Interim Response Action/Risk Evaluation Report

Albia Former Manufactured Gas Plant
Albia, Iowa

Interstate Power and Light Company

June 25, 2021

The Power of Commitment

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1. Introduction

This Interim Response Action (IRA)/Risk Evaluation Report has been prepared by GHD on behalf of Interstate Power and Light Company (IPL) for the Albia former manufactured gas plant (FMGP) site in Albia, Iowa (Figure 1). This work was performed under regulatory oversight of the Iowa Department of Natural Resources (IDNR).

The Albia FMGP site is located at located at 501 North Main Street (Highway 5/137), Albia, Iowa. The FMGP site property is currently owned by the Chariton Valley Electric Cooperative (CVEC). The FMGP operated from at least 1922 until 1947, but little is known about its history of operation. The building, which was demolished as part of the IRA, is believed to have been the original FMGP building at the site but has not been used for this purpose in decades. This IRA Report describes and documents the activities performed at the Albia FMGP site, including excavation and off-site disposal of impacted soil, perimeter air monitoring, and health and safety protocols. A site map (Figure 2) identifies current and former structures located on site.

No previous source removal activities were conducted at the site prior to the IRA activities described in this report. Pre-excavation soil sampling and exploratory trenching were conducted to identify areas of FMGP-impacted soil to be excavated for off-site disposal at a permitted landfill. Demolition of the brick building allowed access to FMGP structures and contamination for removal of source materials as proposed in the Interim Response Action Work Plan (IRAWP; GHD, 2020a).

1.1 Goals and Objectives

The objective of this Report is to document and summarize the interim remedial actions performed from November 2020 through January 2021 at the site and evaluate potential current and future risks posed by the site.

1.2 Response Action and Cleanup Levels

The objectives of the IRA were to reduce the risk to human health and the environment by 1) removing the contents of the relief holder and 2) remove impacted soil identified by pre-excavation sampling that causes potential unacceptable risks (Figure 3).

Demolition of the brick building was completed from December 1 through 3, 2020.

1.3 Nature and Extent of Soil Impact

Potential source areas of residual contamination resulting from FMGP operations include gas holders, an oil tank, a relief holder, underground piping, and operations or equipment potentially housed by the brick building. The locations of these potential source areas are shown on Figure 2.

Contaminants of concern (COCs) identified at the site through the investigations include polynuclear aromatic hydrocarbons (PAHs), arsenic, and lead. The extent of soil removal from planned excavations as described in the RAWP and adjusted following additional soil sampling in July, September, and October 2020 and test trenching in November 2020 is shown on Figure 3.

The final planned extent of excavation was provided to IDNR in a letter dated November 25, 2020. Pre-excavation soil sampling was used to define the extent of excavation, eliminating the need for confirmation soil sampling during the excavation. The final extent of soil removal is shown on Figure 4; Figure 5 shows the structures encountered during the excavation. The soil analytical database is provided in Table 1; soil samples removed during the IRA excavation are denoted with grey shading in Table 1.

2. Response Action

The soil removal entailed excavation of impacted soil and disposal at the South Central Iowa Solid Waste Agency (SCISWA) landfill in Tracy, Iowa. Clay borrow soil was imported for backfilling the excavated areas to approximately 6 inches below the final grade, and topsoil was imported and placed as the top 6 inches, followed by hydro-seeding of the entire site to finalize the remedial action. GHD provided oversight of the removal action and exploratory trenching. Shinn Kellogg, LLC (SK) of Albia, Iowa served as the remediation earthwork contractor. A photographic log of activities during the removal activities is provided in Appendix A with the daily reports.

2.1 Response Action Preparations

2.1.1 Security Fencing

An eight-foot high, chain-link fence with visual barrier fabric was installed around the perimeter of the work area, including some of the adjacent property where soil removal was completed as part of the IRA. The extent of the fencing is displayed on Figure 4. SK was responsible for maintaining the fencing throughout the project. Warning signs were posted at gates and approaches to the site that read “Attention – Unauthorized Personnel Keep Out”.

2.1.2 Site Access and Security

Access to the site was limited to vehicle gates installed along the east, south, and north and a person gate on the west. All visitors were required to check in with the SK Field Supervisor. Access was restricted to properly trained personnel. Access to and from exclusion zones was limited to decontamination areas only.

Excavation and material handling equipment was parked within the fenced areas when the site was unattended. Equipment was only allowed to be removed from the site when fully decontaminated and no longer needed. General construction equipment and supplies were stored onsite in locked trailers or in locked toolboxes.

Throughout the removal activities, the fencing around the site was maintained to limit access to the site. Gates in the temporary fencing were locked when GHD or SK were not on site. SK maintained responsibility for site security throughout the project.

2.1.3 Health and Safety

SK personnel provided a full-time off-site Health and Safety professional as the Safety Officer during the removal action for activities completed under contract to IPL. GHD prepared a HASP for the site with proposed activities in compliance with 29 CFR 1910.120. For the response action, the HASP specified level D PPE, with upgraded levels of respiratory protection if needed based on field observations and field screening with a photoionization detector (PID). Both GHD and SK used their own HASPs for the removal activities. All contractors were responsible for providing their own HASP. A tailgate safety meeting was performed prior to the start of each day’s activities to discuss major HASP components in relation to the day’s planned activities.

GHD was responsible for perimeter air monitoring on a daily and weekly basis. Level D personal protection equipment was standard and no conditions warranting upgraded protection were encountered.

2.1.4 Office Trailer

Field offices were established in the northwest portion of the site, outside the excavation area. The office trailers were connected to electrical supply and used for storage of equipment and files. Pertinent health and safety data, such as Occupational Safety and Health Agency (OSHA) requirements, emergency telephone numbers, and GHD’s HASP were kept in the field office. SK had a separate trailer to the east of the GHD trailer for similar purposes.

Personal protective equipment (PPE) was stored in the trailers. A decontamination area was established at the exits of work zones for disposal of used PPE.

2.1.5 Utilities

Iowa One Call was contacted by SK prior to initiation of site activities to locate utilities in the vicinity of the work areas. The locations of the conduits were identified and marked by the company or department responsible for the conduit, using standard color coding. In addition, unpaved areas will also be marked with flags. Locates were updated periodically, as required.

The subsurface utilities consisted of telephone, electricity, natural gas, sanitary sewer, and water. Intrusive work within 3 feet or known, active utilities did not occur unless a representative was onsite from the respective utility company. Overhead utilities consisted of telephone and electric. Separation distances from overhead utilities were maintained as outlined in the HASP.

2.1.6 Grid System

GHD personnel established a grid system, as shown on Figure 3 and Figure 4. The grid consisted of an alphanumeric system based on 25-foot north-south and east-west intervals. The grid system was used to identify sampling locations and track the extent of the excavation, buried structures, and other pertinent items.

2.1.7 Stormwater Management

Because the area of the excavation was less than 1 acre, a National Pollutant Discharge Elimination System (NPDES) Permit (General Permit 2, Storm Water Discharge Associated with Construction Activities) was not required. Stormwater controls were used to minimize the potential for erosion and sediment transport off site.

Run-off from excavated areas, soil stockpile areas, and work areas with exposed impacted soil and/or debris was controlled by trenches, earthen berms, and/or wattles.

2.1.8 Water Treatment, Storage, and Discharge

Because the excavations did not extend to depths which would require significant dewatering, a water treatment system was not required.

2.1.9 Asbestos Survey, Abatement, and Building Demolition

Prior to the IRA, the brick building located at the site was occupied by a tenant and the site was used to make concrete statuary. Prior to demolition, an asbestos survey was conducted by a State of Iowa licensed asbestos inspector (Diane Pals, License No. 20-4586). Asbestos containing material was identified in the building. All ACM material identified was successfully abated, removed from the site, and disposed of properly by Earth Services and Abatement (ESA) of Des Moines, Iowa under contract to SK. The details of the survey and abatement activities are presented in the Pre-Demolition Survey letter report from GHD to CVEC (GHD, 2020b), and the Decommissioning and Demolition Completion Report completed for CVEC by GHD (GHD, 2021).

The brick building was demolished, including subgrade structures as part of the site-wide decommissioning and demolition. The building demolition and decommissioning is detailed in the Decommissioning and Demolition Completion Report completed for CVEC by GHD (GHD, 2021).

2.2 Excavation and Materials Handling

Excavation activities were conducted from December 4, 2020 to January 5, 2021. The approximate extent of excavation is shown on Figure 3 and Figure 4. The depth of the excavation is show on Figure 6; soil sample locations remaining after the excavation and used in the risk evaluation are shown on Figure 7. Table 1 summarizes the soil data collected at the site and identifies the soil which was excavated during the IRA. A total of 6,486 tons of excavated soil and debris (including pipes and bricks) were loaded by excavator or front-end loader into dump trucks for transport to the SCISWA in Tracy, Iowa. The loads were covered with a truck-mounted tarp prior to leaving the site.

2.2.1 Excavation Confirmation Sampling

The extent of the excavation was determined using pre-excavation sampling. In some areas additional soil was excavated based on visual indications of impacts, but in accordance with the IRAWP, confirmation soil samples were not collected during the IRA.

2.3 Backfill and Cover Material

Backfill material was brought in from a local borrow source to backfill the excavated area and to bring the site to final grade. Representative samples were collected from the borrow source and submitted to Eurofins TestAmerica in Cedar Falls, Iowa for laboratory analysis to confirm compliance with statewide standards.

2.3.1 Clay Fill

Clay backfill soil was imported from off site. A single borrow source, located roughly 20 minutes from the site northwest on Highway 5 sold by Smith Fertilizer and Grain Company of Albia, Iowa, was used. Overall, 9 samples were collected from the borrow area and all concentrations were below the statewide standards except for arsenic in 3 of the 9 samples; the detected arsenic concentrations were within the generally accepted background range for Iowa soils. The analytical results for the imported borrow are provided in Table 2. A total of 6,088 tons of clay fill was imported from the borrow sources.

2.3.2 Topsoil

Topsoil was imported from off site and used for the final 6 inches of cover across the site. One borrow source located roughly 20 minutes from the site northwest on Highway 5 was used. A composite sample of the topsoil source area was collected and the concentrations were below the statewide standards with the exception of arsenic; the detected arsenic concentration was within the generally accepted background range for Iowa soils. The analytical results for the imported topsoil are provided in Table 3. A total of approximately 550 cubic yards of topsoil was imported for site restoration.

2.3.3 Seeding

Seeding was completed after final topsoil placement to prevent erosion and allow for vegetation growth to begin in the spring. Hydro-seeding with a blend of fescue, rye grass and bluegrass (SUDAS Type 1 Permanent Lawn Mixture) was completed on xx, 2021. The seed was applied at a rate of 260 pounds per acre. In addition to the seed, dry cereal straw mulch was placed at a rate of 2 tons per acre. The mulch helps hold and insulate the seed and prevent erosion and ensure proper germination.

2.4 Site Restoration and Demobilization

2.4.1 Final Grade

The final grade was contoured to promote drainage and limit ponding onsite. The contours are slightly modified from the previous grade onsite to smooth the contours and prevent erosion.

2.4.2 Monitoring Wells

Nine monitoring wells are in place and included in the groundwater monitoring network. Minor surface completion repairs at monitoring wells MW-3 and MW-7 were required following the IRA.

2.4.3 Demobilization

Excavation and backfilling work were completed by January 13, 2021. All heavy equipment was removed from the site by January 14, 2021. Topsoil placement and seeding were completed on April 26, 2021.

2.5 Air Monitoring

This section discusses the air monitoring program that was implemented during removal activities at the FMGP site, as outlined in the Ambient Air Monitoring Program (AAMP) that is included in Appendix B of the IRAWP (GHD, 2020a). The overall objectives of ambient air monitoring were to determine if and when emission abatement activities were necessary and to document air quality at the perimeter of the site during the IRA. Five major tasks were completed to achieve this objective: 1) determine background ambient air quality in the vicinity of the site prior to the IRA, 2) determine short-term (daily) exposure to FMGP-related compounds that may be entrained in ambient air during the IRA, 3) determine long-term (project duration) exposure to FMGP-related compounds that may be entrained in ambient air during the IRA, 4) document local meteorological conditions that control the distribution and fate of air-entrained FMGP-related compounds, and 5) determine ambient air quality in the vicinity of the site following the IRA.

Ambient air monitoring was performed using both real-time and time-integrated air monitoring techniques during the IRA. Ambient air monitoring was conducted around the fenced perimeter of the work area to assess air quality leaving the site. The locations of the air monitoring stations are shown on Figure 8. The real-time monitoring occurred on a daily basis to identify if ambient air quality was being affected by the work and if emission abatement actions were necessary to reduce impacts to ambient air quality. Time-integrated monitoring was used to evaluate long-term exposure to ambient air concentrations that occurred during the IRA. The time-integrated sampling documented, in accordance with United States Environmental Protection Agency (EPA) standard methods, air quality at the perimeter of the site during the IRA.

Exclusion zone air monitoring was conducted by the remediation contractor (SK) to assess inhalation hazard exposures to site personnel and determine the appropriate level of respiratory protection, as necessary, and to assess potential risk to the receptors working in the exclusion zone. Exclusion zone monitoring is independent of the AAMP and details are included in the HASP.

2.5.1 Target Compounds

The FMGP-related target compounds measured for time-integrated air sampling included select volatile organic compounds (VOCs) benzene, toluene, ethylbenzene, and xylenes; and select polynuclear aromatic hydrocarbons (PAHs). The target compounds were included in the air monitoring based on soil analytical data from the site, as well as experience with other FMGP sites. Dust was also included in the time-integrated air monitoring program because respirable particulates may pose a health risk even if they are chemically inert.

The selection of real-time air monitoring target compounds was based on the same criteria as time-integrated target compounds, with the consideration of currently available direct-read instruments (DRIs). The real-time monitoring target compounds included total VOCs, benzene (as necessary), and dust.

2.5.1.1 Real-Time Ambient Air Action Levels

As discussed in the AAMP, short-term action levels for carcinogenic risk of benzene exposure were developed because of benzene's high toxicity relative to other site-related compounds. Based on experience at other FMGP sites, it was anticipated respirable concentrations of benzene would be high relative to those of other carcinogenic site-related compounds. Short-term action levels for dust were also established since dust can contribute to health risks.

Proposed abatement action levels were increasingly more aggressive as the concentrations of real-time monitoring parameters increased. Ultimately, the abatement strategies would require stopping IRA activities until steps could be taken to reduce emission concentrations below the action levels. Real-time monitoring action levels and descriptions of different abatement levels were provided in Appendix B (AAMP) of the IRAWP (GHD, 2020).

2.5.1.2 Time-Integrated Ambient Air Action Levels

The time-integrated sampling was designed to monitor the long-term exposure potential associated with the IRA. The long-term action levels were provided as project ambient air quality standards (PAAQSs) for this project and are provided in Table 4. The PAAQS for time-integrated monitoring of organic compounds were derived from EPA's Regional Screening Level Calculator developed by Oak Ridge National Laboratory (EPA, 2020). A more detailed discussion of the development of PAAQSs is presented in the AAMP.

2.5.2 Ambient Air Monitoring Activities

The air monitoring network configuration was designed to provide adequate air monitoring coverage based on the proposed work activities, configuration of the site, and the offsite locations of potentially sensitive populations. Air monitoring stations (AMSs) were established around the site perimeter at the locations identified in the AAMP. Ambient air monitoring activities were completed on active workdays from November 23, 2020 through January 14, 2021.

2.5.2.1 Real-Time Air Monitoring

During the IRA, real-time air monitoring was routinely conducted for analyses of total VOCs and dust using hand-held DRIs. When total VOCs exceeded 1.0 parts per million (ppm), additional sampling was conducted to determine benzene concentrations. Real-time air monitoring was performed at twelve AMS locations four to six times per day during normal work days.

DRIs obtained for the collection of real-time air quality data included an UltraRAE 3000 photoionization detector (PID) for determination of total VOCs and benzene and a SidePak™ AM520 personal aerosol monitor configured for the detection of total particulates. A more detailed discussion of the DRIs used during the IRA is provided in the AAMP. All DRIs were calibrated and maintained in proper working condition according to the manufacturer's specifications and used in general accordance with the methods described in the AAMP. Real-time air monitoring results were recorded on field log sheets and are provided in Appendix B.

2.5.2.2 Time-Integrated Air Sampling

Time-integrated sampling was performed using air sampling equipment appropriate for the quantitative measurement of BTEX and PAHs over a specified period of time. Time-integrated sampling was conducted at four AMS locations for two 48-hour periods each week during the IRA excavation.

Pre-IRA background sampling was conducted prior to any intrusive activities to document the initial background air quality for the site. Post-IRA background sampling was conducted to document ambient air quality upon completion of the IRA. Both pre-IRA and post-IRA background sampling consisted of a single 48-hour event using the same techniques and equipment as used during the IRA. All time-integrated samplers were calibrated and maintained in proper working condition per the manufacturer's specifications and used in general accordance with the methods described in the AAMP.

2.5.2.2.1 VOCs

VOCs were sampled using subatmospheric sampling techniques in general accordance with EPA Compendium Method TO-15 (TO-15; EPA, 1999b). This method uses 6-liter evacuated stainless steel Summa™ canisters for sample collection and gas chromatography/mass spectrometry (GC/MS) analysis. Laboratory provided combination in-line particulate filter and mass-flow control regulators were attached to the canisters and provided a means for steady collection of ambient air for the duration of the sampling event.

2.5.2.2.2 PAHs

Sampling for PAHs was conducted in general accordance with EPA Compendium Method TO-13A (TO-13A; EPA, 1999a). The sampling equipment consisted of high-volume air samplers (Tisch Environmental TE-1000) and sample cartridges containing a combination of a polyurethane foam (PUF) plug and a charge of XAD-2™ polymer sorbent resin. The PUF/XAD-2™ cartridge captures both particulate- and volatile-phase PAHs present in ambient air, thereby measuring “total PAH” emissions. Laboratory analysis was performed by GC/MS in the selective ion monitoring (SIM) mode.

The sampler flow rates were measured at the start, one time during, and at the end of each sampling event to determine the volume of air sampled during the event. Calculations for the determination of air volume sampled were adopted from guidance provided by the equipment manufacturer, were in accordance with method TO-13A, and are fully described in the AAMP. Analytical results were reported on a mass basis for the sample cartridge in the units of micrograms (µg). Upon validation of flow measurements and analytical results, the mass values were divided by the volume of air sampled to determine the concentration of target compounds in ambient air on a weight per volume basis in the units of micrograms per cubic meter (µg/m3).

Additionally, trip blanks for time-integrated sample parameters were collected to demonstrate that no unintentional exposure to site-related target compounds occurred during the transport of sample media both to and from the site. Trip blanks consisted of clean, unused laboratory-prepared media. Field duplicate samples were collected from an AMS co-located with AMS 1 to measure the precision of the sampling process. Trip blanks and field duplicates for VOC, and trip blanks for PAH analysis were submitted for analysis at a rate of 5 percent of samples taken.

All time-integrated air sample media was acquired directly from the analytical laboratory, Eurofins TestAmerica of Knoxville, Tennessee. Samples were packaged, preserved, and shipped under chain-of-custody record via overnight delivery to the analytical laboratory.

Specific details regarding the procedures used for real-time and time-integrated ambient air monitoring are provided in the AAMP.

2.5.2.3 Meteorological Data Collection

Local meteorological conditions that controlled the distribution and fate of air-entrained FMGP-related compounds were monitored continuously throughout the IRA. Meteorological data included wind speed and direction, air temperature, relative humidity, and barometric pressure. The meteorological data was recorded using a data logging weather station (Onset Computer Corporation HOBO™ weather station).

2.5.3 Ambient Air Monitoring Results

2.5.3.1 Real-Time Air Monitoring Results

During the completion of excavation activities, total VOC concentrations at the perimeter of the site ranged from below PID detection limits of 0.05 ppm to a peak of 0.91 ppm, with a corresponding benzene concentration of 0.66 ppm. This peak PID reading occurred at AMS 3 on December 11, 2020 during handling of relief holder materials. Although PID readings of total VOCs were not observed to exceed the 1.0 ppm action level (i.e., no specific abatement actions were required as a result of total VOC/benzene concentrations), site activities were consistently managed to minimize volatilization of heavily impacted materials.

Although dust readings usually ranged from below instrument detection limits to well below the 0.15 mg/m^3 action level, dust concentrations were observed to exceed the 0.15 mg/m^3 action level on several occasions. The maximum real-time dust concentration detected at the site (0.246 mg/m^3) was observed on December 2, 2020. This peak dust reading occurred briefly at AMS F near the southwest perimeter of the site. During all occurrences when dust concentrations approached or exceeded the action level (generally limited to demolition and load-out of the former building), SK sprayed the active work area with water to bring dust concentrations below action levels. Real-time air monitoring field log sheets are provided in Appendix B.

2.5.3.2 Time-Integrated Air Monitoring Results

To assess the long-term exposure associated with the IRA, time-integrated sample results were tabulated by location and a time-weighted average concentration was determined for each target compound. As described in the AAMP, a value of one-half the method detection limit (MDL) was used to represent sample results below the method detection limit. Time-weighted average analyte concentrations were then compared to the risk-based PAAQSs developed in the AAMP. For the purposes of this discussion, time-integrated sample results were grouped into three categories: 1) pre-

IRA background monitoring, 2) excavation monitoring, and 3) post-IRA background monitoring. Laboratory analytical reports for time-integrated sampling events have been provided to IDNR under separate cover.

2.5.3.2.1 Pre-IRA Background Monitoring

The pre-IRA background monitoring event was conducted from November 23 to 25, 2020. Benzene concentrations for this period were relatively constant ranging from 0.330 $\mu g/m^3$ at AMS 4 to 0.430 $\mu g/m^3$ at AMS 3. Naphthalene concentrations for this period ranged from 0.0263 $\mu g/m^3$ at AMS 5 to 0.0617 $\mu g/m^3$ at AMS 3. No other PAH analytes for which a PAAQS was established were detected above laboratory MDLs. No PAAQSs were exceeded during the pre-IRA event with the exception of benzo(a)pyrene at all AMS locations. This exceedance resulted solely from averaging half values of MDLs, as benzo(a)pyrene was below laboratory MDLs in all pre-IRA samples. The average concentration of each target compound at each location is presented in Table 5.

2.5.3.2.2 Excavation Monitoring

Seven 48-hour time-integrated air sampling events were conducted to assess perimeter air quality during IRA excavation activities. 48-hour events began on December 2, December 7, December 9, December 14, December 16, December 21, 2020, and January 4, 2021. The only PAAQS exceedance occurred for benzo(a)pyrene at all locations. As with the pre-IRA event, benzo(a)pyrene was below laboratory MDLs in all excavation monitoring samples, and the exceedance resulted solely from half-MDL values. Benzene concentrations for this period ranged from 2.281 $\mu g/m^3$ at AMS 4 to 11.970 $\mu g/m^3$ at AMS 3; all below the PAAQS of 156 $\mu g/m^3$. Naphthalene concentrations for this period ranged from 1.321 μg/m3 at AMS 4 to 6.016 μg/m3 at AMS 3, all below the PAAQS of 35.8 μg/m3. The average concentration of each target compound at each location is presented in Table 6.

2.5.3.2.3 Post-IRA Background Monitoring

The post-IRA background monitoring event was conducted from January 12 to 14, 2021. Benzene concentrations for this period ranged from 0.600 $\mu g/m^3$ at AMS 1 and 4 to 0.680 $\mu g/m^3$ at AMS 2. Naphthalene concentrations for this period ranged from 0.0332 $\mu g/m^3$ at AMS 1 to 0.0429 $\mu g/m^3$ at AMS 3. No other PAH analytes for which a PAAQS was established were detected above laboratory MDLs. No PAAQSs were exceeded during the post-IRA event with the exception of benzo(a)pyrene at all AMS locations. This exceedance resulted solely from averaging half values of MDLs, as benzo(a)pyrene was below laboratory MDLs in all post-IRA samples. The average concentration of each target compound at each location is presented in Table 7.

2.5.3.3 Data Quality Assessment

To determine if the ambient air monitoring data satisfy the data quality objectives identified in the AAMP, the data were assessed in terms of precision, accuracy, representativeness, completeness, comparability, and traceability.

Assessment of real-time air monitoring was completed in terms of accuracy, completeness, comparability, and traceability. Accuracy for operation of DRIs was assessed through the regular use of calibration checks with span gases of known concentration. Calibration of the PID used for determination of total VOCs and the personal aerosol monitor used for dust determination was conducted on a daily basis, both per manufacturer's recommendation. Completeness was assessed by determining if all planned locations were monitored during each planned monitoring event. Comparability was assessed by determining that all field staff using the equipment operated it in a common way. Finally, traceability was assessed by reviewing documentation of real-time air monitoring events in the form of field log sheets (Appendix B) and DRI calibration records. Upon assessing accuracy, completeness, comparability, and traceability, it was determined that data quality objectives were achieved for the collection of real-time ambient air monitoring data for the project.

Assessment of time-integrated air monitoring was completed in terms of precision, accuracy, representativeness, completeness, comparability, and traceability. Assessment of precision was achieved through the use of a co-located AMS for VOCs for the collection of field duplicate samples. Flow rate accuracy of PUF samplers was determined by the use of single-point calibration audits before and after each sampling event using certified calibration orifices supplied by the equipment manufacturer. Flow rate accuracy of Summa™ regulators was assessed via the comparison of pre- and post-sample canister vacuums. Analytical accuracy was determined by the recovery of laboratory-introduced surrogate compounds. Representativeness was assessed by inspecting trip blank results, the use of consistent procedures, sample holding times, and sample preservation. Assessment of completeness was measured in terms of whether all planned samples were obtained from each planned sampling event. Comparability was assessed by determining that all field staff using the equipment operated it in a common way and by using common units of measure for all calculations. Traceability was assessed by reviewing documentation of time-integrated air monitoring events in the form of field log sheets, sample collection logs and calibration records, and laboratory reports and chain of custody records.

Upon assessing the discussed data quality parameters, it was determined that data quality objectives were generally achieved for the collection of time-integrated ambient air monitoring data for the project. No data was rejected as a result of the noted data quality exceptions in consideration that rejected data would result in an irreplaceable gap in the data set (i.e., collection of time- and activity-specific replacement data was not possible).

2.5.4 Odor and Dust Control

Odor and dust were monitored during excavation activities. Preventative measures were taken by SK to limit visible dust by using wet methods. Dusty conditions were observed on several days due to the nature of the activities being conducted and windy conditions. On these days, a combination of real-time air monitoring, using the DRI units described previously, and visual inspections were used to evaluate dust levels. When dust became visible onsite, SK was notified to increase wet methods by increasing the frequency and volume of water over-spray. On several instances during building demolition, work was temporarily halted until more dust control measures were taken. After implemented additional efforts, dust concentrations were reduced below action levels and work was resumed.

An effort was made to minimize odors by minimizing the amount of heavily impacted soil stockpiled overnight. Generally, impacted soil was excavated and loaded for transport off-site the same day, thereby eliminating the need to stockpile heavily impacted material overnight. During the rare occasions when stockpiled material was not transported offsite by the end of the day, heavily impacted materials were covered with less-impacted materials to form an odor barrier so the stockpile could be left overnight without excessive odors. This method noticeably reduced odors and perimeter air monitoring for VOC’s proved them effective at eliminating excessive VOCs leaving the site. The truckloads of impacted soil leaving the site were covered with tarps to reduce odors and dust emissions while transporting the loads to the disposal facility.

3. Risk Evaluation

The risk evaluation results presented in this Report address the potential human health risk associated with exposure to contaminants in soil. Groundwater risks were not calculated pending completion of the proposed post-soil removal quarterly groundwater sampling (initiated during the second quarter of 2021). Soil data used for evaluation of risk is tabulated in Table 1, the locations of those samples are shown on Figure 7.

3.1 Data Evaluation

Soil sampling has been conducted for a broad list of compounds that comprise the principal FMGP-related contaminants including PAHs, VOCs, phenols, arsenic, lead, and cyanide. All soil sample data from the site representative of materials remaining at the site after the IRA excavation have been retained for risk evaluation. The IDNR’s risk calculator (https://programs.iowadnr.gov/riskcalc/) was used to evaluate soil exposure scenarios for residents, site workers, and construction workers. As site investigation work was conducted on four different properties (the FMGP site owned by CVEC; property west of the FMGP site owned by William Henderson; the highway right of way east of the FMGP owned by the Iowa Department of Transportation [IDOT]; and the gravel road right of way south of the FMGP site owned by the City of Albia), soil data was grouped by property owner.

The soil data sets were further separated into two depth categories, shallow soil which includes samples collected from 0-2 feet below ground surface, and deeper soil collected from greater than 2 feet below ground surface. Although residential land use is not anticipated from any of the parcels, the shallow interval was used to represent soil most likely to be contacted by residents and/or those working at the site. The deeper interval represents the soil below the shallow soil which is not likely to be encountered by residents or site workers, but may be encountered by workers performing subsurface utility work. Soil samples representing materials removed during excavation were omitted from the data sets prior to risk evaluation.

As a conservative measure, all compounds detected in soil from each exposure area were retained in the risk evaluation, even those which do not exceed the corresponding SWS. USEPA software ProUCL (Version 5.1.002) was used to characterize the data set (e.g., data distribution, variability, number of data points, number of data points below the Method Detection Limit [MDL], number of tied data values, etc.) and calculate the appropriate 95 percent upper confidence limit (UCL) of the true mean concentration for each analyte. By definition, the 95 percent UCL of the true mean concentration of an analyte is a value that, when calculated repeatedly for randomly drawn data sets, equals or exceeds the true mean concentration of the analyte 95 percent of the time (USEPA, 1992). In situations where ProUCL was unable to calculate an UCL (only one detection, data set too small, etc.), the maximum value observed from the exposure area was retained as the representative exposure point concentration (EPC).

The 95 percent UCLs calculations are provided in Appendix C and summarized in Table 8. The calculated 95 percent UCLs were used as the EPCs in the cumulative risk evaluations. A cumulative risk evaluation was completed to determine if the cumulative risk for the soil exposure scenarios being evaluated meet the IDNR risk criteria of 10^{-4} target cancer risk and a Target Hazard Quotient (THQ) of less than 1 for each target organ.

3.2 Potential Pathway and Receptor Evaluation

Exposure pathways can be defined as a route through which compounds in the environment become available to potential receptor populations. Once a completed pathway exists, the compounds have the potential to enter the human body through ingestion, inhalation, dermal contact, and absorption. The following sections examine possible points of exposure, potentially completed pathways, and potential receptors. It concludes with a summary of those constituents that have the potential to pose unacceptable risks.

3.2.1 Current and Future Uses

Following the soil excavation activities, the FMGP site will be an undeveloped, grassed parcel with no structures. CVEC has indicated they do not have any plans to redevelop the FMGP property, and anticipate that the property will be used as green space and may eventually be turned over to the City of Albia. No change in land use is anticipated on the Bill Henderson, IDOT, or City of Albia properties.

3.2.2 Soil Exposure Points and Potential Pathways

The soil exposure pathways considered in the IDNR risk calculator include incidental ingestion of soil and dermal absorption. Site Residents and Site Workers would have unlikely potential for exposure to residual soil impact since the majority of impacted material has been removed and has been replaced with clean fill and top dressed with clean top soil and seeded. Analytical results for the soil brought onsite is summarized in Table 2 and Table 3. Construction workers and workers installing or maintaining utility lines could have exposure to deeper soil.

3.2.3 Potential Receptors

The potential human receptors for surface and subsurface soil being evaluated for the property include residents, on-site workers (commercial/industrial workers), and construction workers. As previously stated, for the purpose of the risk evaluation, only material not excavated during the removal action is evaluated. Since the excavated areas consist of clean fill, they do not represent an impacted area and, therefore, are not a risk to potential receptors. The reasonable maximum exposure scenarios (RMEs) for the soil receptors are described below:

1. The site resident is based on EPA default assumptions that focus on individuals who may live in an area for an extended period of time (30 years) with continuous onsite presence (24 hours per day) from childhood through adulthood. For carcinogens, risk calculations utilized a high-end exposure duration (30 years) and TWA soil

ingestion rates and dermal factors. These calculations reflect exposure by both children and adults. For non-carcinogens, only childhood exposure is evaluated, as this is considered to be more conservative.

2. A commercial/industrial adult worker works at the contaminated site, 225 days per year, 8 hours per day, over a period of 25 years of his/her lifetime. The worker is assumed to be exposed to contaminants by incidental ingestion and dermal contact with contaminated soils.
3. A construction worker is exposed to soil contaminants for 200 days for 8 hours per day for the duration of a single construction project. The construction worker is expected to be exposed to impacted soil through incidental ingestion and dermal contact.

3.3 Risk Summary

Risk to future site residents and site workers was estimated using the 95 percent UCL of concentrations for the upper 2 feet of soil for the data set and inputting the data into the IDNR's cumulative risk calculator. IDNR's acceptable risk is considered less than 1 x 10^{-4} cumulative cancer risk and 1 for cumulative non-carcinogenic risks. The risks for the 0-2 feet depth range were calculated for each of the four site properties. The estimated cumulative cancer risks to a site resident ranged from 0.22 x 10^{-4} at the Henderson property to 0.63 x 10^{-4} at the CVEC property. The estimated cumulative cancer risks to a site worker ranged from 0.1 x 10^{-4} at the Henderson property to 0.25 x 10^{-4} at the CVEC property. Non-cancer risks for the 0-2 feet depth range for site residents ranged from zero for numerous target organs to 1.25 for the heart at the CVEC property (the only exposure scenario that resulted in a hazard quotient in excess of 1). Non-cancer risks for the 0-2 feet depth range for site workers ranged from zero for numerous target organs to 0.25 for the heart at the CVEC property. Risk values for the exposure scenarios are tabulated in Table 9. IDNR Risk Calculator outputs are provided in Appendix D.

Risk to future construction workers was estimated using the 95 percent UCL for the soil data set collected below 2 feet bgs. The estimated cumulative cancer risk to a construction worker was less than 10^{-6} for all properties. The non-carcinogenic risks ranged from zero for numerous target organs to 0.11 for the heart target organ on the IDOT property. The cumulative cancer risk and non-carcinogenic risks are within IDNR's acceptable risk range.

Although the non-cancer risk for the 0-2 feet interval on the CVEC property exceeded the IDNR's risk criterion, it should be noted that IPL intends to work with CVEC to establish institutional controls, including an environmental covenant, to prohibit residential use of the property and prevent completion of the residential exposure scenario. Additionally, it should be noted that the arsenic EPC for the CVEC 0-2 foot site resident exposure scenario contributed to approximately 86 percent of the hazard quotient for the heart target organ. The data set used to develop the UCL used as the EPC (21.49 mg/kg) consisted of three data points with concentrations of 1.43, 5.77, and 16.9 mg/kg. If the maximum observed concentration of 16.9 mg/kg had been used as the arsenic EPC, the resulting hazard quotient for the heart target organ would be 0.94, a value below the IDNR criterion of 1. Furthermore, these samples represent soils outside the perimeter of excavation, and are in a range generally considered to be representative of natural background concentrations for arsenic in Iowa soils.

4. Summary and Conclusions

The response action performed at the Albia FMGP site from November 2020 to January 2021 resulted in successful removal of soils that exceeded the SWSs. The soils were disposed of properly at SCISWA in Tracy, Iowa. Site restoration was performed by backfilling the site with material from an offsite borrow source to 6 inches below final grade. The site was regraded similar to the original contours to allow for minimal ponding and proper drainage, then topsoil was placed to grade. Seeding, which included seed and mulch, was completed on April 26, 2021.

Perimeter air monitoring did not detect VOCs above the PAAQs. In some instances, dust levels were detected above action levels as presented by real-time monitoring using the DustTrak units. Actions taken to reduce dust from IRA work included increasing wet methods. These methods effectively controlled dust concentrations.

GHD completed a risk evaluation using the available soil data for the two soil depth intervals of interest. GHD used the 95 percent UCL for each soil contaminant as discussed in Section 3.1 to estimate the soil risk to future site residents, future commercial workers, and future construction workers. The calculated risks were all within the acceptable ranges established by IDNR with the exception of site resident on the CVEC portion of the site; as noted previously, the majority of the risk is associated with arsenic concentrations in soil, which may be within background concentration ranges for Iowa soils.

No change in land use is anticipated on the Bill Henderson, IDOT, or City of Albia properties. CVEC has indicated they do not have any plans to redevelop the FMGP property, and anticipate that the property will be used as green space and may eventually be turned over to the City of Albia.

The Albia FMGP IRA resulted in successful remediation of the site as defined in the IRAWP (GHD, 2020a).

5. References

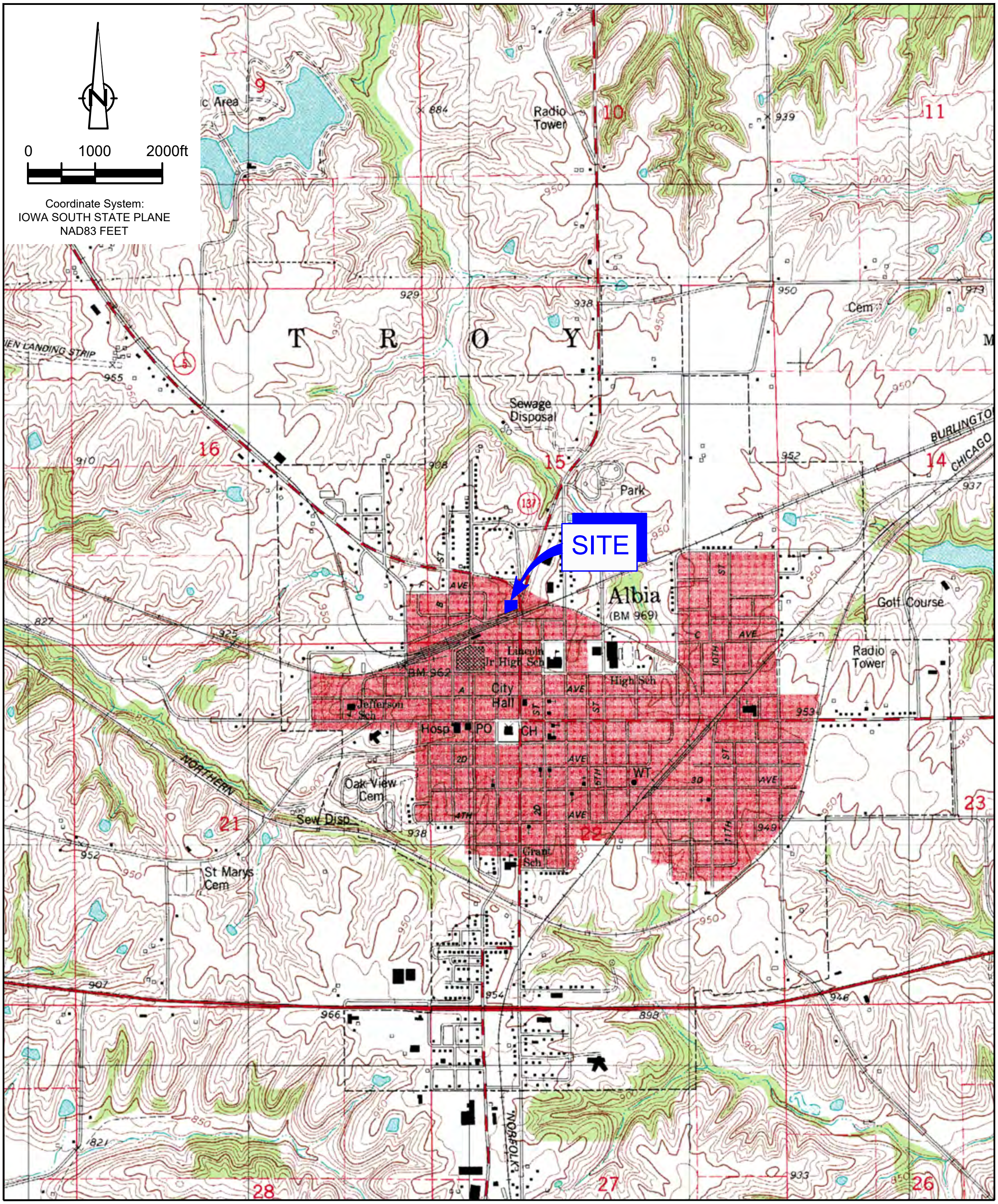
EPA, 2020, Regional Screening Tables Online Calculator, February 18, 2020. Oak Ridge National Laboratory. https://epa-prgs.oml.gov/cgi-bin/chemicals/csi_search.

