|--------------|------------|----------|-------------|---------------|
| Analyte | mg/kg | mg/kg | % | % | |
| Lead | 100 | 105 | 105 | 80.0-120 | |



[†]Cn





(OS) L1387682-03 08/12/21 18:54 • (MS) R3691487-4 08/12/21 19:05 • (MSD) R3691487-5 08/12/21 19:08

| (00) 2:00/002 00 00/:2/2 | | | MS Result (dry) | · | MS Rec. | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|--------------------------|-------|-------|-----------------|-------|---------|----------|----------|-------------|--------------|---------------|------|------------|
| Analyte | mg/kg | mg/kg | mg/kg | mg/kg | % | % | | % | | | % | % |
| Lead | 125 | 323 | 467 | 452 | 116 | 103 | 5 | 75.0-125 | | | 3.36 | 20 |









QUALITY CONTROL SUMMARY

L1387682-53,55

Metals (ICPMS) by Method 6020

Method Blank (MB)

| (MB) R3691431-1 08 | 8/12/21 17:18 | | | |
|--------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | mg/kg | | mg/kg | mg/kg |
| Lead | U | | 0.0990 | 2 00 |







Laboratory Control Sample (LCS)

| (LCS) R3691431-2 08/12/21 | 17:21 | | | | |
|---------------------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | mg/kg | mg/kg | % | % | |
| Lead | 100 | 102 | 102 | 80.0-120 | |

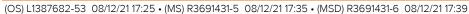


[†]Cn









| (00) 1.007 002 00 007.1272 | , , | | MS Result (dry) | • | | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|----------------------------|-------|-------|-----------------|-------|-----|----------|----------|-------------|--------------|---------------|------|------------|
| Analyte | mg/kg | mg/kg | mg/kg | mg/kg | % | % | | % | | | % | % |
| Lead | 103 | 686 | 803 | 786 | 113 | 96.3 | 5 | 75.0-125 | | | 2.19 | 20 |









GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

| | a Delinitions |
|---------------------------------|--|
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| MDL | Method Detection Limit. |
| MDL (dry) | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| RDL (dry) | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |
| Qualifier | Description |

The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.





















01

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

| Alabama | 40660 | Nebraska | NE-OS-15-05 |
|-------------------------------|-------------|-----------------------------|------------------|
| Alaska | 17-026 | Nevada | TN000032021-1 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey–NELAP | TN002 |
| California | 2932 | New Mexico ¹ | TN00003 |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina ¹ | DW21704 |
| Georgia | NELAP | North Carolina ³ | 41 |
| Georgia ¹ | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio-VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| lowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LA000356 |
| Kentucky 16 | KY90010 | South Carolina | 84004002 |
| Kentucky ² | 16 | South Dakota | n/a |
| Louisiana | Al30792 | Tennessee 1 4 | 2006 |
| Louisiana | LA018 | Texas | T104704245-20-18 |
| Maine | TN00003 | Texas ⁵ | LAB0152 |
| Maryland | 324 | Utah | TN000032021-11 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 110033 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 998093910 |
| Montana | CERT0086 | Wyoming | A2LA |
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| | | | |



^{*} Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto





















 $^{^* \, \}text{Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.} \\$

| Company Name/Address: | MD Environmental - Walnut Creek | | nformation: | | | | | Analysis / C | ontainer / Prese | ervative | | Chain of Custody | Page of | | |
|---|---------------------------------|----------------------------------|-------------------------------|--------------------|-------------|------------------|--------|---------------|------------------|---------------|---|--|---|--|--|
| RMD Environmental | - Walnut Creek | Accou | ints Payable Oakland Blvd. | | Pres Chk | | | | | | | Pac | e Analytical® | | |
| 1371 Oakland Blvd. | | Suite | 200 | | | | | | | | | 1 | or mary trour | | |
| Suite 200 Walnut Creek. CA 94596 | | Walni | ut Creek, CA 945 | 596 | 200 | 100 | 100 | | | 100 | | | | | |
| Report to: Doug Whichard | | Email T dwhich | o: ard@rmdes.net;ba | ngulo@rmdes.r | et | | - 1 | | | | | 12065 Lebanon Rd Mo Submitting a sample via constitutes acknowledg Pace Terms and Conditi | this chain of custody ment and acceptance of the | | |
| Project Description: Pogonip Farm and Garden | City, | State Senta | Cruz, UA | Please Ci | | | | | | | | | om/hubfs/pas-standard- | | |
| Phone: 925-683-8177 | Client Project # 01-Pc | 6-001 | RMDENVPH | HCA-POGON | IP | | | | | | | SDG# AOS | 99 | | |
| Collected by (print): B. Angula | Site/Facility ID # | | P.O. # | | | oPres | | | | | | Acctnum: RM | | | |
| Collected by (signature): Immediately Packed on Ice N Y | Same Day | 5 Day (Rad Onl 10 Day (Rad On | y) Date Resu | ults Needed | No. | 20 4ozCir-NoPres | Hold | | | | | PM: 942 - Jord PB: | Prelogin: P854917 PM: 942 - Jordan N Zito PB: | | |
| Sample ID | Comp/Grab M | atrix * Dep | | Time | Cntrs | Pb 6020 | 20 | | | | | Shipped Via: Fo | Sample # (lab only) | | |
| T-1-0.5 | | SS | 8/3/21 | 2900 | 1 | | X | | | | | | -07 | | |
| +-1-2' | | SS | | 0905 | 1 | | X | | | 10 | 655 | | -02 | | |
| EM-40-0.5 | | SS | | 0935 | 1 | X | | | | | | | 203 | | |
| EM-40-2 | | SS | | 0940 | 1 | X | | | | | | | -04 | | |
| tw-39-0.5 | | SS | | 1005 | 1 | X | - 1 | | | | | | -05 | | |
| EM-39-2 | | SS | | 1010 | 1 | X | | | | 810 | | | -98 | | |
| | | SS | | 1045 | 1 | 1 | | 100 | | | | | -07 | | |
| EM-38-0.5 | | SS | | | 1 | | | | | 93 | | | -00 | | |
| EM-38-2' | | SS | | 1050 | 1 | X | | | | 20 | 100 | | -100 | | |
| EM-37-05' | | | | 1115 | 1 | X | | | | | | | 10. | | |
| * Matrix: ss - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater | Remarks: Metal Priore to me | sourples t | o be sloved | 1120 1 with 100 | 10 5 | sieve | at lak | pH _ Flow_ | Temp_Other | | COC Seal COC Signs Bottles a Correct h | mple Receipt Ch Present/Intact ed/Accurate: arrive intact: bottles used: | necklist NP Y N | | |
| DW - Drinking Water OT - Other | Samples returned via:UPSFedEx | Courier | Trac | cking# | 36 | | | | | | VOA Zero | If Applicab Headspace: | YN | | |
| Relinquished by : (Signature) | Date: | 5/21 | 1245 1. | | 1 PAC | | 2:45 | 100,000,000 | A TE | CL/MeoH BR | RAD Scree | cion Correct/Chen <0.5 mR/hr: | 18/6 N | | |
| Relinquished by : (Signature) | Date: | T | | eived by: (Signa | | | | Temp: 3 | C-23 | s Received: | | tion required by Log | | | |
| Relinquished by : (Signature) | Date: | 1 | Time: Reco | eived for lab by: | (Signat | ure) | to | Date: 8/6/ | Time: | 1,00 | Hold: | | Condition: NCF / OK | | |

A ...

1-0

| Company Name/Address: RMD Environmental - Walnut Creek | | | Billing Info | rmation: | | | | | Analysis / Co | ontainer / Preserva | tive | | Chain of Custody | Page | 2 of 6 |
|--|---|--------------------------|--------------|--------------------------|---------------------|-------------|---------------|-------|---------------|---------------------|---------|---------------|---|-----------------------------|-----------------------|
| RMD Environmental - | Walnut Cr | eek, CA | | s Payable kland Blvd. | | Pres Chk | | | | | | | Par | ο Δηρί | lytical* |
| 1371 Oakland Blvd. | | | Suite 20 | | | | | | | | | | / ac | 6 Allal | yticai |
| Suite 200 | | | Walnut | Creek, CA 9 | 4596 | | 13 | | | | | 2005 | 1 | | |
| Walnut Creek. CA 94596 Report to: | | | Email To: | | | | 633 | | | | | 100 | 12065 Lebanon Rd Mo | unt Juliet, TN | 37122 |
| Doug Whichard | To the second | 1 | | d@rmdes.net; | bangulo@rmdes. | | | | | | | | Submitting a sample via constitutes acknowleds Pace Terms and Condit https://info.pacelabs.o | gment and accions found at: | ceptance of the |
| Project Description: Pogonip Farm and Garden | | City/State Collected: | Senta | (ruz, 14 | Please C | | 1 | | | | | | terms.pdf | 7 Por | - standard |
| Phone: 925-683-8177 | Client Project | POG-0 | 01 | RMDENV | # PHCA-POGON | IIP | | | | | | | SDG # / J | 58/ | 682 |
| Collected by (print): B. Anen lo | Site/Facility I | D# | | P.O.# | | | 4ozClr-NoPres | | | | | | Acctnum: RM | | НСА |
| Collected by (signature): | | Lab MUST Be | | Quote# | | | Ir-N | | | 10 | | | Template:T18 Prelogin: P85 | | |
| Immediately Packed on Ice N Y | ked on Ice N Y Three Day | | | | esults Needed | No. | 20 4ozC | Hord | | | | | PM: 942 - Jord PB: | an N Zito | |
| Sample ID | Comp/Grab | | Depth Depth | Date | Time | Cntrs | Pb 6020 | 20 | | | | | Shipped Via: F | - | round # (lab only) |
| EM-36-0.5' | | SS | T | 8/3/2 | 21 1215 | 1 | X | | | | | | | - | 11 |
| EM-36-2' | | SS | | | 1220 | 1 | X | | | | | | | - | 12 |
| EM-34-1' | | SS | | | 1245 | 1 | X | | | | | | | - | 13 |
| EM-34-2' | | SS | | | 1250 | 1 | X | | | | | | | - | 19 |
| EM-35-6.5' | | SS | | | 1340 | 1 | X | | | | | | | - | 19 |
| EM-35-2' | | SS | | | 1345 | 1 | X | | | 3 - 4 | | | | - | 6 |
| R-3-0.5 | | SS | | | 1315 | 1 | X | | | | | 1988 | | -1 | 7 |
| 12-3-2' | | SS | | | 1320 | 1 | | X | | | | | | | 8 |
| R-6-0.5' | | SS | | | 1430 | 1 | X | | | | | | | - | 9 |
| F-6-2 | | SS | | 1,1 | 1435 | 1 | X | | | | | | | - | 40 |
| * Matrix: SS - Soil AIR - Air F - Filter CM Groundwater R - Bioassay | Remarks: Su | page 1 | for sier | re instruct | tims | | | | рН | Temp | _ | COC Seal I | ple Receipt Ch Present/Intact 1/Accurate: | | N |
| ww - WasteWater | N - Groundwater B - Bioassay W - WasteWater | | | | - 1 | | | | Flow | Other | | Correct bo | rrive intact: ottles used: | | Y N |
| N - Drinking Water - Other | | | | Т | racking # | | | | | | | VOA Zero 1 | volume sent: If Applicab Headspace: | | v N |
| Relinquished by : (Signature) Date: 81512 | | | Time | 2116 | eceived by: (Signal | 1 | | 15/21 | Trip Blank F | Received: Yes/N | | | ion Correct/Chen <0.5 mR/hr: | ecked: | Y N |
| Relinquished by : (Signature) Date: | | | Time | e: R | eceived by: (Signa | ture) | | | Temp: 31 | Bottles Red | ceived: | If preservati | on required by Log | gin: Date | /Time |
| Relinquished by : (Signature) | linquished by : (Signature) Date: | | | e: R | eceived for lab by | - | ture | 2 | Date: 8/6/2 | Time: | 00 | Hold: | A F | | dition: |

| Company Name/Address: | | | Billing Infor | rmation: | | | | | Analysis / Cor | ntainer / Preservat | tive | | Chain of Custody | Page 3 of 6 | |
|---|---|--------------------------|--|--|------------|-------------|---------------|--------------|---------------------------|---------------------|----------------|---|--|--|--|
| RMD Environmental - | MD Environmental - Walnut Creek, C 371 Oakland Blvd. uite 200 | | | | | Pres Chk | | | | | | | Pace | e Analytical [®] | |
| Suite 200 | | | Suite 200 Walnut 0 | Creek, CA 945 | 96 | | | | | S - 100 | | (A) | | | |
| Walnut Creek. CA 94596 | | | Email To: | | | - | | | | | | | 12065 Lebanon Rd Mou | nt Juliet, TN 37122 | |
| Report to: Doug Whichard | # | | dwhichard | @rmdes.net;ban | | | | | | | | | Submitting a sample via constitutes acknowledge Pace Terms and Condition https://info.pacelabs.co | ment and acceptance of the ons found at: | |
| Project Description: Pogonip Farm and Garden | | City/State Collected: | Santa C | | Please Ci | | | | | | | | terms.pdf | 1000 | |
| Phone: 925-683-8177 | Client Project | 1 + 1 - POG - | 001 | RMDENVPH | ICA-POGON | IP | | | | | | | SDG # () | 8 /602 | |
| Collected by (print): B. Angulo | Site/Facility I | D# | | P.O.# | | | oPres | | | | | | Acctnum: RMI | | |
| Collected by (signature): | Same D | Lab MUST Be | Day | Quote# | | | 4ozCir-NoPres | L. D. | | | | | Prelogin: P854917 PM: 942 - Jordan N Zito | | |
| Immediately Packed on Ice N Y | ked on Ice N Y Three Day | | | | Its Needed | No. of | 6020 40 | Ho | | | | | PB: | edEX Ground | |
| Sample ID | Sample ID Comp/Grab Matri | | | Date | Time | Cntrs | Pb 60 | 20 | | | | | Remarks | Sample # (lab only) | |
| P-1-0.5 | | SS | | 8/4/21 | 0745 | 1 | | X | | | | | | -2 | |
| R-1-2' | | SS | | (| 075% | 1 | | X | | | | | | - 47 | |
| P-4-0.51 | | SS | | | 0900 | 1 | X | | | | | | | 73 | |
| 2-4-2' | | SS | | | 0905 | 1 | | X | | | | | | 70 | |
| R-9-0.5 | | SS | | | 0920 | 1 | 100 | X | | | | | | -77 | |
| 2-9-21 | | SS | | | 0925 | 1 | | X | | 0 - 5 | | 100 | | - No | |
| 2-10-0-5 | | SS | | | 5935 | 1 | | X | | | | | | -700 | |
| 2-10-2 | | SS | | | 0940 | 1 | 1000 | X | | | | | | - 16 | |
| 2-11-0.5 | | SS | | | 1000 | 1 | 100 | X | | | | | | -70 | |
| 2-11-2' | | SS | | 1 - | 1010 | 1 | | X | | | | | To Describe the | -50 | |
| * Matrix: SS - Soil AIR - Air F - Filter | Remarks: See | page 1 | ler sieve | instruction | 5 | | | | рН | Temp | _ | COC Seal Pr COC Signed/ Bottles arr | | _NP N N | |
| GW - Groundwater B - Bioassay WW - WasteWater | | | | | | | | | Flow | Other | - BROW | Correct bot | | Z N | |
| W - Drinking Water T - Other | | | | Trac | king# | | | | | BE SEE | | VOA Zero He | If Applicab | YN | |
| Relinquished by : (Signature) Date: 815 | | | Time: Received by: (Signature) 8/5/21 Trip | | | | | Trip Blank F | Received: Yes/N HCL/I TBR | | | on Correct/Che <0.5 mR/hr: | ecked:XN | | |
| Relinquished by : (Signature) Date: | | | | Time: Received by: (Signature) Temp: C Bottles Received: If preservation required by Logi | | | | | | | gin: Date/Time | | | | |
| Relinquished by : (Signature) | Date: | Tim | e: Rece | eived for lab by | 1 | ture) | | Date: 8/6/ | Time: | W; | Hold: | Condition: NCF / OK | | | |

| Company Name/Address: | 110000 | Billing Info | rmation: | | | | | Analysis / | Container | / Preservative | 1 | Chain of Custody | Page 4 of 6 | |
|--|--|--------------------------|------------------------|--------------------------|-----------------|-------------|--------------------|------------|------------|----------------|-------------------|--|---|--|
| RMD Environmental - | Walnut Cre | eek, CA | Account | s Payable kland Blvd. | | Pres Chk | | | | | | | _ Pac | e Analytical [®] |
| 1371 Oakland Blvd. Suite 200 Walnut Creek. CA 94596 | | | Suite 20 Walnut | 0 Creek, CA 9459 | 96 | | | | | | | | | |
| Report to: Doug Whichard | | | Email To: dwhichard | @rmdes.net;ban | gulo@rmdes.r | net | | | | | | | 12065 Lebanon Rd Mo Submitting a sample via constitutes acknowleds Pace Terms and Condit | a this chain of custody gment and acceptance of the |
| Project Description: Pogonip Farm and Garden | | City/State Collected: | Senta C | inz, ur | Please Ci | | | | | | | 100 | https://info.pacelabs.co terms.pdf | om/hubfs/pas-standard- |
| Phone: 925-683-8177 | Client Project | # 1 - POG- | oil | Lab Project # RMDENVPH | CA-POGON | IP | | | | | | | SDG # Table # | 1681 |
| Collected by (print): B. Angolo | Site/Facility II |)# | | P.O. # Quote # | | | loPres | | | | | | Acctnum: RM Template:T18 | |
| Collected by (signature): Immediately Packed on Ice N | Same Day | | | | ts Needed | No. | 6020 4ozClr-NoPres | 4pcp | | | | | Prelogin: P85 PM: 942 - Jord PB: | 4917 an N Zito |
| Sample ID | Sample ID Comp/Grab Matrix | | | | Time | Cntrs | Pb 60 | 20 | | | | | Shipped Via: F | Sample # (lab only) |
| 2-2-0.5' | | SS | | 8/4/21 | 1055 | 1 | | X | | | | | | -31 |
| P-2-2' | | SS | | | 1100 | 1 | | X | | | | | | -32 |
| | | SS | | | 1130 | 1 | | X | | | | 199 | | -33 |
| P-5-0.5' | | SS | | | 1135 | 1 | | X | | | - 1011 | | | -34 |
| T-2-0.5' | | SS | | | 1240 | 1 | | X | | | | | | -35 |
| 1-2-2' | | SS | | | 1245 | 1 | | X | | | 000 | 193 | | -36 |
| 7-3-0.5 | | SS | | | 1305 | 1 | X | | | | | | | -57 |
| +-3-2' | | SS | | | 1310 | 1 | | X | | | | | | -38 |
| P-8-1.5' | | SS | | | 1325 | 1 | | X | | | (日本) | | | -35 |
| | | SS | | | 1330 | 1 | 300 | X | | Alla | | | | -90 |
| * Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater | Matrix: S-Soil AIR-Air F-Filter W-Groundwater B-Bioassay | | Rev Siev | e instruction | S | | | | pH Flow | | Temp | COC Seal COC Sign Bottles Correct | ample Receipt Ch Present/Intact ed/Accurate: arrive intact: bottles used: | necklist : NP Y N Y N Y N |
| DW - Drinking Water OT - Other | V - Drinking Water Samples returned via: | | | Track | king# | | | | | | | VOA Zero | If Applicab Headspace: tion Correct/Ch | YN |
| elinquished by : (Signature) Date: 8 5 7 | | | Tim 1 | 1245 m | Woody / | Porer | | 15/21 | | nk Received | HCL / MeoH TBR | RAD Scre | en <0.5 mR/hr: | ∠ _N |
| Relinquished by : (Signature) | Relinquished by : (Signature) Date: | | | e: Rece | ived by: (Signa | ature) | | | Temp: 1 | 40-9 | Bottles Received: | If preserva | ation required by Lo | gin: Date/Time |
| Relinquished by : (Signature) | linquished by : (Signature) Date: | | | | ived for lab by | : (Signa | ture) | 2 | Date; | 21 | Time: 1.00 | Hold: | | Condition: |

| Company Name/Address: RMD Environmental - Walnut Creek, | | | Billing Info | rmation: | | | | | Analysis / Cor | ntainer / Pro | eservative | | | Chain of Custody | Page _5 of _6 | |
|--|--|--------------------------|------------------------|--------------------------|----------------------|-------------|--------------------|-------|----------------|---------------|-------------------|--|---|---|---|--|
| RMD Environmental - \ | Walnut Cre | eek, CA | | s Payable kland Blvd. | | Pres Chk | | | | | | | | Pace | Analytical® | |
| 1371 Oakland Blvd. Suite 200 Walnut Creek. CA 94596 | | | Suite 200 Walnut 0 | | 1596 | | | | | | | | | | | |
| Report to: Doug Whichard | | | Email To: dwhichard | @rmdes.net;b | angulo@rmdes. | net | | | | | | | | 12065 Lebanon Rd Mour Submitting a sample via t constitutes acknowledgm Pace Terms and Condition | this chain of custody nent and acceptance of the | |
| Project Description: Pogonip Farm and Garden | | City/State Collected: | Sonta C | mz, UA | Please C | | | | | | | | | https://info.pacelabs.com terms.pdf | n/hubfs/pas-standard- | |
| Phone: 925-683-8177 | Client Project | # 0G-00 | 1 | RMDENVE | PHCA-POGON | IP | | | | | | | | SDG# S | 8 1681 | |
| Collected by (print): | Site/Facility ID |)# | | P.O. # | | | oPres | | | | | | | Acctnum: RMD | | |
| Collected by (signature): | Same Day X Next Day Two Day Three Day | | | | sults Needed | No. | 6020 4ozCir-NoPres | d lot | | | | | | Prelogin: P854 PM: 942 - Jorda | 1917 | |
| Packed on Ice N Y | | | (Rad Only) Depth | TAT | Time | of Cntrs | | 20 | | | | | | PB: Shipped Via: Fe | dEX Ground Sample # (lab only) | |
| R-12-0-5 | | SS | | 8/4/21 | 1405 | Ti | Pb | × | | | | | | | -41 | |
| P-12-2' | | SS | | 1 1 | 1410 | 1 | | X | | | | | | | -42 | |
| R-7-0.5 | | SS | | | 1440 | 1 | X | | | | | | | | -43 | |
| F-7-2' | | SS | | 1 | 1445 | 1 | | X | | | | P. Committee | | | -44 | |
| WM-17-0.5' | | SS | | 8/5/2 | 1 0745 | 1 | | X | | | | 192 | | | -49 | |
| WW-17-2' | | SS | | | 0750 | 1 | | X | | | | 1988 | | | -96 | |
| WM-16-6.5 | | SS | | | 0800 | 1 | | X | | | | | | | -17 | |
| WM-16-2' | | SS | | | 0805 | 1 | | + | | | | - | | | - 70 | |
| No-13-0.5 | | SS | | | 0840 | 1 | | X | | | 101 | | | | 79 | |
| No-13- 2' | | SS | | | 0845 | 11 | 100 | X | | | | | | | 750, | |
| * Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater | Remarks: Su | e fage | 1 Per 4 | sieve inst | rudiums | | | | pH Flow | Tem | | COC Si Bottle Correct | eal Prigned/ es arr | le Receipt Che esent/Intact: Accurate: ive intact: tles used: | _NP Y _N _N _N _N _N _N _N | |
| W - Wastewater N - Drinking Water T - Other UPSFedExCouri | | | | Tr | acking# | | | | | | | VOA Ze | ero He | volume sent: If Applicabl adspace: n Correct/Che | YN | |
| Relinquished by Sgnature) | 8/5/2 | | | 245 1 | eceived by: (Signal) | Price | | 8/5/2 | 196 | | HCL / MeoH TBR | Preservation Correct/Checked:N RAD Screen <0.5 mR/hr:N | | | | |
| Relinquished by : (Signature) Date: | | | Time | | eceived by: (Signa | | | | De 3+ | °C 801 | tles Received: | | f preservation required by Login: Date/Time | | | |
| Relinquished by : (Signature) | elinquished by : (Signature) Date: | | | | eceived for lab by | (Signar | ture) | to | B/6/2- | Tir | me: (100 | Hold: | | | Condition: | |

| Company Name/Address: RMD Environmental - Walnut Creek, | | | Billing Info | rmation: | 1 | No. | | | | Aı | nalvsis / Co | ntainer / Preser | vative | | Chain of Custod | y Page 6 of |
|--|---|-----------|--------------|-----------|--------------------|-----------------------|--------------------|-------|-------|------|--------------|------------------|-----------|------------------------------------|---|--|
| RMD Environmental - 1371 Oakland Blvd. Suite 200 | L Oakland Blvd. e 200 nut Creek. CA 94596 rt to: | | | | e vd. A 9459 | 6 | Pres Chk | | | | | | | | Pac | ce Analytical® |
| Report to: Doug Whichard | | | Email To: | l@rmdes.n | et;bang | ulo@rmdes.n | et | | | | | | | | | ount Juliet, TN 37122 via this chain of custody dgment and acceptance of the |
| Project Description: Pogonip Farm and Garden | | ity/State | Sonta (| Croz, us | - | Please Cir PT MT C | rcle: | | | | | | | | Pace Terms and Cond https://info.pacelabs. terms.pdf | itions found at: com/hubfs/pas-standard- |
| Phone: 925-683-8177 | Client Project # | | | Lab Proje | ect# | A-POGONI | | | | | | | | | SDG # \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | 87682 |
| Collected by (print): | Site/Facility ID # | | | P.O.# | | | | oPres | | | | | | | Acctnum: RN | IDENVPHCA |
| Collected by (signature): Immediately Packed on Ice N Y | | Day | | | Results Needed | | 6020 4ozClr-NoPres | Horp | | | | | | Prelogin: P85 PM: 942 - Jorg PB: | 54917 dan N Zito | |
| Sample ID | Comp/Grab | Matrix * | Depth | Da | te | Time | Cntrs | Pb 60 | 70 | | | | | | Shipped Via: h | Sample # (lab only) |
| No-14-0.5 | | SS | | 81 | 5/21 | 0895 | 1 | | X | | | | | | | -5 |
| No-14-2' | | SS | | | | 0900 | 1 | | X | | | | | | | -52 |
| P-13-0.5 | | SS | | | | 0110 | i | X | | | | | | | | -53 |
| R-13-2' | | SS | | | | 0915 | 1 | | X | | | | | 100 | | -54 |
| R-14-0.5 | | SS | | | | 1020 | 1 | X | | | | | | | | -55 |
| P-14-2' | | SS | | | L | 1030 | 1 | | × | | | | | | | -56 |
| | | SS | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | | | |
| | | SS | | | | | | | | | | | | 1000 | | |
| | | SS | | | | | 1 | | | | | | | | | |
| * Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater | Remarks: See | Page 1 | For Siev | ve inst | ruetie | ins. | | | | | pH Flow | Temp Other | | COC Seal COC Signe Bottles a | mple Receipt C Present/Intacted/Accurate: arrive intact: bottles used: | hecklist NP Y N N N N N N N N N |
| OW - Drinking Water OT - Other | Samples returned vi | | | | Trackir | ng# | | | | | | | | VOA Zero | If Applicate Headspace: | ole Y_N |
| Relinquished by : (Signature) | Date | 8/5/ | ZI Time | 245 | M.L | ed by: (Signat | PACE | 5 1 | 8/5/2 | 21 7 | Trip Blank R | TBR | / MeoH | RAD Scree | tion Correct/Ch en <0.5 mR/hr: | _ N_ |
| Relinquished by : (Signature) Date: | | | Time | e: | | ed by: (Signat | | | | - 6 | 2.3 | °C Bottles F | Received: | If preservat | tion required by Lo | ogin: Date/Time |
| Relinquished by : (Signature) | elinquished by : (Signature) Date: | | | | Receiv | red for lab by: | (Signat | ure) | | | 8/6/2 | Time: | 100 | Hold: | | NCF / OK |

2.5



Pace Analytical® ANALYTICAL REPORT

August 25, 2021

RMD Environmental - Walnut Creek, CA

L1391194 Sample Delivery Group:

Project Number:

Samples Received: 08/06/2021

Description: Pogonip Farm and Garden

Report To:

1371 Oakland Blvd.

Suite 200

01-POG-001

Walnut Creek, CA 94596

Doug Whichard

Sc

Entire Report Reviewed By:

Jordan N Zito

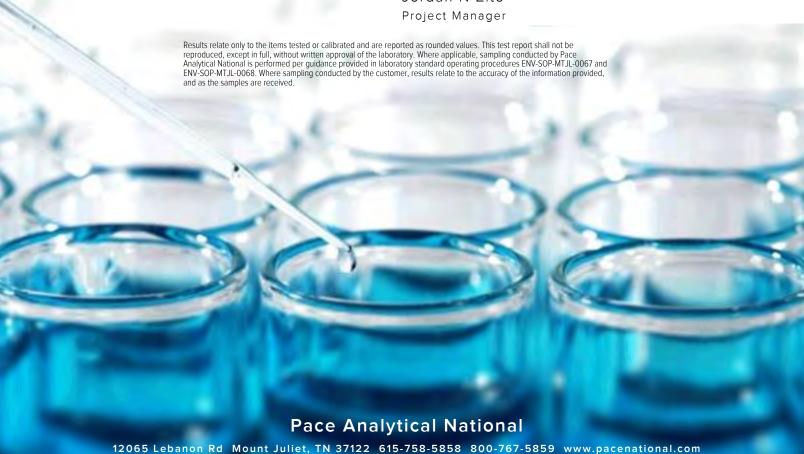




















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Sc: Sample Chain of Custody

33

SAMPLE SUMMARY

| | _ | _ | | | | |
|------------------------------------|-----------|----------|---------------------------|------------------------------------|------------------------------|----------------|
| EM-35-2' L1391194-01 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2113:45 | Received da 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1726941 | 1 | 08/23/21 11:45 | 08/23/21 11:50 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2116:06 | LD | Mt. Juliet, TN |
| R-3-2' L1391194-02 Solid | | | Collected by B. Angulo | Collected date/time 08/03/2113:20 | Received da 08/06/21 11:0 | |
| | Dotah | Dilution | Dranaration | Amahasia | Amaluat | Lagation |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1726941 | 1 | 08/23/21 11:45 | 08/23/21 11:50 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2116:09 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-1-0.5' L1391194-03 Solid | | | B. Angulo | 08/04/21 07:45 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Fotal Solids by Method 2540 G-2011 | WG1726941 | 1 | 08/23/21 11:45 | 08/23/21 11:50 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2116:13 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-1-2' L1391194-04 Solid | | | B. Angulo | 08/04/21 07:50 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| detals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 16:45 | LD | Mt. Juliet, TN |
| R-4-2' L1391194-05 Solid | | | Collected by B. Angulo | Collected date/time 08/04/21 09:05 | Received da 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| detals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2116:49 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-9-0.5' L1391194-06 Solid | | | B. Angulo | 08/04/21 09:20 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Fotal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 16:52 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | |
| R-9-2' L1391194-07 Solid | | | B. Angulo | 08/04/21 09:25 | 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2116:56 | LD | Mt. Juliet, TN |





