GHD, 2020a. Interim Response Action Work Plan for the Albia Former Manufactured Gas Plant Site, Albia, Iowa. April 2020.

GHD, 2020b. Pals, Diane (GHD). Pre-Demolition Survey letter to Becky Teno (CVEC). October 16, 2020. Albia FMGP Site, Albia, Iowa.

GHD, 2021. Decommissioning and Demolition Completion Report for the Albia Former Manufactured Gas Plant Site, Albia, Iowa. January 2021

Figures



Source: USGS Topographic Quadrangle Map(s) : Albia, IA., & Moravia, IA.

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

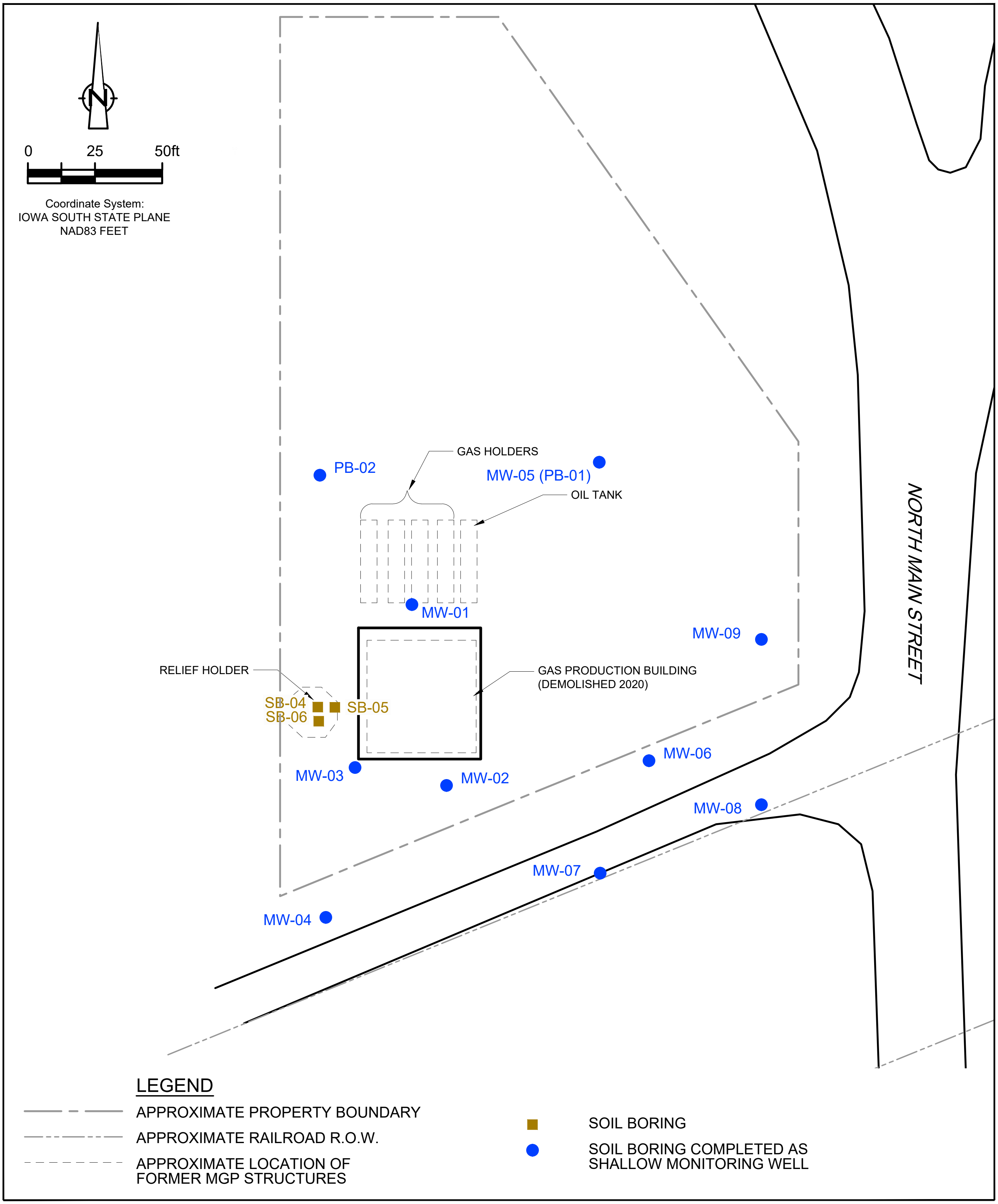
11156780-003

May 6, 2021

SITE LOCATION MAP

FIGURE 1

CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11156000s\11156780\11156780-REPORT\11156780-003(006)\11156780-GHD-0000-RPT-EN-0106_WA-006.DWG



Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

GHD

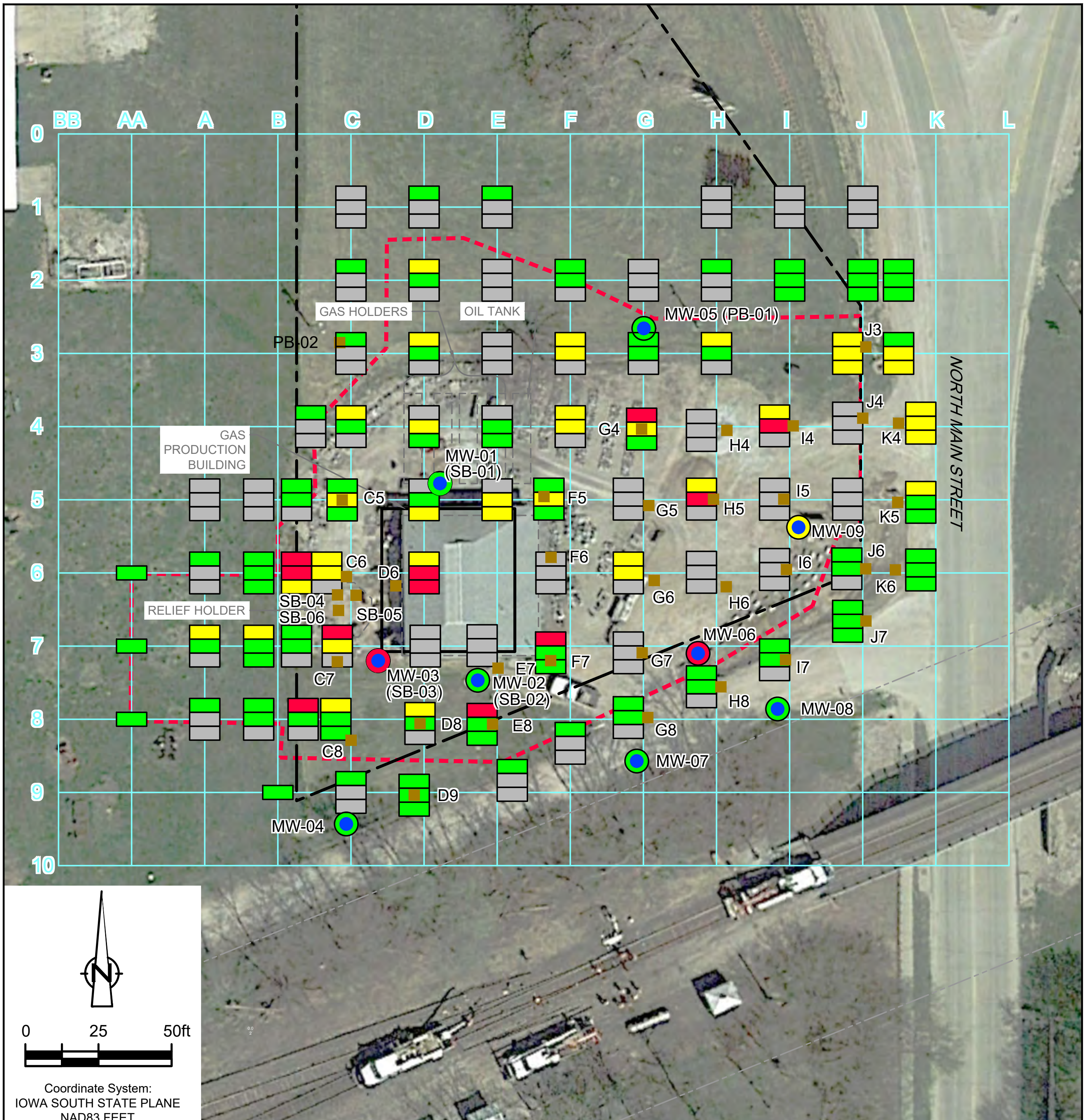
INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

11156780-003
May 6, 2021

SITE LAYOUT MAP

FIGURE 2

CAD File: N:\CA\Waterloo\Legacy\CAD\drawings\11156000s\11156780\11156780-REPORT\11156780-003(006)\11156780-GHD-0000-RPT-EN-0107_WA-006.DWG



Imagery Source: Google earth 4/13/2016

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE RAILROAD R.O.W.
- APPROXIMATE LOCATION OF FORMER MGP STRUCTURES
- PROPOSED EXCAVATION EXTENT
- SOIL BORING
- SOIL BORING COMPLETED AS SHALLOW MONITORING WELL
- 1' DEPTH SAMPLE
- 3' DEPTH SAMPLE
- 5' DEPTH SAMPLE
- NOT ANALYZED/EXPIRED
- MEETS SWS
- EXCEEDS SWS
- EXCEEDS SWS BY >10x

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

GHD

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

PRE-EXCAVATION SOIL SAMPLING LOCATIONS AND PROPOSED EXTENT OF EXCAVATION

11156780-003
May 6, 2021

FIGURE 3

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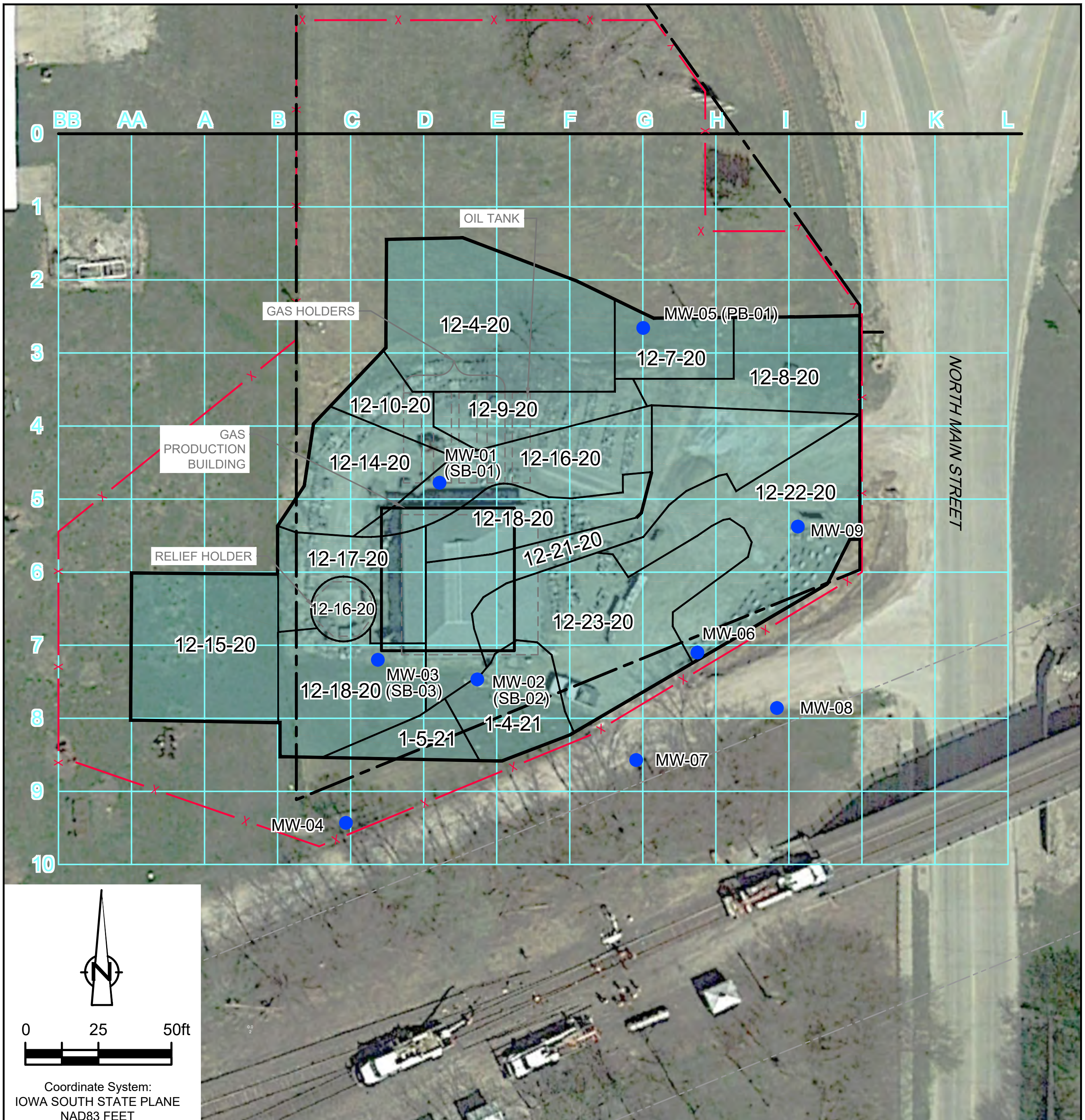

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE RAILROAD R.O.W.
- APPROXIMATE LOCATION OF FORMER MGP STRUCTURES
- FENCE LINE
- SOIL BORING COMPLETED AS SHALLOW MONITORING WELL

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

11156780-003
May 6, 2021

EXTENT AND PROGRESSION OF EXCAVATION

FIGURE 4

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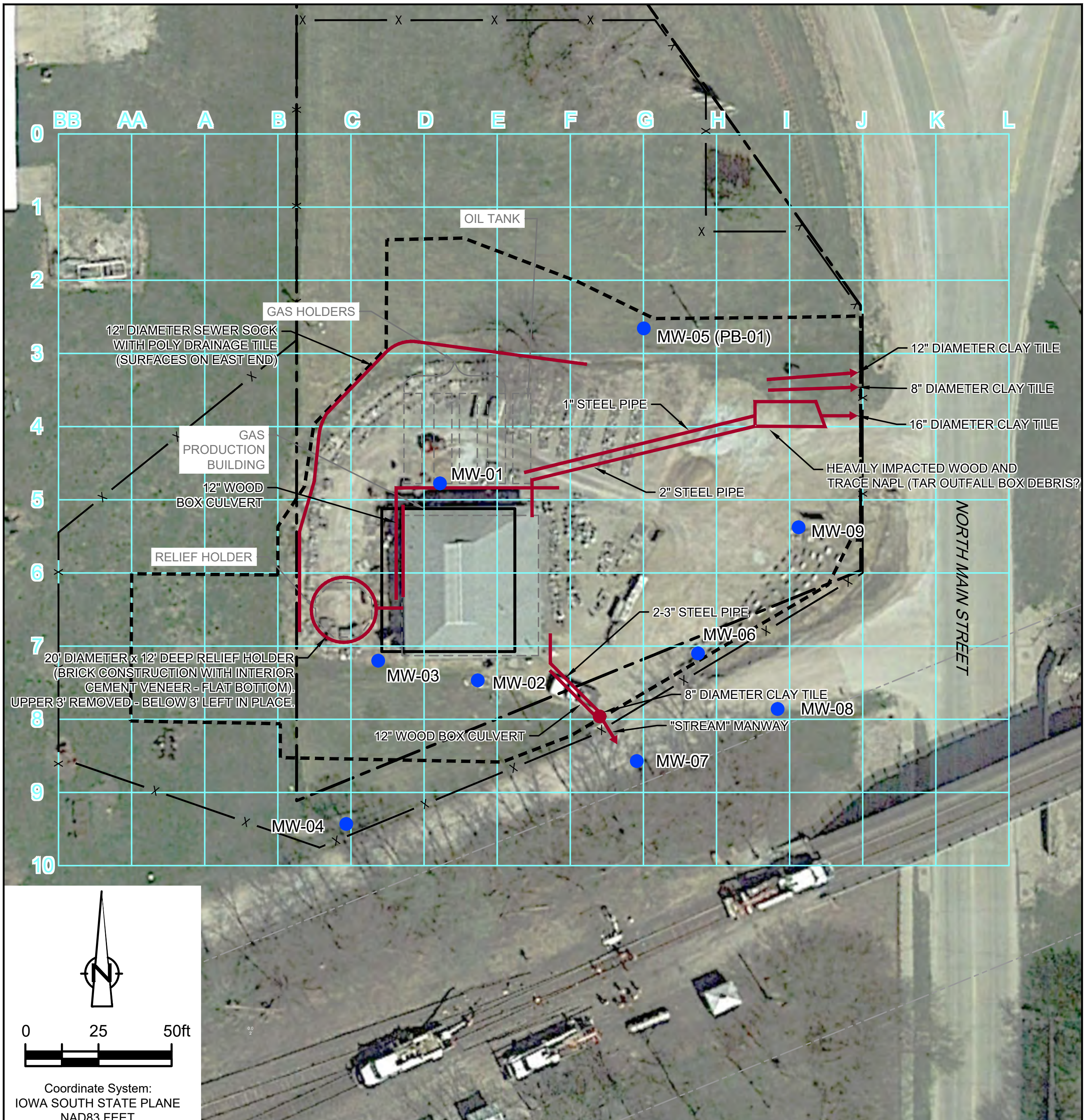

Imagery Source: Google earth 4/13/2016

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE RAILROAD R.O.W.
- APPROXIMATE LOCATION OF FORMER MGP STRUCTURES
- FENCE LINE
- SOIL BORING COMPLETED AS SHALLOW MONITORING WELL
- SUB-SURFACE STRUCTURES ENCOUNTERED DURING EXCAVATION AND REMOVED (UNLESS NOTED)
- EXCAVATION EXTENT

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

11156780-003

May 6, 2021

STRUCTURES ENCOUNTERED DURING EXCAVATION

FIGURE 5

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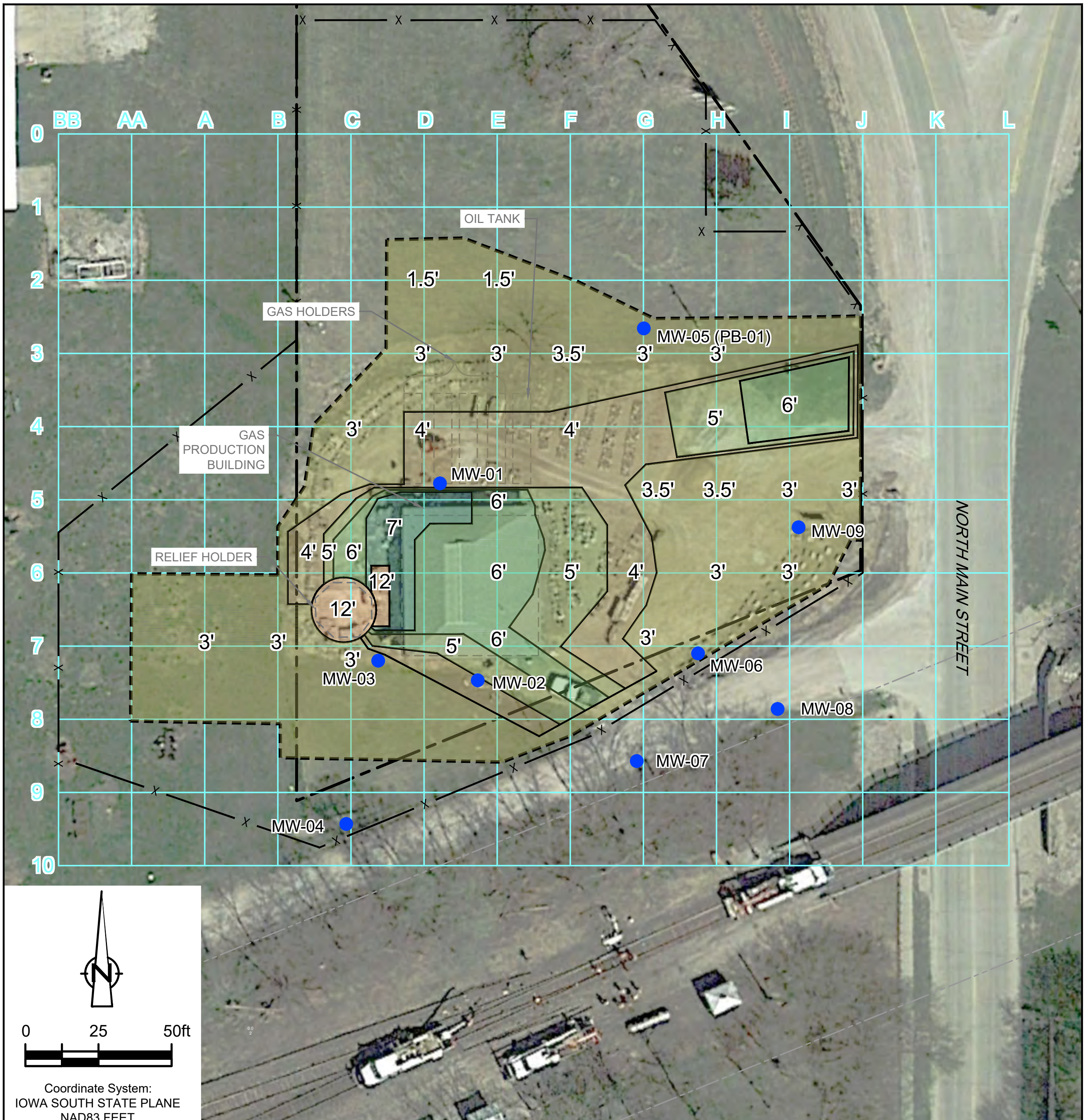

Imagery Source: Google earth 4/13/2016

LEGEND

APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE RAILROAD R.O.W.

APPROXIMATE LOCATION OF FORMER MGP STRUCTURES

SOIL BORING COMPLETED AS SHALLOW MONITORING WELL

EXCAVATION LEGEND

3'	1-3' DEPTH
4'	4' DEPTH
5'	5' DEPTH
6'	6' DEPTH
7'	7' DEPTH
12'	12' DEPTH

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

GHD

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

11156780-003
May 6, 2021

DEPTH OF EXCAVATION

FIGURE 6

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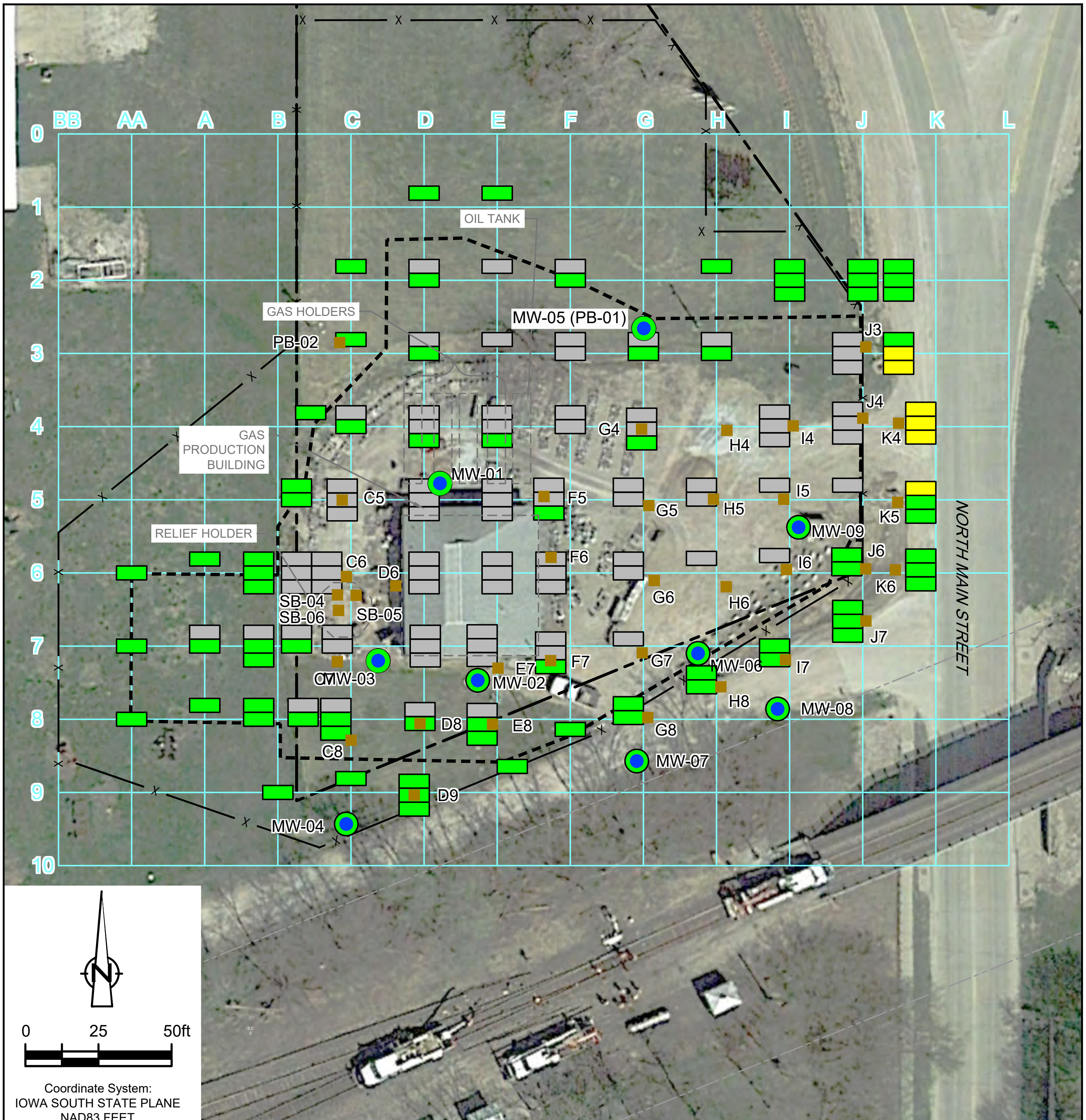

LEGEND

Imagery Source: Google earth 4/13/2016

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE RAILROAD R.O.W.
- APPROXIMATE LOCATION OF FORMER MGP STRUCTURES
- SOIL BORING COMPLETED AS SHALLOW MONITORING WELL
- SOIL BORING
- 1' DEPTH SAMPLE
- 3' DEPTH SAMPLE
- 5' DEPTH SAMPLE
- EXCAVATION EXTENT
- EXCAVATED/REMOVED
- MEETS SWS
- EXCEEDS SWS
- EXCEEDS SWS BY >10x

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

GHD

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

SOIL SAMPLING LOCATIONS
USED FOR RISK EVALUATON

11156780-003
May 6, 2021

FIGURE 7

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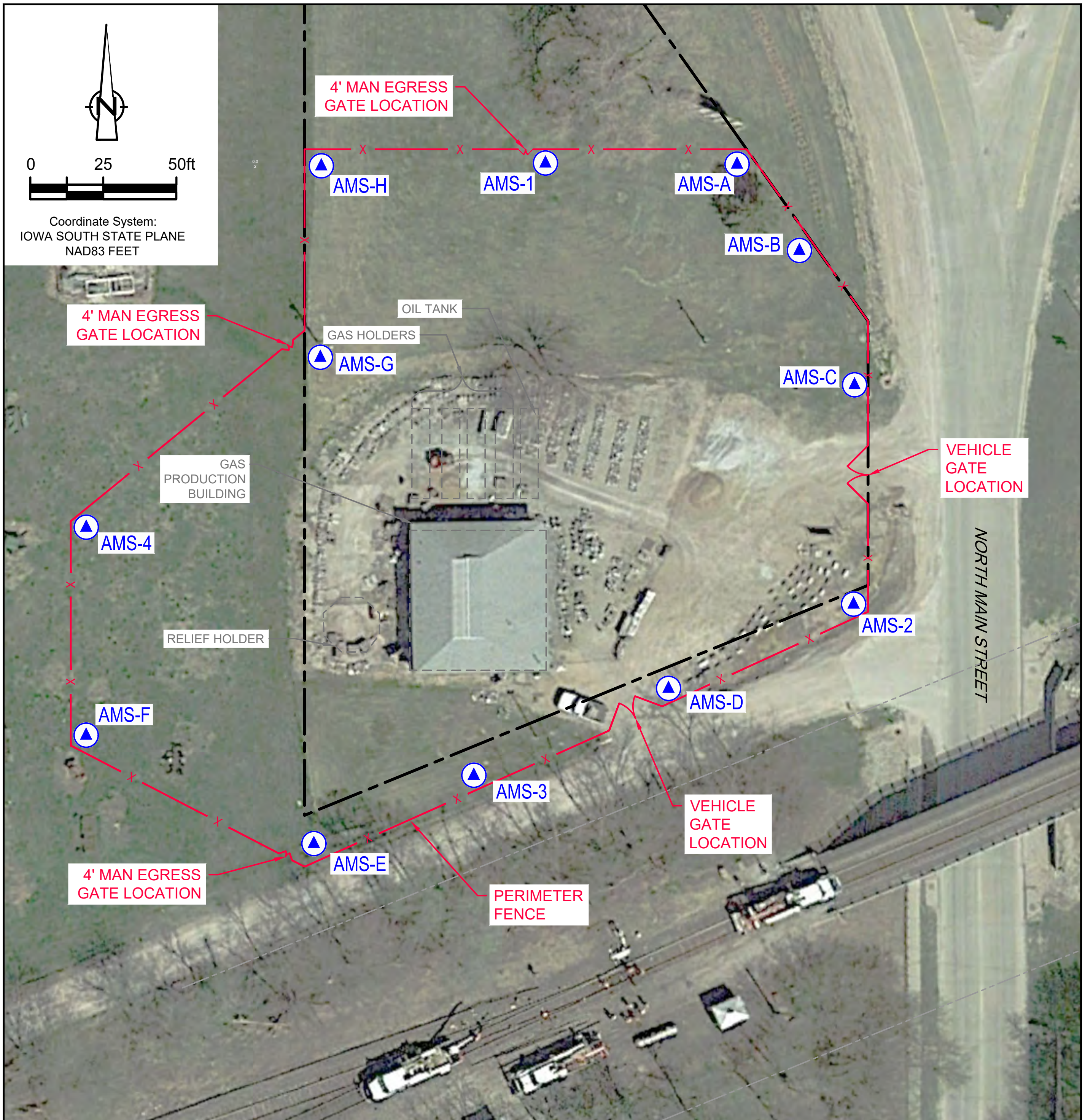

Imagery Source: Google earth 4/13/2016

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- APPROXIMATE RAILROAD R.O.W.
- APPROXIMATE LOCATION OF FORMER MGP STRUCTURES
- PROPOSED AMBIENT AIR MONITORING STATION (AMS)
- X NEW FENCELINE LOCATION

Source: FORMER MGP STRUCTURES FROM SANBORN MAP CO. IMAGERY (1922). & PROPERTY BOUNDARY ESTIMATED FROM MONROE COUNTY GIS.

GHD

INTERSTATE POWER AND LIGHT COMPANY
ALBIA FORMER MANUFACTURED GAS PLANT SITE
ALBIA, IOWA

11156780-003
May 6, 2021

AMBIENT AIR MONITORING STATIONS

FIGURE 8

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Tables

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated SB01-SL-0418-0-2.5' 4/23/2018	SB01-SL-0418-7.5-10' 4/23/2018	excavated SB02-SL-0418-0-2.5' 4/23/2018	SB02-SL-0418-7.5-10' 4/23/2018	excavated SB03-SL-0418-0-2.5' 4/23/2018	SB03-SL-0418-5-7.5' 4/23/2018	excavated SB04-SL-0418-0-2.5' 4/23/2018	excavated SB04-SL-0418-7.5-10' 4/23/2018	PB01-SL-0718-1.25' 7/11/2018	PB01-SL-0718-8.75' 7/11/2018	excavated PB02-SL-0718-1.25' 7/11/2018	PB02-SL-0718-3.75' 7/11/2018
Inorganics														
Cyanide, Amenable	mg/kg	NA	<1.30	<1.27	<1.29	<1.33	<1.35	<1.32	<1.37	<1.42	<1.22	<1.23	<1.18	<1.29
Arsenic	mg/kg	17	9.45	<8.34	<6.66	<6.19	6.58	<7.54	8.11	**21.1**	16.9	<7.36	<7.44	<12.0
Lead	mg/kg	400	16.4	16.6	27.9	11.9	147	15.5	18.1	102	15.3	<9.20	39.1	27.8
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	**748**	<0.115	<0.0118	<0.116	<0.0126
Acenaphthene	mg/kg	3400	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	29.2	<0.115	0.0503	<0.116	<0.0126
Acenaphthylene	mg/kg	1700	<2.47	<2.47 F1	<2.52	<0.257	14.1	<0.254	5.74	301	0.342	<0.0118	0.145	<0.0126
Anthracene	mg/kg	17000	<2.47	<2.47 F1 F2	<2.52	<0.257	12.2	<0.254	<2.65	72.4	0.192	0.0205	<0.116	<0.0126
Benzo[a]anthracene	mg/kg	3.1	<0.986	1.31 J F1 F2	<1.01	<0.103	**15.5**	<0.102	<1.06	**22.7**	0.481	0.0192	0.116	<0.0126
Benzo[a]pyrene	mg/kg	2.3	<1.21	1.80 J F1	<1.23	<0.126	**32.8**	<0.124	**4.53**	**14.6**	0.830	0.0191	0.170	<0.0126
Benzo[b]fluoranthene	mg/kg	3.1	<0.949	1.31 J F1	<0.969	<0.0988	**35.8**	<0.0978	2.92	**14.9**	0.798	0.0180	0.230	<0.0126
Benzo[g,h,i]perylene	mg/kg	170	<2.47	<2.47 F1	<2.52	<0.257	49.4	<0.254	7.78	8.80	0.932	<0.0118	0.194	<0.0126
Benzo[k]fluoranthene	mg/kg	31	<2.47	<2.47 F1	<2.52	<0.257	12.3	<0.254	<2.65	3.46	0.311	<0.0118	<0.116	<0.0126
Chrysene	mg/kg	310	<2.47	<2.47 F1 F2	<2.52	<0.257	22.0	<0.254	<2.65	24.8	0.541	0.0211	0.173	<0.0126
Dibenz(a,h)anthracene	mg/kg	0.31	<0.900	<0.900 F1	<0.918	<0.0936	**5.95**	<0.0927	**1.31 J**	**2.46 J**	0.152	<0.0118	<0.116	<0.0126
Fluoranthene	mg/kg	2300	<2.47	4.38 F1 F2	<2.52	<0.257	23.5	<0.254	<2.65	66.2	0.598	0.0577	0.273	<0.0126
Fluorene	mg/kg	2300	<2.47	<2.47	<2.52	<0.257	<2.66	<0.254	<2.65	140	<0.115	0.0265	<0.116	<0.0126
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.974	1.49 J F1	<0.994	<0.101	**44.8**	<0.100	**7.75**	**10.5**	0.834	<0.0118	0.191	<0.0126
Naphthalene	mg/kg	1100	<2.47	13.6 F1	<2.52	<0.257	<2.66	0.379	<2.65	**1410**	<0.115	<0.0118	<0.116	<0.0126
Phenanthrene	mg/kg	1700	<2.47	9.75 F1 F2	<2.52	<0.257	4.55	<0.254	<2.65	324	0.389	0.0719	0.232	<0.0126
Pyrene	mg/kg	1700	<2.47	6.37 F1 F2	<2.52	<0.257	51.9	<0.254	<2.65	101	1.02	0.0917	0.413	<0.0126
Volatile Organic Compounds														
Benzene	mg/kg	56	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	0.0194	<0.0144	**218**	<0.0118	<0.0144	<0.0131	<0.0145
Ethylbenzene	mg/kg	7600	<0.0152	2.00 F1 F2	<0.0148	<0.0140	<0.0150	0.0203	<0.0144	259 H	<0.0118	<0.0144	<0.0131	<0.0145
Toluene	mg/kg	6100	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	342 H	<0.0118	<0.0144	<0.0131	<0.0145
Xylenes, Total	mg/kg	15000	<0.0456	1.07 F1 F2	<0.0445	<0.0420	<0.0450	<0.0411	<0.0433	188	<0.0354	<0.0431	<0.0394	<0.0434
1,1,1,2-Tetrachloroethane	mg/kg	230	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1,1-Trichloroethane	mg/kg	150000	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1,2,2-Tetrachloroethane	mg/kg	15	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1,2-Trichloroethane	mg/kg	54	<0.0152	<0.121 F2	<0.0148 *	<0.0140 *	<0.0150 *	<0.0137 *	<0.0144 *	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1-Dichloroethane	mg/kg	1500	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1-Dichloroethene	mg/kg	380	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,1-Dichloropropene	mg/kg	NA	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,2,3-Trichlorobenzene	mg/kg	NA	<0.0760	<0.121	<0.0742	<0.0700	<0.0751	<0.0684	<0.0721	<1.31 H	<0.0590	<0.0718	<0.0657	<0.0723
1,2,3-Trichloropropane	mg/kg	0.1	<0.0152	<0.121	<0.0148 *	<0.0140 *	<0.0150 *	<0.0137 *	<0.0144 *	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,2,4-Trichlorobenzene	mg/kg	760	<0.0760	<0.121	<0.0742	<0.0700	<0.0751	<0.0684	<0.0721	<1.31 H	<0.0590	<0.0718	<0.0657	<0.0723
1,2,4-Trimethylbenzene	mg/kg	760	<0.0152	0.809	<0.0148	<0.0140	<0.0150	0.0201	<0.0144	124 H	<0.0118	<0.0144	<0.0131	<0.0145
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	<0.152	<0.121	<0.148	<0.140	<0.150	<0.137	<0.144	<1.31 H	<0.118	<0.144	<0.131	<0.145
1,2-Dibromoethane (EDB)	mg/kg	1.5	<0.152	<0.121 F2	<0.148 *	<0.140 *	<0.150 *	<0.137 *	<0.144 *	<0.131	<0.118	<0.144	<0.131	<0.145
1,2-Dichlorobenzene	mg/kg	5500	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
1,2-Dichloroethane	mg/kg	34	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,2-Dichloropropane	mg/kg	53	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,3,5-Trimethylbenzene	mg/kg	760	<0.0152	0.274 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	31.4 H	<0.0118	<0.0144	<0.0131	<0.0145

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated SB01-SL-0418-0-2.5' 4/23/2018	SB01-SL-0418 -7.5-10' 4/23/2018	excavated SB02-SL-0418 -0-2.5' 4/23/2018	SB02-SL-0418-7.5-10' 4/23/2018	excavated SB03-SL-0418-0-2.5' 4/23/2018	SB03-SL-0418-5-7.5' 4/23/2018	excavated SB04-SL-0418-0-2.5' 4/23/2018	excavated SB04-SL-0418-7.5-10' 4/23/2018	PB01-SL-0718-1.25' 7/11/2018	PB01-SL-0718-8.75' 7/11/2018	excavated PB02-SL-0718-1.25' 7/11/2018	PB02-SL-0718-3.75' 7/11/2018
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
1,3-Dichloropropane	mg/kg	NA	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
1,4-Dichlorobenzene	mg/kg	760	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
2,2-Dichloropropane	mg/kg	NA	<0.0608	<0.121 F2	<0.0594	<0.0560	<0.0600	<0.0548	<0.0577	<0.131	<0.0472	<0.0574	<0.0526	<0.0578
2-Butanone (MEK)	mg/kg	46000	<0.152	<0.302 F2	<0.148	<0.140	<0.150	<0.137	<0.144	<0.326	<0.118	<0.144	<0.131	<0.145
2-Chlorotoluene	mg/kg	1500	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
4-Chlorotoluene	mg/kg	1500	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
Acetone	mg/kg	68000	<0.152	<0.604 F1	<0.148	<0.140	<0.150	<0.137	<0.144	<0.653	<0.118	<0.144	<0.131	<0.145
Bromobenzene	mg/kg	NA	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Bromochloromethane	mg/kg	760	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Bromodichloromethane	mg/kg	50	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Bromoform	mg/kg	390	<0.0304	<0.121	<0.0297	<0.0280	<0.0300	<0.0274	<0.0288	<0.131	<0.0236	<0.0287	<0.0263	<0.0289
Bromomethane	mg/kg	110	<0.0608	<0.604	<0.0594	<0.0560	<0.0600	<0.0548	<0.0577	<0.653	<0.0472	<0.0574	<0.0526	<0.0578
Carbon disulfide	mg/kg	7600	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Carbon tetrachloride	mg/kg	44	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Chlorobenzene	mg/kg	1500	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Chlorodibromomethane	mg/kg	150	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Chloroethane	mg/kg	30000	<0.0608	<0.121	<0.0594	<0.0560	<0.0600	<0.0548	<0.0577	<0.131	<0.0472	<0.0574	<0.0526	<0.0578
Chloroform	mg/kg	NA	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Chloromethane	mg/kg	NA	<0.0608	<0.302	<0.0594	<0.0560	<0.0600	<0.0548	<0.0577	<0.326	<0.0472	<0.0574	<0.0526	<0.0578
cis-1,2-Dichloroethene	mg/kg	150	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
cis-1,3-Dichloropropene	mg/kg	NA	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Dibromomethane	mg/kg	760	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Dichlorodifluoromethane	mg/kg	15000	<0.0456	<0.121	<0.0445	<0.0420	<0.0450	<0.0411	<0.0433	<0.131	<0.0354	<0.0431	<0.0394	<0.0434
Hexachlorobutadiene	mg/kg	40	<0.0760	<0.121	<0.0742	<0.0700	<0.0751	<0.0684	<0.0721	<1.31 H	<0.0590	<0.0718	<0.0657	<0.0723
Hexane	mg/kg	4600	<0.0760	<0.121	<0.0742	<0.0700	<0.0751	<0.0684	<0.0721	<0.131	<0.0590	<0.0718	<0.0657	<0.0723
Isopropylbenzene	mg/kg	7600	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	3.46	<0.0118	<0.0144	<0.0131	<0.0145
Methyl tert-butyl ether	mg/kg	2300	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Methylene Chloride	mg/kg	1500	<0.152	<0.302	<0.148	<0.140	<0.150	<0.137	<0.144	<0.326	<0.118	<0.144	<0.131	<0.145
n-Butylbenzene	mg/kg	3800	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	10.8 H	<0.0118	<0.0144	<0.0131	<0.0145
N-Propylbenzene	mg/kg	7600	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	10.8	<0.0118	<0.0144	<0.0131	<0.0145
p-Isopropyltoluene	mg/kg	NA	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	3.09 H	<0.0118	<0.0144	<0.0131	<0.0145
sec-Butylbenzene	mg/kg	NA	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
Styrene	mg/kg	15000	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	68.0	<0.0118	<0.0144	<0.0131	<0.0145
tert-Butylbenzene	mg/kg	NA	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<1.31 H	<0.0118	<0.0144	<0.0131	<0.0145
Tetrachloroethene	mg/kg	1500	<0.0152	<0.121 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
trans-1,2-Dichloroethene	mg/kg	1500	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
trans-1,3-Dichloropropene	mg/kg	NA	<0.0152	<0.121 F1 F2	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Trichloroethene	mg/kg	67	<0.0152	<0.121	<0.0148	<0.0140	<0.0150	<0.0137	<0.0144	<0.131	<0.0118	<0.0144	<0.0131	<0.0145
Trichlorofluoromethane	mg/kg	23000	<0.0608	<0.121	<0.0594	<0.0560	<0.0600	<0.0548	<0.0577	<0.131	<0.0472	<0.0574	<0.0526	<0.0578
Vinyl chloride	mg/kg	2.1	<0.0456	<0.121	<0.0445	<0.0420	<0.0450	<0.0411	<0.0433	<0.131	<0.0354	<0.0431	<0.0394	<0.0434

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated SB01-SL-0418-0-2.5' 4/23/2018	SB01-SL-0418-7.5-10' 4/23/2018	excavated SB02-SL-0418-0-2.5' 4/23/2018	SB02-SL-0418-7.5-10' 4/23/2018	excavated SB03-SL-0418-0-2.5' 4/23/2018	SB03-SL-0418-5-7.5' 4/23/2018	excavated SB04-SL-0418-0-2.5' 4/23/2018	excavated SB04-SL-0418-7.5-10' 4/23/2018	PB01-SL-0718-1.25' 7/11/2018	PB01-SL-0718-8.75' 7/11/2018	excavated PB02-SL-0718-1.25' 7/11/2018	PB02-SL-0718-3.75' 7/11/2018
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	<4.93 *	<4.93 F1 *	<5.03 *	<0.513 *	<5.32 *	<0.508 *	<5.30 *	<5.37 *	-	-	-	-
2-Chlorophenol	mg/kg	310	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2-Methylphenol	mg/kg	3100	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
2-Nitrophenol	mg/kg	NA	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
4-Nitrophenol	mg/kg	490	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
Pentachlorophenol	mg/kg	4.5	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
Phenol	mg/kg	18000	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-
Total Cresols	mg/kg	NA	<2.47	<2.47 F1	<2.52	<0.257	<2.66	<0.254	<2.65	<2.68	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	MW04-SL-0718-1.25' 7/11/2018	MW04-SL-0718-6.25' 7/11/2018	excavated MW06-SL-0718-1.25' 7/12/2018	MW06-SL-0718-13.75' 7/12/2018	MW07-SL-0918-1.25' 9/19/2018	MW07-SL-0918-6.25' 9/19/2018	MW08-SL-0918-1.25' 9/19/2018	MW08-SL-0918-3.75' 9/19/2018	excavated MW09-SL-0918-1.25' 9/19/2018	MW09-SL-0918-6.25' 9/19/2018	excavated C5-SL-0819-1' 8/13/2019	excavated C5-SL-0819-3' 8/13/2019
Inorganics														
Cyanide, Amenable	mg/kg	NA	<1.31	<1.28	<1.30	<1.15	<1.25	<1.28	<1.27	<1.22	<1.26	<1.26	-	-
Arsenic	mg/kg	17	<7.79	<7.93	14.8	9.10	<7.26	<7.61	<7.59	<3.65	**29.1**	16.7	<5.47	2.39 J
Lead	mg/kg	400	18.5	14.5	51.4	8.60	26.9	16.6	33.8	8.33	64.4	22.8	5.09 J	11.0
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<0.0126	<0.0127	<0.129	2.49	<0.121	<0.0127	<0.119	<0.117	<0.124	<0.0595	9.71	<0.103
Acenaphthene	mg/kg	3400	<0.0126	<0.0127	<0.129	0.722	<0.121	<0.0127	<0.119	<0.117	<0.124	<0.0595	0.744	<0.103
Acenaphthylene	mg/kg	1700	<0.0126	<0.0127	0.146	3.86	<0.121	<0.0127	<0.119	<0.117	1.50	<0.0595	0.655	3.14
Anthracene	mg/kg	17000	<0.0126	<0.0127	0.719	3.41	<0.121	<0.0127	<0.119	<0.117	0.402	<0.0595	0.364	2.27
Benzo[a]anthracene	mg/kg	3.1	0.0159	<0.0127	**5.68**	2.28	<0.121	<0.0127	0.198	<0.117	2.57	<0.0595	1.00	**6.07**
Benzo[a]pyrene	mg/kg	2.3	0.0224	<0.0127	**19.8**	2.22	<0.121 F1	<0.0127	0.387	0.201	**4.03**	<0.0595	0.348	**11.5**
Benzo[b]fluoranthene	mg/kg	3.1	0.0446	<0.0127	**17.6**	1.87	<0.121	<0.0127	0.291	0.182	**5.56**	<0.0595	1.06	**14.1**
Benzo[g,h,i]perylene	mg/kg	170	0.0289	<0.0127	23.5	1.32	<0.121	<0.0127	0.269	0.138	4.19	<0.0595	0.958	9.63
Benzo[k]fluoranthene	mg/kg	31	<0.0126	<0.0127	5.99	0.719	<0.121	<0.0127	0.124	<0.117	1.87	<0.0595	0.318	4.69
Chrysene	mg/kg	310	0.0340	<0.0127	5.84	1.88	<0.121	<0.0127	0.196	<0.117	2.45	<0.0595	1.65	6.04
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0126	<0.0127	**3.53**	0.174	<0.121	<0.0127	<0.119	<0.117	**0.636**	<0.0595	0.173	**1.86**
Fluoranthene	mg/kg	2300	0.0373	<0.0127	5.45	8.77	<0.121	<0.0127	0.233	0.162	3.49	<0.0595	4.04	8.60
Fluorene	mg/kg	2300	<0.0126	<0.0127	<0.129	4.89	<0.121	<0.0127	<0.119	<0.117	<0.124	<0.0595	1.46	0.160
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	0.0301	<0.0127	**21.3**	1.23	<0.121	<0.0127	0.270	0.144	**4.08**	<0.0595	0.794	**9.20**
Naphthalene	mg/kg	1100	<0.0126 F2	<0.0127	0.225	28.5	<0.121	<0.0127	<0.119	<0.117	0.124	<0.0595	19.3	<0.103
Phenanthrene	mg/kg	1700	0.0223	<0.0127	2.06	21.1	<0.121	<0.0127	0.135	<0.117	0.522	<0.0595	15.6	0.297
Pyrene	mg/kg	1700	0.0329	<0.0127	9.38	11.1	<0.121	<0.0127	0.376	0.230	5.97	<0.0595	5.04	27.0
Volatile Organic Compounds														
Benzene	mg/kg	56	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Ethylbenzene	mg/kg	7600	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Toluene	mg/kg	6100	<0.0143	<0.0134	<0.0141	0.212	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Xylenes, Total	mg/kg	15000	<0.0428	<0.0403	<0.0424	1.20	<0.00500	<0.00512	<0.00507	<0.00489	<0.00503	<0.00502	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1,1-Trichloroethane	mg/kg	150000	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1,2-Trichloroethane	mg/kg	54	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1-Dichloroethane	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1-Dichloroethene	mg/kg	380	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,1-Dichloropropene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	<0.0713 F2	<0.0671	<0.0707	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2,3-Trichloropropane	mg/kg	0.1	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2,4-Trichlorobenzene	mg/kg	760	<0.0713 F2	<0.0671	<0.0707	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2,4-Trimethylbenzene	mg/kg	760	<0.0143	<0.0134	<0.0141	2.22 F1 F2	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	<0.143	<0.134	<0.141	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	<0.143	<0.134	<0.141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2-Dichlorobenzene	mg/kg	5500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,2-Dichloroethane	mg/kg	34	<0.0143	<0.0134	<0.0141	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
1,2-Dichloropropane	mg/kg	53	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,3,5-Trimethylbenzene	mg/kg	760	<0.0143	<0.0134	<0.0141	0.677 F1	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	MW04-SL-0718-1.25' 7/11/2018	MW04-SL-0718-6.25' 7/11/2018	excavated MW06-SL-0718-1.25' 7/12/2018	MW06-SL-0718-13.75' 7/12/2018	MW07-SL-0918-1.25' 9/19/2018	MW07-SL-0918-6.25' 9/19/2018	MW08-SL-0918-1.25' 9/19/2018	MW08-SL-0918-3.75' 9/19/2018	excavated MW09-SL-0918-1.25' 9/19/2018	MW09-SL-0918-6.25' 9/19/2018	excavated C5-SL-0819-1' 8/13/2019	excavated C5-SL-0819-3' 8/13/2019
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,3-Dichloropropane	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
1,4-Dichlorobenzene	mg/kg	760	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
2,2-Dichloropropane	mg/kg	NA	<0.0571	<0.0537	<0.0566	<0.110	<0.0250	<0.0256	<0.0254	<0.0244	<0.0251	<0.0251	-	-
2-Butanone (MEK)	mg/kg	46000	<0.143	<0.134	<0.141	<0.275	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
2-Chlorotoluene	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
4-Chlorotoluene	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Acetone	mg/kg	68000	<0.143 F1	<0.134	<0.141	<0.550	<0.0250	<0.0256	<0.0254	<0.0244	<0.0251	<0.0251	-	-
Bromobenzene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Bromochloromethane	mg/kg	760	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Bromodichloromethane	mg/kg	50	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Bromoform	mg/kg	390	<0.0285	<0.0268	<0.0283	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Bromomethane	mg/kg	110	<0.0571	<0.0537	<0.0566	<0.550	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
Carbon disulfide	mg/kg	7600	<0.0143	<0.0134	<0.0141	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
Carbon tetrachloride	mg/kg	44	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Chlorobenzene	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Chlorodibromomethane	mg/kg	150	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Chloroethane	mg/kg	30000	<0.0571	<0.0537	<0.0566	<0.110	<0.00625 *	<0.00640 *	<0.00634 *	<0.00611 *	<0.00629 *	<0.00628 *	-	-
Chloroform	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Chloromethane	mg/kg	NA	<0.0571	<0.0537	<0.0566	<0.275	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
cis-1,2-Dichloroethene	mg/kg	150	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
cis-1,3-Dichloropropene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Dibromomethane	mg/kg	760	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Dichlorodifluoromethane	mg/kg	15000	<0.0428	<0.0403	<0.0424	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
Hexachlorobutadiene	mg/kg	40	<0.0713	<0.0671	<0.0707	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
Hexane	mg/kg	4600	<0.0713	<0.0671	<0.0707	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Isopropylbenzene	mg/kg	7600	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Methyl tert-butyl ether	mg/kg	2300	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Methylene Chloride	mg/kg	1500	<0.143	<0.134	<0.141	<0.275	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
n-Butylbenzene	mg/kg	3800	<0.0143	<0.0134	<0.0141	0.201	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
N-Propylbenzene	mg/kg	7600	<0.0143	<0.0134	<0.0141	0.173	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
p-Isopropyltoluene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
sec-Butylbenzene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Styrene	mg/kg	15000	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
tert-Butylbenzene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Tetrachloroethene	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
trans-1,2-Dichloroethene	mg/kg	1500	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
trans-1,3-Dichloropropene	mg/kg	NA	<0.0143	<0.0134	<0.0141	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-
Trichloroethene	mg/kg	67	<0.0143	<0.0134	<0.0141	<0.110	<0.00250 *	<0.00256 *	<0.00254 *	<0.00244 *	<0.00251 *	<0.00251 *	-	-
Trichlorofluoromethane	mg/kg	23000	<0.0571	<0.0537	<0.0566	<0.110	<0.00625	<0.00640	<0.00634	<0.00611	<0.00629	<0.00628	-	-
Vinyl chloride	mg/kg	2.1	<0.0428	<0.0403	<0.0424	<0.110	<0.00250	<0.00256	<0.00254	<0.00244	<0.00251	<0.00251	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	MW04-SL-0718-1.25' 7/11/2018	MW04-SL-0718-6.25' 7/11/2018	excavated MW06-SL-0718-1.25' 7/12/2018	MW06-SL-0718-13.75' 7/12/2018	MW07-SL-0918-1.25' 9/19/2018	MW07-SL-0918-6.25' 9/19/2018	MW08-SL-0918-1.25' 9/19/2018	MW08-SL-0918-3.75' 9/19/2018	excavated MW09-SL-0918-1.25' 9/19/2018	MW09-SL-0918-6.25' 9/19/2018	excavated C5-SL-0819-1' 8/13/2019	excavated C5-SL-0819-3' 8/13/2019
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	C5-SL-0819-5' 8/13/2019	excavated C6-SL-0819-1' 8/13/2019	excavated C6-SL-0819-3' 8/13/2019	excavated C7-SL-0819-1' 8/13/2019	8/13/2019 C7-SL-0819-3' 8/13/2019	C7-SL-0819-3' DP01-SL-0819 8/13/2019	excavated C8-SL-0819-1' 8/13/2019	C8-SL-0819-3' 8/13/2019	C8-SL-0819-5' 8/13/2019	excavated D6-SL-0819-1' 8/13/2019	excavated D6-SL-0819-3' 8/13/2019	excavated D6-SL-0819-5' 8/13/2019
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	-	5.76	5.47	10.7	6.11 J	6.90 J	-	-	-	7.35 J	9.76	-
Lead	mg/kg	400	-	6.30	76.5	95.3	12.3	14.4	-	-	-	90.8	73.4	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<0.0622	<1.18	**405**	0.378	<0.133	<0.130	0.839 B	<0.0634 F1 F2	0.0146 B	1.28	**368**	**692 B**
Acenaphthene	mg/kg	3400	<0.0622	<1.18	203	0.235	0.227	0.245	0.148	<0.0634	<0.0133	0.508	221	334
Acenaphthylene	mg/kg	1700	0.227	16.6	29.1	12.6	5.11	7.15	7.18	<0.0634	<0.0133	4.47	35.1	71.8
Anthracene	mg/kg	17000	0.351	2.90	67.2	2.85	0.699	0.929	1.94	<0.0634	<0.0133	1.38	103	174
Benzo[a]anthracene	mg/kg	3.1	0.179	<1.18	**19.5**	**5.60**	0.140	0.213	**4.48**	<0.0634	<0.0133	2.97	**51.9**	**86.3**
Benzo[a]pyrene	mg/kg	2.3	0.136	**4.98**	**15.1**	**21.6**	**2.37**	**2.68**	**9.46**	<0.0634	<0.0133	**3.52**	**38.6**	**67.6**
Benzo[b]fluoranthene	mg/kg	3.1	0.120	**3.89**	**13.2**	**21.7**	1.07	1.29	**11.1**	<0.0634	<0.0133	**5.69**	**41.2**	**64.4**
Benzo[g,h,i]perylene	mg/kg	170	0.0959	10.7	7.77	29.9	4.90	6.18	14.0	<0.0634	<0.0133	6.32	22.8	46.9
Benzo[k]fluoranthene	mg/kg	31	<0.0622	1.31	4.19	5.94	0.249	0.359	3.53	<0.0634	<0.0133	2.10	16.2	27.4
Chrysene	mg/kg	310	0.153	<1.18	21.1	7.36	0.240	0.156	6.85	<0.0634	<0.0133	4.63	58.3	98.2
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0622	**1.75**	**1.40**	**5.03**	**0.545**	**0.898**	**2.32**	<0.0634	<0.0133	**0.995**	**5.36**	**8.03**
Fluoranthene	mg/kg	2300	2.23	<1.18	55.8	7.91	<0.133	0.203	6.13	<0.0634	0.0142	6.89	228	352
Fluorene	mg/kg	2300	0.325	<1.18	84.1	0.733	0.365	0.492	0.532	<0.0634	<0.0133	1.11	144	227
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	0.0880	**8.09**	**7.09**	**24.6**	**4.13**	**4.90**	**11.0**	<0.0634	<0.0133	**5.25**	**22.1**	**42.3**
Naphthalene	mg/kg	1100	<0.0622	<1.18	845	0.881	0.293	0.485	1.67	<0.0634 F1 F2	0.0166	0.799	531	**1320**
Phenanthrene	mg/kg	1700	0.0837	<1.18	248	2.83	<0.133	<0.130	3.57	<0.0634	0.0359	10.8	530	788
Pyrene	mg/kg	1700	2.65	1.76	84.7	16.0	0.380	0.632	13.8	<0.0634	0.0193	13.2	315	489
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

				excavated	excavated	excavated	8/13/2019	C7-SL-0819-3'	excavated			excavated	excavated	excavated
Analyte	**Units**	**Iowa Statewide Standard**	**C5-SL-0819-5' 8/13/2019**	**C6-SL-0819-1' 8/13/2019**	**C6-SL-0819-3' 8/13/2019**	**C7-SL-0819-1' 8/13/2019**	**C7-SL-0819-3' 8/13/2019**	**DP01-SL-0819 8/13/2019**	**C8-SL-0819-1' 8/13/2019**	**C8-SL-0819-3' 8/13/2019**	**C8-SL-0819-5' 8/13/2019**	**D6-SL-0819-1' 8/13/2019**	**D6-SL-0819-3' 8/13/2019**	**D6-SL-0819-5' 8/13/2019**
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

				excavated	excavated	excavated	8/13/2019	C7-SL-0819-3'	excavated			excavated	excavated	excavated
Analyte	**Units**	**Iowa Statewide Standard**	**C5-SL-0819-5' 8/13/2019**	**C6-SL-0819-1' 8/13/2019**	**C6-SL-0819-3' 8/13/2019**	**C7-SL-0819-1' 8/13/2019**	**C7-SL-0819-3' 8/13/2019**	**DP01-SL-0819 8/13/2019**	**C8-SL-0819-1' 8/13/2019**	**C8-SL-0819-3' 8/13/2019**	**C8-SL-0819-5' 8/13/2019**	**D6-SL-0819-1' 8/13/2019**	**D6-SL-0819-3' 8/13/2019**	**D6-SL-0819-5' 8/13/2019**
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated D8-SL-0819-1' 8/13/2019	D8-SL-0819-3' 8/13/2019	DP02-SL-0819 8/13/2019	D9-SL-0819-1' 8/13/2019	D9-SL-0819-3' 8/13/2019	D9-SL-0819-5' 8/13/2019	excavated E8-SL-0819-1' 8/13/2019	E8-SL-0819-3' 8/13/2019	E8-SL-0819-5' 8/13/2019	excavated F5-SL-0819-1' 8/13/2019	excavated F5-SL-0819-3' 8/13/2019	F5-SL-0819-5' 8/13/2019
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	12.2	<4.20	7.42 J	-	-	-	-	-	-	-	-	-
Lead	mg/kg	400	104	19.0	33.2	-	-	-	-	-	-	-	-	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	0.216	<0.127	<0.126	0.129 B	<0.127	0.331 B	1.79 B	<0.133	<0.0632	<0.129	0.240 B	<0.125
Acenaphthene	mg/kg	3400	<0.126	<0.127	<0.126	<0.121	<0.127	<0.0645	<1.34	<0.133	<0.0632	<0.129	<0.132	<0.125
Acenaphthylene	mg/kg	1700	0.686	<0.127	<0.126	<0.121	<0.127	<0.0645	17.9	<0.133	<0.0632	0.276	0.985	<0.125
Anthracene	mg/kg	17000	0.454	<0.127	<0.126	<0.121	<0.127	<0.0645	5.03	<0.133	<0.0632	0.238	0.591	<0.125
Benzo[a]anthracene	mg/kg	3.1	1.88	<0.127	<0.126	<0.121	<0.127	<0.0645	**14.7**	<0.133	<0.0632	0.663	2.79	<0.125
Benzo[a]pyrene	mg/kg	2.3	**3.17**	<0.127	<0.126	<0.121	<0.127	<0.0645	**35.0**	<0.133	<0.0632	1.14	**4.25**	0.149
Benzo[b]fluoranthene	mg/kg	3.1	**3.50**	<0.127	<0.126	<0.121	<0.127	<0.0645	**40.0**	<0.133	<0.0632	1.23	**5.07**	0.190
Benzo[g,h,i]perylene	mg/kg	170	3.38	0.139	<0.126	<0.121	<0.127	<0.0645	49.4	<0.133	<0.0632	1.54	5.14	0.226
Benzo[k]fluoranthene	mg/kg	31	1.29	<0.127	<0.126	<0.121	<0.127	<0.0645	13.3	<0.133	<0.0632	0.476	1.97	<0.125
Chrysene	mg/kg	310	2.56	<0.127	<0.126	<0.121	<0.127	<0.0645	20.8	<0.133	<0.0632	0.896	3.77	0.241
Dibenz(a,h)anthracene	mg/kg	0.31	**0.518**	<0.127	<0.126	<0.121	<0.127	<0.0645	**7.01**	<0.133	<0.0632	0.249	**0.886**	<0.125
Fluoranthene	mg/kg	2300	2.18	<0.127	<0.126	<0.121	<0.127	<0.0645	22.7	<0.133	<0.0632	0.906	3.56	0.146
Fluorene	mg/kg	2300	<0.126	<0.127	<0.126	<0.121	<0.127	<0.0645	<1.34	<0.133	<0.0632	<0.129	<0.132	<0.125
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	3.00	0.128	<0.126	<0.121	<0.127	<0.0645	**40.7**	<0.133	<0.0632	1.25	**4.43**	0.197
Naphthalene	mg/kg	1100	0.473	<0.127	<0.126	<0.121	<0.127	<0.0645	3.52	<0.133	<0.0632	0.131	0.465	<0.125
Phenanthrene	mg/kg	1700	1.58	<0.127	<0.126	<0.121	<0.127	<0.0645	9.47	<0.133	<0.0632	0.705	2.15	0.237
Pyrene	mg/kg	1700	3.44	<0.127	<0.126	<0.121	<0.127	<0.0645	44.7	<0.133	<0.0632	1.36	5.41	0.375
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated D8-SL-0819-1' 8/13/2019	D8-SL-0819-3' 8/13/2019	DP02-SL-0819 8/13/2019	D9-SL-0819-1' 8/13/2019	D9-SL-0819-3' 8/13/2019	D9-SL-0819-5' 8/13/2019	excavated E8-SL-0819-1' 8/13/2019	E8-SL-0819-3' 8/13/2019	E8-SL-0819-5' 8/13/2019	excavated F5-SL-0819-1' 8/13/2019	excavated F5-SL-0819-3' 8/13/2019	F5-SL-0819-5' 8/13/2019
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated D8-SL-0819-1' 8/13/2019	D8-SL-0819-3' 8/13/2019	DP02-SL-0819 8/13/2019	D9-SL-0819-1' 8/13/2019	D9-SL-0819-3' 8/13/2019	D9-SL-0819-5' 8/13/2019	excavated E8-SL-0819-1' 8/13/2019	E8-SL-0819-3' 8/13/2019	E8-SL-0819-5' 8/13/2019	excavated F5-SL-0819-1' 8/13/2019	excavated F5-SL-0819-3' 8/13/2019	F5-SL-0819-5' 8/13/2019
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

			excavated	excavated		excavated	8/13/2019	8/13/2019		excavated	excavated			excavated
Analyte	**Units**	**Iowa Statewide Standard**	**F7-SL-0819-1' 8/13/2019**	**F7-SL-0819-3' 8/13/2019**	**F7-SL-0819-5' 8/13/2019**	**G4-SL-0819-1' 8/13/2019**	**G4-SL-0819-3' 8/13/2019**	**DP03-SL-0819 8/13/2019**	**G4-SL-0819-5' 8/13/2019**	**G6-SL-0819-1' 8/13/2019**	**G6-SL-0819-3' 8/13/2019**	**G8-SL-0819-1' 8/13/2019**	**G8-SL-0819-3' 8/13/2019**	**H5-SL-0819-1' 8/13/2019**
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	-	-	-	13.7	6.01	-	-	10.2 J	15.0 J	10.0	<4.31	<13.0
Lead	mg/kg	400	-	-	-	87.0	15.5	-	-	24.3	160	214	12.7	18.1 J
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	0.356 B	<0.119	0.319 B	1.27	<0.125	<0.124	<0.120	<0.111	0.443 F1	<0.0989	<0.0263	0.107
Acenaphthene	mg/kg	3400	0.206	<0.119	0.135	0.431	<0.125	<0.124	<0.120	<0.111	0.729 F1	<0.0989	<0.0263	<0.105
Acenaphthylene	mg/kg	1700	0.460	<0.119	<0.135	9.37	1.84	1.34	1.25	0.339	0.283 F1	0.146	<0.0263	0.339
Anthracene	mg/kg	17000	1.91	<0.119	<0.135	8.31	0.491	0.360	0.277	0.450	2.20	0.159	<0.0263	0.240
Benzo[a]anthracene	mg/kg	3.1	**11.7**	0.421	<0.135	**26.8**	0.270	0.556	0.131	2.27	**3.99**	0.564	<0.0263	1.11
Benzo[a]pyrene	mg/kg	2.3	**25.1**	0.994	<0.135	**26.0**	0.528	0.472	0.699	**5.19**	**4.06**	0.969	<0.0263	2.07
Benzo[b]fluoranthene	mg/kg	3.1	**26.2**	0.965	<0.135	**47.4**	2.77	2.39	0.584	**4.55**	**4.05**	0.975	<0.0263	2.52
Benzo[g,h,i]perylene	mg/kg	170	27.2	1.05	<0.135	34.9	2.13	1.71	1.27	5.47	3.27	0.918	<0.0263	2.45
Benzo[k]fluoranthene	mg/kg	31	8.68	0.329	<0.135	17.9	0.803	0.823	0.190	1.77	1.53	0.370	<0.0263	0.817
Chrysene	mg/kg	310	14.6	0.509	<0.135	36.2	2.01	0.624	0.510	2.76	4.73	0.760	<0.0263	1.47
Dibenz(a,h)anthracene	mg/kg	0.31	**6.12**	0.208	<0.135	**7.33**	**0.474**	**0.469**	0.185	**0.769**	**0.638 F1**	0.161	<0.0263	**0.385**
Fluoranthene	mg/kg	2300	8.91	0.252	<0.135	53.3	0.304	0.972	0.172	2.22	7.84	0.652	<0.0263	1.33
Fluorene	mg/kg	2300	0.318	<0.119	<0.135	1.62	<0.125	<0.124	<0.120	<0.111	0.936	<0.0989	<0.0263	<0.105
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	**24.3**	0.875	<0.135	**32.8**	2.54	1.99	1.25	**4.65**	2.85	0.832	<0.0263	2.11
Naphthalene	mg/kg	1100	0.812	<0.119	0.165	4.79	<0.125	<0.124	<0.120	0.190	0.721 F1	<0.0989	<0.0263	0.130
Phenanthrene	mg/kg	1700	5.53	0.156	0.160	31.1	0.250	0.435	<0.120	1.44	11.3	0.563	<0.0263	0.800
Pyrene	mg/kg	1700	15.4	0.452	0.158	101	0.467	1.06	0.893	3.59	9.99	0.910	<0.0263	2.07
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

			excavated	excavated		excavated	8/13/2019	8/13/2019		excavated	excavated			excavated
Analyte	**Units**	**Iowa Statewide Standard**	F7-SL-0819-1' 8/13/2019	F7-SL-0819-3' 8/13/2019	**F7-SL-0819-5' 8/13/2019**	G4-SL-0819-1' 8/13/2019	G4-SL-0819-3' 8/13/2019	DP03-SL-0819 8/13/2019	**G4-SL-0819-5' 8/13/2019**	G6-SL-0819-1' 8/13/2019	G6-SL-0819-3' 8/13/2019	**G8-SL-0819-1' 8/13/2019**	**G8-SL-0819-3' 8/13/2019**	H5-SL-0819-1' 8/13/2019
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated F7-SL-0819-1' 8/13/2019	excavated F7-SL-0819-3' 8/13/2019	F7-SL-0819-5' 8/13/2019	excavated G4-SL-0819-1' 8/13/2019	8/13/2019 G4-SL-0819-3' 8/13/2019	8/13/2019 DP03-SL-0819 8/13/2019	G4-SL-0819-5' 8/13/2019	excavated G6-SL-0819-1' 8/13/2019	excavated G6-SL-0819-3' 8/13/2019	G8-SL-0819-1' 8/13/2019	G8-SL-0819-3' 8/13/2019	excavated H5-SL-0819-1' 8/13/2019
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated H5-SL-0819-3' 8/13/2019	H8-SL-0819-1' 8/13/2019	H8-SL-0819-3' 8/13/2019	excavated I4-SL-0819-1' 8/13/2019	excavated I4-SL-0819-3' 8/13/2019	I7-SL-0819-1' 8/13/2019	I7-SL-0819-3' 8/13/2019	excavated J3-SL-0819-1' 8/13/2019	excavated J3-SL-0819-3' 8/13/2019	excavated J3-SL-0819-5' 8/13/2019	J6-SL-0819-1' 8/13/2019	J6-SL-0819-3' 8/13/2019
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	**18.9 J**	4.89 J	<3.78	7.19 J	12.7	6.15 J	8.37	14.2	9.19	-	9.23	<3.26
Lead	mg/kg	400	40.7	16.1	12.1	33.3	**134 F1**	15.4	16.4	95.0	158	-	42.3	23.9
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	0.671	<0.122	<0.131	0.280	3.48 F2	<0.113	<0.0125	1.41	2.87	102 B	<0.114	<0.117
Acenaphthene	mg/kg	3400	0.243	<0.122	<0.131	<0.110	9.48	<0.113	<0.0125	<1.09	0.312	283	<0.114	<0.117
Acenaphthylene	mg/kg	1700	3.55	<0.122	<0.131	1.95	41.0 F2	<0.113	<0.0125	6.02	3.80	20.4	<0.114	<0.117
Anthracene	mg/kg	17000	2.93	0.169	<0.131	0.721	37.4 F2	<0.113	<0.0125	2.87	3.40	84.5	<0.114	<0.117
Benzo[a]anthracene	mg/kg	3.1	**12.7**	0.888	<0.131	2.42	**127 F2**	<0.113	<0.0125	**6.39**	**6.05**	**28.4**	0.244	<0.117
Benzo[a]pyrene	mg/kg	2.3	**25.7**	0.883	<0.131 F2	**3.50**	**163 F2**	<0.113	<0.0125	**8.98**	**4.63**	**21.8**	0.353	<0.117
Benzo[b]fluoranthene	mg/kg	3.1	**29.1**	1.32	<0.131 F2	**4.60**	**175 F2**	<0.113	<0.0125	**11.4**	**6.89**	**19.1**	0.417	<0.117
Benzo[g,h,i]perylene	mg/kg	170	30.1	0.646	<0.131 F2	4.20	143 F2	<0.113	<0.0125	13.8	3.37	12.4	0.392	<0.117
Benzo[k]fluoranthene	mg/kg	31	9.75	0.409	<0.131 F2	1.50	**51.3 F2**	<0.113	<0.0125	3.80	2.25	6.09	0.141	<0.117
Chrysene	mg/kg	310	16.6	1.15	<0.131 F2	3.11	142 F2	<0.113	<0.0125	9.18	7.62	30.4	0.312	<0.117
Dibenz(a,h)anthracene	mg/kg	0.31	**5.96**	0.185	<0.131	**0.707**	**21.4 F2**	<0.113	<0.0125	**2.17**	**1.09**	**2.42**	<0.114	<0.117
Fluoranthene	mg/kg	2300	15.6	1.16	<0.131 F2	3.22	**345 F2**	<0.113	<0.0125	10.7	13.1	104	0.336	<0.117
Fluorene	mg/kg	2300	0.608	<0.122	<0.131	0.174	16.7 F2	<0.113	<0.0125	1.11	1.04	116	<0.114	<0.117
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	**25.1**	0.705	<0.131 F2	**3.70**	**129 F2**	<0.113	<0.0125	**10.6**	**3.85**	**11.4**	0.330	<0.117
Naphthalene	mg/kg	1100	1.20	<0.122	<0.131	0.373	12.2 F2	<0.113	<0.0125	2.45	3.92	795	0.150	<0.117
Phenanthrene	mg/kg	1700	10.2	0.720	<0.131	1.81	79.0 F2	<0.113	<0.0125	9.29	11.3	314	0.315	<0.117
Pyrene	mg/kg	1700	25.0	1.09	<0.131 F2	5.57	**506 F2**	<0.113	<0.0125	17.3	12.9	152	0.510	<0.117
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated H5-SL-0819-3' 8/13/2019	H8-SL-0819-1' 8/13/2019	H8-SL-0819-3' 8/13/2019	excavated I4-SL-0819-1' 8/13/2019	excavated I4-SL-0819-3' 8/13/2019	I7-SL-0819-1' 8/13/2019	I7-SL-0819-3' 8/13/2019	excavated J3-SL-0819-1' 8/13/2019	excavated J3-SL-0819-3' 8/13/2019	excavated J3-SL-0819-5' 8/13/2019	J6-SL-0819-1' 8/13/2019	J6-SL-0819-3' 8/13/2019
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated H5-SL-0819-3' 8/13/2019	H8-SL-0819-1' 8/13/2019	H8-SL-0819-3' 8/13/2019	excavated I4-SL-0819-1' 8/13/2019	excavated I4-SL-0819-3' 8/13/2019	I7-SL-0819-1' 8/13/2019	I7-SL-0819-3' 8/13/2019	excavated J3-SL-0819-1' 8/13/2019	excavated J3-SL-0819-3' 8/13/2019	excavated J3-SL-0819-5' 8/13/2019	J6-SL-0819-1' 8/13/2019	J6-SL-0819-3' 8/13/2019
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	DP04-SL-0819 8/13/2019	J7-SL-0819-1' 8/13/2019	J7-SL-0819-3' 8/13/2019	J7-SL-0819-5' 8/13/2019	K4-SL-0819-1' 8/13/2019	K4-SL-0819-3' 8/13/2019	K4-SL-0819-5' 8/13/2019	K5-SL-0819-1' 8/13/2019	K5-SL-0819-3' 8/13/2019	K5-SL-0819-5' 8/13/2019	K6-SL-0819-1' 8/13/2019	K6-SL-0819-3' 8/13/2019
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	-	-	-	-	-	-	-	12.6	6.01 J	-	-	-
Lead	mg/kg	400	-	-	-	-	-	-	-	86.0	18.5	-	-	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<0.116	0.441 B	<0.0114	<0.0113	0.138	0.452	<0.133	0.272	<0.123	<0.0117	<0.112	<0.0115
Acenaphthene	mg/kg	3400	<0.116	<0.113	<0.0114	<0.0113	<0.108	0.591	12.5	0.425	<0.123	<0.0117	<0.112	<0.0115
Acenaphthylene	mg/kg	1700	<0.116	<0.113	<0.0114	<0.0113	0.889	2.93	7.02	0.512	0.139	<0.0117	<0.112	<0.0115
Anthracene	mg/kg	17000	<0.116	<0.113	<0.0114	<0.0113	0.483	1.73	7.35	0.897	<0.123	<0.0117	<0.112	<0.0115
Benzo[a]anthracene	mg/kg	3.1	0.120	0.141	<0.0114	<0.0113	1.26	**4.41**	2.92	2.79	0.483	<0.0117	0.417	<0.0115
Benzo[a]pyrene	mg/kg	2.3	0.181	0.265	<0.0114	<0.0113	1.77	**6.34**	**2.52**	**3.47**	0.868	<0.0117	0.675	<0.0115
Benzo[b]fluoranthene	mg/kg	3.1	0.231	0.283	<0.0114	<0.0113	2.01	**5.68**	2.14	**4.10**	0.949	<0.0117	0.807	<0.0115
Benzo[g,h,i]perylene	mg/kg	170	0.220	0.321	<0.0114	<0.0113	2.18	6.13	1.41	3.39	1.08	<0.0117	0.713	<0.0115
Benzo[k]fluoranthene	mg/kg	31	<0.116	<0.113	<0.0114	<0.0113	0.650	1.83	0.743	1.70	0.307	<0.0117	0.252	<0.0115
Chrysene	mg/kg	310	0.167	0.162	<0.0114	<0.0113	1.69	5.24	2.99	3.36	0.664	<0.0117	0.533	<0.0115
Dibenz(a,h)anthracene	mg/kg	0.31	<0.116	<0.113	<0.0114	<0.0113	**0.360**	**1.05**	0.279	**0.693**	0.149	<0.0117	0.134	<0.0115
Fluoranthene	mg/kg	2300	0.157	0.160	<0.0114	<0.0113	2.08	8.12	9.69	4.86	0.594	<0.0117	0.466	<0.0115
Fluorene	mg/kg	2300	<0.116	<0.113	<0.0114	<0.0113	0.142	0.574	8.28	0.357	<0.123	<0.0117	<0.112	<0.0115
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	0.192	0.265	<0.0114	<0.0113	1.77	**5.17**	1.34	3.08	0.875	<0.0117	0.608	<0.0115
Naphthalene	mg/kg	1100	<0.116	0.190	<0.0114	<0.0113	0.236	0.983	0.213	0.524	<0.123	<0.0117	<0.112	<0.0115
Phenanthrene	mg/kg	1700	<0.116	<0.113	<0.0114	<0.0113	1.45	3.79	26.7	3.56	0.398	<0.0117	0.245	<0.0115
Pyrene	mg/kg	1700	0.250	0.276	<0.0114	<0.0113	3.32	12.7	13.5	5.27	0.908	<0.0117	0.669	<0.0115
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	DP04-SL-0819 8/13/2019	J7-SL-0819-1' 8/13/2019	J7-SL-0819-3' 8/13/2019	J7-SL-0819-5' 8/13/2019	K4-SL-0819-1' 8/13/2019	K4-SL-0819-3' 8/13/2019	K4-SL-0819-5' 8/13/2019	K5-SL-0819-1' 8/13/2019	K5-SL-0819-3' 8/13/2019	K5-SL-0819-5' 8/13/2019	K6-SL-0819-1' 8/13/2019	K6-SL-0819-3' 8/13/2019
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	DP04-SL-0819 8/13/2019	J7-SL-0819-1' 8/13/2019	J7-SL-0819-3' 8/13/2019	J7-SL-0819-5' 8/13/2019	K4-SL-0819-1' 8/13/2019	K4-SL-0819-3' 8/13/2019	K4-SL-0819-5' 8/13/2019	K5-SL-0819-1' 8/13/2019	K5-SL-0819-3' 8/13/2019	K5-SL-0819-5' 8/13/2019	K6-SL-0819-1' 8/13/2019	K6-SL-0819-3' 8/13/2019
Phenols										-				
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Notes:
Concentrations above the Iowa Statewide Standard are in bold red font.
* - LCS or LCSD is outside acceptance limits.
F1 - MS and/or MSD Recovery is outside acceptance limits.
F2 - MS/MSD RPD exceeds control limits.
"-" - Not analyzed.