SAMPLE SUMMARY

| D 40 0 EL 140040 4 00 0 " ' | | | Collected by B. Angulo | Collected date/time 08/04/21 09:35 | Received date 08/06/21 11:0 | |
|--|------------|----------|----------------------------------|------------------------------------|-----------------------------|----------------|
| R-10-0.5' L1391194-08 Solid | | | B. Angulo | 08/04/21 09:35 | 08/06/2111:0 |)U |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| Fatal Calida hu Makhad 2F40 C 2014 | WC172C042 | 1 | date/time | date/time | KDW | M4 Juliat TN |
| otal Solids by Method 2540 G-2011 Netals (ICPMS) by Method 6020 | WG1726943 | 1 5 | 08/23/21 11:35 08/18/21 08:03 | 08/23/21 11:41 | KDW LD | Mt. Juliet, TN |
| retals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:00 | LU | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-10-2' L1391194-09 Solid | | | B. Angulo | 08/04/21 09:40 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/2117:03 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-11-0.5' L1391194-10 Solid | | | B. Angulo | 08/04/2110:00 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | • | |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:07 | LD | Mt. Juliet, TN |
| | | | | | | |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-11-2' L1391194-11 Solid | | | B. Angulo | 08/04/21 10:10 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:11 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-2-0.5' L1391194-12 Solid | | | B. Angulo | 08/04/2110:55 | 08/06/21 11:0 | 00 |
| <i>M</i> ethod | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:15 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-2-2' L1391194-13 Solid | | | B. Angulo | 08/04/21 11:00 | 08/06/21 11:0 | 00 |
| M ethod | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| otal Solids by Method 2540 G-2011 | WG1726943 | 1 | 08/23/21 11:35 | 08/23/21 11:41 | KDW | Mt. Juliet, TN |
| letals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 15:47 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-5-0.5' L1391194-14 Solid | | | B. Angulo | 08/04/21 11:30 | 08/06/21 11:0 | |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| otal Solids by Method 2540 G-2011 | WG1726944 | 1 | 08/23/21 11:28 | 08/23/21 11:34 | KDW | Mt. Juliet, TN |
| A . I (ICDAC) I AA II ICOOO | WC170 4000 | _ | 00/40/24 00:02 | 00/22/24 17:40 | 1.0 | NAC LICETA |























Metals (ICPMS) by Method 6020

WG1724688

08/18/21 08:03

08/23/21 17:19

LD

Mt. Juliet, TN

SAMPLE SUMMARY

| R-5-2' L1391194-15 Solid | | | Collected by B. Angulo | Collected date/time 08/04/21 11:35 | Received da 08/06/21 11:0 | |
|------------------------------------|-----------|----------|---------------------------|------------------------------------|------------------------------|----------------|
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1726944 | 1 | 08/23/21 11:28 | 08/23/21 11:34 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:36 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| T-3-2' L1391194-16 Solid | | | B. Angulo | 08/04/21 13:10 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1726944 | 1 | 08/23/21 11:28 | 08/23/21 11:34 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:40 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-7-2' L1391194-17 Solid | | | B. Angulo | 08/04/21 14:45 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1726944 | 1 | 08/23/21 11:28 | 08/23/21 11:34 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:43 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-13-2' L1391194-18 Solid | | | B. Angulo | 08/05/21 09:15 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |
| Total Solids by Method 2540 G-2011 | WG1726944 | 1 | 08/23/21 11:28 | 08/23/21 11:34 | KDW | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1724688 | 5 | 08/18/21 08:03 | 08/23/21 17:47 | LD | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| R-14-2' L1391194-19 Solid | | | B. Angulo | 08/05/2110:30 | 08/06/21 11:0 | 00 |
| Method | Batch | Dilution | Preparation | Analysis | Analyst | Location |
| | | | date/time | date/time | | |

WG1726944

WG1724688

1

5























Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

08/23/21 11:28

08/18/21 08:03

08/23/21 11:34

08/23/21 17:51

KDW

LD

Mt. Juliet, TN

Mt. Juliet, TN

CASE NARRATIVE

Unless qualified or notated within the narrative below, all sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

2





















Project Manager

Metals (ICPMS) by Method 6020

Jordan N Zito

The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.

BatchLab Sample IDAnalytesWG1724688L1391194-13Lead

DETECTION SUMMARY

Metals (ICPMS) by Method 6020

| | | | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilutio n | Analysis | Batch |
|-----------|---------------|---------|--------------|-----------|-----------|-----------|--------------|------------------|-----------|
| Client ID | Lab Sample ID | Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| EM-35-2' | L1391194-01 | Lead | 198 | | 0.106 | 2.15 | 5 | 08/23/2021 16:06 | WG1724688 |
| R-3-2' | L1391194-02 | Lead | 31.4 | | 0.127 | 2.57 | 5 | 08/23/2021 16:09 | WG1724688 |
| R-1-0.5' | L1391194-03 | Lead | 400 | | 0.132 | 2.67 | 5 | 08/23/2021 16:13 | WG1724688 |
| R-1-2' | L1391194-04 | Lead | 61.5 | | 0.122 | 2.47 | 5 | 08/23/2021 16:45 | WG1724688 |
| R-4-2' | L1391194-05 | Lead | 23.7 | | 0.119 | 2.40 | 5 | 08/23/2021 16:49 | WG1724688 |
| R-9-0.5' | L1391194-06 | Lead | 256 | | 0.126 | 2.54 | 5 | 08/23/2021 16:52 | WG1724688 |
| R-9-2' | L1391194-07 | Lead | 6.59 | | 0.122 | 2.46 | 5 | 08/23/2021 16:56 | WG1724688 |
| R-10-0.5' | L1391194-08 | Lead | 94.0 | | 0.120 | 2.43 | 5 | 08/23/2021 17:00 | WG1724688 |
| R-10-2' | L1391194-09 | Lead | 12.5 | | 0.129 | 2.60 | 5 | 08/23/2021 17:03 | WG1724688 |
| R-11-0.5' | L1391194-10 | Lead | 75.7 | | 0.105 | 2.12 | 5 | 08/23/2021 17:07 | WG1724688 |
| R-11-2' | L1391194-11 | Lead | 23.3 | | 0.106 | 2.13 | 5 | 08/23/2021 17:11 | WG1724688 |
| R-2-0.5' | L1391194-12 | Lead | 215 | | 0.105 | 2.12 | 5 | 08/23/2021 17:15 | WG1724688 |
| R-2-2' | L1391194-13 | Lead | 8.80 | <u>O1</u> | 0.110 | 2.23 | 5 | 08/23/2021 15:47 | WG1724688 |
| R-5-0.5' | L1391194-14 | Lead | 9.86 | | 0.104 | 2.10 | 5 | 08/23/2021 17:19 | WG1724688 |
| R-5-2' | L1391194-15 | Lead | 17.9 | | 0.107 | 2.17 | 5 | 08/23/2021 17:36 | WG1724688 |
| T-3-2' | L1391194-16 | Lead | 8.15 | | 0.112 | 2.26 | 5 | 08/23/2021 17:40 | WG1724688 |
| R-7-2' | L1391194-17 | Lead | 66.0 | | 0.122 | 2.46 | 5 | 08/23/2021 17:43 | WG1724688 |
| R-13-2' | L1391194-18 | Lead | 31.9 | | 0.104 | 2.10 | 5 | 08/23/2021 17:47 | WG1724688 |
| R-14-2' | L1391194-19 | Lead | 10.9 | | 0.112 | 2.26 | 5 | 08/23/2021 17:51 | WG1724688 |























Total Solids by Method 2540 G-2011

Collected date/time: 08/03/21 13:45

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 93.2 | | 1 | 08/23/2021 11:50 | WG1726941 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 198 | | 0.106 | 2.15 | 5 | 08/23/2021 16:06 | WG1724688 |

Collected date/time: 08/03/21 13:20

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 77.9 | | 1 | 08/23/2021 11:50 | WG1726941 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 31.4 | | 0.127 | 2.57 | 5 | 08/23/2021 16:09 | WG1724688 |



Ss















Collected date/time: 08/04/21 07:45

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 74.9 | | 1 | 08/23/2021 11:50 | WG1726941 |

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 400 | | 0.132 | 2.67 | 5 | 08/23/2021 16:13 | WG1724688 |



















Total Solids by Method 2540 G-2011

Collected date/time: 08/04/21 07:50

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 80.8 | | 1 | 08/23/2021 11:41 | WG1726943 |





Ss

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 61.5 | | 0.122 | 2.47 | 5 | 08/23/2021 16:45 | WG1724688 |















Analyte

Lead

SAMPLE RESULTS - 05

Collected date/time: 08/04/21 09:05

Qualifier

MDL (dry)

mg/kg

0.119

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

23.7

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 83.3 | | 1 | 08/23/2021 11:41 | WG1726943 |

RDL (dry)

mg/kg

2.40

Dilution

5

Analysis

date / time

08/23/2021 16:49

Batch

WG1724688





















Collected date/time: 08/04/21 09:20

L1391194

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 78.7 | | 1 | 08/23/2021 11:41 | WG1726943 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 256 | | 0.126 | 2.54 | 5 | 08/23/2021 16:52 | WG1724688 |

















Analyte

Lead

SAMPLE RESULTS - 07

RDL (dry)

mg/kg

2.46

Dilution

5

Analysis

date / time

08/23/2021 16:56

Batch

WG1724688

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

6.59

Qualifier

MDL (dry)

mg/kg

0.122

Collected date/time: 08/04/21 09:25

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 81.4 | | 1 | 08/23/2021 11:41 | WG1726943 |























Collected date/time: 08/04/21 09:35

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 82.2 | | 1 | 08/23/2021 11:41 | WG1726943 |



| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 94.0 | | 0.120 | 2.43 | 5 | 08/23/2021 17:00 | WG1724688 |













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Analyte

Lead

SAMPLE RESULTS - 09

Qualifier

MDL (dry)

mg/kg

0.129

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

12.5

Collected date/time: 08/04/21 09:40

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 76.9 | | 1 | 08/23/2021 11:41 | WG1726943 |

RDL (dry)

mg/kg

2.60

Dilution

5

Analysis

date / time

08/23/2021 17:03

Batch

WG1724688























Analyte

Lead

SAMPLE RESULTS - 10

Collected date/time: 08/04/21 10:00

Qualifier

MDL (dry)

mg/kg

0.105

Result (dry)

mg/kg

75.7

Metals (ICPMS) by Method 6020

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 94.3 | | 1 | 08/23/2021 11:41 | WG1726943 |

RDL (dry)

mg/kg

2.12

Dilution

5

Analysis

date / time

08/23/2021 17:07





Batch

WG1724688



















Collected date/time: 08/04/21 10:10

Metals (ICPMS) by Method 6020

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 93.8 | | 1 | 08/23/2021 11:41 | WG1726943 |





















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 23.3 | | 0.106 | 2.13 | 5 | 08/23/2021 17:11 | WG1724688 |

Collected date/time: 08/04/21 10:55

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 94.4 | | 1 | 08/23/2021 11:41 | WG1726943 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 215 | | 0.105 | 2.12 | 5 | 08/23/2021 17:15 | WG1724688 |



Ss















Analyte

Lead

SAMPLE RESULTS - 13

Collected date/time: 08/04/21 11:00

RDL (dry)

mg/kg

2.23

Dilution

5

Analysis

date / time

08/23/2021 15:47

Batch

WG1724688

Total Solids by Method 2540 G-2011

Metals (ICPMS) by Method 6020

Result (dry)

mg/kg

8.80

Qualifier

01

MDL (dry)

mg/kg

0.110

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 89.7 | | 1 | 08/23/2021 11:41 | WG1726943 |























Collected date/time: 08/04/21 11:30

L1391194

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 95.4 | | 1 | 08/23/2021 11:34 | WG1726944 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 9.86 | | 0.104 | 2.10 | 5 | 08/23/2021 17:19 | WG1724688 |

















Collected date/time: 08/04/21 11:35

| Total Solids by Method | d 2540 G-2 | | | | |
|------------------------|------------|-----------|----------|----------|--------------|
| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |







Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 17.9 | | 0.107 | 2.17 | 5 | 08/23/2021 17:36 | WG1724688 |

















Collected date/time: 08/04/21 13:10

| Total Solids by Method 2540 G-2011 | | | | | | | | | |
|------------------------------------|--------|-----------|----------|------------------|--------------|--|--|--|--|
| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> | | | | |
| Analyte | % | | | date / time | | | | | |
| Total Solids | 88.5 | | 1 | 08/23/2021 11:34 | WG1726944 | | | | |



Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 8.15 | | 0.112 | 2.26 | 5 | 08/23/2021 17:40 | WG1724688 |



Ss









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Collected date/time: 08/04/21 14:45

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 81.1 | | 1 | 08/23/2021 11:34 | WG1726944 |





Ss















| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 66.0 | | 0.122 | 2 46 | 5 | 08/23/2021 17:43 | WG1724688 |

Collected date/time: 08/05/21 09:15

L1391194

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 95.1 | | 1 | 08/23/2021 11:34 | WG1726944 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 31.9 | | 0.104 | 2.10 | 5 | 08/23/2021 17:47 | WG1724688 |

















Collected date/time: 08/05/2110:30

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 88.4 | | 1 | 08/23/2021 11:34 | WG1726944 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 10.9 | | 0.112 | 2.26 | 5 | 08/23/2021 17:51 | WG1724688 |



Ss















QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1391194-01,02,03

Method Blank (MB)

| (MB) R3695514-1 08 | 3/23/21 11:50 | | | |
|--------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | % | | % | % |
| Total Solids | 0.00100 | | | |

³Ss

L1391123-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1391123-01 08/23/21 11:50 • (DUP) R3695514-3 08/23/21 11:50

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|-----------------|------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 94.2 | 94.1 | 1 | 0.0551 | | 10 |



⁶Sr

Laboratory Control Sample (LCS)

(LCS) R3695514-2 08/23/21 11:50

| (200) 1.00000112 00/20/ | 2 | | | | |
|-------------------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |





QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1391194-04,05,06,07,08,09,10,11,12,13

Method Blank (MB)

| (MB) R3695512-1 0 | 8/23/21 11:41 | | | |
|-------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | % | | % | % |
| Total Solids | 0.000 | | | |

10

L1391194-12 Original Sample (OS) • Duplicate (DUP)

| (05) | 1 1391194-12 | 08/23/21 11:41 • | (DLIP | R3695512-3 | 08/23/21 11:41 |
|-------|----------------|------------------|-------|-------------|----------------|
| - | / LIJJ11J + 1Z | 00/23/2111.71 | (00) | 113033312 3 | 00/23/2111.41 |

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|-----------------|------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 94.4 | 94.0 | 1 | 0.481 | | 10 |

³Ss

⁶Sr

Laboratory Control Sample (LCS)

| (LCS) R3695512-2 08/23/21 11:4 |
|--------------------------------|
|--------------------------------|

| () | -, | | | | |
|--------------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | % | % | % | % | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | |





QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1391194-14,15,16,17,18,19

Method Blank (MB)

| (MB) R3695511-1 08 | 3/23/21 11:34 | | | |
|--------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | % | | % | % |
| Total Solids | 0.00100 | | | |

Tc

L1391194-14 Original Sample (OS) • Duplicate (DUP)

| | Original Resu | ult DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|---------------|----------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 95.4 | 95.4 | 1 | 0.0336 | | 10 |



Sr

Ss

Laboratory Control Sample (LCS)

| 11 (5) | P3695511_2 | 08/23/21 11:34 | |
|----------|------------|----------------|---|
| 11 () 1 | K3093311-Z | U0/Z3/Z1 II.34 | • |

| 203) 100030311-2 00/23/21 11:54 | | | | | | | | | | |
|---------------------------------|--------------|------------|----------|-------------|---------------|--|--|--|--|--|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier | | | | | |
| Analyte | % | % | % | % | | | | | | |
| Total Solids | 50.0 | 50.0 | 100 | 85.0-115 | | | | | | |





QUALITY CONTROL SUMMARY

L1391194-01,02,03,04,05,06,07,08,09,10,11,12,13,14,15,16,17,18,19

Method Blank (MB)

Metals (ICPMS) by Method 6020

(MB) R3695415-1 08/23/21 15:39

| | MB Result | MB Qualifier | MB MDL | MB RDL |
|---------|-----------|--------------|--------|--------|
| Analyte | mg/kg | | mg/kg | mg/kg |
| Lead | U | | 0.0990 | 2.00 |







Laboratory Control Sample (LCS)