NA - Not applicable.
H - Sample prepped or analyzed outside holding time.
J - Result is an approximate value.
X - Surrogate is outside control limits.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	K6-SL-0819-5' 8/13/2019	B6-SL-0720-1' 7/27/2020	B6-SL-0720-3' 7/27/2020	B6-SL-0720-5' 7/27/2020	excavated B7-SL-0720-1' 7/27/2020	B7-SL-0720-3' 7/27/2020	B7-SL-0720-5' 7/27/2020	C9-SL-0720-1' 7/27/2020	E8.7-SL-0720-1' 7/27/2020	F8.3-SL-0720-1' 7/27/2020	excavated DP01-SL-0720 7/27/2020 (F4-1')	excavated DP02-SL-0720 7/27/2020 (F3-1')
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	-	5.31	1.79 J	<2.09	<1.94	<2.65	<2.05	2.00 J	<1.12	<2.13	1.86 J	<2.02
Lead	mg/kg	400	-	67.6	18.7	16.6	114 F1	74	18.9	18.7	18.2	25.5	32.5	47.4
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<0.0116	0.084	<0.309	<0.0623	0.220 F1	<0.0720	<0.0126	0.0678	<0.0137	<0.0656	0.529	<0.0617
Acenaphthene	mg/kg	3400	<0.0116	<0.0638	<0.309	<0.0623	<0.0627	<0.0720	<0.0126	<0.0124	<0.0137	<0.0656	0.507	<0.0617
Acenaphthylene	mg/kg	1700	<0.0116	1.06	0.672	0.2	1.52	0.276	<0.0126	0.181	<0.0137	<0.0656	6.51	1.23
Anthracene	mg/kg	17000	<0.0116	0.241 F1	<0.309	<0.0623	0.395 F1	0.0784	<0.0126	0.0477	<0.0137	<0.0656	15.1	0.253
Benzo[a]anthracene	mg/kg	3.1	<0.0116	0.788	0.521	<0.0623	1.39	0.237	<0.0126	0.0573	<0.0137	<0.0656	**20.1**	0.447
Benzo[a]pyrene	mg/kg	2.3	<0.0116	1.32	0.896	0.0793	**2.63**	0.4	<0.0126	0.128	<0.0137	0.0969	**23.8**	1.49
Benzo[b]fluoranthene	mg/kg	3.1	<0.0116	1.83	1.45	<0.0623	3.05	0.591	<0.0126	0.159	0.0212	0.108	**27.1**	1.3
Benzo[g,h,i]perylene	mg/kg	170	<0.0116	1.51	1.32	0.238	2.44	0.451	<0.0126	0.247	<0.0137	0.105	19.2	2.74
Benzo[k]fluoranthene	mg/kg	31	<0.0116	0.704	0.485	<0.0623	0.977	0.147	<0.0126	0.0441	<0.0137	<0.0656	9.08	0.393
Chrysene	mg/kg	310	<0.0116	0.974	0.807	<0.0623	1.84	0.381	<0.0126	0.0808	<0.0137	<0.0656	19.9	0.484
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0116	0.259 F1	<0.309	<0.0623	**0.429 F1**	<0.0720	<0.0126	0.0337	<0.0137	<0.0656	**2.3**	0.295
Fluoranthene	mg/kg	2300	<0.0116	0.766	0.53	<0.0623	1.91	0.4	<0.0126	0.0645	<0.0137	<0.0656	49.5	0.526
Fluorene	mg/kg	2300	<0.0116	<0.0638	<0.309	<0.0623	0.0978	<0.0720	<0.0126	<0.0124	<0.0137	<0.0656	3.01	<0.0617
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.0116	1.16	0.953	0.163	1.89	0.37	<0.0126	0.196	<0.0137	0.0805	**14.6**	2.19
Naphthalene	mg/kg	1100	<0.0116	0.124 F1	<0.309	<0.0623	0.347 F1	<0.0720	<0.0126	0.169	<0.0137	0.231	2.3	0.066
Phenanthrene	mg/kg	1700	<0.0116	0.370 F1	<0.309	<0.0623	1	0.182	<0.0126	0.0764	<0.0137	<0.0656	59	0.27
Pyrene	mg/kg	1700	<0.0116	1.34	1.01	<0.0623	3.27	0.594	<0.0126	0.0913	<0.0137	0.0959	79.3	1.04
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	K6-SL-0819-5' 8/13/2019	B6-SL-0720-1' 7/27/2020	B6-SL-0720-3' 7/27/2020	B6-SL-0720-5' 7/27/2020	excavated B7-SL-0720-1' 7/27/2020	B7-SL-0720-3' 7/27/2020	B7-SL-0720-5' 7/27/2020	C9-SL-0720-1' 7/27/2020	E8.7-SL-0720-1' 7/27/2020	F8.3-SL-0720-1' 7/27/2020	excavated DP01-SL-0720 7/27/2020 (F4-1')	excavated DP02-SL-0720 7/27/2020 (F3-1')
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	K6-SL-0819-5' 8/13/2019	B6-SL-0720-1' 7/27/2020	B6-SL-0720-3' 7/27/2020	B6-SL-0720-5' 7/27/2020	excavated B7-SL-0720-1' 7/27/2020	B7-SL-0720-3' 7/27/2020	B7-SL-0720-5' 7/27/2020	C9-SL-0720-1' 7/27/2020	E8.7-SL-0720-1' 7/27/2020	F8.3-SL-0720-1' 7/27/2020	excavated DP01-SL-0720 7/27/2020 (F4-1')	excavated DP02-SL-0720 7/27/2020 (F3-1')
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

					excavated	excavated	excavated	excavated	excavated	excavated		excavated	excavated	excavated
Analyte	Units	Iowa Statewide Standard	BC5-SL-0720-1' 7/27/2020	BC5-SL-0720-3' 7/27/2020	BC6-SL-0720-1' 7/27/2020	BC6-SL-0720-3' 7/27/2020	BC7-SL-0720-1' 7/27/2020	BC7-SL-0720-3' 7/27/2020	BC8-SL-0720-1' 7/27/2020	C4-SL-0720-1' 7/27/2020	C4-SL-0720-3' 7/27/2020	D4-SL-0720-3' 7/27/2020	D5-SL-0720-3' 7/27/2020	E4-SL-0720-3' 7/27/2020
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	1.43 J	<1.88	6.78 J	5.57	3.57 J	<3.39	2.45 J	2.50 J	3.55 J	3.53 J	<1.05	<1.05
Lead	mg/kg	400	13.8	14	20.4	21.8	82.5	15.2 J	15.8	29	17.4	13.1	18.3	20.3
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	0.127	0.0694	172	**829**	0.0769	0.135	0.187	0.824	0.151	<0.0628	0.162	0.029
Acenaphthene	mg/kg	3400	0.0226	0.0223	144	318	<0.0633	0.0218	<0.0629	0.303	0.0631	<0.0628	<0.0645	<0.0124
Acenaphthylene	mg/kg	1700	0.256	0.527	78.4	87.1	0.64	0.0187	6.42	8.67	0.673	3.23	1.82	0.0612
Anthracene	mg/kg	17000	0.0759	0.0567	63	144	0.193	<0.0130	0.745	3.21	0.344	0.806	0.528	0.022
Benzo[a]anthracene	mg/kg	3.1	0.0292	0.0791	**84.3**	**52.3**	0.758	0.0144	**9.12**	**6.98**	0.48	0.22	0.284	0.0248
Benzo[a]pyrene	mg/kg	2.3	0.0808	0.121	**88.1**	**43.2**	1.12	0.0209	**23.3**	**10.7**	0.565	0.886	0.837	<0.0618
Benzo[b]fluoranthene	mg/kg	3.1	0.181	0.303	**84.6**	**33.8**	1.81	0.0353	**19.9**	**14.5**	0.526	1.12	0.67	0.0897
Benzo[g,h,i]perylene	mg/kg	170	0.207	0.145	27.6	17.3	0.673	0.0193	16.5	11.1	0.3	8.91	1.46	0.121
Benzo[k]fluoranthene	mg/kg	31	0.0522	0.0991	24.8	13.4	0.508	<0.0130	7.7	5.71	0.219	0.289	0.172	<0.0618
Chrysene	mg/kg	310	0.0621	0.157	77.1	48	1.08	0.0222	9.82	8.4	0.479	0.269	0.27	0.0534
Dibenz(a,h)anthracene	mg/kg	0.31	0.0298	0.0329	**6.3**	**4.02**	0.115	<0.0130	**2.38**	**1.51**	0.0406	**0.782**	0.277	<0.0618
Fluoranthene	mg/kg	2300	0.0816	0.0713	182	120	1.03	0.0176	9.4	13.9	1.83	0.195	0.269	0.0232
Fluorene	mg/kg	2300	0.0541	0.0701	78.3	177	<0.0633	<0.0130	0.15	2.55	0.604	0.146	0.204	<0.0124
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	0.156	0.148	**26.3**	**14**	0.583	0.0171	**12.8**	**9.49**	0.258	**7.53**	1.36	0.0886
Naphthalene	mg/kg	1100	0.185	0.158	298 E	**1350**	0.228	0.302	0.538	1.45	0.202	<0.0628	0.377	0.0555
Phenanthrene	mg/kg	1700	0.214	0.0801	128 E	403	0.326	<0.0130	0.424	13.8	3.61	<0.0628	0.256	0.0343
Pyrene	mg/kg	1700	0.122	0.168	351	198	1.71	0.0285	18.9	22.4	2.34	0.559	0.497	0.0471
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	BC5-SL-0720-1' 7/27/2020	BC5-SL-0720-3' 7/27/2020	excavated BC6-SL-0720-1' 7/27/2020	excavated BC6-SL-0720-3' 7/27/2020	excavated BC7-SL-0720-1' 7/27/2020	excavated BC7-SL-0720-3' 7/27/2020	excavated BC8-SL-0720-1' 7/27/2020	excavated C4-SL-0720-1' 7/27/2020	C4-SL-0720-3' 7/27/2020	excavated D4-SL-0720-3' 7/27/2020	excavated D5-SL-0720-3' 7/27/2020	excavated E4-SL-0720-3' 7/27/2020
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	BC5-SL-0720-1' 7/27/2020	BC5-SL-0720-3' 7/27/2020	excavated BC6-SL-0720-1' 7/27/2020	excavated BC6-SL-0720-3' 7/27/2020	excavated BC7-SL-0720-1' 7/27/2020	excavated BC7-SL-0720-3' 7/27/2020	excavated BC8-SL-0720-1' 7/27/2020	excavated C4-SL-0720-1' 7/27/2020	C4-SL-0720-3' 7/27/2020	excavated D4-SL-0720-3' 7/27/2020	excavated D5-SL-0720-3' 7/27/2020	excavated E4-SL-0720-3' 7/27/2020
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated E5-SL-0720-3' 7/27/2020	excavated F3-SL-0720-1' 7/27/2020	excavated F3-SL-0720-3' 7/27/2020	excavated F4-SL-0720-1' 7/27/2020	excavated F4-SL-0720-3' 7/27/2020	excavated G3-SL-0720-1' 7/27/2020	G3-SL-0720-3' 7/27/2020	excavated H3-SL-0720-1' 7/27/2020	H3-SL-0720-3' 7/27/2020	I2-SL-0720-1' 7/27/2020	I2-SL-0720-3' 7/27/2020	I2-SL-0720-5' 7/27/2020	J2-SL-0720-1' 7/27/2020
Inorganics															
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	3.11 J	<2.07	<2.22	4.07 J	<2.00	<2.34	<2.03	<2.17	2.54 J	5.77	<1.85	2.88 J	6.67 J
Lead	mg/kg	400	18.3	16.2	23.5	30.4	28.1	18.9	16.7	22.6 F1	18.6	53.1	18.1	19.3	124
Polynuclear Aromatic Hydrocarbons															
2-Methylnaphthalene	mg/kg	230	0.106	0.132	0.440 F1	0.18	0.422 F1	<0.0636	<0.0127	0.233	<0.0125	<0.0602	<0.0122	<0.0127	<0.0597
Acenaphthene	mg/kg	3400	23.4	<0.0648	0.268 F1	0.146	2.83	<0.0636	<0.0127	<0.0595	<0.0125	<0.0602	<0.0122	<0.0127	<0.0597
Acenaphthylene	mg/kg	1700	2.18	1.31	9.74 F2	0.88	1.93	0.0774	<0.0127	1.98	0.0212	0.384	0.0292	<0.0127	0.0988
Anthracene	mg/kg	17000	7.09	0.425	1.81 F2	0.356	1.87 F2	<0.0636	<0.0127	0.8	<0.0125	0.0967	<0.0122	<0.0127	0.101
Benzo[a]anthracene	mg/kg	3.1	**6.09**	1.86	2.44 F2	1.52	1.92 F2	0.117	<0.0127	2.49	0.024	0.991	0.0391	0.0298	0.57
Benzo[a]pyrene	mg/kg	2.3	**5.98**	**4.21**	**8.68 F2**	**3.13**	**2.97**	0.225	0.0159	**3.69**	0.0403	1.61	0.0687	0.0477	0.775
Benzo[b]fluoranthene	mg/kg	3.1	**5.13**	**4.01**	**7.38 F2**	2.98	2.62	0.299	0.0216	**5.44**	0.0602	1.9	0.0891	0.0609	0.933
Benzo[g,h,i]perylene	mg/kg	170	2.51	4.69	13.0 F2	2.93	2.46	0.245	0.0205	4.98	0.0558	1.2	0.049	0.0387	0.516
Benzo[k]fluoranthene	mg/kg	31	1.88	1.32	2.53	1.06	0.957	0.0858	<0.0127	1.64	0.0165	0.632	0.0254	0.0168	0.265
Chrysene	mg/kg	310	5.46	2.35	2.23	1.68	2.24 F2	0.164	0.0143	3.22	0.036	1.28	0.0522	0.0382	0.653
Dibenz(a,h)anthracene	mg/kg	0.31	**0.484**	**0.702**	**1.08 F2**	**0.418**	**0.342 F1**	<0.0636	<0.0127	0.774	<0.0125	0.188	<0.0122	<0.0127	0.101
Fluoranthene	mg/kg	2300	17.4	1.83	3.35 F2	1.56	3.93 F2	0.123	<0.0127	3.17	0.0277	1.45	0.0599	0.0429	0.553
Fluorene	mg/kg	2300	9.51	0.0725	0.599 F1	0.107	1.79 F2	<0.0636	<0.0127	0.148	<0.0125	<0.0602	<0.0122	<0.0127	<0.0597
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	2.37	**3.97**	**8.98 F2**	2.29	2.01	0.195	0.0163	**3.42**	0.0425	1.03	0.0415	0.0311	0.45
Naphthalene	mg/kg	1100	1.59	0.322	1.31	0.405	0.281 F1	<0.0636	<0.0127	0.490 F1	<0.0125	0.07	<0.0122	<0.0127	0.101
Phenanthrene	mg/kg	1700	26.1	1.32	1.31	1.01	5.23 F2	<0.0636	<0.0127	2.01	0.0194	0.407	0.0179	<0.0127	0.404
Pyrene	mg/kg	1700	26.4	3.53	7.64 F2	2.47	5.66 F2	0.223	0.0178	5.88	0.0474	2.43	0.112	0.0723	0.803
Volatile Organic Compounds															
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated E5-SL-0720-3' 7/27/2020	excavated F3-SL-0720-1' 7/27/2020	excavated F3-SL-0720-3' 7/27/2020	excavated F4-SL-0720-1' 7/27/2020	excavated F4-SL-0720-3' 7/27/2020	excavated G3-SL-0720-1' 7/27/2020	G3-SL-0720-3' 7/27/2020	excavated H3-SL-0720-1' 7/27/2020	H3-SL-0720-3' 7/27/2020	I2-SL-0720-1' 7/27/2020	I2-SL-0720-3' 7/27/2020	I2-SL-0720-5' 7/27/2020	J2-SL-0720-1' 7/27/2020
Volatile Organic Compounds (cont'd)															
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated E5-SL-0720-3' 7/27/2020	excavated F3-SL-0720-1' 7/27/2020	excavated F3-SL-0720-3' 7/27/2020	excavated F4-SL-0720-1' 7/27/2020	excavated F4-SL-0720-3' 7/27/2020	excavated G3-SL-0720-1' 7/27/2020	G3-SL-0720-3' 7/27/2020	excavated H3-SL-0720-1' 7/27/2020	H3-SL-0720-3' 7/27/2020	I2-SL-0720-1' 7/27/2020	I2-SL-0720-3' 7/27/2020	I2-SL-0720-5' 7/27/2020	J2-SL-0720-1' 7/27/2020
Phenols															
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	J2-SL-0720-3' 7/27/2020	J2-SL-0720-5' 7/27/2020	JK3-SL-0720-1' 7/27/2020	JK3-SL-0720-3' 7/27/2020	JK3-SL-0720-5' 7/27/2020	excavated A7-SL-0720-1' 7/27/2020	A7-SL-0720-3' 7/27/2020	A6-SL-0720-1' 7/27/2020	A8-SL-0720-1' 7/27/2020	B8-SL-0720-1' 7/27/2020	B8-SL-0720-3' 7/27/2020	BC4-SL-0720-1' 7/27/2020
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-			-	-	-
Arsenic	mg/kg	17	<2.01	2.53 J	<6.67	3.99 J	4.23 J	-	-			-	-	-
Lead	mg/kg	400	24.4	22	26.3 J	93.5	113	-	-	-	-	-	-	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	<0.0127	<0.0123	<0.0505	0.248	0.189	<0.0562	<0.0634	<0.0583	<0.0575	<0.0659	<0.0688	0.133
Acenaphthene	mg/kg	3400	<0.0127	<0.0123	<0.0505	<0.0582	0.0804	<0.0562	<0.0634	<0.0583	<0.0575	<0.0659	<0.0688	<0.0625
Acenaphthylene	mg/kg	1700	<0.0127	<0.0123	<0.0505	1.09	0.882	0.0823	0.167	<0.0583 F1	<0.0575	0.482	0.311	0.492 F1
Anthracene	mg/kg	17000	<0.0127	<0.0123	<0.0505	0.487	0.604	<0.0562	0.0745	<0.0583	<0.0575	0.081	<0.0688	0.141
Benzo[a]anthracene	mg/kg	3.1	<0.0127	<0.0123	0.0925	2.27	1.8	0.189	0.276	0.0689 F1 F2	0.112	0.203	0.143	0.640 F1
Benzo[a]pyrene	mg/kg	2.3	0.0127	<0.0123	0.18	**3.79**	**2.71**	0.347	0.44	0.0722 F1	0.166	0.883	0.542	0.909
Benzo[b]fluoranthene	mg/kg	3.1	0.0184	<0.0123	0.212	**3.8**	**3.25**	0.389	0.644	0.109 F1	0.264	0.812	0.533	1.27
Benzo[g,h,i]perylene	mg/kg	170	<0.0127	<0.0123	0.149	2.37	1.58	0.506	0.463	0.0691 F1	0.151	0.888	0.567	1.06
Benzo[k]fluoranthene	mg/kg	31	<0.0127	<0.0123	0.0579	1.36	0.973	0.198	0.195	<0.0583 F1	0.0640	0.207	0.136	0.411 F1
Chrysene	mg/kg	310	<0.0127	<0.0123	0.115	2.53	1.99	0.225	0.439	0.104 F1 F2	0.174	0.319	0.248	0.861
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0127	<0.0123	<0.0505	**0.384**	**0.321**	0.354	0.0734	<0.0583	<0.0575	0.117	0.0701	0.168 F1
Fluoranthene	mg/kg	2300	0.0131	<0.0123	0.0982	3.17	2.39	0.285	0.442	0.160 F1	0.151	0.223	0.169	0.902
Fluorene	mg/kg	2300	<0.0127	<0.0123	<0.0505	0.164	0.14	<0.0562	<0.0634	<0.0583	<0.0575	<0.0659	<0.0688	<0.0625
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.0127	<0.0123	0.116	2.05	1.45	0.476	0.364	<0.0583 F1	0.123	0.67	0.424	0.78
Naphthalene	mg/kg	1100	<0.0127	<0.0123	<0.0505	0.438	0.279	<0.0562	<0.0634	<0.0583	<0.0575	<0.0659	<0.0688	0.360 F1
Phenanthrene	mg/kg	1700	0.0155	<0.0123	<0.0505	1.97	2.08	0.136	0.296	0.130	0.107	0.0842	<0.0688	0.500 F1
Pyrene	mg/kg	1700	0.0159	<0.0123	0.162	5.53	3.61	0.372	0.617	0.246 F1 F2	0.187	0.414	0.316	1.45
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	J2-SL-0720-3' 7/27/2020	J2-SL-0720-5' 7/27/2020	JK3-SL-0720-1' 7/27/2020	JK3-SL-0720-3' 7/27/2020	JK3-SL-0720-5' 7/27/2020	excavated A7-SL-0720-1' 7/27/2020	A7-SL-0720-3' 7/27/2020	A6-SL-0720-1' 7/27/2020	A8-SL-0720-1' 7/27/2020	B8-SL-0720-1' 7/27/2020	B8-SL-0720-3' 7/27/2020	BC4-SL-0720-1' 7/27/2020
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	J2-SL-0720-3' 7/27/2020	J2-SL-0720-5' 7/27/2020	JK3-SL-0720-1' 7/27/2020	JK3-SL-0720-3' 7/27/2020	JK3-SL-0720-5' 7/27/2020	excavated A7-SL-0720-1' 7/27/2020	A7-SL-0720-3' 7/27/2020	A6-SL-0720-1' 7/27/2020	A8-SL-0720-1' 7/27/2020	B8-SL-0720-1' 7/27/2020	B8-SL-0720-3' 7/27/2020	BC4-SL-0720-1' 7/27/2020
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

			excavated			excavated			excavated		excavated			
Analyte	**Units**	**Iowa Statewide Standard**	BC6-SL-0720-5' 7/27/2020	**BC8-SL-0720-3' 7/27/2020**	**C3-SL-0720-1' 7/27/2020**	D3-SL-0720-1' 7/27/2020	**D3-SL-0720-3' 7/27/2020**	**D4-SL-0720-5' 7/27/2020**	D5-SL-0720-5' 7/27/2020	**E4-SL-0720-5' 7/27/2020**	E5-SL-0720-5' 7/27/2020	**F2-SL-0720-1' 7/27/2020**	**F2-SL-0720-3' 7/27/2020**	**H2-SL-0720-1' 7/27/2020**
Inorganics														
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/kg	17	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	400	-	-	-	-	-	-	-	-	-	-	-	-
Polynuclear Aromatic Hydrocarbons														
2-Methylnaphthalene	mg/kg	230	**265**	<0.0131	<0.0602	<0.0627	<0.0126	<0.0127	0.0877	<0.0126	0.0917	<0.0596	<0.0124	<0.0592
Acenaphthene	mg/kg	3400	41.5	<0.0131	<0.0602	<0.0627	<0.0126	<0.0127	26.1	<0.0126	27.5	<0.0596	<0.0124	<0.0592
Acenaphthylene	mg/kg	1700	68.5	<0.0131	0.2	1.93	<0.0126	<0.0127	9.58	0.0682	2.5	0.133	<0.0124	0.106
Anthracene	mg/kg	17000	32.1	<0.0131	<0.0602	0.301	<0.0126	<0.0127	27.4	<0.0126	13.3	0.0674	<0.0124	0.0617
Benzo[a]anthracene	mg/kg	3.1	**10.2**	<0.0131	0.323	0.144	<0.0126	<0.0127	**15.1**	<0.0126	**7.73**	0.464	<0.0124	0.453
Benzo[a]pyrene	mg/kg	2.3	**7.43**	0.0326	0.455	1.92	<0.0126	<0.0127	**13.9**	0.0473	**7.09**	0.868	<0.0124	0.709
Benzo[b]fluoranthene	mg/kg	3.1	**6.34**	0.0339	0.67	1.46	<0.0126	0.0143	**12.5**	0.041	**6.53**	1.11	<0.0124	0.9
Benzo[g,h,i]perylene	mg/kg	170	3.11	0.027	0.468	4.13	<0.0126	<0.0127	7.78	0.0996	3.5	0.862	<0.0124	0.67
Benzo[k]fluoranthene	mg/kg	31	2.42	<0.0131	0.22	0.391	<0.0126	<0.0127	4.3	<0.0126	2.48	0.363	<0.0124	0.236
Chrysene	mg/kg	310	9.39	0.0133	0.446	0.134	<0.0126	<0.0127	13.6	<0.0126	7.26	0.691	<0.0124	0.605
Dibenz(a,h)anthracene	mg/kg	0.31	**0.737**	<0.0131	0.0671	**0.47**	<0.0126	<0.0127	**1.25**	0.0358	**0.638**	0.128	<0.0124	0.101
Fluoranthene	mg/kg	2300	28.7	<0.0131	0.466	0.173	<0.0126	0.0208	53	<0.0126	25.3	0.665	<0.0124	0.624
Fluorene	mg/kg	2300	54.1	<0.0131	<0.0602	0.0996	<0.0126	<0.0127	27.3	<0.0126	13.5	<0.0596	<0.0124	<0.0592
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	2.51	0.021	0.338	2.51	<0.0126	<0.0127	**6.25**	0.0761	2.89	0.68	<0.0124	0.531
Naphthalene	mg/kg	1100	540	<0.0131	<0.0602	<0.0627	<0.0126	<0.0127	0.41	<0.0126	3.4	<0.0596	<0.0124	<0.0592
Phenanthrene	mg/kg	1700	116	<0.0131	0.126	<0.0627	<0.0126	0.0284	110	<0.0126	49	0.372	<0.0124	0.35
Pyrene	mg/kg	1700	42.2	0.0251	0.803	0.498	<0.0126	0.0301	68.6	0.0131	34.8	0.936	<0.0124	0.937
Volatile Organic Compounds														
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated BC6-SL-0720-5' 7/27/2020	BC8-SL-0720-3' 7/27/2020	C3-SL-0720-1' 7/27/2020	excavated D3-SL-0720-1' 7/27/2020	D3-SL-0720-3' 7/27/2020	D4-SL-0720-5' 7/27/2020	excavated D5-SL-0720-5' 7/27/2020	E4-SL-0720-5' 7/27/2020	excavated E5-SL-0720-5' 7/27/2020	F2-SL-0720-1' 7/27/2020	F2-SL-0720-3' 7/27/2020	H2-SL-0720-1' 7/27/2020
Volatile Organic Compounds (cont'd)														
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	excavated BC6-SL-0720-5' 7/27/2020	BC8-SL-0720-3' 7/27/2020	C3-SL-0720-1' 7/27/2020	excavated D3-SL-0720-1' 7/27/2020	D3-SL-0720-3' 7/27/2020	D4-SL-0720-5' 7/27/2020	excavated D5-SL-0720-5' 7/27/2020	E4-SL-0720-5' 7/27/2020	excavated E5-SL-0720-5' 7/27/2020	F2-SL-0720-1' 7/27/2020	F2-SL-0720-3' 7/27/2020	H2-SL-0720-1' 7/27/2020
Phenols														
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	JK2-SL-0720-1' 7/27/2020	JK2-SL-0720-3' 7/27/2020	JK2-SL-0720-5' 7/27/2020	AA8-SL-0920-1' 9/11/2020	AA7-SL-0920-1' 9/11/2020	AA6-SL-0920-1' 9/11/2020	B9-SL-0920-1' 9/11/2020	C2-SL-0920-1' 9/11/2020	excavated D2-SL-0920-1' 9/11/2020	D2-SL-1020-2.5' 10/22/2020	D1-SL-1020-1' 10/22/2020	E1-SL-1020-1' 10/22/2020	DP01-SL-1020 10/22/2020
Inorganics															
Cyanide, Amenable	mg/kg	NA	-	-	-	-	-	-	-	-	-				
Arsenic	mg/kg	17	-	-	-	-	-	-	-	-	-				
Lead	mg/kg	400	-	-	-	-	-	-	-	-	-				
Polynuclear Aromatic Hydrocarbons															
2-Methylnaphthalene	mg/kg	230	<0.0613	<0.0628	<0.0641	<0.0623	<0.0590	<0.0113	<0.0619	<0.0657	0.235	<0.0121	<0.0115	<0.0118	<0.0118
Acenaphthene	mg/kg	3400	<0.0613	<0.0628	<0.0641	<0.0623	<0.0590	<0.0113	<0.0619	<0.0657	<0.0690	<0.0121	<0.0115	<0.0118	<0.0118
Acenaphthylene	mg/kg	1700	<0.0613	0.132	<0.0641	0.0963	0.192	0.0359	0.237	0.184	4.52	<0.0121	<0.0115	<0.0118	<0.0118
Anthracene	mg/kg	17000	<0.0613	0.0774	<0.0641	<0.0623	0.0666	0.0129	<0.0619	<0.0657	1.17	<0.0121	<0.0115	<0.0118	<0.0118
Benzo[a]anthracene	mg/kg	3.1	0.0924	0.432	0.105	0.251	0.242	0.0527	0.260	0.396	**6.32**	<0.0121	<0.0115	<0.0118	<0.0118
Benzo[a]pyrene	mg/kg	2.3	0.108	0.532	0.124	0.347	0.420	0.0881	0.725	0.643	**4.90**	<0.0121	<0.0115	<0.0118	<0.0118
Benzo[b]fluoranthene	mg/kg	3.1	0.136	0.687	0.156	0.484	0.519	0.131	0.856	0.885	**13.8**	<0.0121	0.0150	<0.0118	0.0143
Benzo[g,h,i]perylene	mg/kg	170	0.0781	0.459	0.0886	0.319	0.436	0.103	0.796	0.728	10.5	<0.0121	<0.0115	<0.0118	<0.0118
Benzo[k]fluoranthene	mg/kg	31	<0.0613	0.201	<0.0641	0.151	0.152	0.0378	0.235	0.262	5.30	<0.0121	<0.0115	<0.0118	<0.0118
Chrysene	mg/kg	310	0.107	0.521	0.134	0.344	0.293	0.0755	0.405	0.527	8.30	<0.0121	<0.0115	<0.0118	<0.0118
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0613	0.0849	<0.0641	<0.0623	0.0739	0.0187	0.113	0.0863	**1.75**	<0.0121	<0.0115	<0.0118	<0.0118
Fluoranthene	mg/kg	2300	0.107	0.58	0.114	0.369	0.343	0.0630	0.375	0.868	10.1	<0.0121	<0.0115	<0.0118	<0.0118
Fluorene	mg/kg	2300	<0.0613	<0.0628	<0.0641	<0.0623	<0.0590	<0.0113	<0.0619	<0.0657	0.253	<0.0121	<0.0115	<0.0118	<0.0118
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.0613	0.368	0.0764	0.285	0.376	0.0875	0.674	0.633	**10.1**	<0.0121	<0.0115	<0.0118	<0.0118
Naphthalene	mg/kg	1100	<0.0613	<0.0628	<0.0641	0.0740	0.0642	0.0113	<0.0619	<0.0657	0.820	<0.0121	<0.0115	<0.0118	<0.0118
Phenanthrene	mg/kg	1700	0.0661	0.337	0.0854	0.268	0.205	0.0320	0.176	0.260	2.94	<0.0121	<0.0115	<0.0118	<0.0118
Pyrene	mg/kg	1700	0.143	0.77	0.15	0.455	0.510	0.0945	0.604	1.29	15.0	<0.0121	<0.0115	<0.0118	<0.0118
Volatile Organic Compounds															
Benzene	mg/kg	56	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes, Total	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1,2-Tetrachloroethane	mg/kg	230	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,1-Trichloroethane	mg/kg	150000	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	15	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	54	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	380	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichlorobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromo-3-Chloropropane	mg/kg	2.6	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dibromoethane (EDB)	mg/kg	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	5500	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	34	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	53	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3,5-Trimethylbenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	JK2-SL-0720-1' 7/27/2020	JK2-SL-0720-3' 7/27/2020	JK2-SL-0720-5' 7/27/2020	AA8-SL-0920-1' 9/11/2020	AA7-SL-0920-1' 9/11/2020	AA6-SL-0920-1' 9/11/2020	B9-SL-0920-1' 9/11/2020	C2-SL-0920-1' 9/11/2020	excavated D2-SL-0920-1' 9/11/2020	D2-SL-1020-2.5' 10/22/2020	D1-SL-1020-1' 10/22/2020	E1-SL-1020-1' 10/22/2020	DP01-SL-1020 10/22/2020
Volatile Organic Compounds (cont'd)															
1,3-Dichlorobenzene	mg/kg	6800	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
2,2-Dichloropropane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Butanone (MEK)	mg/kg	46000	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chlorotoluene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	68000	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromobenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromochloromethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	50	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	390	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	110	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon disulfide	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	44	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorodibromomethane	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	30000	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,2-Dichloroethene	mg/kg	150	-	-	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	mg/kg	760	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodifluoromethane	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachlorobutadiene	mg/kg	40	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexane	mg/kg	4600	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl tert-butyl ether	mg/kg	2300	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Butylbenzene	mg/kg	3800	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Propylbenzene	mg/kg	7600	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Isopropyltoluene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
sec-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Styrene	mg/kg	15000	-	-	-	-	-	-	-	-	-	-	-	-	-
tert-Butylbenzene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	1500	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	67	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichlorofluoromethane	mg/kg	23000	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 1

Soil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	JK2-SL-0720-1' 7/27/2020	JK2-SL-0720-3' 7/27/2020	JK2-SL-0720-5' 7/27/2020	AA8-SL-0920-1' 9/11/2020	AA7-SL-0920-1' 9/11/2020	AA6-SL-0920-1' 9/11/2020	B9-SL-0920-1' 9/11/2020	C2-SL-0920-1' 9/11/2020	excavated D2-SL-0920-1' 9/11/2020	D2-SL-1020-2.5' 10/22/2020	D1-SL-1020-1' 10/22/2020	E1-SL-1020-1' 10/22/2020	DP01-SL-1020 10/22/2020
Phenols															
2,4,5-Trichlorophenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	220	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	180	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	1200	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	120	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Chlorophenol	mg/kg	310	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	3100	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
4,6-Dinitro-2-methylphenol	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol (and/or 3-Methylphenol)	mg/kg	6100	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	490	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	4.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	18000	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cresols	mg/kg	NA	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
mg/kg = miligram per kilogram.
Cells with red outlines exceed the statewide standard.
Shaded columns indicate soil which has been excavated.

Table 2

Borrow Clay Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	BF1-113020 11/30/2020	BF2-113020 11/30/2020	BF3-113020 11/30/2020	BF4-113020 11/30/2020	BF5-113020 11/30/2020	BF6-113020 11/30/2020	BF7-113020 11/30/2020	BF8-113020 11/30/2020	BF9-113020 11/30/2020
Cyanide, Total	mg/kg	46	<1.22	<1.24	<1.14	<1.19	<1.20	<1.18	<1.18	<1.18	<1.25
Arsenic	mg/kg	1.9	<1.99	<1.93	<1.79	<2.77	2.89 J	<1.88	5.94	3.82 J	<1.85
Lead	mg/kg	400	15.2	18.2	13.6	13.3	14.1	16.6	8.77	26.1	18.3
Benzene	mg/kg	56	<0.0975	<0.0962	<0.0972	<0.0912	<0.0925	<0.0917	<0.0952	<0.0966	<0.0989
Ethylbenzene	mg/kg	7600	<0.0975	<0.0962	<0.0972	<0.0912	<0.0925	<0.0917	<0.0952	<0.0966	<0.0989
Toluene	mg/kg	6100	<0.0975	<0.0962	<0.0972	<0.0912	<0.0925	<0.0917	<0.0952	<0.0966	<0.0989
Xylenes, Total	mg/kg	15000	<0.292	<0.288	<0.292	<0.273	<0.278	<0.275	<0.286	<0.290	<0297
Total Extractable Hydrocarbons (Gasoline)	mg/kg		<9.91	<9.80	<9.78	<9.50	<9.54	<9.48	<9.57	<9.94	<9.77
Total Extractable Hydrocarbons (Diesel)	mg/kg	28000	<9.91	<9.80	<9.78	<9.50	<9.54	<9.48	<9.57	<9.94	<9.77
Total Extractable Hydrocarbons (Waste Oil)	mg/kg	9400	11.5	18.2	<9.78	15.2	<9.54	14	13	15	18
Acenaphthene	mg/kg	3400	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Acenaphthylene	mg/kg	1700	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Anthracene	mg/kg	17000	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Benzo[a]anthracene	mg/kg	3.1	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Benzo[a]pyrene	mg/kg	2.3	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Benzo[b]fluoranthene	mg/kg	3.1	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Benzo[g,h,i]perylene	mg/kg	170	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Benzo[k]fluoranthene	mg/kg	31	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Chrysene	mg/kg	310	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Fluoranthene	mg/kg	2300	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Fluorene	mg/kg	2300	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
2-Methylnaphthalene	mg/kg	230	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Naphthalene	mg/kg	1100	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Phenanthrene	mg/kg	1700	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128
Pyrene	mg/kg	1700	<0.0126	<0.0129	<0.0122	<0.0124	<0.0121	<0.0123	<0.0123	<0.0127	<0.0128

Note:

mg/kg - Miligrams per kilogram.

Table 3

Borrow Topsoil Analytical Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard	Topsoil Composite
Cyanide, Total	mg/kg	46	<1.27
Arsenic	mg/kg	1.9	3.87 J
Lead	mg/kg	400	19.2
Benzene	mg/kg	56	<0.0975
Ethylbenzene	mg/kg	7600	<0.0975
Toluene	mg/kg	6100	<0.0975
Xylenes, Total	mg/kg	15000	<0.292
Total Extractable Hydrocarbons (Gasoline)	mg/kg		<9.58
Total Extractable Hydrocarbons (Diesel)	mg/kg	28000	<9.58
Total Extractable Hydrocarbons (Waste Oil)	mg/kg	9400	55.4
Acenaphthene	mg/kg	3400	<0.0639
Acenaphthylene	mg/kg	1700	<0.0639
Anthracene	mg/kg	17000	<0.0639
Benzo[a]anthracene	mg/kg	3.1	<0.0639
Benzo[a]pyrene	mg/kg	2.3	<0.0639
Benzo[b]fluoranthene	mg/kg	3.1	<0.0639
Benzo[g,h,i]perylene	mg/kg	170	<0.0639
Benzo[k]fluoranthene	mg/kg	31	<0.0639
Chrysene	mg/kg	310	<0.0639
Dibenz(a,h)anthracene	mg/kg	0.31	<0.0639
Fluoranthene	mg/kg	2300	<0.0639
Fluorene	mg/kg	2300	<0.0639
Indeno[1,2,3-cd]pyrene	mg/kg	3.1	<0.0639
2-Methylnaphthalene	mg/kg	230	<0.0639
Naphthalene	mg/kg	1100	<0.0639
Phenanthrene	mg/kg	1700	<0.0639
Pyrene	mg/kg	1700	<0.0639

Note:

mg/kg - Miligrams per kilogram.

Table 4

Project Ambient Air Quality Standards
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

	Outdoor Worker Screening Level		Residential Screening Level		
	Carcinogenic[1] Target Risk=1E-06 ($\mu g/m^3$)	Noncarcinogenic[2] Target Hazard Index=1 ($\mu g/m^3$)	Carcinogenic[1] Target Risk=1E-06 ($\mu g/m^3$)	Noncarcinogenic[2] Target Hazard Index=1 ($\mu g/m^3$)	PAAQS ($\mu g/m^3$)
Constituent					
Benzo(a)anthracene	85.2	-	0.0169	-	0.0169
Benzene	655	5840	156	1390	156
Benzo(a)pyrene	8.52	0.146	0.00169	0.0348	0.00169
Benzo(b)fluoranthene	85.2	-	0.0169	-	0.0169
Benzo(g,h,i)perylene	-	-	-	-	-
Benzo(k)fluoranthene	852	-	0.169	-	0.169
Chrysene	8520	-	1.69	-	1.69
Dibenz(a,h)anthracene	8.52	-	0.00169	-	0.00169
Ethylbenzene	2040	657000	487	156000	487
Indeno(1,2,3-cd)pyrene	85.2	-	0.0169	-	0.0169
Naphthalene	150	219	35.8	52.1	35.8
Toluene	-	365000	-	86900	86900
Xylenes	-	29200	-	6950	6950

Notes:

1 Project-specific Screening Levels (SLs) for multiple exposure pathways for chemicals with carcinogenic effects. Provided values correspond to a 10^{-6} target risk level for carcinogenic effects.
2 Project-specific SLs for multiple exposure pathways for chemicals with non-carcinogenic effects. Provided values correspond to a Hazard Quotient of 1 for non-carcinogenic
"-" - Indicates not applicable.
$\mu g/m^3$ - Micrograms per cubic meter.
PAAQS - Project Ambient Air Quality Standard.
Screening levels Source: United States Environmental Protection Agency's regional screening level calculator developed by Oak Ridge National Laboratory. Regional Screening Levels for Chemical Contaminants at Superfund Sites.(https://www.epa.gov/risk/regional-screening-levels-rsls).

Table 5

Average Time-Integrated Air Monitoring Results - Pre-IRA Background Monitoring
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analytical Parameter	PAAQS	AMS 1	AMS 2	AMS 3	AMS 4
Volatile Organic Compounds (µg/M^3)					
Benzene	156	0.350	0.340	0.430	0.330
Toluene	86900	1.100	0.370	2.000	0.370
Ethyl Benzene	487	0.070	0.350	0.320	0.210
Xylenes	6950	0.620	1.660	1.500	0.930
Polynuclear Aromatic Hydrocarbons (µg/M^3)					
Naphthalene	35.8	0.0263	0.0303	0.0617	0.0575
Chrysene	1.69	0.0010	0.0010	0.0010	0.0010
Benzo(a)anthracene	0.0169	0.0009	0.0008	0.0008	0.0008
Benzo(b)fluoranthene	0.0169	0.0017	0.0017	0.0017	0.0017
Benzo(k)fluoranthene	0.169	0.0010	0.0010	0.0010	0.0010
Benzo(a)pyrene	0.00169	0.0017	0.0017	0.0017	0.0017
Indeno(1,2,3-c,d)pyrene	0.0169	0.0017	0.0017	0.0017	0.0017
Dibenz(a,h)anthracene	0.00169	0.0013	0.0013	0.0013	0.0013

Notes:

PAAQS = Project Ambient Air Quality Standards.

µg/M^3 = Microgram(s) per cubic meter.

Table 6

Average Time-Integrated Air Monitoring Results - Excavation Monitoring
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analytical Parameter	PAAQS	AMS 1	AMS 2	AMS 3	AMS 4
Volatile Organic Compounds (μg/M^3)					
Benzene	156	3.777	9.517	11.970	2.281
Toluene	86900	3.186	7.420	8.949	2.177
Ethyl Benzene	487	1.590	4.553	4.116	0.944
Xylenes	6950	1.627	3.761	3.404	1.170
Polynuclear Aromatic Hydrocarbons (μg/M^3)					
Naphthalene	35.8	1.5366	5.9789	6.0163	1.3210
Chrysene	1.69	0.0010	0.0010	0.0010	0.0010
Benzo(a)anthracene	0.0169	0.0008	0.0009	0.0010	0.0008
Benzo(b)fluoranthene	0.0169	0.0017	0.0017	0.0017	0.0017
Benzo(k)fluoranthene	0.169	0.0010	0.0010	0.0010	0.0010
Benzo(a)pyrene	0.00169	0.0017	0.0017	0.0017	0.0017
Indeno(1,2,3-c,d)pyrene	0.0169	0.0017	0.0017	0.0020	0.0017
Dibenz(a,h)anthracene	0.00169	0.0013	0.0013	0.0013	0.0013

Notes:

PAAQS = Project Ambient Air Quality Standards.

μg/M^3 = Microgram(s) per cubic meter.

Table 7

Average Time-Integrated Air Monitoring Results - Post-IRA Background Monitoring
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analytical Parameter	PAAQS	AMS 1	AMS 2	AMS 3	AMS 4
Volatile Organic Compounds (μg/M^3)					
Benzene	156	0.600	0.680	0.640	0.600
Toluene	86900	0.820	0.760	0.370	0.840
Ethyl Benzene	487	0.220	0.210	0.180	0.210
Xylenes	6950	0.960	0.800	0.650	0.960
Polynuclear Aromatic Hydrocarbons (μg/M^3)					
Naphthalene	35.8	0.0332	0.0405	0.0429	0.0388
Chrysene	1.69	0.0011	0.0011	0.0011	0.0011
Benzo(a)anthracene	0.0169	0.0009	0.0010	0.0009	0.0009
Benzo(b)fluoranthene	0.0169	0.0018	0.0019	0.0019	0.0019
Benzo(k)fluoranthene	0.169	0.0011	0.0011	0.0011	0.0011
Benzo(a)pyrene	0.00169	0.0018	0.0019	0.0019	0.0019
Indeno(1,2,3-c,d)pyrene	0.0169	0.0018	0.0019	0.0019	0.0019
Dibenz(a,h)anthracene	0.00169	0.0014	0.0015	0.0015	0.0014

Notes:

PAAQS = Project Ambient Air Quality Standards.
--- = No PAAQS established.

μg/M^3 = Microgram(s) per cubic meter.

Table 8

Soil 95% UCL Results
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Analyte	Units	Iowa Statewide Standard for Soil	City of Albia 0-2 Feet		City of Albia >2 Feet		CVEC 0-2 Feet		CVEC >2 Feet		Henderson 0-2 Feet		Henderson >2 Feet		IDOT 0-2 Feet		IDOT >2 Feet	
			95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration	95% UCL	Maximum Concentration
Polynuclear Aromatic Hydrocarbons																		
2-Methylnaphthalene	mg/Kg	230	0.0825	0.129	**1.584**	0.331	0.0799	0.133	0.0598	0.319	No UCL	0.084	No UCL	ND	0.25	0.441	0.13	0.452
Acenaphthene	mg/Kg	3400	ND	No UCL	No UCL	0.722	No UCL	0.0266	0.0354	0.135	No UCL	ND	No UCL	ND	No UCL	0.425	2.452	12.5
Acenaphthylene	mg/Kg	1700	0.104	0.181	No UCL	3.86	0.305	0.492	0.227	1.25	0.514	1.06	**2.028**	1.67	0.464	0.889	1.621	7.02
Anthracene	mg/Kg	17000	0.0955	0.169	No UCL	3.41	0.106	0.192	0.0917	0.351	0.114	0.241	0.218	0.423	0.461	0.897	1.523	7.35
Benzo[a]anthracene	mg/Kg	3.1	0.37	0.888	No UCL	2.28	0.562	0.991	0.313	1.31	0.563	0.788	0.799	1.54	2.317	2.79	1.397	4.41
Benzo[a]pyrene	mg/Kg	2.3	0.485	0.969	1.912	2.22	0.906	1.61	0.2	0.699	0.798	1.32	1.381	2.63	2.889	3.47	1.902	6.34
Benzo[b]fluoranthene	mg/Kg	3.1	**1.392**	1.32	1.612	1.87	1.121	1.9	0.325	1.31	1.002	1.83	2.012	3.8	3.377	4.1	1.844	5.68
Benzo[g,h,i]perylene	mg/Kg	170	0.424	0.918	1.139	1.32	0.866	1.2	0.291	1.27	0.869	1.51	**4.353**	3.41	3.127	3.39	1.56	6.13
Benzo[k]fluoranthene	mg/Kg	31	0.204	0.409	No UCL	0.719	0.366	0.632	0.057	0.219	0.615	0.704	0.753	1.49	0.783	1.7	0.612	1.83
Chrysene	mg/Kg	310	0.479	1.15	No UCL	1.88	0.74	1.28	0.163	0.51	0.526	0.974	1.133	2.12	2.891	3.36	1.585	5.24
Dibenz(a,h)anthracene	mg/Kg	0.31	0.0952	0.185	No UCL	0.174	0.132	0.188	0.0589	0.185	0.139	0.259	0.274	0.546	0.356	0.693	0.276	1.05
Fluoranthene	mg/Kg	2300	0.466	1.16	No UCL	8.77	0.835	1.45	1.221	4.38	0.452	0.766	0.831	1.51	4.231	4.86	0.4889	9.69
Fluorene	mg/Kg	2300	ND	No UCL	No UCL	4.89	No UCL	0.0541	0.103	0.604	No UCL	ND	No UCL	0.0855	0.322	0.357	4.709	8.28
Indeno[1,2,3-cd]pyrene	mg/Kg	3.1	0.406	0.832	1.161	1.23	0.71	1.03	0.421	1.49	0.688	1.16	**3.797**	2.86	**3.715**	3.08	1.339	5.17
Naphthalene	mg/Kg	1100	0.136	0.231	No UCL	28.5	0.149	0.36	4.067	13.6	0.0728	0.124	0.288	0.402	0.282	0.524	0.256	0.983
Phenanthrene	mg/Kg	1700	0.323	0.72	No UCL	21.1	0.364	0.5	3.076	9.75	0.244	0.37	No UCL	0.402	**5.513**	3.56	13.29	26.7
Pyrene	mg/Kg	1700	0.518	1.09	No UCL	11.1	1.34	2.43	1.711	6.37	0.741	1.34	1.524	2.86	4.944	5.27	7.2	13.5
Inorganics																		
Arsenic	mg/Kg	1.9	6.22	7.79	7.497	9.1	**21.49**	16.9	6.02	16.7	No UCL	5.31	3.039	3.48	12.3	12.6	4.845	6.01
Lead	mg/Kg	400	136.6	214	15.23	16.6	**64.94**	53.1	21.49	33.2	No UCL	67.6	56.97	74	121.6	124	**124.6**	113
Volatile Organic Compounds																		
Ethylbenzene	mg/kg	7600	No UCL	ND	No UCL	ND	No UCL	ND	No UCL	2	No UCL	NA	No UCL	NA	No UCL	NA	No UCL	NA
1,2,4-Tyrimethylbenzene	mg/kg	760	No UCL	ND	No UCL	2.22	No UCL	ND	No UCL	0.809	No UCL	NA	No UCL	NA	No UCL	NA	No UCL	NA

Notes:

No UCL means no UCL could be calculated either because the compund was not detected or only detected once.
NA = Not Analyzed
ND = Not detected
Bold indicates a UCL which is higher than the maximum concentration detected.
Shaded cells indicate values greater than the respecive statewide standards.

Table 9

Summary of Cumulative Risks
Interstate Power and Light Company
Former Manufactured Gas Plant - Albia, Iowa

Receptor	Soil Interval (feet below ground surface)	Carcinogenic Risk (10E-4)	Non-Carcinogenic Total Hazard Quotient [a]
IDNR Risk Criteria	not applicable	1	1
City of Albia			
Residential	0 to 2	0.23	0.63
Site Worker	0 to 2	0.05	0.186
Construction Worker	0 to 2	0	0.13
Construction Worker	>2	0	0.08
CVEC			
Residential	0 to 2	0.63	1.15
Site Worker	0 to 2	0.14	0.254
Construction Worker	0 to 2	0.01	0.23
Construction Worker	>2	0	0.07
Henderson			
Residential	0 to 2	0.22	0.42
Site Worker	0 to 2	0.04	0.104
Construction Worker	0 to 2	0	0.08
Construction Worker	>2	0	0.06
IDOT			
Residential	0 to 2	0.58	0.87
Site Worker	0 to 2	0.14	0.218
Construction Worker	0 to 2	0.01	0.18
Construction Worker	>2	0	0.11

Note:

[a] The value displayed is the maximum value for non-cancer risk by organ.

Appendices

Appendix A

Daily Log with Photographs Logs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/01/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/1/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	0.00	
Impacted material transported offsite (blended relief holder)	tons	0.00	0.00	
C & D waste material transported offsite	tons	0.00	0.00	
Clean fill transported onsite (subsoil)	tons	0.00	0.00	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 42 °F
Low Temp: 15 °F
Wind: variable, 0-5 mph
Precip: none

HEALTH AND SAFETY

- Kickoff health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
-

ACTIVITIES CONDUCTED LAST 24 HOURS

- Building Demo (dust control via wetting)
- Lay geotech/gravel for truck exit route
- Chemical Sweep of building (Monday)
- Additional Backfill sampling (Monday)

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 12-2-20: begin offsite transport of building demo debris
- Thursday 12-3-20: complete building demo debris transport if needed; begin soil excavation and transport to SCISWA
- Friday 12-4-20: continued excavation/disposal to SCISWA

OPERATIONAL ISSUES/CONCERNS

Significant dust from building demo (attributed to cellulose insulation and concrete dust from statuary business) - controlled by spraying water over demo activities. Perimeter air dust concentrations maintained below action levels.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Roger Shinn, Dean Hargens, Jamie Dunn, Troy Dejong
- Subcontractors:

SITE VISITORS AND AFFILIATION

- Carson Hodge (CVEC)

Photo 1 –View of newly constructed haul road along south side of site (facing SW).

Photo 2 – Demolition of former gas plant building. Water spray used to help control dust (facing North).

2020-12-01 Site Photographs

Photo 3 – Debris from building demolition (facing SE).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/02/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/2/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	0.00	
Impacted material transported offsite (blended relief holder)	tons	0.00	0.00	
C & D waste material transported offsite	tons	144.66	144.66	
Clean fill transported onsite (subsoil)	tons	0.00	0.00	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 46 °F
Low Temp: 23 °F
Wind: generally from east, 0-5 mph
Precip: none

HEALTH AND SAFETY

- daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Began 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Loading and offsite disposal of demolition debris (dust control via wetting)
- Installation/activation of electrical service (perimeter AAM stations and trailers)
-
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Thursday 12-3-20: complete building demo debris transport; prep for impacted soil excavation and transport to SCISWA
- Friday 12-4-20: begin excavation/disposal of impacted soil to SCISWA
- Monday 12-7-20: continued excavation/disposal of impacted soil to SCISWA; possible visit by IDNR

OPERATIONAL ISSUES/CONCERNS

Excavation/blending of relief holder materials expected to generate significant odor/air impacts. Blending activities to occur in morning and all blended material to be shipped offsite same day. Relief holder and blending areas to be covered by less impacted waste soils (blending material for following day) upon completion to minimize air impacts. GHD/SK will conduct more frequent air monitoring with direct read instruments at site perimeter and within exclusion zone during blending/loading to monitor air quality.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Roger Shinn, Dean Hargens, Jamie Dunn, Troy Dejong and drivers from Ben Shinn Trucking
- Subcontractors: CVEC lineman crew and Francis Electric

SITE VISITORS AND AFFILIATION

- none

Photo 1 – Load-out of demolition debris. Water spray used to help control dust (facing NW).

Photo 2 – Tire-cleaning mats installed in truck decontamination area along south side of site (facing W).

2020-12-02 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/03/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/3/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	0.00	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	0.00	
C & D debris transported offsite	tons	56.37	201.03	
Clean fill transported onsite (subsoil)	tons	129.03	129.03	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 44 °F
Low Temp: 22 °F
Wind: variable, 5-10 mph
Precip: none

HEALTH AND SAFETY

- daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling event in progress

ACTIVITIES CONDUCTED LAST 24 HOURS

- Loading and offsite disposal of demolition debris (completed, with exception of concrete floor and foundation)
- Dust control via wetting (as needed to maintain air quality at fenceline)
- Begin stockpiling clean fill onsite
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Friday 12-4-20: begin excavation of impacted materials on north side of site to stockpile for consolidation of relief holder materials
- Monday 12-7-20: consolidation of relief holder materials with less impacted wastes for transport and disposal at SCISWA; possible visit by IDNR
- Tuesday 12-8-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

Excavation/blending of relief holder materials expected to generate significant odor/air impacts. Consolidation activities to occur in morning and all consolidated material to be shipped offsite same day. Relief holder and consolidation areas to be covered by less impacted waste soils (consolidation material for following day) upon completion to minimize air impacts. GHD/SK will conduct more frequent air monitoring with direct read instruments at site perimeter and within exclusion zone during consolidation/loading to monitor air quality.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Dean Hargens, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

Photo 1 – Clean fill stockpile placed NE of excavation area (facing NW).

Photo 2 – Personnel contaminant reduction zone (CRZ) at exit of exclusion zone (facing SW).

2020-12-02 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/04/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/4/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	0.00	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	0.00	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	223.07	352.10	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 50 °F
Low Temp: 27 °F
Wind: generally 5-10 mph from west
Precip: none

HEALTH AND SAFETY

- daily health and safety meeting for all onsite (more extensive than usual for benefit of new local union operator)
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- completion of 48-hour time-integrated perimeter air sampling

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation of impacted materials on north portion of site (D2, E2, D3, E3, F3 areas) - material stockpiled for consolidation with relief holder materials or stockpiled for direct disposal (clayey materials not suitable for consolidation)
- Limited backfill of excavated areas (compaction testing expected soon)
- Continue stockpiling clean fill onsite

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Monday 12-7-20: consolidation of relief holder materials with less impacted wastes for transport and disposal at SCISWA
- Tuesday 12-8-20: continued consolidation of relief holder materials for transport and disposal at SCISWA; visit planned by IDNR
- Wednesday 12-9-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

Excavation/consolidation of relief holder materials expected to generate significant odor/air impacts. Consolidation activities to occur in morning and all consolidated material to be shipped offsite same day. Relief holder and consolidation areas to be covered by less impacted waste soils (consolidation material for following day) upon completion to minimize air impacts. GHD/SK will conduct more frequent air monitoring with direct read instruments at site perimeter and within exclusion zone during consolidation/loading to monitor air quality.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Dean Hargens, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

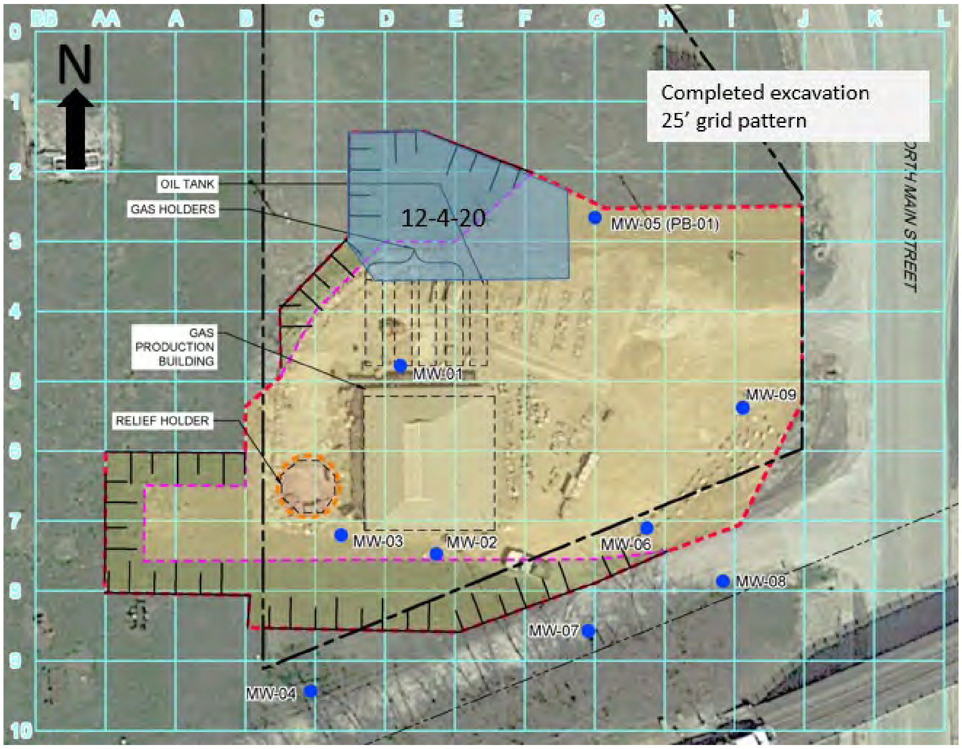


Photo 1 – current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Initial excavation of impacted materials along northern extent of excavation; air sampling and meteorological logging station in foreground (facing ENE).

2020-12-04 Site Photographs

Photo 3 – Excavation near F3 on site grid; very tight clay at base of excavation (facing NW).

Photo 4 – Extent of excavation near end of day Friday. Stockpile to right of excavator to be used for consolidation with relief holder materials (facing S).

2020-12-04 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/07/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/7/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	136.44	136.44	
Impacted material transported offsite (consolidated relief holder)	tons	82.53	82.53	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	0.00	352.10	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 34 °F
Low Temp: 30 °F
Wind: generally 0-5 mph, variable in AM, from west in PM
Precip: none

HEALTH AND SAFETY
- Daily health and safety meeting for all onsite (more extensive than usual for benefit of second local union operator)
-

AIR MONITORING
- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Start 48-hour time-integrated perimeter air sampling

ACTIVITIES CONDUCTED LAST 24 HOURS
- Begin excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 ratio
- Excavation of impacted materials on north portion of site (G3) - material stockpiled for consolidation with relief holder materials
- (Shinn-Kellogg spent a couple hours backfilling Saturday)

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS
- Tuesday 12-8-20: continued excavation, consolidation, and load-out of relief holder materials to SCISWA; IDNR visit expected late morning.
- Wednesday 12-9-20: continued consolidation of relief holder materials for transport and disposal at SCISWA
- Thursday 12-10-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS
- Odor/air emissions from excavation/consolidation of shallow relief holder materials went well and perimeter air quality was good; will continue to monitor closely as impacts are likely greater with depth.
- Consolidated wastes from relief holder sticking in trailers at landfill (excavator at landfill being used to pull waste out of trailer). SK planning to line trailers with polyethylene sheeting starting tomorrow
- Compaction testing results below project requirements - SK bringing sheep's foot compactor onsite today to improve (will retest following additional compaction)

PERSONNEL ONSITE
- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: Braun Intertek (backfill compaction testing)

SITE VISITORS AND AFFILIATION
- Local union representative onsite briefly to talk to union workers

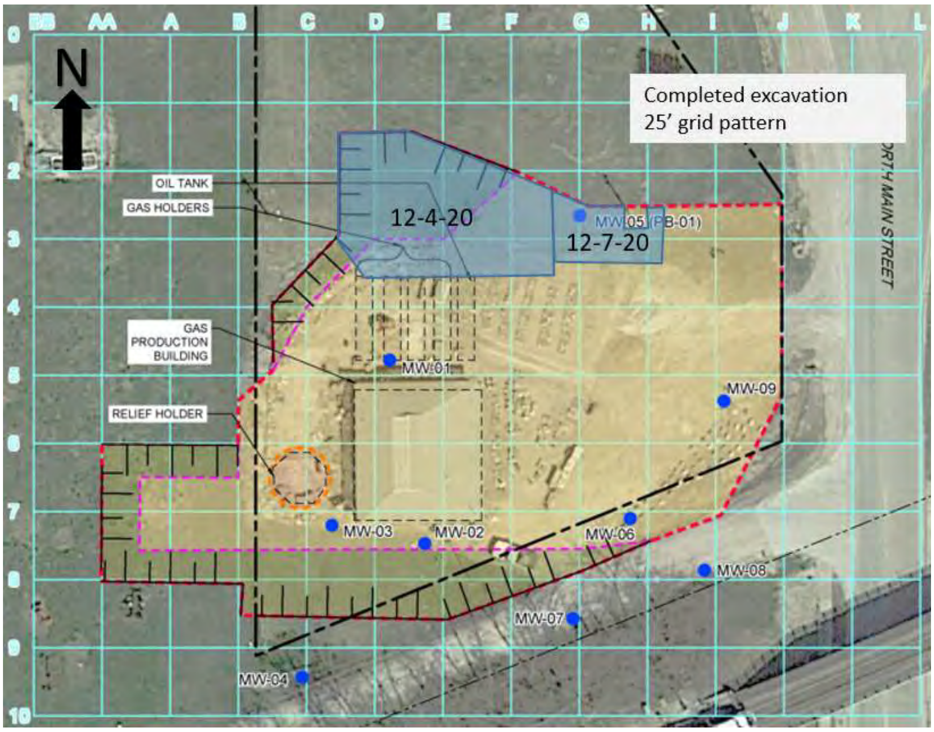


Photo 1 – current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Excavation in vicinity of G3. Monitoring well MW-05 under cone (facing south).

2020-12-07 Site Photographs

Photo 3 – Excavation near G3 on site grid (facing SE).

Photo 4 – Compaction testing near E3 (facing S).

2020-12-07 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/08/20 — GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/8/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	15.68	152.12	
Impacted material transported offsite (consolidated relief holder)	tons	213.62	296.15	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	148.88	500.98	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 27 °F
Low Temp: 53 °F
Wind: generally from south 0-10 mph
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite (including IDNR visit)
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling underway

ACTIVITIES CONDUCTED LAST 24 HOURS

- Continue excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 ratio.
- Excavation of impacted materials on northeast portion of site (north and east of G4) - material stockpiled for consolidation with relief holder materials. Found numerous ceramic tiles, piping, and small wooden box culvert near I4/J4. Excavated to depth of 6' near I4/J4 to remove impacted wooden debris/backfill in this area (trace NAPLs/heavy sheen impacts blended with less impacted materials to absorb fluids)
- IDNR (Matt Culp) visit from 9:20 to 11:30 went very well - no concerns with ongoing/planned site activities.

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 12-9-20: continued consolidation of relief holder materials for transport and disposal at SCISWA
- Thursday 12-10-20: continued consolidation of relief holder materials for transport and disposal at SCISWA
- Friday 12-11-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Odor/air emissions from excavation/consolidation of shallow relief holder materials has been less than anticipated and perimeter air quality remains good; will continue to monitor closely as impacts are likely greater with depth.
- Upon SK placing consolidated wastes from relief holder on polyethylene sheeting in trailers, sticking is no longer a problem - waste is emptying without problem.

PERSONNEL ONSITE

- GHD: Tim Wineland and Kevin Armstrong
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: None

SITE VISITORS AND AFFILIATION

- Matt Culp - Iowa Department of Natural Resources

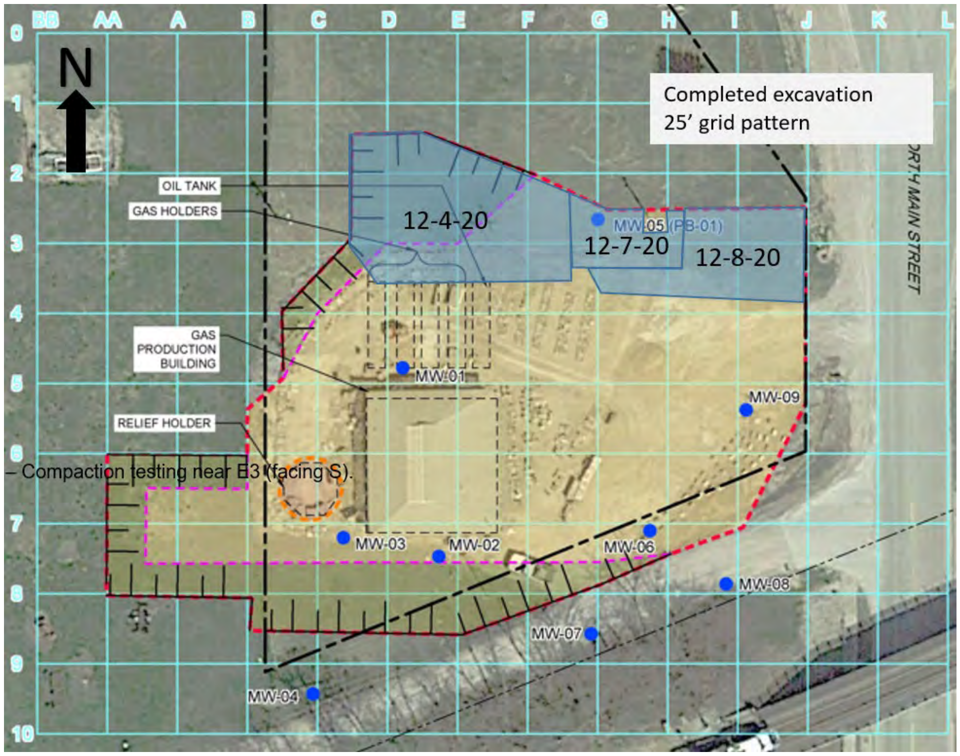


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Temporary stockpile of relief holder materials consolidated with less impacted waste soils at 1:6 ratio (about to be loaded for offsite disposal; facing SE).

2020-12-08 Site Photographs

Photo 3 – Relief holder contents temporarily excavated for benefit of IDNR viewing. Material immediately placed back into holder and covered with less impacted waste soils to minimize volatilization/air impact (facing NE).

Photo 4 – Heavily impacted waste soils and wood debris in vicinity of I4. Excavation extended to approximately 8' deep at this location. Heavily impacted materials at this location consolidated with less impacted waste soils (facing west).

Photo 5 – One of three clay tiles encountered at approximately 2 to 3' below grade at eastern extent of excavation near J3/J4. All full of water with trace NAPL (heavy sheen), but no apparent flow. (facing SE).

Photo 6 – Same three clay tiles sealed with concrete at eastern extent of excavation (buried fiber-optic utility just east of fence). Locations of all recorded with sub-foot accuracy GPS (facing NE).

2020-12-08 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/09/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/9/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	152.12	
Impacted material transported offsite (consolidated relief holder)	tons	262.97	559.12	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	268.97	769.95	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 58 °F
Low Temp: 37 °F
Wind: generally 5-10 mph from north
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- complete / start 48-hour time-integrated perimeter air sampling events

ACTIVITIES CONDUCTED LAST 24 HOURS

- Continue excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 ratio.
- Excavation of impacted materials on north central portion of site (vicinity of F4) - material stockpiled for consolidation with relief holder materials.
- Continued backfill and additional compaction with sheeps foot vibratory compactor

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Thursday 12-10-20: continued consolidation of relief holder materials for transport and disposal at SCISWA, including additional prep ahead of forecast rain/snow expected Friday
- Friday 12-11-20: continued consolidation of relief holder materials for transport and disposal at SCISWA
- Monday 12-14-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Air impacts at perimeter, as indicated by direct read instruments, continue to be minimal (generally 0.00 ppm on PID/nothing above 0.05 ppm; odor is present). Will continue to monitor closely as air impacts may increase as we get deeper into the relief holder.
- Rain changing to snow is forecast on Friday into Saturday… planning to loadout more heavily impacted waste soil stockpiles, and backfill / compact clean fill in excavations to minimize rainwater contact with impacted materials. Stormwater wattles will be placed across gate openings as needed to prevent surface flow offsite (fence and storm drains already protected by wattles).

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Dean Hargins, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: None

SITE VISITORS AND AFFILIATION

- none

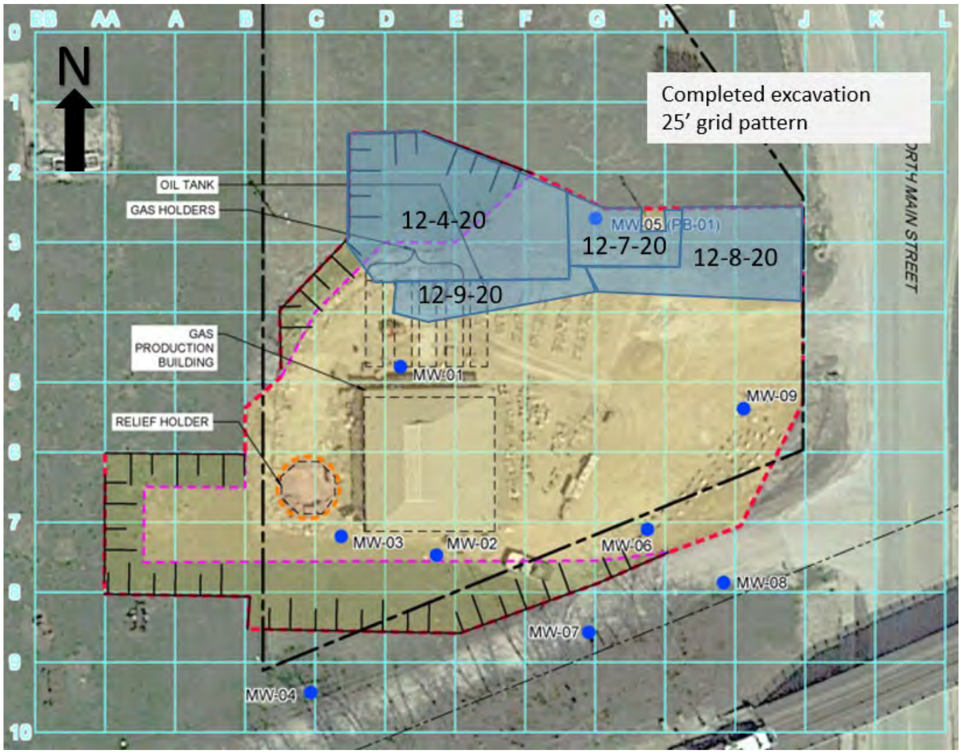


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View into relief holder – approximately 40% of contents have been excavated. Structure is made of standard size red brick with cement veneer interior (facing SE).

2020-12-09 Site Photographs

Photo 3 – Relief holder in foreground and consolidated stockpile in front of excavator about to be loaded. Aboveground stockpile limited to two truckloads at any one time, and covered with less impacted waste soil in between handling to reduce air impacts (facing east).

Photo 4 – Clean fill placed on northern extent of excavation. Vibratory sheep foot compactor is being used for compaction (facing east).


Photo 5 – Excavation near E4; lighter soil colors at bottom of excavation are very tight clays (facing SE).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/10/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/10/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	41.95	194.07	
Impacted material transported offsite (consolidated relief holder)	tons	418.03	977.15	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	96.50	866.45	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 63 °F
Low Temp: 31 °F
Wind: generally 5-10 mph from south
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling event underway

ACTIVITIES CONDUCTED LAST 24 HOURS

- Continued excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 ratio.
- Excavation of impacted materials on north central portion of site (vicinity of C/D-3/4) - material stockpiled for consolidation with relief holder materials.
- Continued backfill and additional compaction with sheeps foot vibratory compactor
- Rain preparation (clean fill berms placed between clean/impacted areas, downslope of impacted areas, and upslope of open excavations/impacted areas to prevent overland flow into these areas)

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Friday 12-11-20: Contingent on rain (see below)…we anticipate being able to continue loading out impacted materials to landfill as long as stormwater runoff is manageable (minimal backfill/compaction planned due to expected precipitation)
- Monday 12-14-20: continued consolidation of relief holder materials for transport and disposal at SCISWA
- Tuesday 12-15-20: continued consolidation of relief holder materials for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Air impacts at perimeter, as indicated by direct read instruments, continue to be minimal as we're nearing the bottom of the holder. We'll continue to monitor closely throughout excavation of relief holder materials.
- Rain changing to snow is forecast nearly all day Friday into Saturday. All heavily impacted stockpile materials were loaded out Thursday afternoon. Extent and duration of site activities on Friday will depend on the amount of rain, and how well preventative stormwater runoff measures are working.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Dean Hargens, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: Braun Intertek (compaction testing) and Caudill Portable Welding (attaching flat edge to excavator bucket for final holder cleanout)

SITE VISITORS AND AFFILIATION

- none

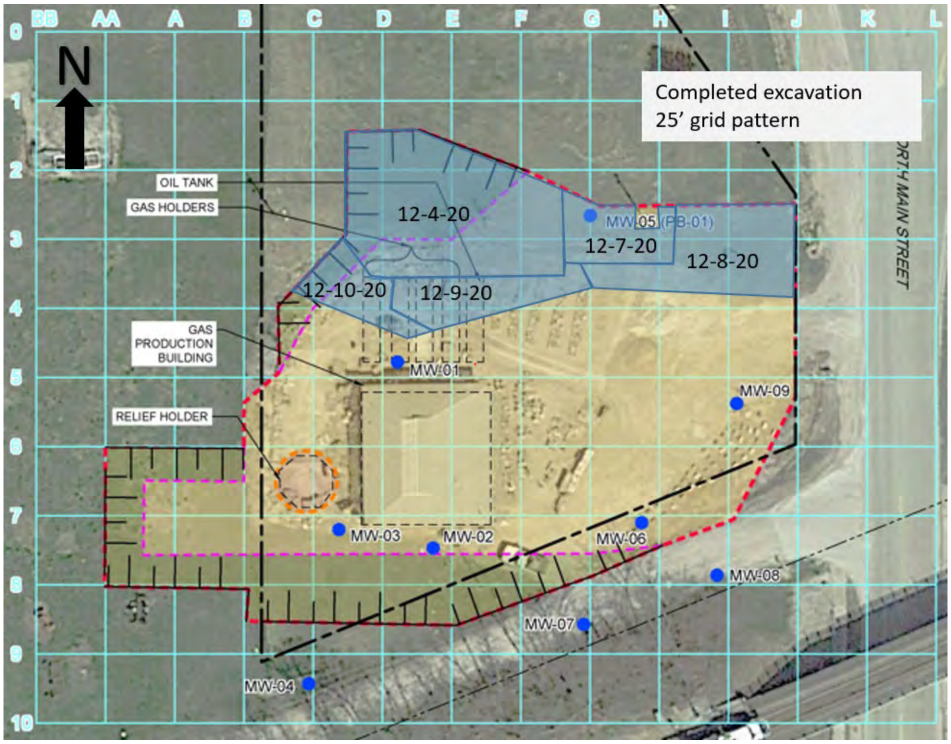


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View into relief holder – approximately 60% of contents have been excavated. Structure is made of standard size red brick with cement veneer interior (facing SE).