(LCS) R3695415-2 08/23/2115:43

| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
|---------|--------------|------------|----------|-------------|---------------|
| Analyte | mg/kg | mg/kg | % | % | |
| Lead | 100 | 96.1 | 96.1 | 80.0-120 | |









(OS) L1391194-13 08/23/21 15:47 • (MS) R3695415-5 08/23/21 15:58 • (MSD) R3695415-6 08/23/21 16:02

| (00, 2000) | , , | | MS Result (dry) | MSD Result (dry) | MS Rec. | | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|------------|-------|-------|-----------------|---------------------|---------|-----|----------|-------------|--------------|---------------|------|------------|
| Analyte | mg/kg | mg/kg | mg/kg | mg/kg | % | % | | % | | | % | % |
| Lead | 111 | 8.80 | 135 | 136 | 113 | 114 | 5 | 75.0-125 | | | 1.16 | 20 |











GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

| Appleviations and | a Definitions |
|---------------------------------|--|
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| MDL | Method Detection Limit. |
| MDL (dry) | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| RDL (dry) | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |
| Qualifier | Description |

The analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference. 01



















PAGE:

31 of 38

ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

| Alabama | 40660 | Nebraska | NE-OS-15-05 |
|-------------------------------|-------------|-----------------------------|------------------|
| Alaska | 17-026 | Nevada | TN000032021-1 |
| Arizona | AZ0612 | New Hampshire | 2975 |
| Arkansas | 88-0469 | New Jersey-NELAP | TN002 |
| California | 2932 | New Mexico ¹ | TN00003 |
| Colorado | TN00003 | New York | 11742 |
| Connecticut | PH-0197 | North Carolina | Env375 |
| Florida | E87487 | North Carolina ¹ | DW21704 |
| Georgia | NELAP | North Carolina ³ | 41 |
| Georgia ¹ | 923 | North Dakota | R-140 |
| Idaho | TN00003 | Ohio-VAP | CL0069 |
| Illinois | 200008 | Oklahoma | 9915 |
| Indiana | C-TN-01 | Oregon | TN200002 |
| lowa | 364 | Pennsylvania | 68-02979 |
| Kansas | E-10277 | Rhode Island | LAO00356 |
| Kentucky 16 | KY90010 | South Carolina | 84004002 |
| Kentucky ² | 16 | South Dakota | n/a |
| Louisiana | Al30792 | Tennessee 1 4 | 2006 |
| Louisiana | LA018 | Texas | T104704245-20-18 |
| Maine | TN00003 | Texas ⁵ | LAB0152 |
| Maryland | 324 | Utah | TN000032021-11 |
| Massachusetts | M-TN003 | Vermont | VT2006 |
| Michigan | 9958 | Virginia | 110033 |
| Minnesota | 047-999-395 | Washington | C847 |
| Mississippi | TN00003 | West Virginia | 233 |
| Missouri | 340 | Wisconsin | 998093910 |
| Montana | CERT0086 | Wyoming | A2LA |
| A2LA – ISO 17025 | 1461.01 | AIHA-LAP,LLC EMLAP | 100789 |
| A2LA – ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
| | | | |



^{*} Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto























^{*} Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.

| Company Name/Address: | And the last | 177 | Billing Information: Analysis / Container / P | | | | | ntainer / Preservative | | Chain of Custody | Page 2 of b | | |
|--|--|-------------|--|--------------------------|------------------|-------------|--------------------|------------------------|---------------|--------------------------|------------------|---|----------------------------|
| RMD Environmental - 1 | Walnut Cr | eek, CA | CONTRACTOR OF STREET | s Payable kland Blvd. | | Pres Chk | | | | | | Pac | e Analytical* |
| 1371 Oakland Blvd. Suite 200 | | | Suite 20 | | | | | 1000 | | | | 1/- ac | or mary troat |
| Walnut Creek. CA 94596 | | | Walnut | Creek, CA 94! | 596 | | | | | | | | |
| Report to: | | | Email To: | | BET LANS. | | 100 | | | | | 12065 Lebanon Rd Mo | |
| Doug Whichard | | ole and | dwhichard | @rmdes.net;ba | ngulo@rmdes. | net | | 1 | | | | Submitting a sample via constitutes acknowleds Pace Terms and Conditi | ment and acceptance of the |
| Project Description: Pogonip Farm and Garden | | | Senta | Cruz, LA | Please C | | | PER CO | | | | https://info.pacelabs.co terms.pdf | |
| Phone: 925-683-8177 | Client Project | # POG-01 | 01 | RMDENVPI | HCA-POGON | IIP | | | | | | SDG# | 8 7682 |
| Collected by (print): S. Hren lo | Site/Facility II |)# | | P.O.# | | | Pres | | | | | Acctnum: RM | 39119V DENVPHCA |
| Collected by (signature): | The state of the s | Lab MUST Be | | Quote# | | | Ir-No | | | | | Template:T18 | |
| Immediately Packed on Ice N Y | Same D Next Da Two Da Three D | y 10 Da | Day y (Rad Only) ay (Rad Only) to tw7 | | ults Needed | No. | 6020 4ozClr-NoPres | Herb | | | | Prelogin: P85 PM: 942 - Jord P8: | A TURN THE STREET CONTROL |
| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | Cntrs | Pb 607 | 30 | | | | Shipped Via: Fi | Sample # (lab only) |
| EM-36-0.5' | | SS | | 8/3/21 | 1215 | 11 | X | 100 | | | | | -# |
| EM-36-2" | | SS | | | 1270 | 1 | X | | | | | | 1-12 |
| EM-34-1 | THE REAL PROPERTY. | SS | 品是严厉 | | 1245 | 1 | X | | | | 一層層 | | 1-13 |
| EM-34-2 | | SS | | | 1250 | 1 | X | | | | | | -14 |
| E14-35-6.5 | | SS | | | 1340 | 1 | Y | 75.5 | | | | | -19 |
| EU1-35-2' | | SS | | | 1345 | 1 | X | | | | 705- | | -16- |
| P-3-0.5' | | SS | davis | | 1315 | 1 | X | 196 | | | | | -17 |
| P-3-2' | A SUBSECTION OF THE PARTY OF TH | SS | Section 1 | | 1320 | 1 | | X | | | | | -t8 - |
| R-6-0.5' | Marie Sale | SS | | | 1430 | 1 | X | | | 福 - 8 00 | | | 1-19 |
| P-6-2' | | SS | Carlot Control | The state of | 1435 | 1 | X | | | | | | -20 |
| GW - Groundwater B - Bioassay WW - WasteWater | Remarks: Su | suge 1 | for slov | ve instruction | ns | | | | pH | Temp | COC Si Bottle | Sample Receipt Chal Present/Intact gned/Accurate: s arrive intact: t bottles used: | |
| DW - Drinking Water OT - Other | Samples returnedUPSFedEx | | | Trac | king# | | | | | | VOA Ze | ient volume sent: If Applicab ero Headspace: | Y_N |
| Relinquished by : (Signature) | yb " | 8/5/21 | Time | 245 Reco | elved by: (Signa | ture) | | 15/21 | Trip Blank Re | HCL / Meo | RAD Sc | vation Correct/Chereen <0.5 mR/hr: | ecked: Y N |
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| RMD Environmental | - Walnut Cr | eek, CA | Account | | | Pre: Chk | _ | | Analysis / (| Container / Pr | eservative | | Chain of Custody | Page 3 of b | |
| Suite 200 Walnut Creek. CA 94596 | | | Suite 20 Walnut | | A 94596 | | | | | | | | 1 | or way doca | 7 - 7 |
| Report to: | 100 | | Email To: | | | | | | | | | | 12065 Lebanon Rd Mo | | |
| Doug Whichard Project Description: | | | dwhichard | @rmdes.n | et;bangulo@rmo | des.net | | | | | | | | a this chain of custody greent and acceptance of the tions found at: | 133 |
| Pogonip Farm and Garden | | City/State Collected: | Santa (| ruz, cf | PT M | se Circle: | | | | | | | https://info.pacelabs.c | com/hubfk/pas-standard- | |
| Phone: 925-683-8177 | Client Project | # - POG - | 001 | RMDE! | ect # NVPHCA-POG | ONIP | | | | | | | SDG # | \$768. | 7 |
| ollected by (print): B. Angelo | Site/Facility II | D# | | P.O.# | | | Pres | | | | | | Acctnum: RM | 394194 IDENVPHCA | |
| ollected by (signature): | | ab MUST Be | | Quote # | | | 4ozCir-NoPres | A | | | | | Template:T18 Prelogin: P85 | | |
| nmediately acked on Ice N y | Next Da Two Da Three D | 10 Da | (Rad Only) by (Rad Only) STD T | | e Results Needed | No. | 20 40z | Hot | | | | | PM: 942 - Jord PB: | | |
| Sample ID | Comp/Grab | Matrix * | Depth | Dat | te Time | Cote | Pb 6020 | 2 0 | | | | | Shipped Via: F | Sample # (lab only) | |
| F-1-0.5 | | SS | | 814 | 21 074 | 15 1 | | X | | | | | | 1-21 | -03 |
| R-1-2' | | SS | | 1 | 075 | 00 1 | | X | | | | | | 1-7-9 | -d |
| P-4-0-51 | | SS | | | 090 | THE REAL PROPERTY. | X | | 775 | | | | | -73 | |
| 2-4-2' | | SS | | | 040 | ACCUSE OF THE PARTY OF | | X | | 78.0 | | 95 0 | | -29 | 1-05 |
| R-9-0.5 | | SS | | 103 | 093 | 20 1 | | X | | | | | | 1-25 | -00 |
| R-9-21 | | SS | | | 092 | 575 | 19 1989 | X | | | | 96394 | Wild Care State | 1-75 | 1-07 |
| 2-10-05 | | SS | Jan Val | | 093 | District Control | | X | | - | | | | -247 | 1 - |
| 2-10-2 | | SS | | | 094 | 1000 ETS | 1 | × | | | 500 | | | =28 | \$60 |
| 2-11-0.5 | | SS | | - | 100 | The same | | X | | 198 | | | | -19 | - 10 |
| 2-11-2' | | SS | | I | 1010 | | | × | | 900 | | | HE TO AN ALLES | 1-201 | -1 |
| - Groundwater B - Bioassay - WasteWater | Remarks: See | page 1 h | v slove | instru | tims | | | | pH _ | Ten | | COC Sea | Sample Receipt C al Present/Intact gned/Accurate: s arrive intact: | hecklist NP | |
| | Samples returned v | | | Tracking # | | | | | | | | Suffic | t bottles used: ient volume sent: If Applica | ble | |
| nquished by : (Signature) | No Date | 8/5/21 | Time: | 1 | | | | 5×1 | Trip Blank | Received: | Yes / No HCL / Meol TBR | Preser RAD Sc | ro Headspace: vation Correct/Cl reen <0.5 mR/hr: | lecked: J N | |
| equished by : (Signature) | Date | 2 | Time: | | | | | 14 (1 2 1) 14 (2 2 1) | Temp: | 10 2 | ttles Receive | d: If preser | rvation required by Lo | igin: Date/Time | |
| quished by : (Signature) | Date: Time: Received for lab by, (Signat | | | ture) | I A | Date: | 6. Tir | ne: | () Hold: | | Condition NCF / OK/ | 1 | | | |

| Company Name/Address: | State of the | | Inches (| Billing Information: | | | | | | | | | | |
|--|--------------------|--------------------------|----------------|------------------------------|--|--------------|---------------|-----------|------------|---------------|--------------------------|------------|-----------------------------------|---|
| RMD Environmental | - Walnut | Creek, C | A Billing In | | | 36. | 1 | | Analysis / | Container | / Preservative | LESSET | Chain of Custod | y Page 4 of b |
| 1371 Oakland Blvd. | | | Accour | nts Payable Pakland Blvd. | | Pres Chik | 100 | | | | | | 5 |) |
| Suite 200 | | | Suite 2 | | | Cin | 10000 | | - Ballion | | | C200 | - / Pac | ce Analytical |
| Walnut Creek. CA 94596 | | | Walnut | Creek, CA 945 | 96 | | | | | | | | 1/- | |
| Report to: Doug Whichard | | | Email To: | | | | 188 | | | | | | T . | |
| Project Description: | | 2.14.79 | dwhichar | rd@rmdes.net;ban | gulo@rmdes | net | | | | | | | | ria this chain of custody |
| ogonip Farm and Garden | | City/State Collected: | Sonta | cruz, crt | Please (PT) MT | Circle: | | | | | | | Face Terms and Cond | ogment and acceptance of the ltions found at: com/hub/s/pas-standard- |
| none: 925-683-8177 | Client Proje | ct# | DEC TH | Lab Project # | [CT]MI | CIEI | | | | | | 1000 | 1/ | 20000 |
| | C | 1- 60G. | 011 | RMDENVPH | CA-POGON | VIP | | | | | | | SDG# | 18/40 |
| B. Angulo | Site/Facility | ID# | | P.O. # | | | es | | | | | | Table # _ | 139/194 |
| lected by (signature): | Puch 2 | 0.1. | | | No. Phys | | 4ozCir-NoPres | 250 | | | | | Acctnum: RN | IDENVPHCA |
| B. M. | Same | (Lab MUST Be | Notified) | Quote # | | | Z-Z | | | | | | Template:T1 | |
| nediately | Next D | ay 5 Day | (Rad Only) | Date Result | s Needed | 1 | ZCI | A | | | | | Prelogin: P85 | |
| ked on Ice NY_V | Two Da | 3V 10 Da | STD TI | | 3 Needeu | No. | 140 | #P.LD | | | | | PM: 942 - Jord | dan N Zito |
| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | of Cntrs | 6020 | 20 | | | | | PB: Shipped Via: F | edEX Ground |
| 2-2-0.5 | | - | | | | 1 | Pb | | | | | | Remarks | Sample # (lab only) |
| P-2-2' | | SS | | 8/4/21 | 1055 | 1 | | X | | | | | | 1-31 |
| P-5-0.5' | | SS | | | 1100 | 11 | | X | and a | 100 - | - 60 | | | -32 |
| 2-5-2 | | SS | | | 1130 | 1 | | X | | | | | | -33 |
| T-2-0.5 | | SS | 神門。由 | | 1135 | 1 | | X | | | | | | -34 |
| The state of the s | | SS | | | 1240 | 1 | | X | | | | | | -30 |
| 1-2-2 | | SS | | | 1245 | i | | X | | | | - 600 | Suite King | -3- |
| T-3-0.5 | | SS | 100 | | | 1 | X | ^ | | | | 2000 | | 100 |
| +-3-21 | | SS | 100 | | 1305 | | ^ | ~ | | | 10000 | | | = 300 |
| F-8-1.5' | | SS | 15 43 | | | 3 | | X | 39 | | | | | = 35 |
| 2-8-21 | 1000 | SS | 20.00 | | 1325 | 1 | | X | | - | | | | = 40 |
| AIR - Air F - Filter | emarks: Su p | | sieve | makerd | 1330 | 11 | | X | 000 | | | 77 1944 | | = 10 |
| oundwater R Ricarray | | 0 | | Shoomas | | | | | pH | 1 | emp | COC Sea | Sample Receipt C | hecklist |
| asteWater inking Water | | | | | | | | | | Total Control | | coc sig | med/Accurate: arrive intact: | |
| erSa | mples returned via | : 24 | | THE REAL PROPERTY. | | C-865 | 100000 | ESCAPEDIO | Flow_ | - (| Other | Correct | bottles used | 5/2 |
| shed by : (Signature) | UPSFedEx _ | | 7.7 | Tracking | # | | | | | | | 559996 | ent volume sent: If Applical | ele . |
| 95-1 | Date: | Islan | Time: | Received | by: (Signatu | re) | 8/1 | -/21 | Trip Blank | Received: | Yes/No | Preserv | o Headspace: ration Correct/Ch | |
| hed by : (Signature) | | | 124 | 5 mil | ocoy PA | mer | 12 | 145 | no | | HCL / MeoH | KAD Scr | een <0.5 mR/hr: | U_1 |
| | Date: | | Time: | Received | by: (Signatur | re) | 100 | /3 | Temp: 12 | C °C | TBR Bottles Received: | If preserv | vation required by Lo | gin: Date/Time |
| ned by : (Signature) | Data | 111 | Market Control | | | | | | 2.31 | 10-27 | 3 56 | 1000 | | |
| | Date: | | Time: | Received | Received for lab by: (Signature) Date; Time: 1/3 | | | | | | Time: + / 1/ | Hold: | | Condition: |
| | | 20 60 - | 1 1 1 1 1 | mi | a A | 11 | 1/12 | 7 | 18/16/2 | 1 | 11.00 | | | NCF / OK) |