2020-12-10 Site Photographs

Photo 3 – View into relief holder – approximately 70% of contents have been excavated (later in the day; facing NW).

Photo 4 – In preparation for forecast rain on Friday, berms of clean fill were placed at perimeter of excavation to prevent overland flow into excavation from north and west, and to prevent impacted sediment/water from entering from south (facing SE). Berms also placed to prevent flow into relief holder (not shown in this picture)

2020-12-10 Site Photographs

Photo 5 – In preparation for forecast rain on Friday, storm water wattles placed across gate at end of day. Berms of fill placed downslope of excavated materials to prevent runoff of impacted sediment/water.

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/11/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/11/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	194.07	
Impacted material transported offsite (consolidated relief holder)	tons	207.88	1185.03	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	0.00	866.45	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 38 °F
Low Temp: 37 °F
Wind: generally 5-20 mph from NE
Precip: 0.3 inches rain, about 1 inch snow

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- complete 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Continue excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 or greater ratio.
- No new shallow excavation (using up stockpiled shallow soils for consolidation of relief holder materials prior to weekend)
- End day in early afternoon due to increasing rain

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Monday 12-14-20: continued excavation of shallow soils and consolidation of relief holder materials for transport and disposal at SCISWA
- Tuesday 12-15-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Wednesday 12-16-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Air impacts at perimeter, as indicated by direct read instruments, were higher than previous days nearing the bottom of the holder, but maintained below action levels. We'll continue to monitor closely throughout excavation of relief holder materials.
- As of Monday morning, several inches of accumulated rainwater in eastern (downslope) portion of excavation near J3. All accumulation from runoff over clean fill (berms isolated imacted materials), so clear water will be pumped out of excavation without treatment.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
-

SITE VISITORS AND AFFILIATION

- none

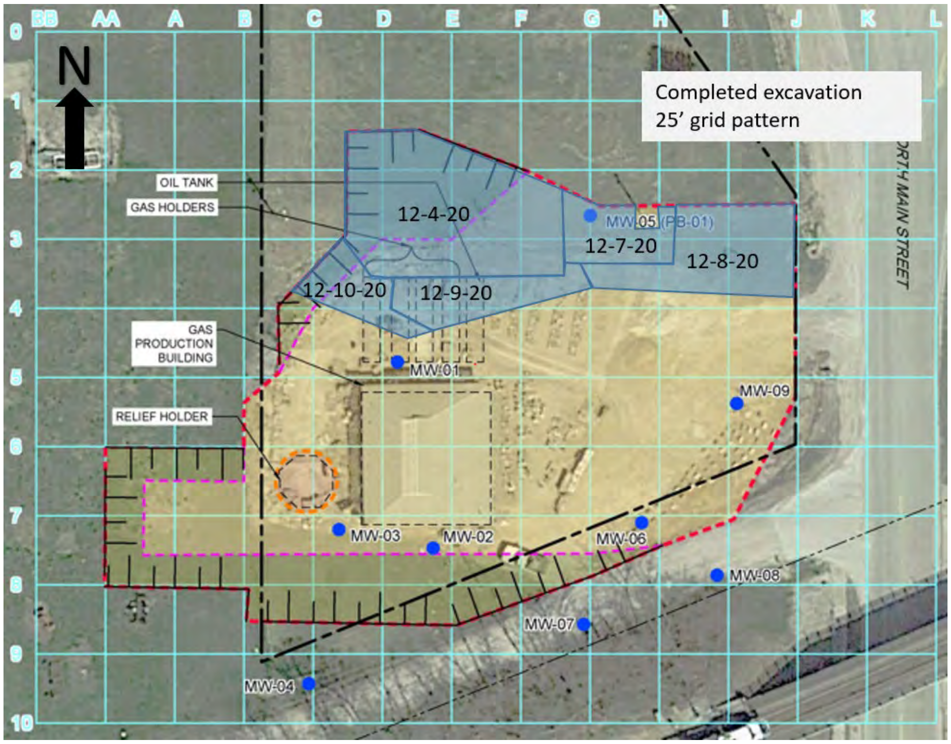


Photo 1 – No new shallow excavation completed on Friday - partial backfill is complete on all shallow excavations in preparation of forecast precipitation.

Photo 2 – View of work area at end of day on Friday (early shut down due to rain - facing south).

2020-12-11 Site Photographs

Photo 3 – Data-logging meteorological station and one of four air sampling stations for BTEX and PAHs (facing NW).

Photo 4 (Monday morning) – Pooled precipitation water in shallow excavation near J3; excavation had initial lift of clean backfill and berms prevented any flow of impacted water/sediment into this area (facing north). Water infiltrated surface (no run-off observed) in exclusion zones where minimal impacted material was exposed (perimeter of these areas also protected by wattles and clean fill berms).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/14/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/14/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	194.07	
Impacted material transported offsite (consolidated relief holder)	tons	170.64	1355.67	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	155.24	1021.69	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 19 °F
Low Temp: 11 °F
Wind: generally 5-10 mph from NW
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Start 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Resumed excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 or greater ratio.
- Shallow excavation NW of former building (C4, C5, and D5 areas)
- Placement of backfill in open excavations NW of former building (not to final grade).

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Tuesday 12-15-20: continued excavation/consolidation of relief holder materials (may complete by end of day) and shallow soils for transport and disposal at SCISWA
- Wednesday 12-16-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Thursday 12-17-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Air impacts at perimeter, as indicated by direct read instruments, were less than Friday but still elevated relative to previous days as we're nearing the bottom of the holder (maintained below action levels). We'll continue to monitor closely throughout excavation of relief holder materials and continue covering heavily impacted materials in between handling.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
-

SITE VISITORS AND AFFILIATION

- none

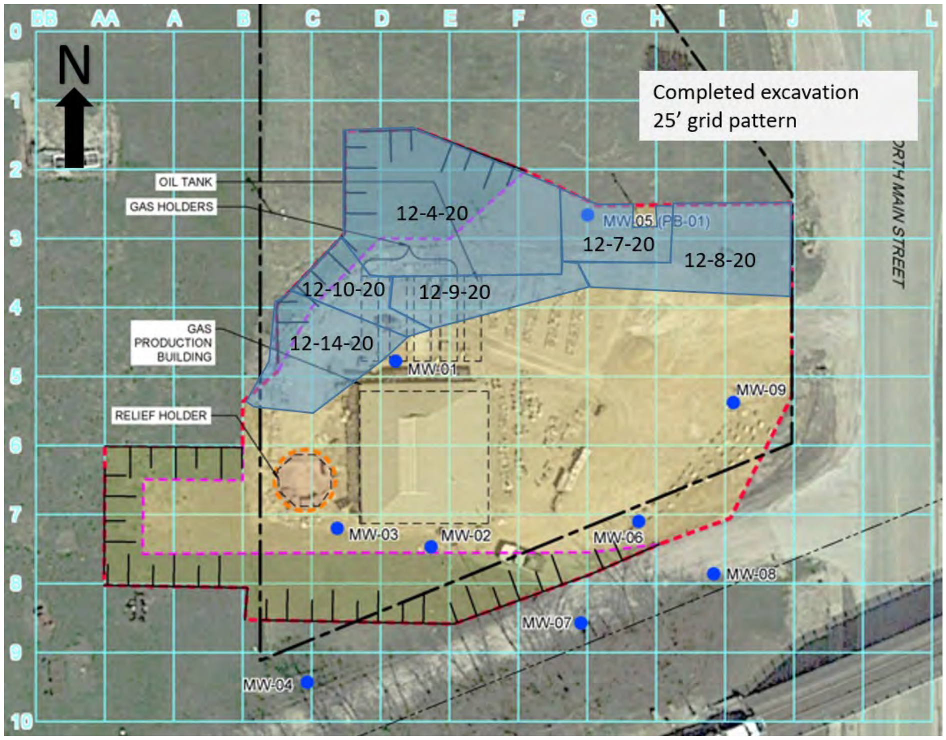


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View of relief holder with less impacted soils placed over heavily impacted materials to minimize volatilization (facing SE).

2020-12-14 Site Photographs

Photo 3 – Backfill on northern portion of excavation and shallow excavation NW of building (west of monitoring well MW-1 [under cone in middle of photo]; facing east).

Photo 4 – Backfill on northern portion of excavation in foreground and shallow excavation NW of building (facing south).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/15/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/15/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	69.95	264.02	
Impacted material transported offsite (consolidated relief holder)	tons	499.86	1855.53	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	235.54	1257.23	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 23 °F
Low Temp: 17 °F
Wind: generally 5-10 mph from East
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling event underway

ACTIVITIES CONDUCTED LAST 24 HOURS

- Continued excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 or greater ratio.
- Shallow excavation on Henderson property (nearly complete and awaiting backfill)
- Placement of backfill in north portion of excavation

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 12-16-20: complete excavation, consolidation, and load-out of relief holder wastes and continue excavation of shallow soils west of former building
- Thursday 12-17-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Friday 12-18-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Air impacts at perimeter, as indicated by direct read instruments, continue to be elevated relative to previous days as we're nearing the bottom of the holder (maintained below action levels). We'll continue to monitor closely throughout excavation of relief holder materials (that should conclude on Wednesday) and continue covering heavily impacted materials in between handling.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: Caudill Portable Welding (re-attaching flat edge to excavator bucket for final holder cleanout)

SITE VISITORS AND AFFILIATION

- none

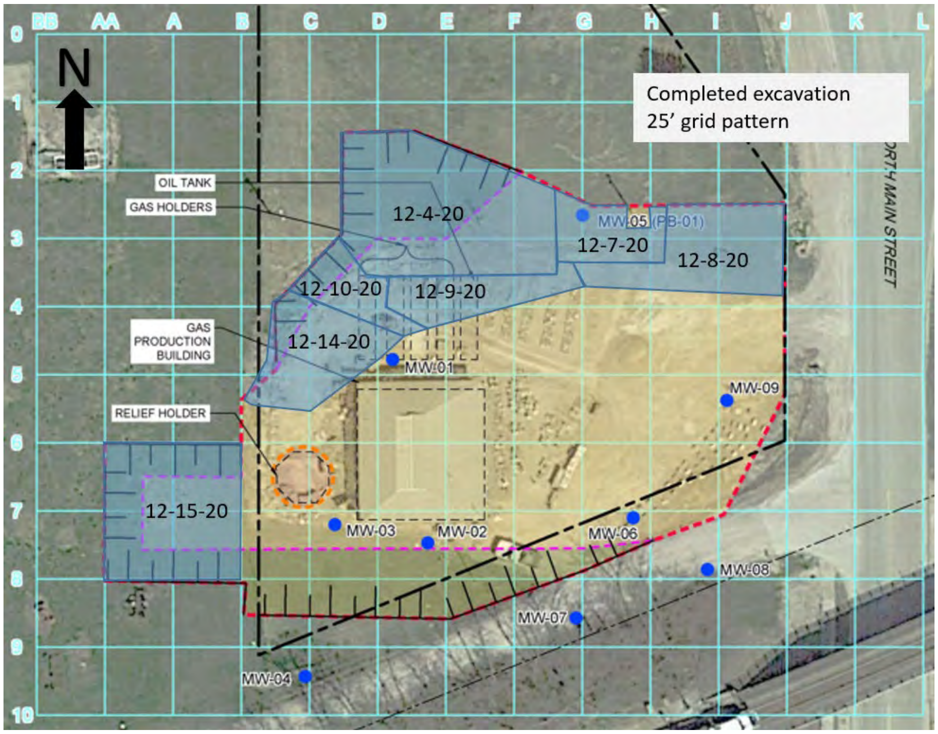


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View of fluid accumulated in relief holder. Mostly water with heavy sheen / trace DNAPL (facing NW).

2020-12-15 Site Photographs

Photo 3 – Remaining contents of relief holder mid-day Tuesday. Lighter colored soils are less impacted waste soils placed on heavily impacted holder waste to minimize volatilization (facing NE).

Photo 4 – Foundation materials from north side of former building; impacted black soil on bottom yet to be scraped off prior to disposal as C&D waste (glove placed on clean break for scale; facing NE).

Photo 5 – Shallow excavation on Henderson property (facing NW).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/16/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/16/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	51.34	315.36	
Impacted material transported offsite (consolidated relief holder)	tons	461.78	2317.31	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	168.24	1425.47	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 26 °F
Low Temp: 14 °F
Wind: generally 5-10 mph from North
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- End and start 48-hour time-integrated perimeter air sampling events

ACTIVITIES CONDUCTED LAST 24 HOURS

- Completed excavation, consolidation, and load-out of relief holder contents with less impacted materials at 1:6 or greater ratio.
- Shallow excavation north of former building (columns C through G and rows 4 to 6)
- Placement of backfill in north portion of excavation

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Thursday 12-17-20: continued excavation of shallow soils for transport and disposal at SCISWA, including deeper excavations around eastern outer perimeter of relief holder to determine extent of impacts with depth in locations most likely to have piping runs between holder/building.
- Friday 12-18-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Monday 12-21-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Site related odors were noticeably less upon completing excavation of holder.
- Direct read instrument for assessment of dust not working - replacement expected by end of day Thursday (dust had been consistently below project criteria in recent days)

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Dean Hargens, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

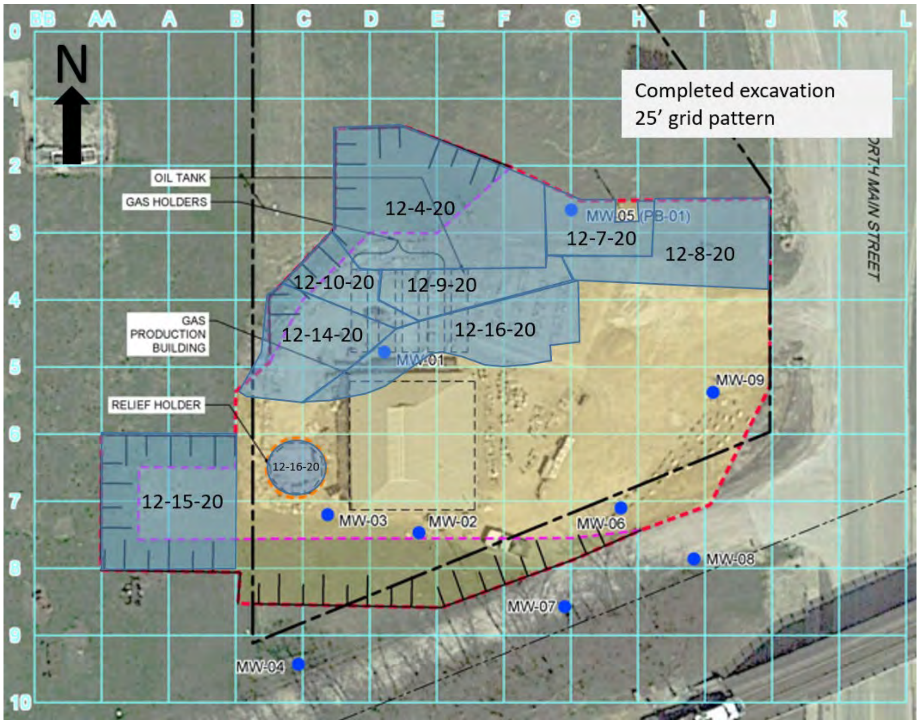


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Wooden box culvert near F5 with DNAPL residues (minimal free-phase NAPL). Was below 3’ excavation but chased back under clean fill once identified. Blended with less impacted soils and transported under relief holder material manifest (facing west).

2020-12-16 Site Photographs

Photo 3 – Relatively un-impacted native clay immediately below (5' depth) wooden box culvert. Appeared that clay fractures had trace DNAPL presence (facing SW).

Photo 4 – Wooden box culvert within excavation cut (yet to be excavated; facing SSE).

Photo 5 – Bottom of relief holder being scraped by excavator bucket with flat cutting edge. Holder was essentially watertight with negligible solids, water, or NAPL left in bottom (facing NW).

Photo 6 – Bottom of relief holder showing possible sump in eastern side of floor (dark area in middle of lighter colored scrape marks). Metal protrusion was also found in center of holder, as well as potential sump on holder floor directly adjacent to east wall (facing NE).

Photo 7 – Brick structure uncovered below former building floor on western half of building, east of holder. Soil beneath had minimal impacts (facing NNE).

Photo 8 – Bottom of brick structure uncovered below former building floor on western half of building, east of holder. Structure remained together after repeated handling with excavator (facing NNE).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/17/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/17/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	342.26	1329.66	
Impacted material transported offsite (consolidated relief holder)	tons	33.01	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	209.68	1915.76	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 27 °F
Low Temp: 20 °F
Wind: generally 5-10 mph from South
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling event underway

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation around east side of relief holder / NW corner of former building.
- began backfill of relief holder with Limestone fines / 3/4"-minus LS gravel
- removal of upper three feet of relief holder walls.

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Friday 12-18-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Monday 12-21-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Tuesday 12-22-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Significant impacts being found from 3 to 7 foot depth around NW corner of former building; suspect these deeper impacts may extend below / along North side of former building.
- Heavily impacted soils (e.g., from around tar stained tiles, etc.) are being blended with less impacted soils and transported/ disposed under the "relief holder" manifest to ensure they are buried in the disposal cell and not used as daily cover

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

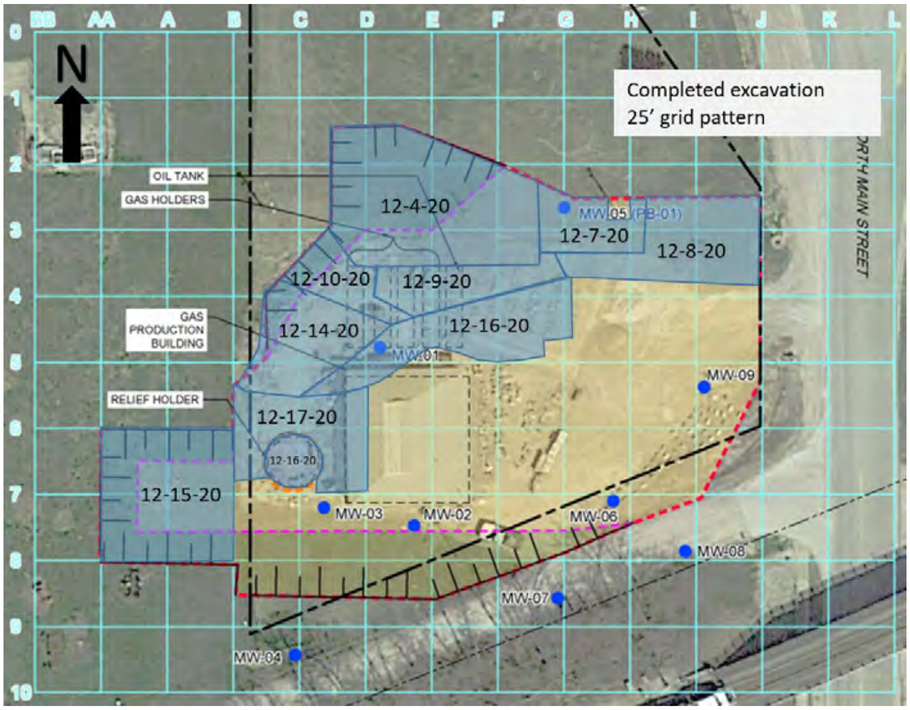


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Shallow (3 foot bgs) impacts along east side of relief holder. Steel pipe along left side of trench (see scrape marks from bucket teeth) fill with water and trace DNAPL (facing SSE).

2020-12-17 Site Photographs

Photo 3 – Exploratory trench on east side of holder to 12 feet bgs. Concrete protrusion on holder (left side of trench) did not have any piping leaving it, and soil appeared to be native below approximately 4 to 6 feet bgs (facing north).

Photo 4 – After sitting empty overnight, the relief holder accumulated approximately 2 inches of water, with a couple spots where a near neutral density NAPL accumulated (left side of photo). Water was absorbed with waste soil bound for offsite disposal prior to start of backfill with limestone fines (bottom 1 foot) and ¾-inch minus limestone gravel (for compaction characteristics; facing north).

2020-12-17 Site Photographs

Photo 5 – West side of relief holder as upper 3 feet of holder wall is being removed. Wall remains very structurally sound. Limestone fines visible in bottom of holder (wastes dropped into holder removed prior to additional backfill placement; facing NNW).

Photo 6 – Shallow excavation around NE corner of relief holder to depth of approximately 3 to 4 feet bgs and removal of holder wall to 3 feet bgs (facing SE).

2020-12-17 Site Photographs

Photo 7 – Impacts/trace NAPL along outside edge of building foundation – depth at bottom at about 3.5’ bgs (facing east near NW corner of former building).

Photo 8 – Bottom of excavation where surface soils have transitioned to clay… brown hues north of the holder (foreground) transitioning to blue-green hues closer to building – depth approximately 4’ bgs (facing east).

2020-12-17 Site Photographs

Photo 9 – Brick structure at depth of approximately 5’ bgs near NW corner of building, associated with clay tile that extends north to south in this area. Clay tile was full of water/trace NAPL leaving strong sheen on soils in this area (facing SE).

Photo 10 – As excavating impacts shown above, DNAPL (presumably from tile joint) was found directly to the south of photo above (facing SSE).

Photo 11 – Relatively clean native clays were encountered below DNAPL impacts (photo 10) at depth of approximately 7’ bgs (facing SSE).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/18/20 | GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/18/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	672.04	1329.66	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	280.61	1915.76	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 43 °F
Low Temp: 27 °F
Wind: generally 5-15 mph from southeast
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Conclude 48-hour time-integrated perimeter air sampling event; PUF sampler maintenance (change motor brushes and conduct new multi-point calibrations).

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation around south side of relief holder / north side of former building.
- Backfill of relief holder with limestone fines / 3/4"-minus LS gravel to 3 feet bgs
- Complete removal of upper three feet of relief holder walls.

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Monday 12-21-20: continued excavation of shallow soils, working from west to east, for transport and disposal at SCISWA
- Tuesday 12-22-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Wednesday 12-23-20: continued excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- Significant impacts being found from 3 to 7 foot depth around NW corner of former building; suspect these deeper impacts may extend below / along North side of former building.
- Heavily impacted soils (e.g., from around tar stained tiles, etc.) are being blended with less impacted soils and transported/ disposed under the "relief holder" manifest to ensure they are buried in the disposal cell and not used as daily cover

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

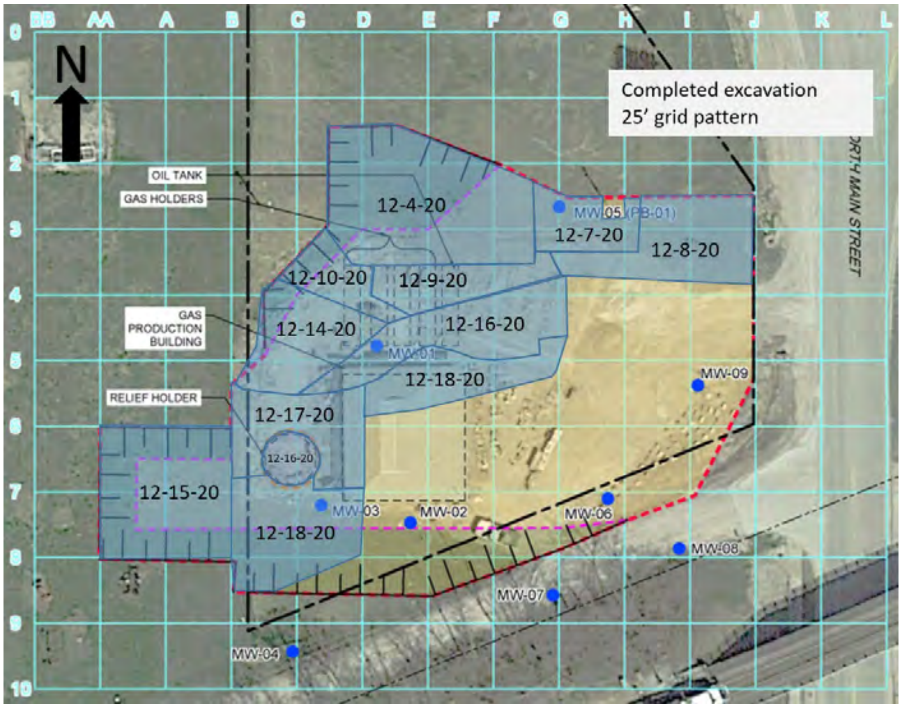


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Shallow impacts along north side of former building at depth of approximately 4 feet bgs. Right side of photo shows relatively less impacted clays (brown hues) while right site of photo shows more impacted blackish blue soil/mixed debris materials. Excavation on right side was extended to to about 7 feet bgs on far right side where brown hue clays were encountered (clean fill in foreground; facing SW).

2020-12-18 Site Photographs

Photo 3 – Backfill and compaction with bucket of relief holder. Walls on west, north, and east sides have been removed to approximately 3 feet bgs. Holder was backfilled with an initial 1-2 foot layer of limestone fines (3/8” minus), followed by 3/4" minus limestone gravel to 3 feet bgs. Clay backfill will be used to near original grade (facing SE).

Photo 4 – Backfill along north and west sides of former building; relief holder walls removed to three feet bgs and backfilled to 3’ bgs with limestone gravel. Black dirt on left side of photo is un-excavated soils near monitoring well MW-1 (facing east).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/21/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/21/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	580.54	1910.20	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	373.99	2289.75	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 46 °F
Low Temp: 37 °F
Wind: generally 15-25 mph from west
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Begin 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation beneath building (north/west portions) and areas near H4/I4
- Backfill of shallow excavations north and west of former building

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Tuesday 12-22-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Wednesday 12-23-20: continued excavation of shallow soils for transport and disposal at SCISWA
- Thursday 12-24-20: will only work partial day if it allows us to complete excavation/disposal of impacted materials, otherwise we'll resume on January 4, 2021.

OPERATIONAL ISSUES/CONCERNS

- Several compaction tests completed on Monday with results ranging from 82 to 94 percent compaction, with strong correlation to moisture of backfill. Shinn-Kellogg investigating alternatives to current backfill/ways to increase compaction.
- As impacted materials are excavated, we're reducing the working area to load truck for offsite disposal… Trucks will soon be required to back into the site from the west for loading, potentially slowing operations.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: Braun Intertec onsite for compaction testing.

SITE VISITORS AND AFFILIATION

- none

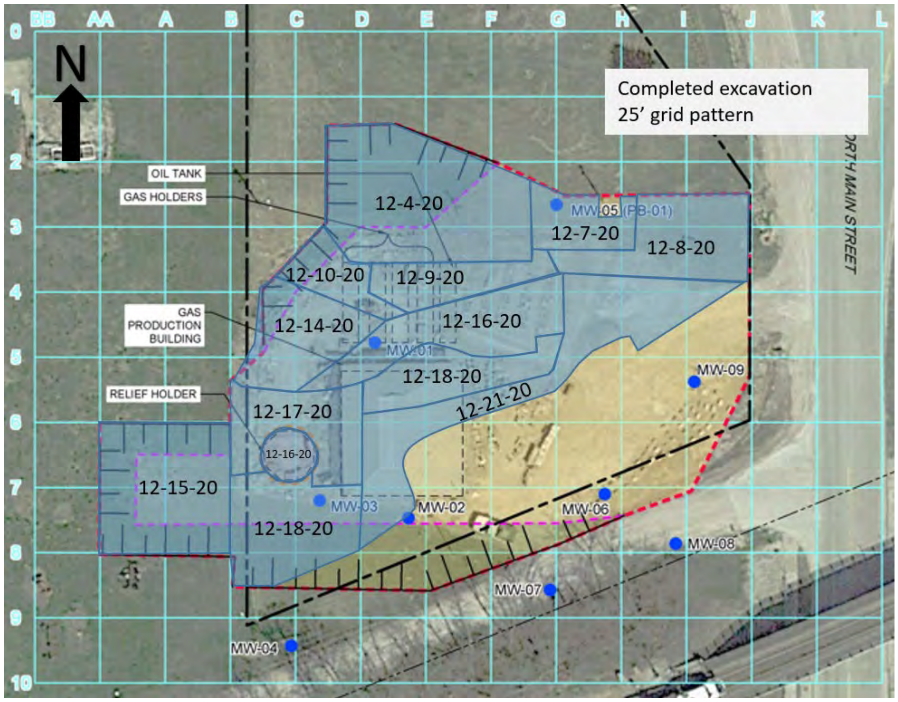


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Shallow excavation and backfill near where former building was located (MW-1 in foreground, MW-2 behind MW-1, and MW-3 on right, all marked with traffic cones; facing SSE).

2020-12-21 Site Photographs

Photo 3 – Shallow excavation and backfill south and east of MW-1 (cone on left; facing E).

Photo 4 – Shallow excavation near I4, where multiple tiles/pipes were encountered at 3 foot bgs, soil impacts significantly less at 4 feet bgs (shown, facing WSW).

2020-12-21 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/22/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/22/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	902.98	2813.18	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	283.06	2572.81	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 52 °F
Low Temp: 28 °F
Wind: generally 10-20 mph from south
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- 48-hour time-integrated perimeter air sampling event underway

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation of shallow soils in southeast corner of site, near monitoring wells MW-6 and MW-9
- Backfill of shallow excavations in front of east gate

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 12-23-20: continued excavation of shallow soils for transport and disposal at SCISWA; prepare site for extended break
- Monday 1-4-21: continued (completion?) excavation of shallow soils for transport and disposal at SCISWA
- Tuesday 1-5-21: complete (if needed) excavation of shallow soils for transport and disposal at SCISWA

OPERATIONAL ISSUES/CONCERNS

- For remainder of excavation, trucks for export of impacted materials will back in to be loaded, which may slightly slow process/reduce total loads per day.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

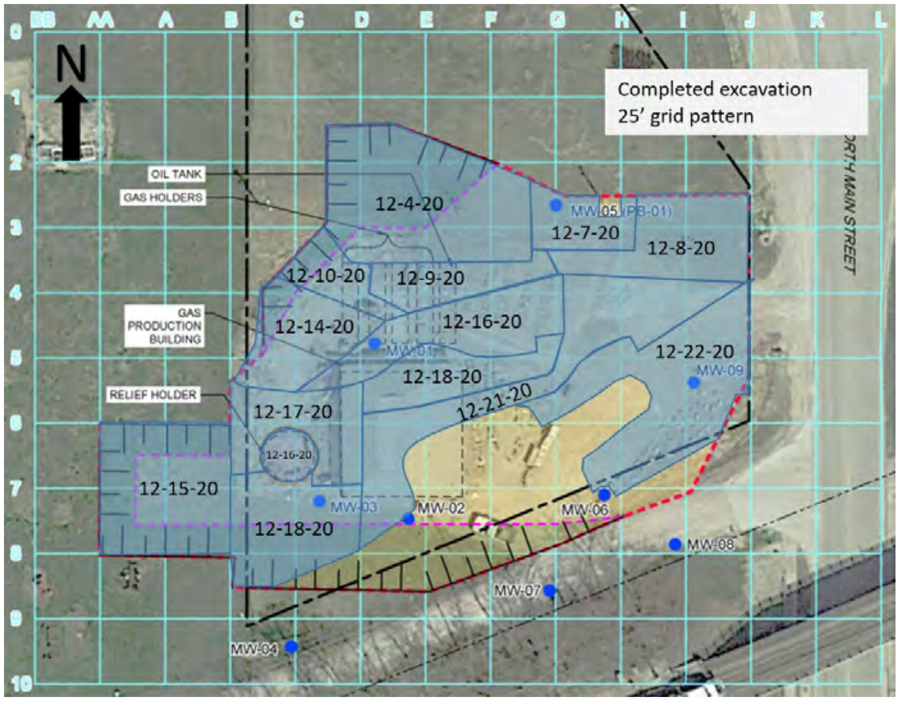


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Shallow excavation in southeast corner of site, with east gate on left, AMS 2 in background, and MW-9 on right (facing SSE).

Photo 3 – Shallow excavation in southeast corner of site (facing SE).

Photo 4 – Shallow excavation in southeast corner of site (MW-6 on right, facing NE).

2020-12-22 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 12/23/20 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	12/23/2020	Total	Comments
Impacted material transported offsite (shallow soils)	tons	858.72	3671.90	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	428.90	3001.71	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 53 °F
Low Temp: 19 °F
Wind: generally 20-35 mph (gusting to 50) from south changing to west
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Complete 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation of shallow soils southeast corner of former building
- Backfill of shallow excavations in southeast section of site
- Replacement of south drive culvert

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Monday 1-4-21: continued (completion?) excavation of shallow soils for transport and disposal at SCISWA
- Tuesday 1-5-21: complete (if needed) excavation of shallow soils for transport and disposal at SCISWA and backfill/compaction of excavation
- Wednesday 1-6-21: backfill/compaction of excavation

OPERATIONAL ISSUES/CONCERNS

- Site prepared for extended break over holidays (wattles in front of downslope gates, berms around impacted soil, etc.)

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Frank Kellogg, Roger Shinn, Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer and Justin Hess
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

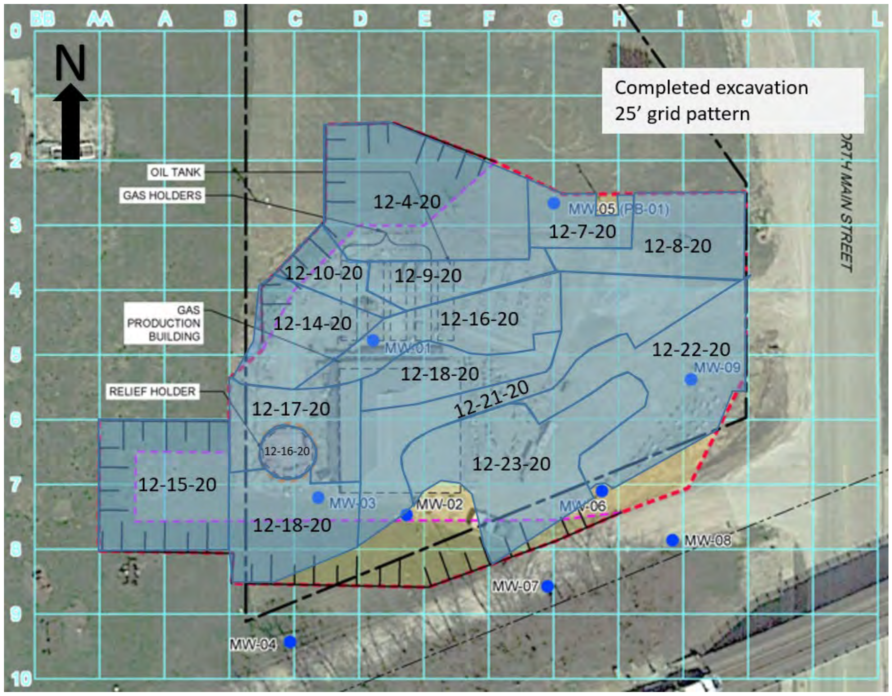


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – Inside manway located on south edge of property to the southeast of former building. Tile shown in photo goes toward building (facing NW).

Photo 3 – Excavation of manway shown in photo 2, showing impacted soils at depth of approximately 3 feet bgs (facing SE).

Photo 4 – Excavation of manway shown in photos 2 and 3, showing crushed tile that extended offsite toward the SE (facing SE). Wooden box culvert also found trending NE of manway (not shown).

Photo 5 – Replaced culvert beneath south drive (will eventually be covered with gravel; facing WSW).

Photo 6 – Erosion wattles placed across east fence prior to extended holiday break (facing ENE).

2020-12-23 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/04/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/4/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	320.00	3991.90	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	158.49	3160.20	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 40 °F
Low Temp: 28 °F
Wind: generally 5-10 mph from southwest
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Start 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Excavation of shallow soils southeast/south of former building (near F7/F8)
- Backfill of shallow excavations in southeast/southcentral sections of site
- Snow management (about 4 to 6 inches of accumulation across site).

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Tuesday 1-5-21: hoping to complete excavation of shallow soils for transport and disposal at SCISWA; continued backfill/compaction of open excavation
- Wednesday 1-6-21: backfill/compaction of excavation
- Thursday 1-7-21: backfill/compaction of excavation

OPERATIONAL ISSUES/CONCERNS

- 4 to six inches of accumulated snow on site… Snow on top of clean backfill stockpiled onsite; snow over contaminated soils transported offsite as waste (small quantity). Snow/wet clay backfill are very slick resulting in backfill trucks often needing to be pulled/pushed offsite. Several loads of limestone screenings being brought on site to assist with traction across backfill.

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- Crew from Chariton Valley onsite briefly to pickup drums of waste from building (lead paint and misc. chemicals)

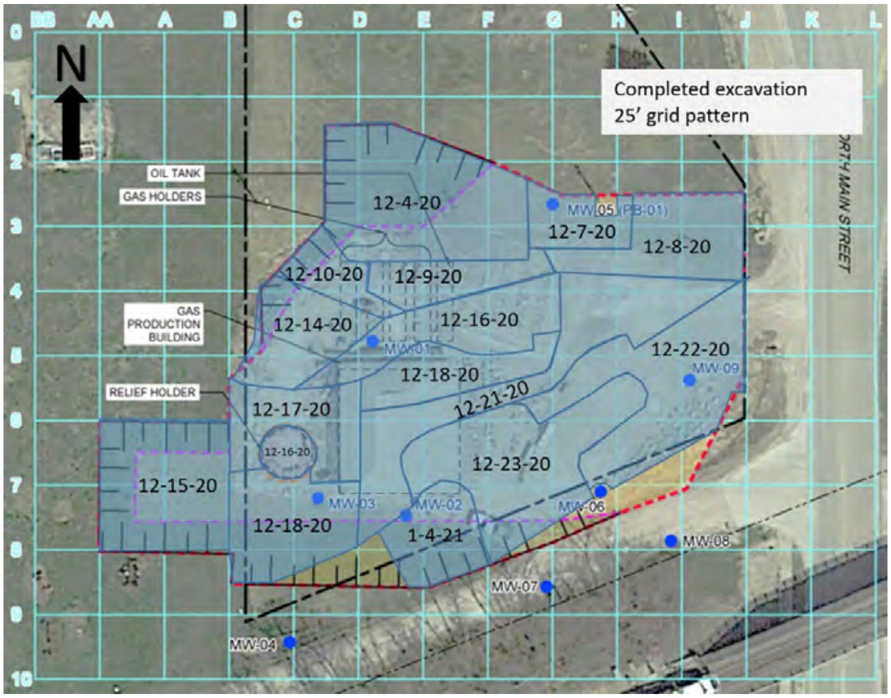


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View of site following bulk of snow removal activities (facing east).