| RMD Environmenta 1371 Oakland Blvd. Suite 200 Walnut Creek. CA 94596 Report to: | r - Wainut Creek, | 1371 C Suite 2 | nformation: Ints Payable Dakland Blvd. 200 It Creek, CA 9 | | Pre Chk | | | Analysis | / Container / | Preservative | | Chain of Cust | ody Page 5 of So 2 ace Analytical | |
|--|------------------------------|--|---|----------------|------------|-------------|---|-----------------|---------------|--------------|-------------|--|---|-----|
| Doug Whichard | See Line | Email To: | 2 9 9 9 | | | | | | | | | | | |
| Project Description: Pogonip Farm and Garden | City/St | dwhichai | rd@rmdes.net;b | angulo@rmd | es.net | | | | | | | | Mount Juliet, TN 37122 le via this chain of custody | |
| Phone: 925-683-8177 | Collecte | d: Sonta (| Cruz, Ut | Prease | Circle: | | | | | | | Pace Terms and Co https://imfo.paceto | eledgment and acceptance of the inditions found at: (Br.com/hubfs/pas-standard- | |
| 323-083-8177 | | | Lab Project # | | PROBLEM OF | | | | | | | terms.pdf | 2000 | |
| Collected by (print); | 01-906- | 001 | RMDENVP | HCA-POGO | NIP | 1 | | | | | | SDG# | 38 AS | 4 |
| Collected by (print); | Site/Facility ID # | | P.O. # | | | - 5 | | | | | | Table# | 139119 V | |
| collected by (signature): | Puch 3 III | | | | | Pres | | | | | | THE REAL PROPERTY. | MDENVPHCA | |
| 12/ | Rush? (Lab MUSTSame Day X FI | Be Notified) | Quote# | TREES. | | -No | | | | | | Template:T | | |
| nmediately ocked on Ice N y | Next Day 5 | Davido | Date Resu | Its Needed | | 4ozCir-NoPr | 9 | | | | | Prelogin: P | | |
| Sample ID | Three Day | | THT | | No. | | He | 16.6 | | 188 | | PM: 942 - Jo | ordan N Zito | |
| Sample ID | Comp/Grab Matrix | COLUMN TO STATE OF THE PARTY OF | Date | T | Of | 6020 | 20 | | | | | PB: | Codry Commed | |
| R-12-0-5 | | | | Time | Final | Pb 6 | 0 | | | | | Remarks | FedEX Ground Sample # (lab only) | |
| P-12-2' | SS | | 8/4/21 | 1405 | 11 | | X | | | | | | 1 111 | |
| R-7-0.5" | SS | | | 1410 | 1 | | | | | ALCOHOL: | | | 135 | |
| F-7-2' | SS | | | 1440 | | ~ | X | | | 19555 | | | 17/4 | |
| WM-17-0.5' | SS | | T | 1445 | 1 | ^ | X | | | | | | 77 | |
| WW-17-2' | SS | | 8/5/21 | 0745 | | 25 M | Billian Co. | | | | | | 1-44 | -/ |
| WM-16-0.5' | SS | | | 0750 | 1, | | X | | | 100 × | | | -49 | |
| WM-16-05 | SS | Page 3 | TO SAS | 0800 | 1 | 30-8 | The second second | | 100 | | | | -96 | |
| No-13-0.5 | SS | STOWN STOWN | | | 1 | | X | 900 | | | | | -17 | |
| No-13- 2' | SS | | | 0805 | | | | | | | | | -40 | |
| V* | SS | | 18087 | 0840 | 1 | | X | | 34 | | | | 1-49 | |
| AIR - Air F - Filter roundwater B - Bioassay | narks: Su page | fer give | einstruct | 0845 | | | 1 | | | | | | 050 | 100 |
| /asteWater inking Water | | | | | | | | рН | Tem | | COC Seal | ample Receipt Present/Intac | Checklist NP N | |
| | ples returned via: | | | 10000 | | | | Flow | Othe | | COC Sign | ned/Accurate: arrive intact: | AN | |
| shed by Senature) | P5FedExCourier | | Tracking | # | | | THE REAL PROPERTY. | | 9 4 4 1 | Maria Nation | Correct | bottles used: ent volume sent | | |
| 12/1/- | Date: | Time: | Received | by: (Signatur | el el | | | | | | VOA Zero | If Application Headspace: | YN | |
| hed by : (Signature) | 8/5/21 | 1245 | m. W | 1000 | | | 15/21 | STORESTON STATE | eceived: Yo | HCL/MeaH | RAD Scre | en <0.5 mR/hr: | hecked: Y N | |
| | Date: | Time: | Received | by: (Signatur | nc 6- | 15 | :45 | Temp.R | | TBR | | | Y | |
| ned by : (Signature) | Date: | Times | 图 图 游差 | | | | | 2. 3+C | 1 3 | es Received | If preserva | ation required by L | ogin: Date/Time | |
| | | Time: | Received t | or lab by; (Si | gnature) | 23, | A 15 30 30 50 50 50 50 50 50 50 50 50 50 50 50 50 | Bate: | Time | | Hold: | A STATE OF THE STA | Condition: y | 4 |

| RMD Environmenta 1371 Oakland Blvd. Suite 200 Walnut Creek. CA 94596 Report to: | l - Walnut C | reek, C | Suite 2 | Jakland Blvd. | Blvd. | | | | Analysis | Container / | Preservative | | Chain of Custod | Page & of A | |
|--|------------------|------------|----------------------------|---------------------|---------------|-----------|---------------|-------|---------------|-------------|-------------------|---------------------------------|--|---|------|
| Project Description: | | | Email To: | : rd@rmdes.net;b | annulo Ser de | | | | | | | | 12065 Lebanon Rd. Mo | ourd lotter TN 37122 | |
| Pogonip Farm and Garden | | City/State | | Croz, ca | Please | Circle: | | | | | | | Submitting a sample vi constitutes ecknowled Pace Terms and Condit | a this chain of custody gment and acceptance of the tions found at: | |
| hone: 925-683-8177 | Client Project | # | 2011 | Lab Project # | (PT) MT | CT ET | | | | | | | https://info.pacelabs.c terms.pdf | om/hubfl/pas-standard | |
| ollected by (print): | 01-4 | 03-00i | | RMDENVP | | NIP | | | | | | | SDG# 13 | 87682 | |
| B. Anzila. | Site/Facility II |)# | | P.O.# | | | - 5 | | | | | | Table # / | 1391191 | |
| ellected by (signature): | Ruch3 u | | | | | | Pre | | | 70% | | | Acctnum: RM | DENVPHCA | 1 |
| 9 | Same Da | ab MUST Be |)av | Quote # | | | L'N | | | | | | Template:T18 | 9615 | |
| mediately ked on Ice N y | Two Day | 5 Day | (Rad Only) y (Rad Only) | Date Resu | ilts Needed | T | 4ozCir-NoPres | 9 | | | | | Prelogin: P85 | | |
| Sample ID | Three Da | 311 | THE | | | No. of | 20 4 | Hord | | 0.5 | | | PM: 942 - Jordi PB: | an N Zito | |
| | Comp/Grab | Matrix * | Depth | Date | Time | Cntrs | 6020 | 70 | | | | | Shipped Via: Fo | edEX Ground | |
| No-14-0.5 | | SS | | 8/5/21 | 0865 | 1 | PB | | | 10 m | | | Remarks | Sample # (lab only) | |
| NO-14-2' | | SS | | 1 | 0900 | 1 | | X | | | | | | -S | |
| P-13-0.5 | | SS | | | 0110 | 1 | X | X | | | | | | -52 | |
| R-14-0.5 | | SS | | | 0915 | 1 | ^ | 1 | | | | | | -53 | |
| P-14-2 | | SS | | | 1020 | 1 | X | X | | | | | | -54 | -1 |
| F-14-2 | | SS | | | 1030 | 1 | | × | | | 200 | 1000 | | -55 | |
| | | SS | | | 1030 | | | ^ | | | | | | -56 | -1 |
| | | SS | W. | | ALC: | | | | | | | - SING / | | | 45 |
| | | SS | | | | 100 | | | | | 1000 | 2000 | - 10 Karana (* 11) | | 16 |
| X: Re | marke: 5 0 | SS | 38 | | | 1 | | | | | | | | | 1000 |
| VasteWater Inking Water | marks: Set P | age to | Sieve | Instruction | ns. | | | | pH _ Flow_ | Tem | | COC Seal COC Sign Bottles | ample Receipt Ch Present/Intact: ed/Accurate; arrive Intact: | ecklist N N N | |
| | UPS FedEx | Courier | | Tracking | H | | | | | 100 | | Correct | bottles used: | J_N N | |
| hed by : (Signature) | Date: | Islzi | Time: | 15 M. () | by: (Signatur | ME | | 15/21 | Trip Blank | | HCL / MeoH TBR | Preserva PAD Scre | If Applicabl Headspace; tion Correct/Che en <0.5 mg/hr: | cked: Y N | |
| hed by : (Signature) | | | 1313 | | /- Summal | 18 55 | | | Temp: | °C Bott | es Received: | If preserva | tion required by Logi | in: Date/Time | 193 |

R5

RMDENVPHCA Pb HOLD Samples L1387682

Please log these HOLD samples for PBG, SIEVE, TS. Note to sieve before analysis.

-21 and -22 (R-1 @ 0.5' and 2')

-24 (R-4 @ 2')

-25 and -26 (R-9 @ 0.5' and 2')

-27 and -28 (R-10 @ 0.5' and 2') -29 and -30 (R-11 @ 0.5' and 2')

-31 and -32 (R-2 @ 0.5' and 2') -33 and -34 (R-5 @ 0.5' and 2')

-38 (T-3 @ 2')

-44 (R-7 @ 2')

-54 (R-13 @ 2")

-56 (R-14 @ 2')

Please also RELOG the below sample for PBG, SIEVE, TS. Let me know if there are any volume issues

-16 (EM-35 @ 2')

Time estimate: oh

Time spent: oh

Members

JZ Jordan Zito



Pace Analytical® ANALYTICAL REPORT

January 24, 2022

RMD Environmental - Walnut Creek, CA

L1451658 Sample Delivery Group: Samples Received: 01/14/2022

Project Number: 01-POG-001

Description: Pogonip Farm and Garden

Report To: Doug Whichard

1371 Oakland Blvd.

Suite 200

Walnut Creek, CA 94596

Entire Report Reviewed By:

Jordan N Zito

Project Manager Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be

reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received. Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com



















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SAMPLE SUMMARY

| | SAMITLE | | VI AIX I | | | |
|------------------------------------|-------------|----------|---------------------------|------------------------------------|------------------------------|----------------|
| | | | Collected by | Collected date/time | Received da | te/time |
| T-5-0.5' L1451658-03 Solid | | | B. Angulo | 01/11/22 09:10 | 01/14/22 08:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1803304 | 5 | 01/17/22 15:03 | 01/21/22 17:11 | JDG | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| T-5-2' L1451658-04 Solid | | | B. Angulo | 01/11/22 09:15 | 01/14/22 08:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1803304 | 5 | 01/17/22 15:03 | 01/21/22 17:28 | JDG | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | Received da | te/time |
| T-6-0.5' L1451658-05 Solid | | | B. Angulo | 01/11/22 09:40 | 01/14/22 08:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1803304 | 5 | 01/17/22 15:03 | 01/21/22 17:32 | JDG | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | | |
| T-6-2' L1451658-06 Solid | | | B. Angulo | 01/11/22 09:45 | 01/14/22 08:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1803304 | 5 | 01/17/22 15:03 | 01/21/22 17:36 | JDG | Mt. Juliet, TN |
| T 7 0 FL 144F40F0 07 Calid | | | Collected by B. Angulo | Collected date/time 01/11/22 09:55 | Received da 01/14/22 08:0 | |
| T-7-0.5' L1451658-07 Solid | | B | | | | |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| Metals (ICPMS) by Method 6020 | WG1803304 | 5 | 01/17/22 15:03 | 01/21/22 17:46 | JDG | Mt. Juliet, TN |
| | | | Collected by | Collected date/time | | |
| T-7-2' L1451658-08 Solid | | | B. Angulo | 01/11/22 10:00 | 01/14/22 08:0 | 00 |
| Method | Batch | Dilution | Preparation date/time | Analysis date/time | Analyst | Location |
| Total Solids by Method 2540 G-2011 | WG1803687 | 1 | 01/18/22 17:03 | 01/18/22 17:23 | CMK | Mt. Juliet, TN |
| M . I (ICPMC) M .II ICCCC | 11101000001 | - | 04/47/00 45 00 | 04/04/00 47 50 | IDC | A4: 1 1: 1 TS: |

WG1803304























Metals (ICPMS) by Method 6020

01/17/22 15:03

01/21/22 17:50

JDG

Mt. Juliet, TN

CASE NARRATIVE

Unless qualified or notated within the narrative below, all sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

¹Cp



















Jordan N Zito Project Manager

DETECTION SUMMARY

Metals (ICPMS) by Method 6020

| | | | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilutio n | Analysis | Batch |
|-----------|---------------|---------|--------------|-----------|-----------|-----------|--------------|------------------|-----------|
| Client ID | Lab Sample ID | Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| T-5-0.5' | L1451658-03 | Lead | 159 | | 0.113 | 2.29 | 5 | 01/21/2022 17:11 | WG1803304 |
| T-5-2' | L1451658-04 | Lead | 7.07 | | 0.118 | 2.38 | 5 | 01/21/2022 17:28 | WG1803304 |
| T-6-0.5' | L1451658-05 | Lead | 187 | | 0.120 | 2.42 | 5 | 01/21/2022 17:32 | WG1803304 |
| T-6-2' | L1451658-06 | Lead | 9.42 | | 0.120 | 2.42 | 5 | 01/21/2022 17:36 | WG1803304 |
| T-7-0.5' | L1451658-07 | Lead | 153 | | 0.120 | 2.43 | 5 | 01/21/2022 17:46 | WG1803304 |
| T-7-2' | L1451658-08 | Lead | 8.92 | | 0.109 | 2.20 | 5 | 01/21/2022 17:50 | WG1803304 |





















Collected date/time: 01/11/22 09:10

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 87.4 | | 1 | 01/18/2022 17:23 | WG1803687 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 159 | | 0.113 | 2.29 | 5 | 01/21/2022 17:11 | WG1803304 |



Ss















Collected date/time: 01/11/22 09:15

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 84.0 | | 1 | 01/18/2022 17:23 | WG1803687 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 7.07 | | 0.118 | 2.38 | 5 | 01/21/2022 17:28 | WG1803304 |



Ss













Collected date/time: 01/11/22 09:40

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 82.7 | | 1 | 01/18/2022 17:23 | WG1803687 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 187 | | 0.120 | 2.42 | 5 | 01/21/2022 17:32 | WG1803304 |



Ss















Collected date/time: 01/11/22 09:45

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 82.8 | | 1 | 01/18/2022 17:23 | WG1803687 |



Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 9.42 | | 0.120 | 2.42 | 5 | 01/21/2022 17:36 | WG1803304 |



Ss















Collected date/time: 01/11/22 09:55

1451658

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | <u>Batch</u> |
|--------------|--------|-----------|----------|------------------|--------------|
| Analyte | % | | | date / time | |
| Total Solids | 82.4 | | 1 | 01/18/2022 17:23 | WG1803687 |

²Tc

Metals (ICPMS) by Method 6020

| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 153 | | 0.120 | 2.43 | 5 | 01/21/2022 17:46 | WG1803304 |

















Collected date/time: 01/11/22 10:00

Total Solids by Method 2540 G-2011

| | Result | Qualifier | Dilution | Analysis | Batch |
|--------------|--------|-----------|----------|------------------|-----------|
| Analyte | % | | | date / time | |
| Total Solids | 90.8 | | 1 | 01/18/2022 17:23 | WG1803687 |





| | Result (dry) | Qualifier | MDL (dry) | RDL (dry) | Dilution | Analysis | Batch |
|---------|--------------|-----------|-----------|-----------|----------|------------------|-----------|
| Analyte | mg/kg | | mg/kg | mg/kg | | date / time | |
| Lead | 8.92 | | 0.109 | 2.20 | 5 | 01/21/2022 17:50 | WG1803304 |



Ss













QUALITY CONTROL SUMMARY

Total Solids by Method 2540 G-2011

L1451658-03,04,05,06,07,08

Method Blank (MB)

| (MB) R3751369-1 | 01/18/22 17:23 | | | |
|-----------------|----------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | % | | % | % |
| Total Solids | 0.000 | | | |

3 Ss

L1451658-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1451658-04 01/18/22 17:23 • (DUP) R3751369-3 01/18/22 17:23

| | Original Result | DUP Result | Dilution | DUP RPD | DUP Qualifier | DUP RPD Limits |
|--------------|-----------------|------------|----------|---------|---------------|-------------------|
| Analyte | % | % | | % | | % |
| Total Solids | 84.0 | 81.8 | 1 | 2.69 | | 10 |



Laboratory Control Sample (LCS)

(LCS) R3751369-2 01/18/22 17:23

| (===) | Spike Amount | LCS Result | LCS Rec. | Rec. Limits |
|--------------|--------------|------------|----------|--------------|
| | Spike Amount | LC3 Result | LC3 Rec. | Rec. Lillins |
| Analyte | % | % | % | % |
| Total Solids | 50.0 | 49.0 | 98.0 | 85.0-115 |



Sr



QUALITY CONTROL SUMMARY

L1451658-03,04,05,06,07,08

Metals (ICPMS) by Method 6020

Method Blank (MB)

| (MB) R3752474-1 01 | 1/21/22 17:03 | | | |
|--------------------|---------------|--------------|--------|--------|
| | MB Result | MB Qualifier | MB MDL | MB RDL |
| Analyte | mg/kg | | mg/kg | mg/kg |
| Lead | U | | 0.0990 | 2.00 |





Laboratory Control Sample (LCS)

(LCS) R3752474-2 01/21/22 17:07

| (200) | | | | | |
|---------|--------------|------------|----------|-------------|---------------|
| | Spike Amount | LCS Result | LCS Rec. | Rec. Limits | LCS Qualifier |
| Analyte | mg/kg | mg/kg | % | % | |
| Lead | 100 | 103 | 103 | 80.0-120 | |









(OS) L1451658-03 01/21/22 17:11 • (MS) R3752474-5 01/21/22 17:21 • (MSD) R3752474-6 01/21/22 17:25

| (, | | | MS Result (dry) | • | | MSD Rec. | Dilution | Rec. Limits | MS Qualifier | MSD Qualifier | RPD | RPD Limits |
|---------|-------|-------|-----------------|-------|------|----------|----------|-------------|--------------|---------------|------|------------|
| Analyte | mg/kg | mg/kg | mg/kg | mg/kg | % | % | | % | | | % | % |
| Lead | 114 | 159 | 269 | 263 | 95.9 | 91.3 | 5 | 75.0-125 | | | 1.99 | 20 |









GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

| Abbreviations and | a Definitions |
|---------------------------------|--|
| (dry) | Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils]. |
| MDL | Method Detection Limit. |
| MDL (dry) | Method Detection Limit. |
| RDL | Reported Detection Limit. |
| RDL (dry) | Reported Detection Limit. |
| Rec. | Recovery. |
| RPD | Relative Percent Difference. |
| SDG | Sample Delivery Group. |
| U | Not detected at the Reporting Limit (or MDL where applicable). |
| Analyte | The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported. |
| Dilution | If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor. |
| Limits | These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges. |
| Original Sample | The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG. |
| Qualifier | This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable. |
| Result | The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte. |
| Uncertainty (Radiochemistry) | Confidence level of 2 sigma. |
| Case Narrative (Cn) | A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report. |
| Quality Control Summary (Qc) | This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material. |
| Sample Chain of Custody (Sc) | This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis. |
| Sample Results (Sr) | This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported. |
| Sample Summary (Ss) | This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis. |

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



















PAGE:

14 of 16



ACCREDITATIONS & LOCATIONS

Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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| Georgia | NELAP | North Carolina ³ | 41 |
| Georgia ¹ | 923 | North Dakota | R-140 |
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| Indiana | C-TN-01 | Oregon | TN200002 |
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| Kentucky ^{1 6} | KY90010 | South Carolina | 84004002 |
| Kentucky ² | 16 | South Dakota | n/a |
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| Louisiana | LA018 | Texas | T104704245-20-18 |
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| A2LA – ISO 17025 ⁵ | 1461.02 | DOD | 1461.01 |
| Canada | 1461.01 | USDA | P330-15-00234 |
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^{*} Not all certifications held by the laboratory are applicable to the results reported in the attached report.

TN00003

EPA-Crypto





















 $^{^* \, \}text{Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.} \\$

| Company Name/Address: | | ALAN AND AND AND AND AND AND AND AND AND A | Billing Info | rmation: | | | | | Analysis / Co | ntainer / Preserva | tive | | Chain of Custody | Page of 1 | |
|---|-------------------------|--|--|---------------------------------------|------------------|-----------|--------------------|--------|---------------|---|---------|---|--|--|--|
| 1371 Oakland Blvd. Suite 200 Walnut Creek. CA 94596 Report to: | | 1371 Oa Suite 20 | Accounts Payable 1371 Oakland Blvd. Suite 200 Walnut Creek, CA 94596 | | | | | PARE D | | | | - Pace | e Analytica | | |
| | | Email To: dwhichard@rmdes.net;bangulo@rmdes.net | | | | | | | | | | 12065 Lebanon Rd Moui Submitting a sample via I constitutes acknowledge | this chain of custody nent and acceptance of t | | |
| Project Description: Pogonip Farm and Garden | as T | City/State Collected: | | | Please Ci | | | | | | | | Pace Terms and Conditionhttps://info.pacelabs.com terms.pdf | m/hubfs/pas-standard- | |
| Phone: 925-683-8177 | Client Project | # POG-001 | | RMDENVPH | HCA-POGON | IP | | | | | | | | 1191 | |
| Collected by (print): Site/Facility ID # | | 0# | P.O.# | | | | Pres | | | | | | Acctnum: RMD | Acctnum: RMDENVPHCA | |
| Collected by (signature): | | Lab MUST Be | | | | | 6020 4ozClr-NoPres | Horp | | | | | Prelogin: P897 | Template:T189615 Prelogin: P897732 PM: 942 - Jordan N Zito PB: Shipped Via: FedEX Ground | |
| Immediately Packed on Ice N Y | Two Da | Next Day 5 Day (Rail Two Day 10 Day (R | | (Rad Only) Date Resul y (Rad Only) | | No. of | | | | | | | PB: | | |
| Sample ID | Comp/Grab | Matrix * | Depth | Date | Time | Cntrs | P 60 | 50 | | | | | Remarks | Sample # (lab or | |
| T-4-0.5 | | SS | 0.5 | 1/1/21 | 0840 | 1 | | X | | | | | - Minneson | -01 | |
| T-4-2 | | SS | 2' | | 0845 | 1 | | X | | | | | A Comment | -12 | |
| t-5-0.5' | | SS | 6.5 | | 0910 | 1 | X | | | | | | | -13 | |
| T-5-2' | | SS | 2 | | 0915 | 1 | X | | 1-12 Mg | | | | | -44 | |
| T-6-0.5 | D. Carlon and P. Carlon | SS | 05 | | 0940 | 1 | X | | | | | | | -25 | |
| T-6-21 | | SS | 2' | | 0945 | 1 | × | | 23.57 | | | | 11/2/2 | 46 | |
| T-7-0.5 | | SS | 0.5 | | 0955 | 1 | × | | | | | | | 27 | |
| T-7-2' | | SS | 2' | | 1000 | 1 | 人 | | | | | | | -68 | |
| | W | SS | 4.15 | | 1.2% | | | | | | | | | | |
| | | SS | | | | | | | | | | | | 12 | |
| * Matrix: SS - Soil AIR - Air F - Filter GW - Groundwater B - Bioassay WW - WasteWater | Remarks:SIEVE | samples w/ | no. 10 SIE | VE PRIOR TO A | INALYSIS | | | | pH Flow | Temp Other | | COC Seal COC Sign Bottles Correct | ample Receipt Che Present/Intact: led/Accurate: arrive intact: bottles used: | | |
| OT - Other Samples returned via: UPSFedExCourier | | Tracking # | | | | | | | | Sufficient volume sent: If Applicable VOA Zero Headspace: | | _Y_ | | | |
| Relinquished by : (Signature) | J. 6-10 | ate: 12 2 | Time | e: Reco | eived by: (Signa | ture) | | - PR | Trip Blank R | eceived: Yes N HCL TBR | МеоН | RAD Scre | etion Correct/Che en <0.5 mR/hr: | | |
| Relinquished by : (\$ignature) | PN 1 | ate: /13/2 | 1 Time | e: Reco | eived by: (Signa | ture) | 50 | | Temp: 3, 34 2 | °C Bottles Re | ceived: | | ation required by Log | | |
| Relinquished by : (Signature) | | ate: | Tim | e: Reco | eived for lab by | (Signat | | | Date: | Time: U | ev | Hold: | | NCF / OK | |

APPENDIX F LEAD MODEL SPREADSHEETS

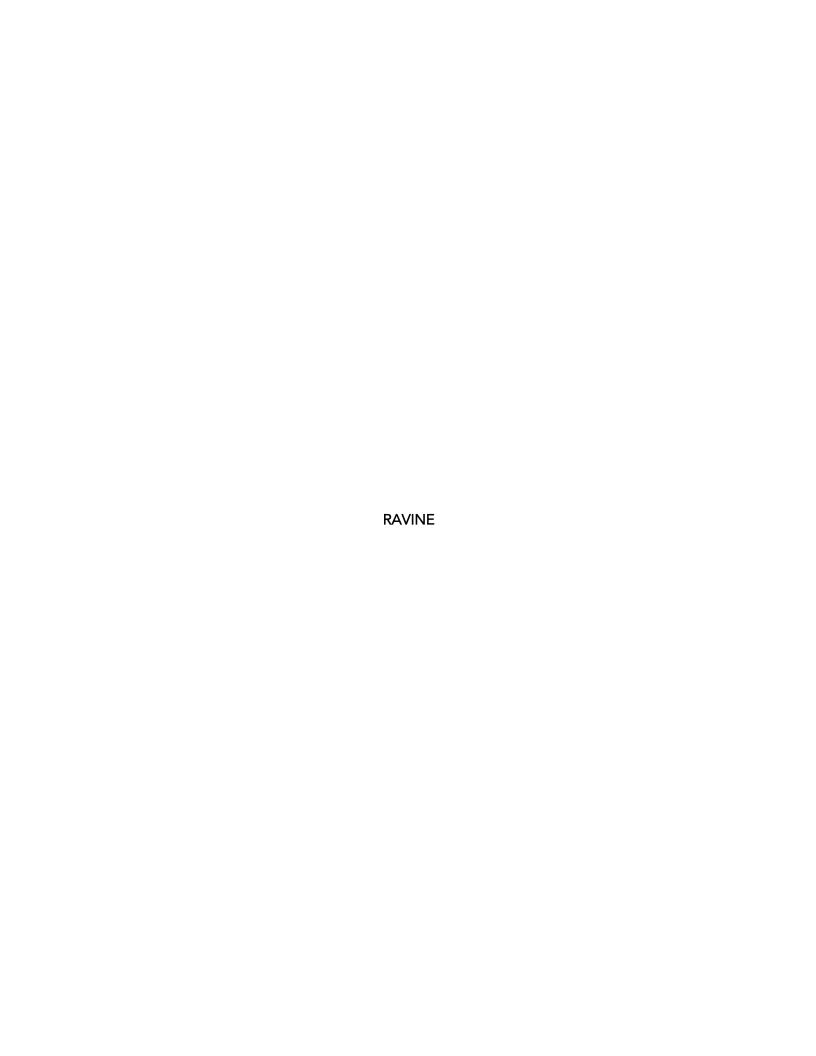


| Sum | nary of P | roUCL Output | |
|---|------------|--|-----------|
| | - | Soil (0 to 1.5 feet bgs) | |
| Last Meadow | / Sur lace | Soli (U to 1.5 leet bgs) | |
| | General : | Statistics | |
| Total Number of Observations | 42 | Number of Distinct Observations | 42 |
| | | Number of Missing Observations | 0 |
| Minimum | 6.12 | Mean | 353.1 |
| Maximum | 2090 | Median | 105.1 |
| SD | 518.6 | Std. Error of Mean | 80.03 |
| Coefficient of Variation | 1.469 | Skewness | 1.958 |
| | | 1 | |
| | Normal (| GOF Test | |
| Shapiro Wilk Test Statistic | 0.677 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.942 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.257 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.135 | Data Not Normal at 5% Significance Level | |
| Data Not N | ormal at | 5% Significance Level | |
| | | | |
| Assum | ning Norm | nal Distribution | |
| 95% Normal UCL | | 95% UCLs (Adjusted for Skewness) | |
| 95% Student's-t UCL | 487.8 | 95% Adjusted-CLT UCL (Chen-1995) | 510.6 |
| | | 95% Modified-t UCL (Johnson-1978) | 491.8 |
| | | | |
| | Gamma (| | |
| A-D Test Statistic | 1.416 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.815 | Data Not Gamma Distributed at 5% Significance | Level |
| K-S Test Statistic | 0.171 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.144 | Data Not Gamma Distributed at 5% Significance | Level |
| Data Not Gamma | Distribut | ed at 5% Significance Level | |
| | | | |
| | Gamma | | 0.450 |
| k hat (MLE) | 0.492 | k star (bias corrected MLE) | 0.473 |
| Theta hat (MLE) | 717.9 | Theta star (bias corrected MLE) | 747.2 |
| nu hat (MLE) | 41.32 | nu star (bias corrected) | 39.7 |
| MLE Mean (bias corrected) | 353.1 | MLE Sd (bias corrected) | 513.6 |
| | | Approximate Chi Square Value (0.05) | 26.26 |
| Adjusted Level of Significance | 0.0443 | Adjusted Chi Square Value | 25.87 |
| | | | |
| | | ma Distribution | F 4 4 . O |
| % Approximate Gamma UCL (use when n>=50)) | 533.7 | 95% Adjusted Gamma UCL (use when n<50) | 541.8 |
| | ognorma | GOF Test | |
| Shapiro Wilk Test Statistic | 0.853 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.833 | Data Not Lognormal at 5% Significance Lev | ام |
| Lilliefors Test Statistic | | Lilliefors Lognormal GOF Test | eı |
| 5% Lilliefors Critical Value | 0.133 | - | |
| | | Data appear Lognormal at 5% Significance Le normal at 5% Significance Level | evei |
| Data appear Approxi | nate Log | normal at 3% significance Level | |
| | | | |