2021-01-04 Site Photographs

Photo 3 – Bottom of excavation near E8, with relatively minimal visual impacts at excavation depths of 1 to 3 feet (well shown in upper left corner; facing north).

2021-01-04 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/05/21 GHD Project Number: 11156780.002.01
Completed by: Diane Pals / Tim Wineland

QUANTITIES GENERATED

	Units	1/5/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	143.30	3991.90	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	230.75	3160.20	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 40 °F
Low Temp: 19 °F
Wind: generally 0-5 mph from southwest changing to southeast
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Continue 48-hour time-integrated perimeter air sampling event, 24 hour reading in the AM

ACTIVITIES CONDUCTED LAST 24 HOURS

- Completion of excavation of impacted materials - total mass of impacted materials to SCISWA: 6,485.52 tons
- Backfill of excavated area in central and southern section of site
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 1-6-21: backfill/compaction of excavation
- Thursday 1-7-21: backfill/compaction of excavation
- Friday 1-8-21: backfill/compaction of excavation

OPERATIONAL ISSUES/CONCERNS

- Warmer weather is melting recent snows and creating wet conditions for backfill placement/compaction

PERSONNEL ONSITE

- GHD: Diane Pals
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

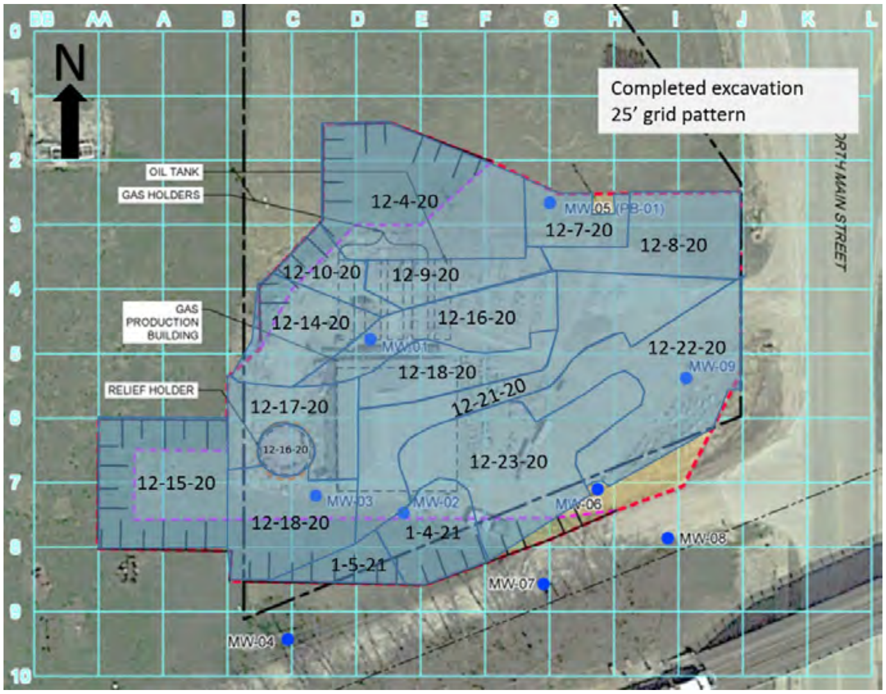


Photo 1 – Current extent of completed excavation (only partial backfill is occurring pending compaction testing).

Photo 2 – View of excavation near southern extent of excavation (near D8); clean fill in foreground (facing SW).

2021-01-05 Site Photographs

Photo 3 – View of excavation near southern extent of excavation; clean fill in foreground as well as monitoring wells MW-1(left cone), MW-2 (behind MW-1), and MW-3 (right cone; facing south).

2021-01-05 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/06/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/6/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	3991.90	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	520.92	3160.20	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 35 °F
Low Temp: 33 °F
Wind: generally 5-15 mph from east
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- Perimeter air monitoring with direct read instruments by GHD
- Exclusion zone air monitoring with direct read instruments by Shinn Kellogg
- Complete 48-hour time-integrated perimeter air sampling event

ACTIVITIES CONDUCTED LAST 24 HOURS

- Backfill and compaction of clean fill
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Thursday 1-7-21: Backfill and compaction of clean fill
- Friday 1-8-21: Backfill and compaction of clean fill; attempt to locate damaged monitoring well MW-08 SE of site
- Monday 1-11-21: backfill/compaction of excavation

OPERATIONAL ISSUES/CONCERNS

- None

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors: none

SITE VISITORS AND AFFILIATION

- none

Photo 1 – View of site with clean backfill over all entire extent of excavation (facing SE).

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/07/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/7/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	4135.20	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	505.05	4416.92	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 33 °F
Low Temp: 27 °F
Wind: generally 5-10 mph from northeast
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- no air monitoring conducted - no impacted soils exposed
-
-

ACTIVITIES CONDUCTED LAST 24 HOURS

- Backfill and compaction of clean fill - west half of site backfilled to ~0.5' below original grade
- compaction testing on backfill - mostly at or above 90% compaction

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Friday 1-8-21: Backfill and compaction of clean fill; attempt to locate damaged monitoring well MW-08 SE of site
- Monday 1-11-21: backfill/compaction of excavation
- Tuesday 1-12-21: backfill/compaction of excavation (should be near completion with clay backfill)

OPERATIONAL ISSUES/CONCERNS

- None

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors: Braun Intertec for compaction testing

SITE VISITORS AND AFFILIATION

- none

Photo 1 – View of western half of site where backfill of clean fill is at approximately 0.5 feet below original grade (monitoring wells 1, 2, and 3 under cones from left to right; facing SW).

Photo 1 – View of southeastern portion of site where clean backfill is still several feet below original grade (facing SE).

2021-01-07 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/08/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/8/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	4135.20	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	583.91	5000.83	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 30 °F
Low Temp: 28 °F
Wind: generally 5-10 mph from north
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- no air monitoring conducted - no impacted soils exposed
-
-

ACTIVITIES CONDUCTED LAST 24 HOURS

- Backfill and compaction of clean fill - west and north halves of site backfilled to ~0.5' below original grade
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Monday 1-11-21: backfill/compaction of excavation
- Tuesday 1-12-21: backfill/compaction of excavation (should be near completion with clay backfill)
- Wednesday 1-13-21: finish backfill and compaction of excavation (if needed); prepare site for remainder of winter until spring topsoil placement and seeding; begin 48-hr post-remediation perimeter air sampling

OPERATIONAL ISSUES/CONCERNS

- None

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Jamie Dunn, Troy Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators: Sam Dwyer
- Subcontractors:

SITE VISITORS AND AFFILIATION

- none

Photo 1 – Borrow area for clean clay fill (Lat 41.2090/Long -93.0049; facing SSW).

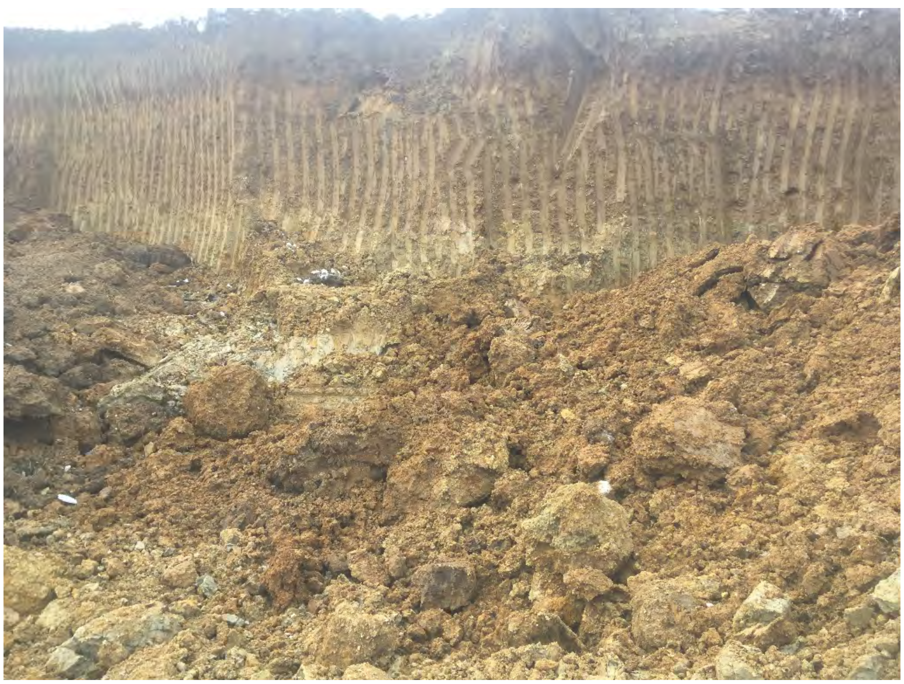


Photo 2 – Exposure of native clays at borrow area (facing west).

2021-01-08 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/11/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/11/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	4135.20	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	633.76	5634.59	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 40 °F
Low Temp: 26 °F
Wind: generally 5-15 mph from southwest
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- no air monitoring conducted - no impacted soils exposed
-
-

ACTIVITIES CONDUCTED LAST 24 HOURS

- Backfill and compaction of clean fill in southeast corner of site
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Tuesday 1-12-21: backfill/compaction of excavation (should be near completion with clay backfill)
- Wednesday 1-13-21: finish backfill and compaction of excavation (if needed); prepare site for remainder of winter until spring topsoil placement and seeding; begin 48-hr post-remediation perimeter air sampling
- Thursday 1-14-21: limited activity; 48-hr post excavation air sampling

OPERATIONAL ISSUES/CONCERNS

- None

PERSONNEL ONSITE

- GHD: Diane Pals
- Shinn Kellogg: Troy Dejong and drivers from Ben Shinn Trucking
- Local Union Operators:
- Subcontractors:

SITE VISITORS AND AFFILIATION

- none

Photo 1 – View of western portion of site with clean fill to approximately 0.5 feet below grade (facing SW).

Photo 2 – View of eastern portion of site (facing SE).

2021-01-11 Site Photographs

DAILY ACTIVITY REPORT
IPL ALBIA MGP - INTERIM RESPONSE ACTION

Date: 01/12/21 GHD Project Number: 11156780.002.01
Completed by: Tim Wineland

QUANTITIES GENERATED

	Units	1/12/2021	Total	Comments
Impacted material transported offsite (shallow soils)	tons	0.00	4135.20	
Impacted material transported offsite (consolidated relief holder)	tons	0.00	2350.32	
C & D debris transported offsite	tons	0.00	201.03	
Clean fill transported onsite (subsoil)	tons	452.98	6087.57	
Clean fill transported onsite (topsoil)	tons	0.00	0.00	
Estimated water generated today / total pending disposal	gallons	0.00	0.00	
Water discharged offsite today / total for project	gallons	0.00	0.00	

WEATHER LAST 24 HOURS

High Temp: 44 °F
Low Temp: 24 °F
Wind: generally 5-10 mph, variable direction
Precip: none

HEALTH AND SAFETY

- Daily health and safety meeting for all onsite
-

AIR MONITORING

- no air monitoring conducted - no impacted soils exposed
- begin post-excavation 48-hr air sampling event at end of day after shutdown of all equipment
-

ACTIVITIES CONDUCTED LAST 24 HOURS

- Complete backfill and compaction of clean fill to ~0.5' below original grade
-

ESTIMATED ACTIVITIES PLANNED FOR NEXT 3 WORK DAYS

- Wednesday 1-13-21: possible demob of equipment; prep of site for remainder of winter
- Thursday 1-13-21: No activity planned (late day completion of post-excavation air sampling)
- Friday 1-14-21: no activity planned; disassembly/packing/shipping of air monitoring equipment

OPERATIONAL ISSUES/CONCERNS

- None

PERSONNEL ONSITE

- GHD: Tim Wineland
- Shinn Kellogg: Troy Dejong, Cliff Dejong, and drivers from Ben Shinn Trucking
- Local Union Operators:
- Subcontractors:

SITE VISITORS AND AFFILIATION

- none

Photo 1 – View of backfilled excavation near where former building was located; backfill to approximately 0.5 feet below original grade (facing south).

Photo 2 – View of backfilled excavation near northern area of excavation. Piles are snow cleared from excavation following holiday break with backfill melt-out (facing north).

2021-01-12 Site Photographs

Photo 3 – Meltwater from snow piles shown in photo 2; flow is toward east side of site near original driveway (facing SE).

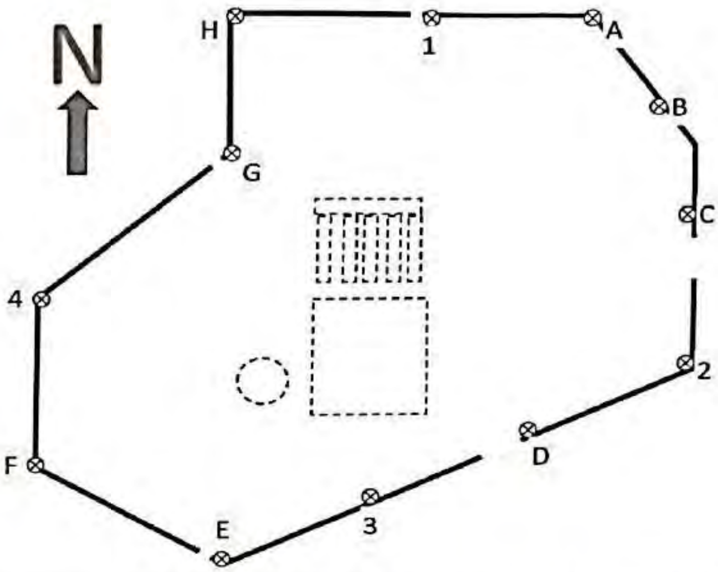
Appendix B

Real-Time Air Monitoring Field Log Sheets

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN:
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006

Date: 11-23-20



Start Time: 1425 Wind Speed & Direction: calm SNOW 35°F Comments pre-cx air soil savers installing waddles (staking - all laid out)
End Time: 1435
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.043	0.047	0.090	0.054	0.097	0.042	0.036	0.032	0.049	0.032	0.031	0.029
PID												
Benzene												

Start Time: 0945 Wind Speed & Direction: 14/18 Comments during Aem abatement Raining
End Time: 1000
Initials: DAP

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.104	0.074	0.077	0.083	0.081	0.080	0.060	0.087	0.079	0.090	0.052	0.073
PID												
Benzene												

Start Time: 1220 Wind Speed & Direction: 11/– Comments light Rain 41°
End Time: 1228
Initials: DAP

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.72	0.078	0.091	0.086	0.095	0.096	0.075	0.079	0.097	0.096	0.097	0.093
PID												
Benzene												

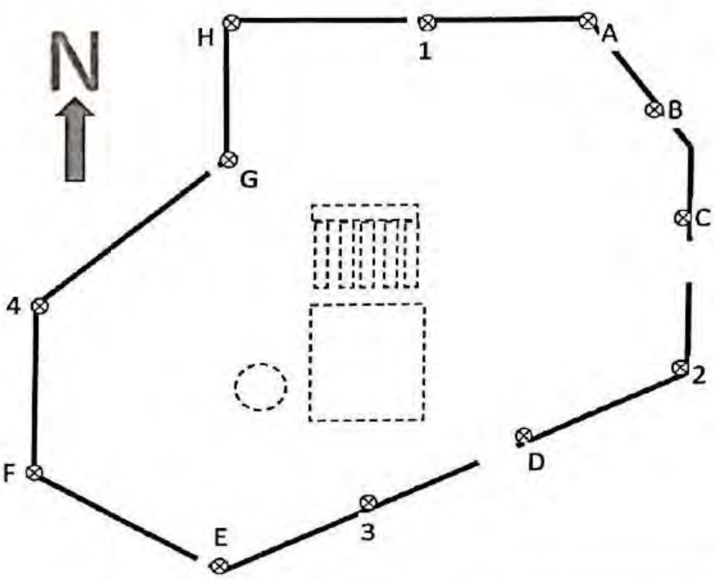
Start Time: ______ Wind Speed & Direction: Comments
End Time: ______
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000 596-908042
SN: NA - dead battery @ 920
Dust: pDR1000-AN
SN: 5202033006

Date: 12-1-2020



Start Time: 0920 Wind Speed & Direction: N W E S 0-5 24°F clear
End Time: 0927
Initials: TRW
Comments: Before any activities track hoe running but not moved yet

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.042	0.056	0.053	0.062	0.049	0.059	0.036	0.063	0.050	0.066	0.039	0.045
PID												
Benzene												

Start Time: 1135 Wind Speed & Direction: N W calm E S ~40°F
End Time:
Initials: TRW
Comments: No activity gravel road in place

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.032	0.038	0.031	0.034	0.033	0.027	0.038	0.035	0.033	0.029	0.032	0.029
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1330 Wind Speed & Direction: N W E S 0-5 mph 45°F
End Time: 1340
Initials: TRW
Comments: Building Demo underway (10% knocked down)

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.025	0.056	0.032	0.025	0.028	0.035	0.090	0.110	0.059	0.024	0.019	0.025
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

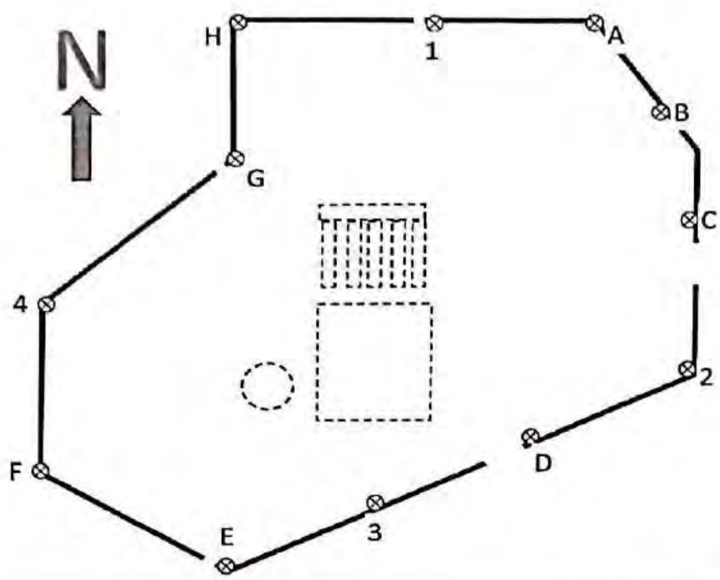
Start Time: 1435 Wind Speed & Direction: N W E S 0-5 mph variable 40°F
End Time: 1445
Initials: TRW
Comments: Continued demo - spraying down demo with municiple water to help control dust. (~30% knocked down

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.037	0.042	0.036	0.037	0.035	0.037	0.150	0.148	0.047	0.037	0.045	0.045
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 598-908042
Dust: pDR1000-AN
SN: 52020 33006

Date: 12-1-2020



Start Time: 1510 Wind Speed & Direction: N 0-5mph W E S ~40°F
End Time: 1515
Initials: TRW
Comments: Continued demo ~75% knocked down

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.040	0.059	0.083	0.033	0.042	0.046	0.039	0.049	0.136	0.173	0.046	0.055
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1555 Wind Speed & Direction: N 0-5 mph W E S ~35°F
End Time: 1600
Initials: TRW
Comments: Continued demo ~90% knocked down

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.032	0.058	0.036	0.040	0.044	0.043	0.046	0.041	0.130	0.041	0.039	0.043
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

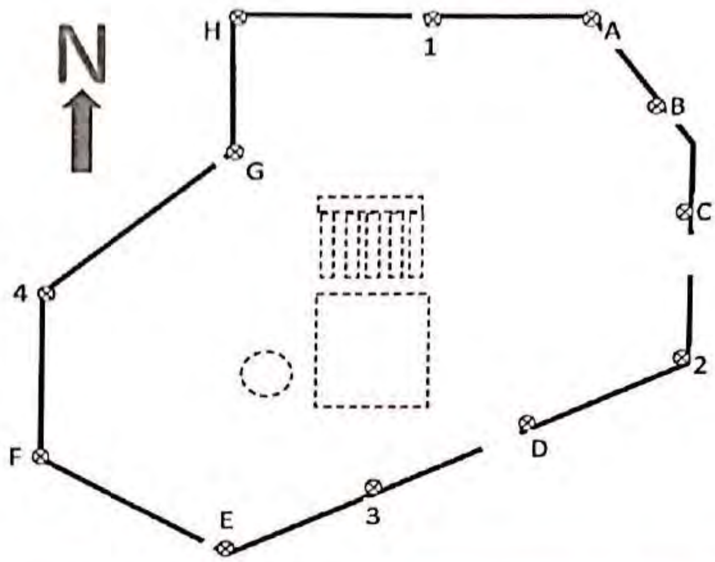
Start Time: 1650 Wind Speed & Direction: N W calm E S
End Time: 1655
Initials: TRW
Comments: ~10 minutes after completion of demo

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.056	0.046	0.068	0.055	0.056	0.058	0.048	0.047	0.050	0.049	0.052	0.046
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: N W · E S
End Time: ______
Initials: ______
Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 576-908042
Dust: pDR1000-AN
SN: 5202033006

Date: 12-2-20

Start Time: 800 Wind Speed & Direction: N. 35°F W calm E S Comments: Just began loading demo debris
End Time: 805
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.056	0.061	0.053	0.056	0.064	0.078	0.105	0.141	0.062	0.044	0.086	0.047
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 900 Wind Speed & Direction: 30°F N W Calm E S Comments: continued loading demo debris
End Time: 905
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.059	0.046	0.125	0.041	0.059	0.047	0.075	0.047	0.043	0.167	0.074	0.056
PID	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1050 Wind Speed & Direction: 40 mph N ← W E S 0-5 mph Comments: Resuming loading demo debris (wetting to control dust)
End Time: 1100
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.045	0.070	0.137	0.053	0.053	0.075	0.047	0.048	0.097	0.085	0.070	0.045
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1225 Wind Speed & Direction: N 0-5 ← W E 45°F S Comments:
End Time:
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.042	0.078	0.116	0.058	0.090	0.062	0.053	0.054	0.080	0.046	0.053	0.068
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

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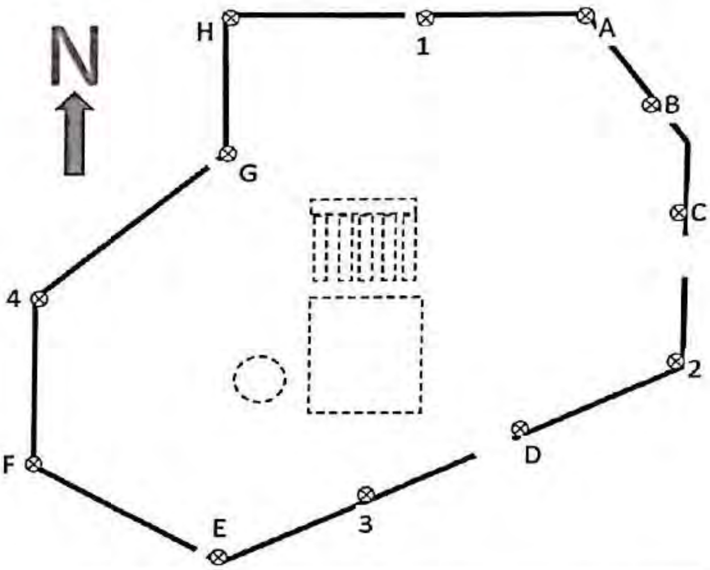
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 576-908042
Dust: pDR1000-AN
SN: 5202033006

Date: 12-2-2020

Start Time: 1340 Wind Speed & Direction: N 0-5 W ← E S 45°F
End Time:
Initials: TRW

Comments: loading out demo debris wetting to control dust.

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.049	0.086	0.068	0.042	0.041	0.036	0.054	0.047	0.246	0.040	0.037	0.035
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1515 Wind Speed & Direction: N 0-5 mph W ← E S 40°F
End Time: 1525
Initials: TRW

Comments: loading out demo debris

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.045	0.045	0.046	0.035	0.046	0.049	0.052	0.049	0.047	0.046	0.058	0.038
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1630 Wind Speed & Direction: N 30°F W ← E S 0-5
End Time: 1635
Initials: TRW

Comments: No activity onsite - maybe more traffic than usual (strong smell of smoke ~~at~~ 1645 - leaf burning?)

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.063	0.071	0.082	0.080	0.077	0.076	0.076	0.066	0.097	0.087	0.106	0.074
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: N W · E S
End Time: ______
Initials: ______

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

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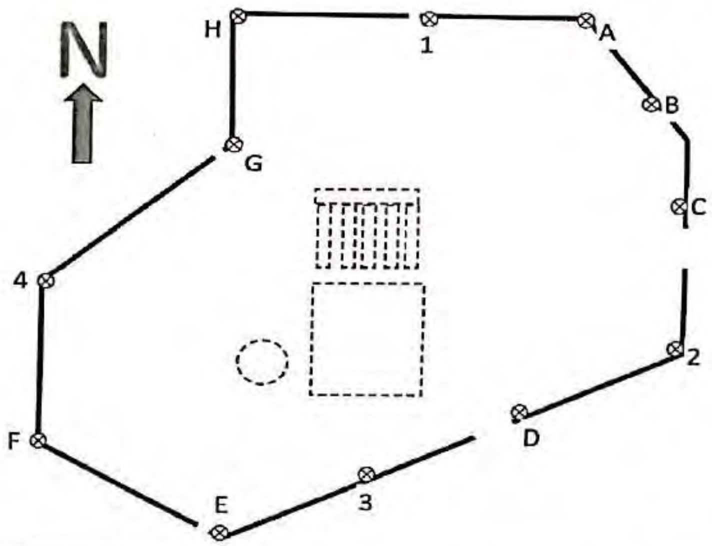
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 576-908042
Dust: pDR1000-AN
SN: 5202033006

Date: 12-3-2020

Start Time: 800 Wind Speed & Direction: N 25°F Comments: loading out demo debris
End Time: 805 W calm E
Initials: TRW S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.062	0.041	0.046	0.062	0.060	0.056	0.060	0.077	0.058	0.044	0.061	0.057
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 905 Wind Speed & Direction: N 30°F Comments: loading out demo debris -visible dust over fenceline between "D" and "3" - ask SK to begin wetting material
End Time: 910 W ↓ E ~5 mph
Initials: TRW S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.053	0.077	0.114	0.064	~~0.050~~ 0.057	0.064	0.064	0.056	0.060	0.053	0.078	0.059
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1135 Wind Speed & Direction: N 45°F Comments: transporting clean fill to stockpile in NE corner of site (very moist - no visible dust)
End Time: 1140 W Calm E
Initials: TRW S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.065	0.040	0.051	0.042	0.046	0.061	0.061	0.070	0.059	0.048	0.054	0.057
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1500 Wind Speed & Direction: N 0-10 Comments: No activity on site
End Time: 1505 W → E
Initials: TRW S 40°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.077	0.069	0.070	0.113	0.072	0.067	0.075	0.079	0.068	0.072	0.065	0.071
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

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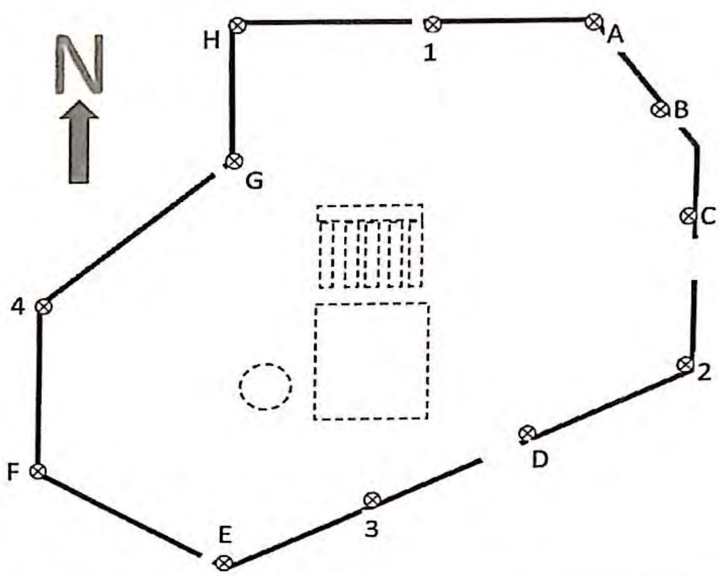
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN
SN: 5202033006

Date: 12-4-20



Start Time: 845 Wind Speed & Direction: 32°F N W → E S 5-10mph
End Time: 850
Initials: TRW
Comments: excavation of impacted soil near D 1.5

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.050	0.030	0.049	0.033	0.050	0.048	0.049	0.048	0.050	0.039	0.037	0.042
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1020 Wind Speed & Direction: 36°F N W → E S 5-10mph
End Time: 1035
Initials: TRW
Comments: excavation near E2/E3 moving impacted w/ loader near relief holder

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.021	0.032	0.031	0.043	0.019	0.047	0.032	0.053	0.022	0.025	0.044	0.035
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1215 Wind Speed & Direction: 43°F N W → E S 5-10 mph
End Time: 1225
Initials: TRW
Comments: excavation near FG3 / stockpiling clayey material near F6 and consolidation material near C5

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.031	0.023	0.027	0.028	0.032	0.025	0.029	0.036	0.026	0.027	0.025	0.054
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1415 Wind Speed & Direction: 48°F N W → E S 5-10mph
End Time:
Initials: TRW
Comments: Excavation complete to F/G-3/4 and progressing west - backfilling along N side of excavation

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.036	0.063	0.028	0.032	0.065	0.097	0.022	0.046	0.024	0.030	0.039	0.032
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

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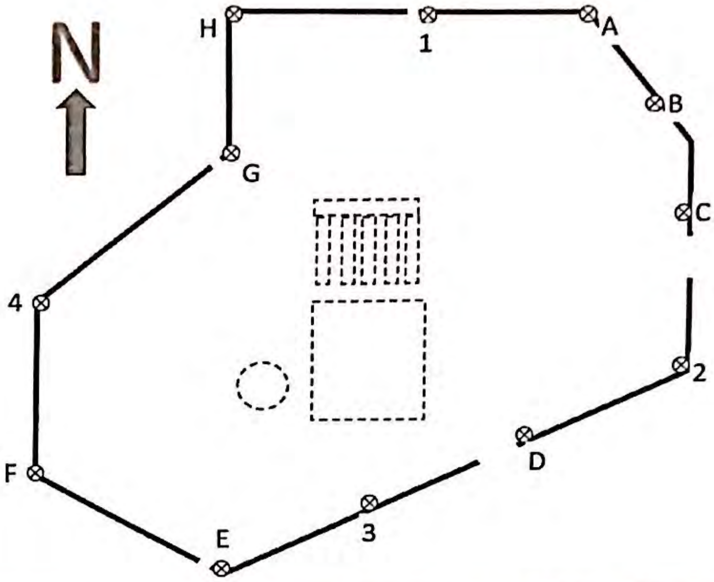
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596- 908042
Dust: pDR1000-AN
SN: 5202033006

Date: 12-4-2020



Start Time:	1610	Wind Speed & Direction:	N	~40°F	Comments	No excavation - backfilling northern extent of dig (D2, E2)
End Time:	1625	W	calm	E		
Initials:	TRW		S			

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.025	0.041	0.028	0.035	0.114	0.037	0.041	0.035	0.033	0.031	0.027	0.00
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
Benzene												

Start Time:		Wind Speed & Direction:	N		Comments
End Time:		W	·	E	
Initials:			S		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time:		Wind Speed & Direction:	N		Comments
End Time:		W	·	E	
Initials:			S		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time:		Wind Speed & Direction:	N		Comments
End Time:		W	·	E	
Initials:			S		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

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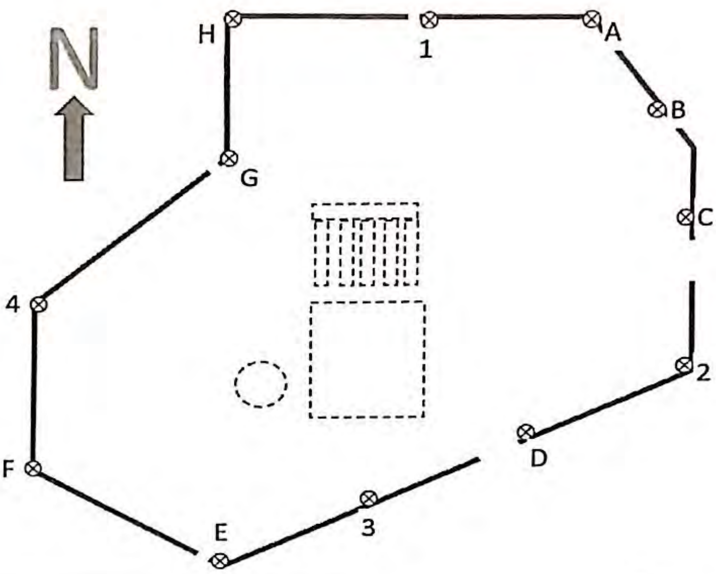
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006

Date: 12-7-20

Start Time: 840 | Wind Speed & Direction: | Comments: loading trucks with "less" impacted clay stockpiled from Fridays excavation
End Time: 850 | N 35°F
Initials: TRW | W calm E | S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.046	0.052	0.056	0.087	0.041	0.057	0.062	0.063	0.056	0.051	0.053	0.060
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1050 | Wind Speed & Direction: 0-5 | Comments: Prior to relief holder excavation
End Time: 1100 | N
Initials: TRW | W E | S 35°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.068	0.056	0.071	0.069	0.052	0.062	0.046	0.083	0.058	0.047	0.066	0.057
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1205 | Wind Speed & Direction: 0-5 | Comments: Consolidating first batch from relief holder - slight odor downwind
End Time: 1215 | N
Initials: TRW | W E | S 35°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.078	0.056	0.093	0.059	0.072	0.115	0.083	0.061	0.058	0.064	0.052	0.064
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1255 | Wind Speed & Direction: 0-5 | Comments: Consolidating relief holder wastes and loadout
End Time: 1305 | N
Initials: TRW | W E | S 35°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.045	0.046	0.067	0.059	0.068	0.061	0.062	0.055	0.049	0.070	0.072	0.059
PID	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
~~Benzene~~ odor			✓	✓	✓							

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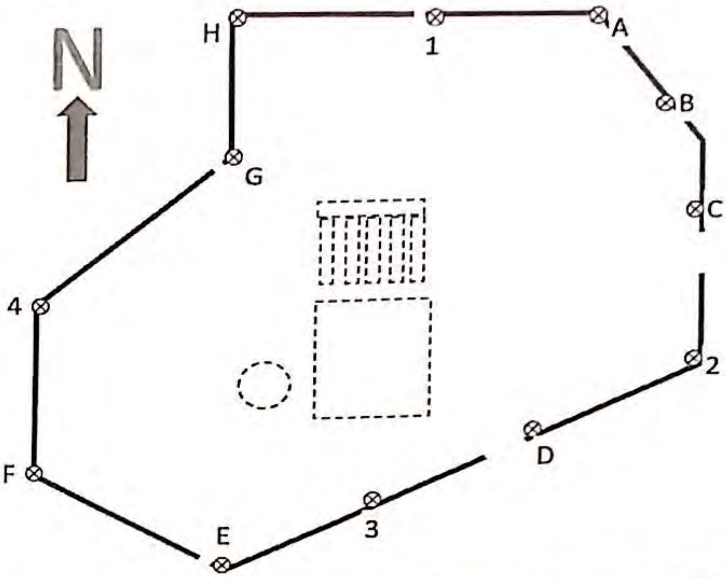
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006



Date: 12-7-2020

Start Time: 1405	Wind Speed & Direction:	Comments
End Time: 1415	N 0-5	Continued excavation / Consolidation and load-out of relict holder contents
Initials: TRW	W → E	
	S 35°F	

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.061	0.051	0.040	0.046	0.056	0.055	0.043	0.058	0.050	0.074	0.056	0.053
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1530	Wind Speed & Direction:	Comments
End Time: 1540	N 0-5	Begining excavation near G3 to 3' depth - stockpiling onsite to blending pile and clay pile
Initials: TRW	W → E	
	S 35°F	

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.058	0.068	0.072	0.056	0.046	0.053	0.067	0.058	0.048	0.061	0.056	0.059
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______	Wind Speed & Direction:	Comments
End Time: ______	N	
Initials: ______	W · E	
	S	

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______	Wind Speed & Direction:	Comments
End Time: ______	N	
Initials: ______	W · E	
	S	

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

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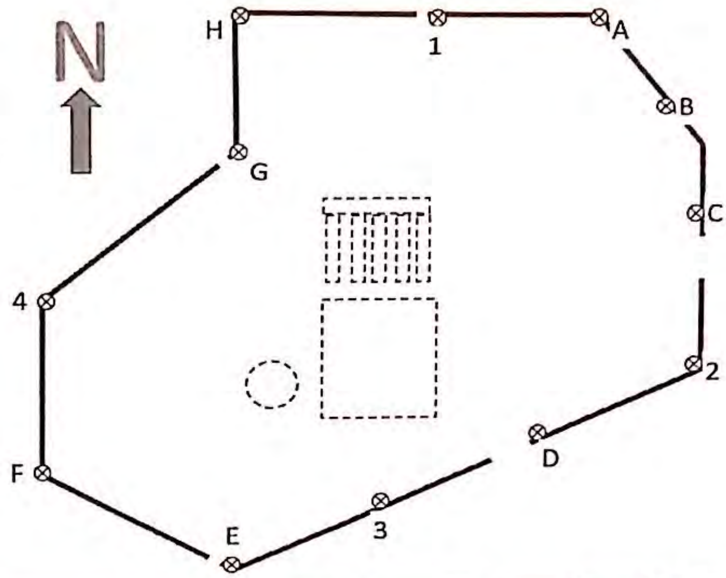
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006

Date: 12-8-20

Start Time:	810	Wind Speed & Direction:		Comments	consolidating waste from holder excavating near I3						
End Time:	820	N 0-5									
Initials:	TRW	W E S 30°F									

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.060	0.061	0.060	0.060	0.053	0.074	0.062	0.048	0.055	0.054	0.060	0.049
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time:	920	Wind Speed & Direction:		Comments	as above
End Time:	930	N 0-5			
Initials:	TRW	W E S 30°F			

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.070	0.052	0.064	0.074	0.075	0.052	0.057	0.057	0.063	0.085	0.081	0.083
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time:	1050	Wind Speed & Direction:		Comments	loading out consolidated waste from holder, finish excavation near I3
End Time:	1100	N 0-5			
Initials:	TRW	W E S 34°F			

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.059	0.060	0.066	0.091	0.106	0.100	0.057	0.056	0.061	0.060	0.107	\
PID	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Benzene												

Start Time:	1350	Wind Speed & Direction:		Comments	Blending holder materials, excavating near G3/G4.
End Time:		N 0-5			
Initials:	TRW	W E S 40°F			

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.058	0.071	0.072	0.075	0.049	0.058	0.057	0.065	0.058	0.071	0.052	0.054
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

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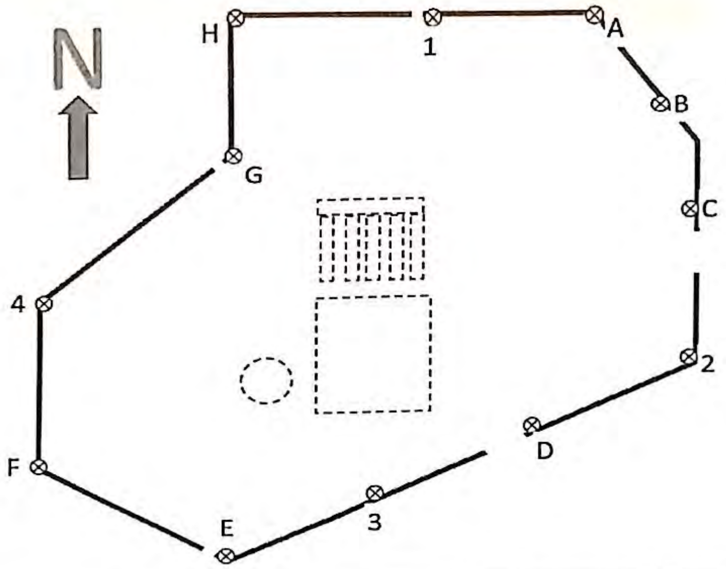
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN AM520
SN: 5202033006