| L | .ognorma | l Statistics | |
|---|---------------|---|-----------|
| Minimum of Logged Data | 1.812 | Mean of logged Data | 4.572 |
| Maximum of Logged Data | 7.645 | SD of logged Data | 1.811 |
| | | | |
| | | mal Distribution | |
| 95% H-UCL | 1299 | 90% Chebyshev (MVUE) UCL | 980.5 |
| 95% Chebyshev (MVUE) UCL | 1219 | 97.5% Chebyshev (MVUE) UCL | 1550 |
| 99% Chebyshev (MVUE) UCL | 2200 | | |
| | | | |
| | | tion Free UCL Statistics | |
| Data appear to follow a Di | scernible | Distribution at 5% Significance Level | |
| | | | |
| Nonparam | netric Dist | ribution Free UCLs | |
| 95% CLT UCL | 484.7 | 95% Jackknife UCL | 487.8 |
| 95% Standard Bootstrap UCL | 479.4 | 95% Bootstrap-t UCL | 531.9 |
| 95% Hall's Bootstrap UCL | 511 | 95% Percentile Bootstrap UCL | 485.9 |
| 95% BCA Bootstrap UCL | 509.6 | | |
| 90% Chebyshev(Mean, Sd) UCL | 593.2 | 95% Chebyshev(Mean, Sd) UCL | 701.9 |
| 97.5% Chebyshev(Mean, Sd) UCL | 852.9 | 99% Chebyshev(Mean, Sd) UCL | 1149 |
| | | IIII . II | |
| | | UCL to Use | |
| 95% Chebyshev (Mean, Sd) UCL | 701.9 | | |
| Note: Suggestions regarding the selection of a 95% L | JCL are pro | vided to help the user to select the most appropriate 95% | UCL. |
| Recommendations are base | ed upon dat | a size, data distribution, and skewness. | |
| These recommendations are based upon the resul- | ts of the sim | nulation studies summarized in Singh, Maichle, and Lee (200 | 06). |
| However, simulations results will not cover all Real Wo | rld data set | s; for additional insight the user may want to consult a stat | istician. |

| Sum | nary of P | roUCL Output | |
|--|------------|--|-----------|
| | - | • | |
| East Meadow | Snallow S | ioil (>1.5 to 2 feet bgs) | |
| | Canaval | Statistics | |
| Total Number of Observations | General 22 | Number of Distinct Observations | 21 |
| Total Number of Observations | 22 | | 21 |
| No. | 0.04 | Number of Missing Observations | 62.49 |
| Minimum | 9.26 | Mean | |
| Maximum | 220 | Median | 38.15 |
| SD SD | 61.55 | Std. Error of Mean | 13.12 |
| Coefficient of Variation | 0.985 | Skewness | 1.478 |
| | | | |
| | | GOF Test | |
| Shapiro Wilk Test Statistic | 0.79 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.911 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.239 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.184 | Data Not Normal at 5% Significance Level | |
| Data Not N | ormal at | 5% Significance Level | |
| | | | |
| | ning Norn | nal Distribution | |
| 95% Normal UCL | | 95% UCLs (Adjusted for Skewness) | |
| 95% Student's-t UCL | 85.07 | 95% Adjusted-CLT UCL (Chen-1995) | 88.49 |
| | | 95% Modified-t UCL (Johnson-1978) | 85.76 |
| | | | |
| | | GOF Test | |
| A-D Test Statistic | 0.586 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | | ected data appear Gamma Distributed at 5% Signit | ficance L |
| K-S Test Statistic | 0.147 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | | ected data appear Gamma Distributed at 5% Signif | ficance L |
| Detected data appear G | iamma Di | stributed at 5% Significance Level | |
| | | | |
| | | Statistics | |
| k hat (MLE) | 1.312 | k star (bias corrected MLE) | 1.164 |
| Theta hat (MLE) | 47.62 | Theta star (bias corrected MLE) | 53.7 |
| nu hat (MLE) | 57.75 | nu star (bias corrected) | 51.2 |
| MLE Mean (bias corrected) | 62.49 | MLE Sd (bias corrected) | 57.93 |
| | | Approximate Chi Square Value (0.05) | 35.77 |
| Adjusted Level of Significance | 0.0386 | Adjusted Chi Square Value | 34.81 |
| | | | |
| Assum | ing Gami | ma Distribution | |
| % Approximate Gamma UCL (use when n>=50) | 89.45 | 95% Adjusted Gamma UCL (use when n<50) | 91.93 |
| | | | |
| L | ognorma | GOF Test | |
| Shapiro Wilk Test Statistic | 0.962 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.911 | Data appear Lognormal at 5% Significance Le | evel |
| Lilliefors Test Statistic | 0.094 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.184 | Data appear Lognormal at 5% Significance Le | evel |
| Data appear Lo | ognormal | at 5% Significance Level | |
| | | | |

| L | .ognorma | Statistics | |
|---|---------------|---|-----------|
| Minimum of Logged Data | 2.226 | Mean of logged Data | 3.708 |
| Maximum of Logged Data | 5.394 | SD of logged Data | 0.949 |
| Assumi | a Lagnar | mal Distribution | |
| 95% H-UCL | 107.6 | 90% Chebyshev (MVUE) UCL | 104.3 |
| | | • | |
| 95% Chebyshev (MVUE) UCL | 123.4 | 97.5% Chebyshev (MVUE) UCL | 149.9 |
| 99% Chebyshev (MVUE) UCL | 202 | | |
| Nonparametri | c Distribu | tion Free UCL Statistics | |
| | | Distribution at 5% Significance Level | |
| · · | | <u> </u> | |
| Nonparam | netric Dist | ribution Free UCLs | |
| 95% CLT UCL | 84.07 | 95% Jackknife UCL | 85.07 |
| 95% Standard Bootstrap UCL | 83.69 | 95% Bootstrap-t UCL | 90.7 |
| 95% Hall's Bootstrap UCL | 88.78 | 95% Percentile Bootstrap UCL | 83.94 |
| 95% BCA Bootstrap UCL | 86.14 | | |
| 90% Chebyshev(Mean, Sd) UCL | 101.9 | 95% Chebyshev(Mean, Sd) UCL | 119.7 |
| 97.5% Chebyshev(Mean, Sd) UCL | 144.4 | 99% Chebyshev(Mean, Sd) UCL | 193.1 |
| | | UCL . II | |
| | | UCL to Use | |
| 95% Adjusted Gamma UCL | 91.93 | | |
| Note: Suggestions regarding the selection of a 95% L | JCL are pro | vided to help the user to select the most appropriate 95% | UCL. |
| Recommendations are base | ed upon dat | a size, data distribution, and skewness. | |
| These recommendations are based upon the resul | ts of the sin | nulation studies summarized in Singh, Maichle, and Lee (200 | 06). |
| However, simulations results will not cover all Real Wo | rld data set | s; for additional insight the user may want to consult a stat | istician. |



Summary of ProUCL Output Ravine Surface Soil (0 to 1.5 feet bgs) **General Statistics** Total Number of Observations Number of Distinct Observations 12 Number of Missing Observations Minimum 9.86 Mear 593 428 Maximum 1600 Median SD 561.1 Std. Error of Mear 162 Coefficient of Variation 0.946 Skewnes 0.944 Normal GOF Test 0.858 Shapiro Wilk Test Statistic Shapiro Wilk GOF Test 0.859 5% Shapiro Wilk Critical Value Data Not Normal at 5% Significance Level Lilliefors Test Statistic 0.184 Lilliefors GOF Test 5% Lilliefors Critical Value 0.243 Data appear Normal at 5% Significance Level Data appear Approximate Normal at 5% Significance Level **Assuming Normal Distribution** 95% Normal UCL 95% UCLs (Adjusted for Skewness) 95% Student's-t UCL 883.9 95% Adjusted-CLT UCL (Chen-1995) 906.6 891.2 95% Modified-t UCL (Johnson-1978) Gamma GOF Test A-D Test Statistic 0.191 Anderson-Darling Gamma GOF Test 5% A-D Critical Value 0.76 Detected data appear Gamma Distributed at 5% Significance Level 0.117 K-S Test Statistic Kolmogorov-Smirnov Gamma GOF Test 5% K-S Critical Value 0.253 Detected data appear Gamma Distributed at 5% Significance Level Detected data appear Gamma Distributed at 5% Significance Level Gamma Statistics k hat (MLE) 0.906 0.735 k star (bias corrected MLE) Theta hat (MLE) 654.3 806.5 Theta star (bias corrected MLE) nu hat (MLE) 21.75 17.65 nu star (bias corrected) MLE Mean (bias corrected) 593 MLE Sd (bias corrected) 691.5 Approximate Chi Square Value (0.05) 9.136 Adjusted Chi Square Value 8.217 Adjusted Level of Significance 0.029 **Assuming Gamma Distribution** 95% Approximate Gamma UCL (use when n>=50)) 1145 95% Adjusted Gamma UCL (use when n<50) 1273 Lognormal GOF Test Shapiro Wilk Test Statistic Shapiro Wilk Lognormal GOF Test 0.908 5% Shapiro Wilk Critical Value 0.859 Data appear Lognormal at 5% Significance Level Lilliefors Test Statistic 0.151 Lilliefors Lognormal GOF Test 5% Lilliefors Critical Value 0.243 Data appear Lognormal at 5% Significance Level Data appear Lognormal at 5% Significance Level

| | Lognormal Statistics | : | |
|--|-------------------------|---|------|
| Minimum of Logged Data | 2.288 | Mean of logged Data | 5.74 |
| Maximum of Logged Data | 7.378 | SD of logged Data | 1.47 |
| Assum | ing Lognormal Distr | ibution | |
| 95% H-UCL | 5038 | 90% Chebyshev (MVUE) UCL | 188 |
| 95% Chebyshev (MVUE) UCL | 2382 | 97.5% Chebyshev (MVUE) UCL | 307 |
| 99% Chebyshev (MVUE) UCL | 4427 | 77.376 GHEBYSHEV (WVOE) COE | |
| Nonparametr | ic Distribution Free | UCL Statistics | |
| Data appear to follow a Dis | scernible Distributio | n at 5% Significance Level | |
| Nonpara | netric Distribution F | ree UCLs | |
| 95% CLT UCL | 859.4 | 95% Jackknife UCL | 883 |
| 95% Standard Bootstrap UCL | 852 | 95% Bootstrap-t UCL | 100 |
| 95% Hall's Bootstrap UCL | 898.4 | 95% Percentile Bootstrap UCL | 859 |
| 95% BCA Bootstrap UCL | 929.2 | | |
| 90% Chebyshev(Mean, Sd) UCL | 1079 | 95% Chebyshev(Mean, Sd) UCL | 129 |
| 97.5% Chebyshev(Mean, Sd) UCL | 1605 | 99% Chebyshev(Mean, Sd) UCL | 220 |
| | uggested UCL to U | se | |
| 95% Student's-t UCL | 883.9 | | |
| When a data set follows an approxim | nate (e.g., normal) dis | tribution passing one of the GOF test | |
| When applicable, it is suggested to use a UCL bas | | , , | L |
| Note: Suggestions regarding the selection of a 95% U | • | | JCL. |
| | | a distribution, and skewness. | |
| These recommendations are based upon the result | s of the simulation st | udies summarized in Singh, Maichle, and Lee (2006 | o). |

Summary of ProUCL Output Ravine Shallow Soil (>1.5 to 2 feet bgs) **General Statistics** Total Number of Observations Number of Distinct Observations 12 Number of Missing Observations Minimum 6.59 Mear 52.96 Maximum 341 Median 23.5 SD Std. Error of Mear 26.77 92.73 Coefficient of Variation 1.751 Skewnes 3.21 Normal GOF Test 0.504 Shapiro Wilk Test Statistic Shapiro Wilk GOF Test 0.859 5% Shapiro Wilk Critical Value Data Not Normal at 5% Significance Level Lilliefors Test Statistic 0.361 Lilliefors GOF Test 5% Lilliefors Critical Value 0.243 Data Not Normal at 5% Significance Level Data Not Normal at 5% Significance Level **Assuming Normal Distribution** 95% Normal UCL 95% UCLs (Adjusted for Skewness) 95% Student's-t UCI 101 95% Adjusted-CLT UCL (Chen-1995) 123.5 105.2 95% Modified-t UCL (Johnson-1978) Gamma GOF Test A-D Test Statistic 0.995 Anderson-Darling Gamma GOF Test 5% A-D Critical Value 0.762 Data Not Gamma Distributed at 5% Significance Level K-S Test Statistic 0.27 Kolmogorov-Smirnov Gamma GOF Test 5% K-S Critical Value 0.254 Data Not Gamma Distributed at 5% Significance Level Data Not Gamma Distributed at 5% Significance Level Gamma Statistics k hat (MLE) 0.841 0.687 k star (bias corrected MLE) Theta hat (MLE) 62.95 Theta star (bias corrected MLE) 77.14 nu hat (MLE) 20.19 16.48 nu star (bias corrected) MLE Mean (bias corrected) 52.96 MLE Sd (bias corrected) 63.92 Approximate Chi Square Value (0.05) 8.299 Adjusted Chi Square Value 7.429 Adjusted Level of Significance 0.029 **Assuming Gamma Distribution** 95% Approximate Gamma UCL (use when n>=50)) 105.1 95% Adjusted Gamma UCL (use when n<50) 117.4 Lognormal GOF Test Shapiro Wilk Test Statistic Shapiro Wilk Lognormal GOF Test 0.922 5% Shapiro Wilk Critical Value 0.859 Data appear Lognormal at 5% Significance Level Lilliefors Test Statistic 0.179 Lilliefors Lognormal GOF Test 5% Lilliefors Critical Value 0.243 Data appear Lognormal at 5% Significance Level Data appear Lognormal at 5% Significance Level

| Lognormal Statistics | | |
|--|----------------------|-------|
| Minimum of Logged Data 1.886 Mea | an of logged Data | 3.26 |
| Maximum of Logged Data 5.832 SE | D of logged Data | 1.0 |
| Assuming Lognormal Distribution | | |
| 95% H-UCL 127.4 90% Chebys | shev (MVUE) UCL | 88.1 |
| 95% Chebyshev (MVUE) UCL 108.1 97.5% Chebys | shev (MVUE) UCL | 135. |
| 99% Chebyshev (MVUE) UCL 190.5 | | |
| Nonparametric Distribution Free UCL Statistics | | |
| Data appear to follow a Discernible Distribution at 5% Significance Level | | |
| | | |
| Nonparametric Distribution Free UCLs | 50/ 1 11 16 1101 | 40 |
| | 5% Jackknife UCL | 10 |
| · | Bootstrap-t UCL | 243.7 |
| 95% Hall's Bootstrap UCL 244.4 95% Percentil | ile Bootstrap UCL | 104. |
| 95% BCA Bootstrap UCL 139 | | |
| 90% Chebyshev(Mean, Sd) UCL 133.3 95% Chebyshe | nev(Mean, Sd) UCL | 169. |
| 97.5% Chebyshev(Mean, Sd) UCL 220.1 99% Chebyshe | nev(Mean, Sd) UCL | 319.3 |
| Suggested UCL to Use | _ | |
| 95% Chebyshev (Mean, Sd) UCL 169.6 | | |
| | | |
| s regarding the selection of a 95% UCL are provided to help the user to select the mos | st appropriate 95% l | UCL. |
| | | UCL. |



Summary of ProUCL Output North Orchard Surface Soil (0 to 1.5 feet bgs) **General Statistics** Total Number of Observations Number of Distinct Observations 12 Number of Missing Observations Minimum 10.5 Mear 127.8 34.9 Maximum 690 Mediar SD 195.1 Std. Error of Mear 56.32 Coefficient of Variation 1.527 Skewnes 2.522 Normal GOF Test Shapiro Wilk Test Statistic 0.652 Shapiro Wilk GOF Test 0.859 5% Shapiro Wilk Critical Value Data Not Normal at 5% Significance Level Lilliefors Test Statistic 0.274 Lilliefors GOF Test 5% Lilliefors Critical Value 0.243 Data Not Normal at 5% Significance Level Data Not Normal at 5% Significance Level **Assuming Normal Distribution** 95% Normal UCL 95% UCLs (Adjusted for Skewness) 95% Student's-t UCI 228.9 95% Adjusted-CLT UCL (Chen-1995) 264.2 235.8 95% Modified-t UCL (Johnson-1978) Gamma GOF Test A-D Test Statistic 0.682 Anderson-Darling Gamma GOF Test 5% A-D Critical Value 0.77 Detected data appear Gamma Distributed at 5% Significance Level 0.231 K-S Test Statistic Kolmogorov-Smirnov Gamma GOF Test 5% K-S Critical Value 0.256 Detected data appear Gamma Distributed at 5% Significance Level Detected data appear Gamma Distributed at 5% Significance Level Gamma Statistics k hat (MLE) 0.687 0.571 k star (bias corrected MLE) Theta hat (MLE) 186.1 223.9 Theta star (bias corrected MLE) nu hat (MLE) 16.48 13.69 nu star (bias corrected) MLE Mean (bias corrected) 127.8 MLE Sd (bias corrected) 169.2 Approximate Chi Square Value (0.05) 6.362 Adjusted Chi Square Value 5.617 Adjusted Level of Significance 0.029 **Assuming Gamma Distribution** 95% Approximate Gamma UCL (use when n>=50) 275 95% Adjusted Gamma UCL (use when n<50) 311.5 Lognormal GOF Test Shapiro Wilk Test Statistic 0.914 Shapiro Wilk Lognormal GOF Test 5% Shapiro Wilk Critical Value 0.859 Data appear Lognormal at 5% Significance Level Lilliefors Test Statistic 0.177 Lilliefors Lognormal GOF Test 5% Lilliefors Critical Value 0.243 Data appear Lognormal at 5% Significance Level Data appear Lognormal at 5% Significance Level

| L | ognorma | Statistics | |
|---|------------|--|-------|
| Minimum of Logged Data | 2.351 | Mean of logged Data | 3.968 |
| Maximum of Logged Data | 6.537 | SD of logged Data | 1.372 |
| Assumir | ng Logno | rmal Distribution | |
| 95% H-UCL | 608.8 | 90% Chebyshev (MVUE) UCL | 273.8 |
| 95% Chebyshev (MVUE) UCL | 343.9 | 97.5% Chebyshev (MVUE) UCL | 441.1 |
| 99% Chebyshev (MVUE) UCL | 632.1 | | |
| Nonparametric | : Distribu | tion Free UCL Statistics | |
| Data appear to follow a Disc | cernible D | Distribution at 5% Significance Level | |
| | | | |
| Nonparam | etric Dist | ribution Free UCLs | |
| 95% CLT UCL | 220.4 | 95% Jackknife UCL | 228.9 |
| 95% Standard Bootstrap UCL | 215.8 | 95% Bootstrap-t UCL | 356.6 |
| 95% Hall's Bootstrap UCL | 570.1 | 95% Percentile Bootstrap UCL | 225.7 |
| 95% BCA Bootstrap UCL | 273.9 | | |
| 90% Chebyshev(Mean, Sd) UCL | 296.7 | 95% Chebyshev(Mean, Sd) UCL | 373.3 |
| 97.5% Chebyshev(Mean, Sd) UCL | 479.5 | 99% Chebyshev(Mean, Sd) UCL | 688.2 |
| Su | agested | UCL to Use | |
| 95% Adjusted Gamma UCL | 311.5 | | |
| Note: Suggestions regarding the selection of a 95% UC | CL are pro | vided to help the user to select the most appropriate 95% | UCL. |
| | • | a size, data distribution, and skewness. | |
| | | nulation studies summarized in Singh, Maichle, and Lee (200 | 6). |
| · | | s; for additional insight the user may want to consult a stati | |

Summary of ProUCL Output North Orchard Shallow Soil (>1.5 to 2 feet bgs) **General Statistics** Total Number of Observations Number of Distinct Observations Number of Missing Observations Minimum 3.97 Mear 15.06 Maximum 45.3 Median 6.55 SD 17.33 Std. Error of Mear 7.749 Coefficient of Variation 1.151 Skewnes 1.988 Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1 Normal GOF Test Shapiro Wilk Test Statistic 0.723 Shapiro Wilk GOF Test 5% Shapiro Wilk Critical Value 0.762 Data Not Normal at 5% Significance Level Lilliefors Test Statistic 0.327 Lilliefors GOF Test 5% Lilliefors Critical Value 0.343 Data appear Normal at 5% Significance Level Data appear Approximate Normal at 5% Significance Level **Assuming Normal Distribution** 95% Normal UCL 95% UCLs (Adjusted for Skewness) 95% Student's-t UCL 31.58 95% Adjusted-CLT UCL (Chen-1995) 35.17 95% Modified-t UCL (Johnson-1978) 32.73 Gamma GOF Test A-D Test Statistic 0.505 Anderson-Darling Gamma GOF Test 5% A-D Critical Value 0.688 Detected data appear Gamma Distributed at 5% Significance Level K-S Test Statistic 0.301 Kolmogorov-Smirnov Gamma GOF Test 0.363 Detected data appear Gamma Distributed at 5% Significance Level 5% K-S Critical Value Detected data appear Gamma Distributed at 5% Significance Level Gamma Statistics k hat (MLE) 1.311 k star (bias corrected MLE) 0.658 Theta star (bias corrected MLE) Theta hat (MLE) 11.49 22.89 6.578 13.11 nu hat (MLE) nu star (bias corrected) MLE Mean (bias corrected) 15.06 MLE Sd (bias corrected) 18.57 Approximate Chi Square Value (0.05) 1.942 1.033 0.0086 Adjusted Chi Square Value Adjusted Level of Significance Assuming Gamma Distribution 95% Approximate Gamma UCL (use when n>=50)) 51.01 95% Adjusted Gamma UCL (use when n<50) 95.87

| ı | Lognormal C | GOF Test | |
|--|----------------|--|---------|
| Shapiro Wilk Test Statistic | 0.898 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.762 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.262 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.343 | Data appear Lognormal at 5% Significance Level | |
| Data appear L | ognormal at | : 5% Significance Level | |
| | | | |
| | Lognormal S | | |
| Minimum of Logged Data | 1.379 | Mean of logged Data | 2.285 |
| Maximum of Logged Data | 3.813 | SD of logged Data | 0.97 |
| | | In the | |
| | | nal Distribution | 04.50 |
| 95% H-UCL | 159.2 | 90% Chebyshev (MVUE) UCL | 31.53 |
| 95% Chebyshev (MVUE) UCL | 39.47 | 97.5% Chebyshev (MVUE) UCL | 50.49 |
| 99% Chebyshev (MVUE) UCL | 72.13 | | |
| N | . 5 | E HGI G. P. P. | |
| · | | on Free UCL Statistics | |
| Data appear to follow a Dis | scernible Di | stribution at 5% Significance Level | |
| | | 7 5 | |
| | | ibution Free UCLs | 24.50 |
| 95% CLT UCL | 27.81 | 95% Jackknife UCL | 31.58 |
| 95% Standard Bootstrap UCL | 26.43 | 95% Bootstrap-t UCL | 156.9 |
| 95% Hall's Bootstrap UCL | 130.2 | 95% Percentile Bootstrap UCL | 29.28 |
| 95% BCA Bootstrap UCL | 31.08 | | |
| 90% Chebyshev(Mean, Sd) UCL | 38.31 | 95% Chebyshev(Mean, Sd) UCL | 48.84 |
| 97.5% Chebyshev(Mean, Sd) UCL | 63.46 | 99% Chebyshev(Mean, Sd) UCL | 92.17 |
| <u> </u> | uggested U | ICI to Use | |
| 95% Student's-t UCL | 31.58 | 132 to 330 | |
| 7576 Stadent's 1 0 CE | 31.50 | | |
| When a data set follows an approxim | nate (e.g., no | rmal) distribution passing one of the GOF test | |
| When applicable, it is suggested to use a UCL base | ed upon a di | stribution (e.g., gamma) passing both GOF tests in ProUC | L |
| | | | |
| Note: Suggestions regarding the selection of a 95% U | ICL are prov | ided to help the user to select the most appropriate 95% l | JCL. |
| Recommendations are base | ed upon data | size, data distribution, and skewness. | |
| These recommendations are based upon the result | ts of the simu | ulation studies summarized in Singh, Maichle, and Lee (2006 |). |
| However, simulations results will not cover all Real Wor | rld data sets; | for additional insight the user may want to consult a statis | tician. |



Summary of ProUCL Output West Meadow Surface Soil (0 to 1.5 feet bgs) **General Statistics** Total Number of Observations Number of Distinct Observations 28 Number of Missing Observations 104.9 Minimum 6.16 Mear 39.1 Maximum 1230 Median SD 224.5 Std. Error of Mear 41.68 Coefficient of Variation 2.139 Skewnes 4.803 Normal GOF Test Shapiro Wilk Test Statistic 0.4 Shapiro Wilk GOF Test 0.926 5% Shapiro Wilk Critical Value Data Not Normal at 5% Significance Level Lilliefors Test Statistic 0.33 Lilliefors GOF Test 5% Lilliefors Critical Value 0.161 Data Not Normal at 5% Significance Level Data Not Normal at 5% Significance Level **Assuming Normal Distribution** 95% Normal UCL 95% UCLs (Adjusted for Skewness) 95% Student's-t UCI 175.8 95% Adjusted-CLT UCL (Chen-1995) 213.2 182 95% Modified-t UCL (Johnson-1978) Gamma GOF Test A-D Test Statistic 1.385 Anderson-Darling Gamma GOF Test 5% A-D Critical Value 0.786 Data Not Gamma Distributed at 5% Significance Level 0.164 K-S Test Statistic Kolmogorov-Smirnov Gamma GOF Test 0.169 Detected data appear Gamma Distributed at 5% Significance Level 5% K-S Critical Value Detected data follow Appr. Gamma Distribution at 5% Significance Level Gamma Statistics k hat (MLE) 0.727 0.674 k star (bias corrected MLE) Theta hat (MLE) 144.4 Theta star (bias corrected MLE) 155.6 nu hat (MLE) 42.14 39.11 nu star (bias corrected) MLE Mean (bias corrected) 104.9 MLE Sd (bias corrected) 127.8 Approximate Chi Square Value (0.05) 25.79 Adjusted Chi Square Value 25.14 Adjusted Level of Significance 0.0407 **Assuming Gamma Distribution** 95% Approximate Gamma UCL (use when n>=50) 159.1 95% Adjusted Gamma UCL (use when n<50) 163.2 Lognormal GOF Test Shapiro Wilk Test Statistic Shapiro Wilk Lognormal GOF Test 0.962 5% Shapiro Wilk Critical Value 0.926 Data appear Lognormal at 5% Significance Level Lilliefors Test Statistic 0.0957 Lilliefors Lognormal GOF Test 5% Lilliefors Critical Value 0.161 Data appear Lognormal at 5% Significance Level Data appear Lognormal at 5% Significance Level

| I | Lognorma | Statistics | |
|--|---------------|---|-----------|
| Minimum of Logged Data | 1.818 | Mean of logged Data | 3.826 |
| Maximum of Logged Data | 7.115 | SD of logged Data | 1.184 |
| Assumi | ina Loano | rmal Distribution | |
| 95% H-UCL | 169.4 | 90% Chebyshev (MVUE) UCL | 158.8 |
| 95% Chebyshev (MVUE) UCL | 190.4 | 97.5% Chebyshev (MVUE) UCL | 234.2 |
| 99% Chebyshev (MVUE) UCL | 320.4 | | |
| Nonparametri | ic Distribu | tion Free UCL Statistics | |
| Data appear to follow a Dis | cernible [| Distribution at 5% Significance Level | |
| Nonparan | netric Dist | tribution Free UCLs | |
| 95% CLT UCL | 173.5 | 95% Jackknife UCL | 175.8 |
| 95% Standard Bootstrap UCL | 170.8 | 95% Bootstrap-t UCL | 328.4 |
| 95% Hall's Bootstrap UCL | 419.5 | 95% Percentile Bootstrap UCL | 182.2 |
| 95% BCA Bootstrap UCL | 228.2 | | |
| 90% Chebyshev(Mean, Sd) UCL | 230 | 95% Chebyshev(Mean, Sd) UCL | 286.6 |
| 97.5% Chebyshev(Mean, Sd) UCL | 365.2 | 99% Chebyshev(Mean, Sd) UCL | 519.7 |
| Sı | uggested | UCL to Use | |
| 95% Adjusted Gamma UCL | 163.2 | | |
| When a data set follows an approxim | nate (e.g., n | ormal) distribution passing one of the GOF test | |
| ,,, | | distribution (e.g., gamma) passing both GOF tests in ProU | CL |
| Note: Suggestions regarding the selection of a 95% U | CL are prc | ovided to help the user to select the most appropriate 95% | UCL. |
| Recommendations are based | d upon dat | ta size, data distribution, and skewness. | |
| These recommendations are based upon the result | s of the sin | nulation studies summarized in Singh, Maichle, and Lee (200 | 06). |
| However, simulations results will not cover all Real Wor | ld data set | s; for additional insight the user may want to consult a stat | istician. |

| ervations | 7 |
|-------------|-----------|
| ervations | 0 |
| Mean | 23.01 |
| Median | 15.9 |
| of Mean | 5.539 |
| skewness | 1.167 |
| | |
| | |
| est. | |
| | |
| 5.1 | |
| | |
| | |
| | |
| nce Level | |
| aca Laval | |
| ice Levei | |
| | |
| | |
| ness) | |
| | 34.74 |
| | 34.18 |
| | |
| | |
| Test | |
| % Significa | nce Level |
| F Test | |
| % Significa | nce Level |
| | |
| | |
| | |
| ed MLE) | 2.011 |
| ed MLE) | 11.45 |
| | 28.15 |
| • | 16.23 |
| | 17.04 |
| re Value | 14.5 |
| | |
| .50 | 44.10 |
| en n<50) | 44.68 |
| | |

| L | ognormal GO | F Test | |
|--|------------------|--|-------|
| Shapiro Wilk Test Statistic | 0.883 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.803 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.213 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.304 | Data appear Lognormal at 5% Significance Level | |
| Data appear Lo | gnormal at 5° | % Significance Level | |
| | | | |
| ı | ognormal Sta | tistics | |
| Minimum of Logged Data | 2.407 | Mean of logged Data | 2.98 |
| Maximum of Logged Data | 3.892 | SD of logged Data | 0.587 |
| Assumi | ng Lognormal | Distribution | |
| 95% H-UCL | 44.07 | 90% Chebyshev (MVUE) UCL | 37.99 |
| 95% Chebyshev (MVUE) UCL | 44.89 | 97.5% Chebyshev (MVUE) UCL | 54.46 |
| 99% Chebyshev (MVUE) UCL | 73.28 | 77.3% Chebyshev (WVOE) OCE | 34.40 |
| , , , , , <u>, , , , , , , , , , , , , , </u> | | <u>l</u> | |
| Non parametri | c Distribution | Free UCL Statistics | |
| Data appear to follow a Dis | cernible Distr | ibution at 5% Significance Level | |
| | | | |
| Nonparan | netric Distribu | tion Free UCLs | |
| 95% CLT UCL | 32.12 | 95% Jackknife UCL | 33.78 |
| 95% Standard Bootstrap UCL | 31.45 | 95% Bootstrap-t UCL | 50.28 |
| 95% Hall's Bootstrap UCL | 52.74 | 95% Percentile Bootstrap UCL | 31.5 |
| 95% BCA Bootstrap UCL | 33.09 | | |
| 90% Chebyshev(Mean, Sd) UCL | 39.63 | 95% Chebyshev(Mean, Sd) UCL | 47.16 |
| 97.5% Chebyshev(Mean, Sd) UCL | 57.6 | 99% Chebyshev(Mean, Sd) UCL | 78.12 |
| | | | |
| | uggested UCL | to Use | |
| 95% Student's-t UCL | 33.78 | | |
| Note: Suggestions regarding the selection of a 95% U | CL are provide | ed to help the user to select the most appropriate 95% U | JCL. |
| | | e, data distribution, and skewness. | |
| | | | |
| These recommendations are based upon the results | s of the simulat | ion studies summarized in Singh, Maichle, and Lee (2006) |). |