Date: 12-8-2020

Start Time: 1530 | Wind Speed & Direction: 5-10mph | Comments: Consolidating relief holder materials, fueling equipment, etc.
End Time: 1535 | N W E S ~45°F
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.061	0.092	0.057	0.055	0.059	0.057	0.067	0.056	0.071	0.059	0.062	0.070
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N W · E S
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N W · E S
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N W · E S
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

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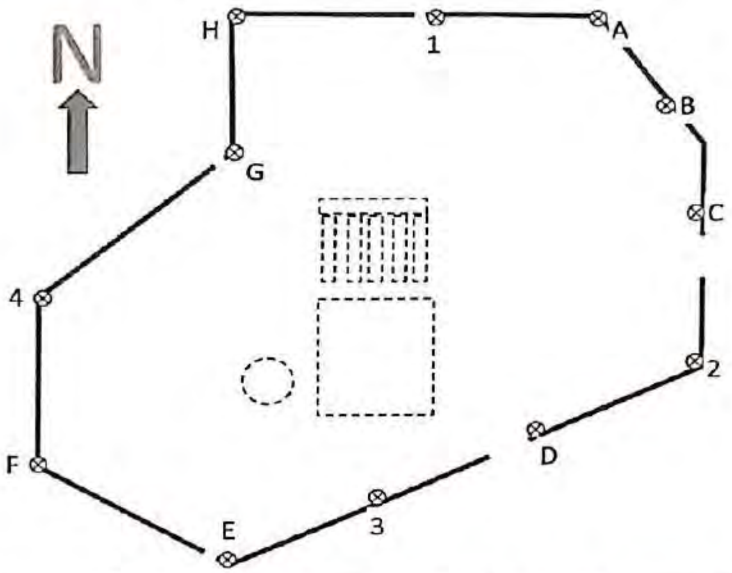

Instruments:

PID/Benzene: UltraRAE 3000

SN: 596-908042

Dust: ~~pDR1000-AN~~ AM520

SN: 5202033006

Date: 12-9-2020

Start Time: 745 Wind Speed & Direction: Calm 35°F
End Time: 755
Initials: TRW

Comments: loading out blended holder material excavation near F/64, and preparing to compact clean fill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.029	0.024	0.036	0.054	0.028	0.102	0.051	0.022	0.018	0.084	0.036	0.050
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 920 Wind Speed & Direction:
End Time:
Initials: TRW

Comments: blending select holder material and backfilling /compacting

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.024	0.011	0.038	0.041	0.018	0.026	0.037	0.019	0.030	0.019	0.016	0.021
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1046 Wind Speed & Direction: 5-10 N → S ~50°F
End Time:
Initials:

Comments: blending holder materials and backfilling

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.039	0.020	0.056	0.024	0.042	0.013	0.025	0.017	0.019	0.016	0.026	0.033
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1310 Wind Speed & Direction: 5-10 N → S ~60°F
End Time:
Initials: TRW

Comments: backfilling /compacting

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.011	0.078	0.020	0.006	0.020	0.023	0.005	0.015	0.013	0.015	0.049	0.010
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

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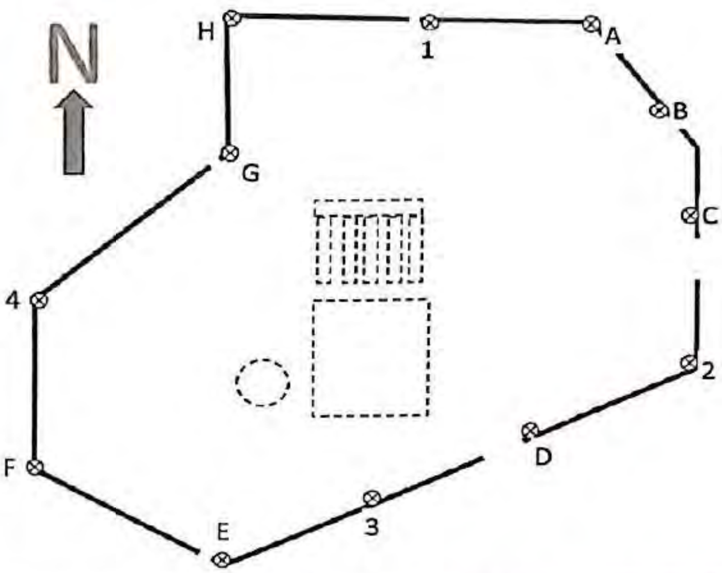
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596 - 908042
Dust: pDR1000-AN Am 520
SN: 52020 33006

Date: 12-9-20



Start Time: 1520 Wind Speed & Direction: N 0-5 Comments excavation near E4 and backfill and compaction
End Time: 1525
Initials: GRW W ↑ E
S v 55°F
PID of 0.01 between D and 3

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.017	0.023	0.013	0.020	0.066	0.021	0.012	0.005	0.006	0.006	0.018	0.011
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: _______ Wind Speed & Direction: N Comments
End Time: _______
Initials: _______ W · E
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: _______ Wind Speed & Direction: N Comments
End Time: _______
Initials: _______ W · E
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: _______ Wind Speed & Direction: N Comments
End Time: _______
Initials: _______ W · E
S

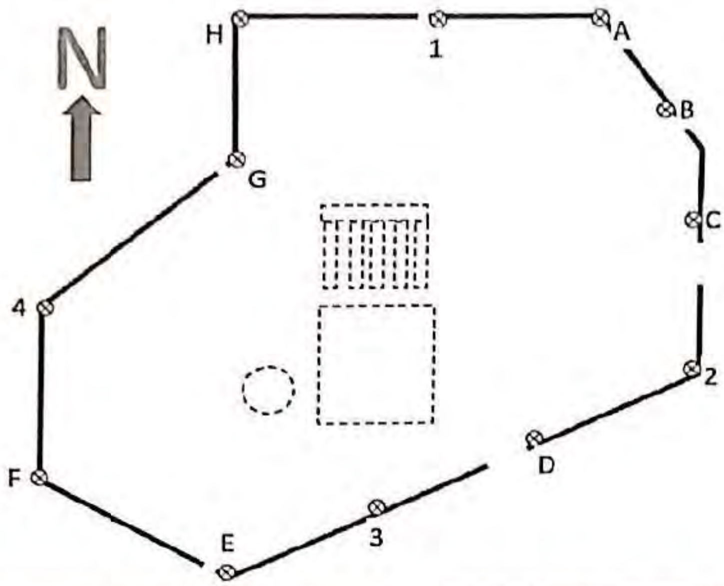
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:

PID/Benzene: UltraRAE 3000
SN 596-908042
Dust: pDR1000-AN AM520
SN 52020 33006

Date: 12-10-20



Start Time: 750 **Wind Speed & Direction:** 5-10 35°F **Comments** loading out blended relict holder material and excavation near C4
End Time: 810
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.066	0.071	0.084	0.041	0.061	0.067	0.047	0.067	0.050	0.051	0.064	0.118
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 955 **Wind Speed & Direction:** 5-10 45°F **Comments** loading out blended holder material backfilling near I4
End Time: 1005
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.060	0.057	0.085	0.055	0.065	0.046	0.066	0.061	0.054	0.066	0.050	0.059
PID	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1125 **Wind Speed & Direction:** 5-10 55°F **Comments** loading out blended material and compacting backfill
End Time: 1135
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.077	0.058	0.086	0.051	0.082	0.059	0.077	0.069	0.056	0.063	0.077	0.058
PID	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

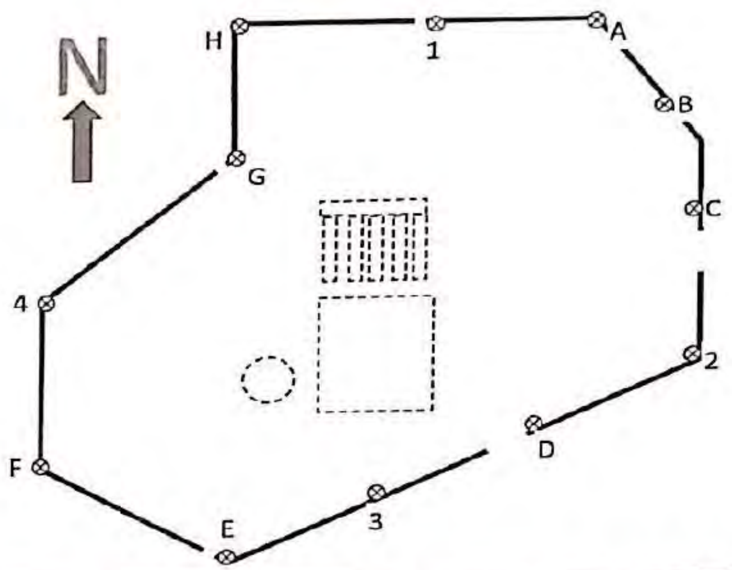
Start Time: 1320 **Wind Speed & Direction:** 5-10 60°F **Comments** loading out / blending holder materials and compacting backfill
End Time: 1330
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.052	0.139	0.063	0.096	0.122	0.062	0.045	0.056	0.063	0.079	0.065	0.091
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN 59B-908042
Dust: pDR1000-AN AM520
SN: 5202033006

Date: 12-10-20



Start Time: 1440
End Time:
Initials: TRW

Wind Speed & Direction: N W E S 5-10 60°F

Comments: Blending / loading out relict holder materials and preping for forecast rain (tomorrow)

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.053	0.063	0.074	0.079	0.052	0.052	0.049	0.063	0.067	0.125	0.048	0.051
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time:
End Time:
Initials:

Wind Speed & Direction: N W E S

Comments: No activity after 1500 (Equipment Maintenance)

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time:
End Time:
Initials:

Wind Speed & Direction: N W E S

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time:
End Time:
Initials:

Wind Speed & Direction: N W E S

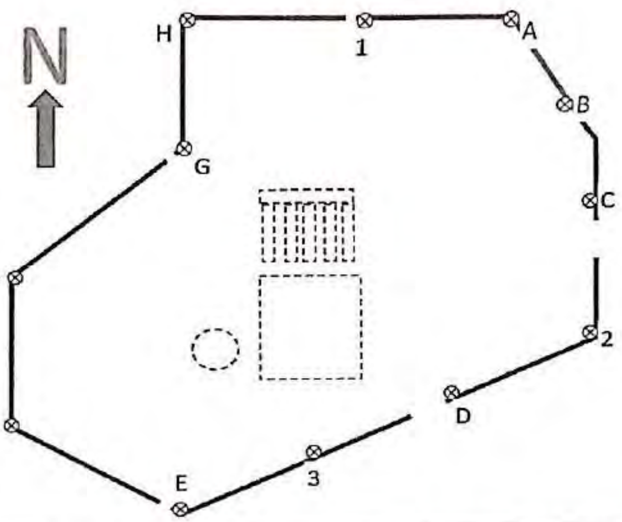
Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006

Date: 12-11-2020



Start Time: 745 **End Time:** 755 **Initials:** TRW
Wind Speed & Direction: 5-10 (N, E, S, W) 37° lt rain (total VOC at AMS 3 ranging from 0.08 to 0.91)
Comments: blending / loading out holder material

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	No dust readings (concern rain may damage unit)											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00
Benzene							0.66					

Start Time: 800 **End Time:** 835 **Initials:** TRW
Wind Speed & Direction: 5-10 (N, E, S, W) 37° lt rain ~0.2 to 1.0 over holder – 0.33 benzene
Comments: blending / loading out holder material – ask Troy to cover holder contents w/ less impacted waste soil

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	No dust readings - rain											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 940 **End Time:** 955 **Initials:** TRW
Wind Speed & Direction: 5-15 (N, E, S, W) 39°F lt rain
Comments: blending / loading out holder material – less odor now that holder contents covered

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	No dust readings - rain											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Benzene												

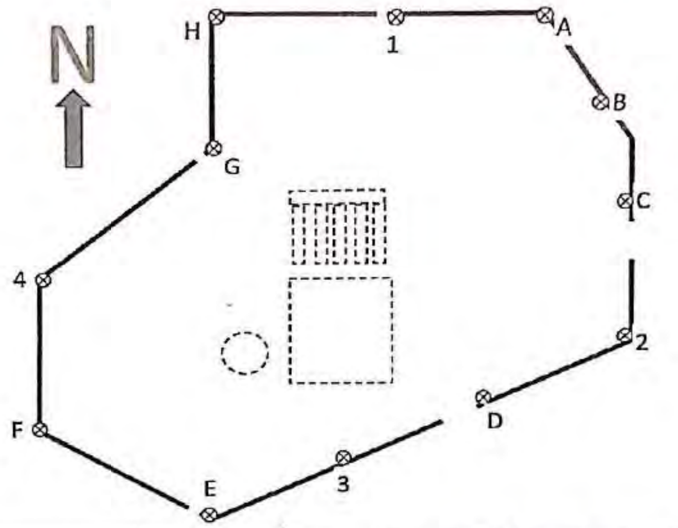
Start Time: 1045 **End Time:** 1055 **Initials:** ______
Wind Speed & Direction: 5-15 (N, E, S, W) 39° lt rain PID less than ~~[illegible]~~ 0.10 SW of "E" on south side of gravel road (~50')
Comments: blending loading out holder material

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	No dust readings – rain											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.00	0.00
Benzene								–				

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908047
Dust: pDR1000-AN AM520
SN: 5202053006

Date: 12-11-2020



Start Time: 1145	Wind Speed & Direction: 5-15	Comments: Equipment fueling/greasing
End Time: 1155	N W E S	
Initials: TRW	40°F lt rain	

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	No	dust										
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Benzene												

Start Time:	Wind Speed & Direction:	Comments
End Time:	N W E S	
Initials:		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time:	Wind Speed & Direction:	Comments
End Time:	N W E S	
Initials:		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

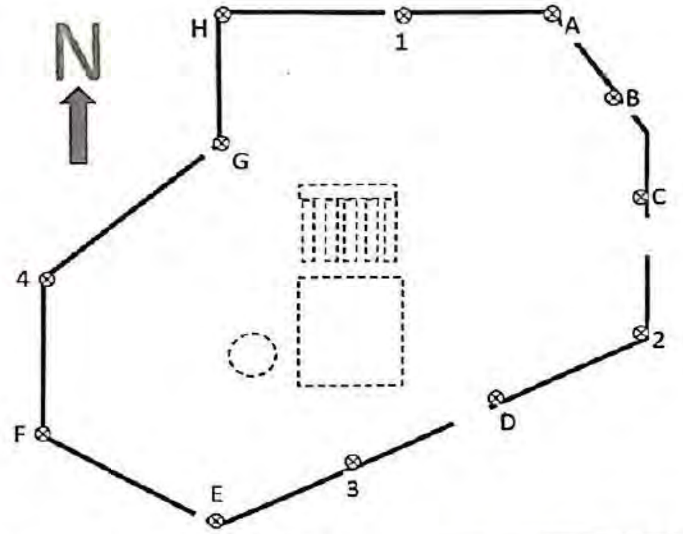
Start Time:	Wind Speed & Direction:	Comments
End Time:	N W E S	
Initials:		

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene UltraRAE 3000
SN 596-908042
Dust pDR1000-AN AM520
SN 52020 33006

Date: 12-14-20



Start Time: 825 Wind Speed & Direction: Comments SK pulling up concrete from building and pad NW of building.
End Time: 840 15°F
Initials: TRW 5-10 from NW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.035	0.022	0.020	0.011	0.015	0.114	0.019	0.028	0.030	0.019	0.036	0.019
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1020 Wind Speed & Direction: Comments SK blending relief holder materials with shallow soils near D 4/5
End Time: 1030 15°F
Initials: TRW 5-10mph

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.048	0.023	0.021	0.025	0.022	0.033	0.020	0.024	0.027	0.032	0.023	0.026
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1135 Wind Speed & Direction: Comments loading out blended relief holder materials and excavating shallow soils near C 4/5
End Time: 1145 5-10mph
Initials: TRW 20°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.057	0.038	0.079	0.033	0.079	0.039	0.039	0.037	0.035	0.052	0.044	0.053
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

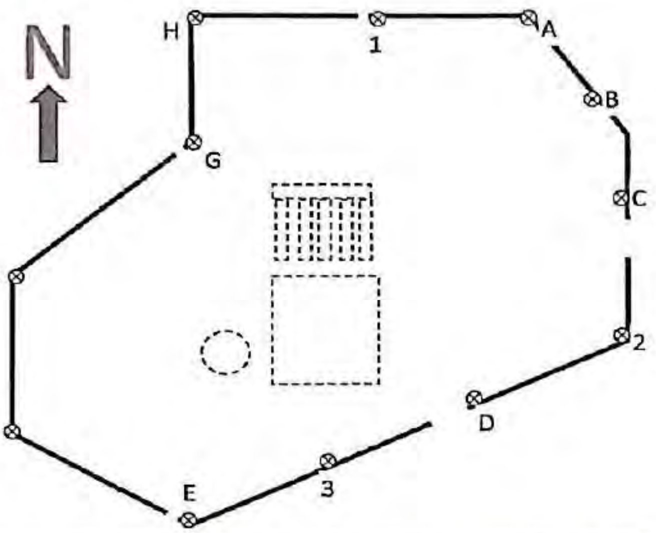
Start Time: 1330 Wind Speed & Direction: Comments Loading-out blended relief holder Materials and shallow excavation near D5
End Time: 1340 0-5 mph
Initials: TRW 20°F

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.048	0.044	0.038	0.054	0.045	0.037	0.046	0.054	0.060	0.055	0.043	0.049
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN AM520
SN: 5202033006

Date: 12-14-2020



Start Time: 1505	Wind Speed & Direction:		Comments									
End Time: 1515	N 5-10		Blending relief holder materials - open excavation near C5 - moving backfill									
Initials: TRW	W E											
	S 20°F											
AMS:	**1**	**A**	**B**	**C**	**2**	**D**	**3**	**E**	**F**	**4**	**G**	**H**
Dust	0.062	0.067	0.074	0.087	0.063	0.073	0.065	0.084	0.061	0.085	0.066	0.065
PID	0.00	0.00	1.00	0.00	0.00	0.00	~~0.00~~ 0.35	0.00	0.00	0.00	0.00	0.00
Benzene						0.25	0.06					

Start Time: 1635	Wind Speed & Direction:		Comments									
End Time: 1645	N 5-10		Scraping down equipment for night (not running)									
Initials: TRW	W E											
	S 20°F											
AMS:	**1**	**A**	**B**	**C**	**2**	**D**	**3**	**E**	**F**	**4**	**G**	**H**
Dust	0.062	0.079	0.059	0.077	0.076	0.077	0.075	0.074	0.056	0.060	0.071	0.057
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

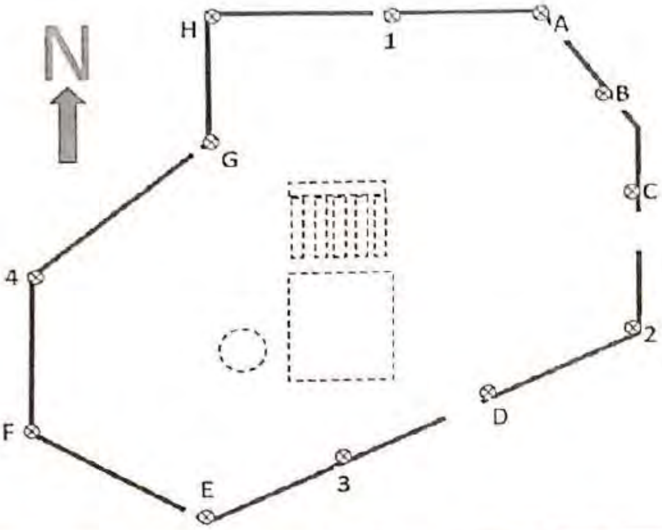
Start Time: ____	Wind Speed & Direction:		Comments									
End Time: ____	N											
Initials: ____	W · E											
	S											
AMS:	**1**	**A**	**B**	**C**	**2**	**D**	**3**	**E**	**F**	**4**	**G**	**H**
Dust												
PID												
Benzene												

Start Time: ____	Wind Speed & Direction:		Comments									
End Time: ____	N											
Initials: ____	W · E											
	S											
AMS:	**1**	**A**	**B**	**C**	**2**	**D**	**3**	**E**	**F**	**4**	**G**	**H**
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene UltraRAE 3000
SN 596-908042
Dust pDR1000-AN AM520
SN 5202033006

Date: 12-15-2020



Start Time: 730	Wind Speed & Direction: W ← E, 18°F, 5-10 mph				Comments: SK just starting to load-out concrete from pad NW of building and shallow excavation near AA6 also moving backfill to C5 area							
End Time: 740												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.061	0.068	0.052	0.049	0.059	0.055	0.078	0.065	0.054	0.054	0.05	0.066
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 915	Wind Speed & Direction: calm, 20°F				Comments: SK blending / loading out holder material as trucks arrive / shallow excavation near AA8 and backfill to north							
End Time: 925												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.081	0.070	0.063	0.058	0.094	0.057	0.076	0.077	0.044	0.050	0.064	0.062
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

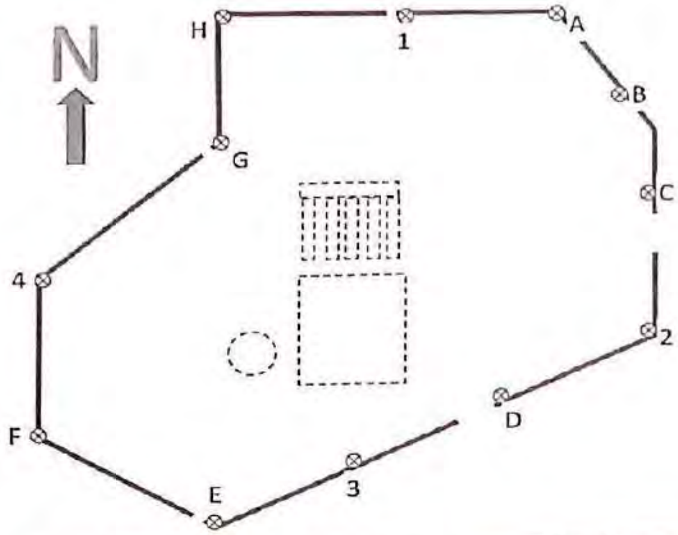
Start Time: 1050	Wind Speed & Direction: ↙ 5-10, 30°F				Comments: VOC hits at "E" intermittent. SK blending / loading out holder materials and shallow excavation near AA7 / backfilling north side							
End Time: 1100												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.056	0.052	0.038	0.091	0.079	0.082	0.061	0.075	0.041	0.066	0.085	0.078
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.43	0.01	0.00	0.00	0.00
Benzene								0.20				

Start Time: 1245	Wind Speed & Direction: W ← E, 5-10, 35°F				Comments: SK blending / loading out holder materials and excavating shallow soil near A8 - stockpiling backfill							
End Time: 1255												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.075	0.072	0.061	0.070	0.071	0.088	0.093	0.365	0.057	0.075	0.073	0.092
PID	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN 596 - 908042
Dust: pDR1000-AN AM520
SN: 52020 33006

Date: 12-15-2020



Start Time: 1440 Wind Speed & Direction: 5-10 mph N W ← S E 25°F Comments: Blending / load-out of holder materials, pulling N foundation from building near D/E5
End Time:
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.097	0.074	0.077	0.077	0.077	0.080	0.081	0.093	0.082	0.084	0.070	0.070
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1630 Wind Speed & Direction: 5-10 mph N W ← S E 25°F Comments: Shallow soil excavation near B7 and equipment fueling
End Time: 1635
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.075	0.076	0.065	0.083	0.080	0.069	0.061	0.080	0.074	0.084	0.086	0.069
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: N W · E S Comments
End Time: ______
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

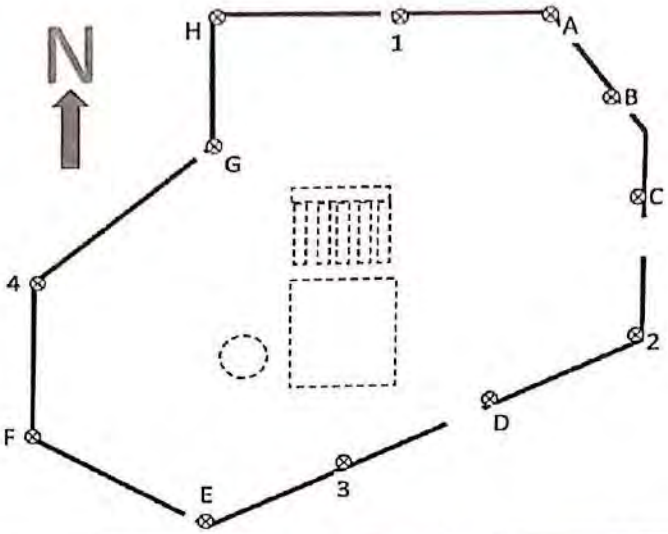
Start Time: ______ Wind Speed & Direction: N W · E S Comments
End Time: ______
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN AM520
SN: 5202033006

Date: 12-16-2020



Start Time: 735 Wind Speed & Direction: 0-5
End Time: 745
Initials: TRW
20°F
Comments: load-out of holder waste and compaction N area

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.061	0.039	0.071	0.065	0.085	0.038	0.040	0.047	0.044	0.039	0.032	0.020
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 829 Wind Speed & Direction: 0-5
End Time: 840
Initials: TRW
20°F
Comments: SK loading out Holder material Compacting

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.057	0.059	0.057	0.079	0.061	0.075	0.053	0.106	0.067	0.063	0.057	0.071
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1025 Wind Speed & Direction: 0-5
End Time: 1035
Initials: TRW
20°F
Comments: SK loading out blended holder material, shallow soil excavation near E.4/5 and backfill placement

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.081	0.068	0.065	0.076	0.088	0.058	0.086	0.086	0.065	0.072	0.064	0.056
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

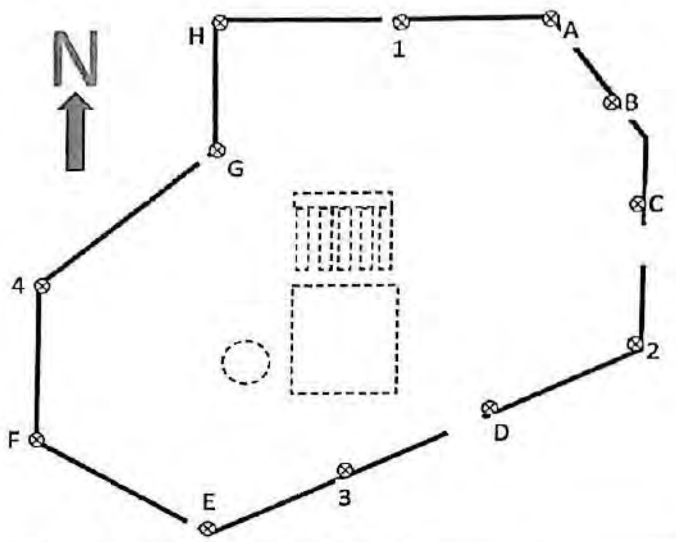
Start Time: 1355 Wind Speed & Direction: 5-10 mph
End Time: 1400
Initials: TRW
30°F
Comments: Blending / loading out last of holder material and heavy impacts from F5

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.090	0.079	0.080	0.091	0.107	0.098	0.087	0.110	0.087	0.086	0.098	0.075
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-900042
Dust: ~~pDR1000-AN~~ AM520
SN: 5202033006

Date: 12-16-20



Start Time:	1500	Wind Speed & Direction:				Comments					
End Time:			N	~5							
Initials:	TRW	W		E							
			S	29°F							

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.084											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time:	1630	Wind Speed & Direction:				Comments					
End Time:			N	5-10							
Initials:	TRW	W		E							
			S								

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	NA											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time:		Wind Speed & Direction:				Comments					
End Time:			N								
Initials:		W	•	E							
			S								

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

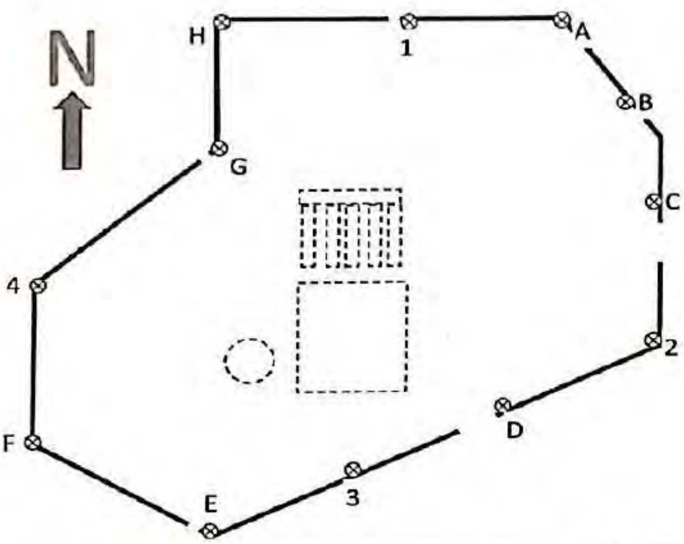
Start Time:		Wind Speed & Direction:				Comments					
End Time:			N								
Initials:		W	•	E							
			S								

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN
SN:

Date: 12-17-2020



Start Time: 840 Wind Speed & Direction: 23°
End Time: 845
Initials: TRW
5-10mph
Comments: SK loading concrete, backfilling deep excavation East of holder and compacting clean fill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	NA											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1035 Wind Speed & Direction: 27°F
End Time: 1100
Initials: TRW
5-10mph
Comments: Excavating shallow soil west of holder, loading out concrete foundations and spreading backfill.

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	NA											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1150 Wind Speed & Direction: 28°F
End Time: 1200
Initials: TRW
5-10mph
Comments: loading out impacted concrete/ shallow soils, backfilling holder w/ lime fines (bottom) and compacting backfill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	NA											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

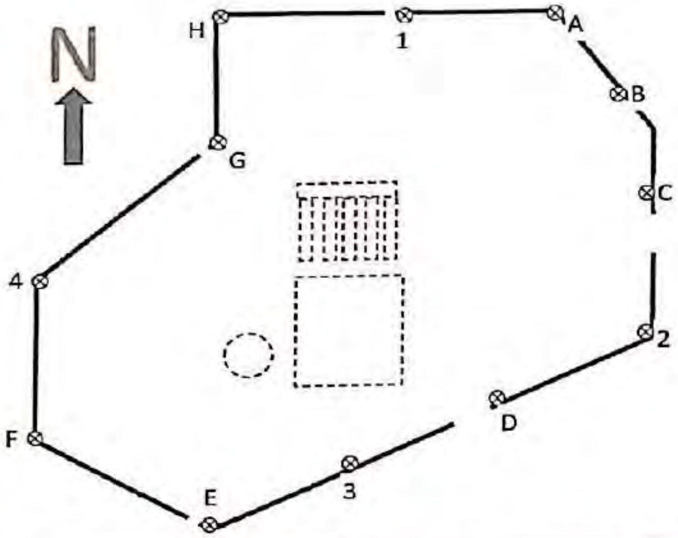
Start Time: 1410 Wind Speed & Direction:
End Time:
Initials: TRW
Comments:

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	NA											
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN
SN:

Date: 12-12-22



Start Time: 1550 Wind Speed & Direction: 32 °F
End Time: 1600 N
Initials: TRW W variable E
S 0-5

Comments: 5K excavating near NW corner of building / making backfill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction:
End Time: ______ N
Initials: ______ W · E
S

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction:
End Time: ______ N
Initials: ______ W · E
S

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction:
End Time: ______ N
Initials: ______ W · E
S

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

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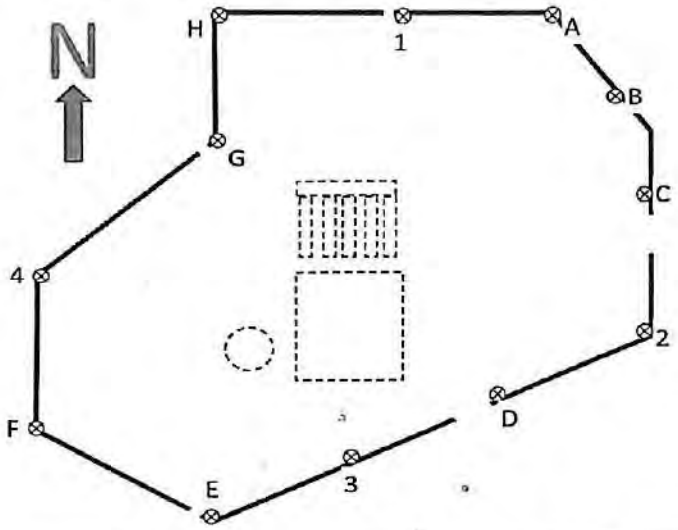
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ SidePak AM520
SN: 5201735007

Date: 12-18-20

Start Time: ~~[illegible]~~ 845 Wind Speed & Direction: 5-10 Comments: Excavation near C5/105
End Time: 855 N W E S 30°F
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.118	0.074	0.097	0.073	0.105	0.067	0.111	0.090	0.095	0.119	0.112	0.102
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1032 Wind Speed & Direction: 5-10 Comments: Excavation along N side former building
End Time: 1040 N W E S 35°F
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.059	0.071	0.036	0.079	0.103	0.137	0.115	0.082	0.059	0.088	0.096	0.045
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

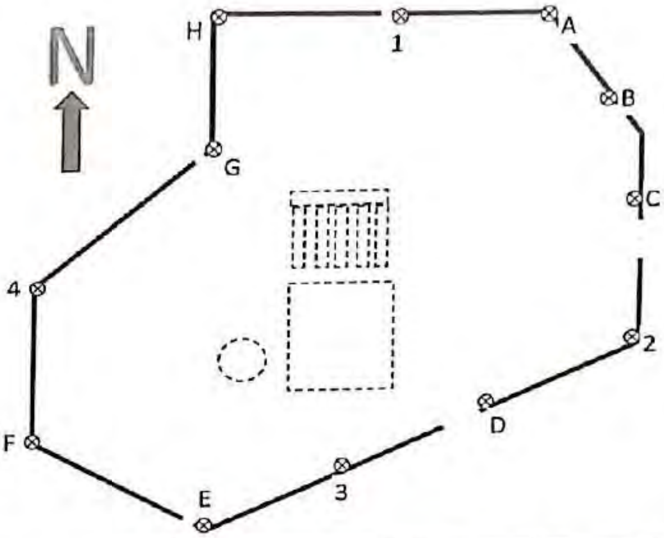
Start Time: 1326 Wind Speed & Direction: 10-15 Comments: Shallow excavation S of holder
End Time: 1332 N W E S 40°F
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.059	0.073	0.061	0.080	0.066	0.052	0.043	0.040	0.060	0.051	0.082	0.067
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N W E S
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ Sidepak AM520
SN: 5201735007

Date: 12-21-2020

Start Time: 815
End Time: 820
Initials: TRW
Wind Speed & Direction: 15-20mph, N W E S, 37°F
Comments: loading out shallow soils from D7 and moving backfill to holder area

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.004	0.003	0.005	0.005	0.005	0.004	0.005	0.006	0.015	0.007	0.009	0.036
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 925
End Time: 935
Initials: TRW
Wind Speed & Direction: N W E S, 41°F, 15-20mph
Comments: No activity - awaiting trucks

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.024	0.061	0.011	0.002	0.001	0.025	0.004	0.026	0.033	0.021	0.010	0.003
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1105
End Time: 1110
Initials: TRW
Wind Speed & Direction: N W E S, 45°F, ~20mph
Comments: occasional trucks, excavation near E7 and I4, moving backfill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.006	0.004	0.010	0.011	0.015	0.005	0.011	0.046	0.004	0.010	0.088	0.015
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

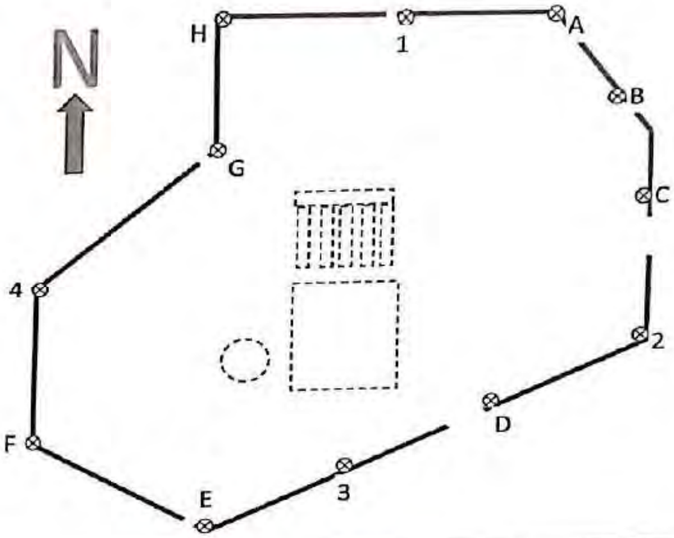
Start Time: 1250
End Time: 1300
Initials: TRW
Wind Speed & Direction: N W E S, 46°F, 20-25mph
Comments: excavation near H4 and E/F7, moving backfill

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.016	0.040	0.012	0.014	0.012	0.009	0.003	0.015	0.013	0.021	0.016	0.010
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596 - 908042
Dust: pDR1000-AN AM520
SN: 5201735007

Date: 12-21-2020



Start Time: 1455 Wind Speed & Direction: 48°F Comments shallow excavation / Load-out from E5/F5 and H4/5 and moving backfill
End Time: 1500 N
Initials: TRW W → E ~20mph S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.019	0.011	0.009	0.007	0.014	0.017	0.013	0.005	0.004	0.005	0.008	0.007
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1605 Wind Speed & Direction: 46°F Comments Moving backfill, finishing up excavation near ~G5
End Time: 1629 N
Initials: TRW W → E ~20mph S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.032	0.006	0.015	0.020	0.005	0.041	0.030	0.025	0.010	0.009	0.020	0.013
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E S

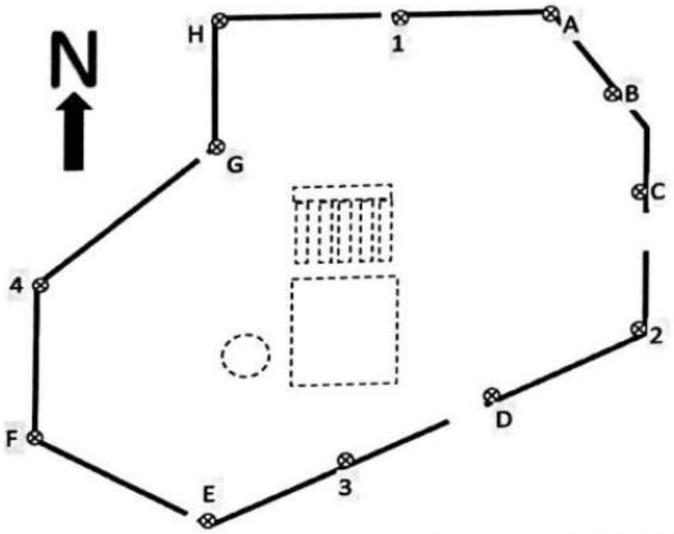
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5201735007

Date: 12-22-2020



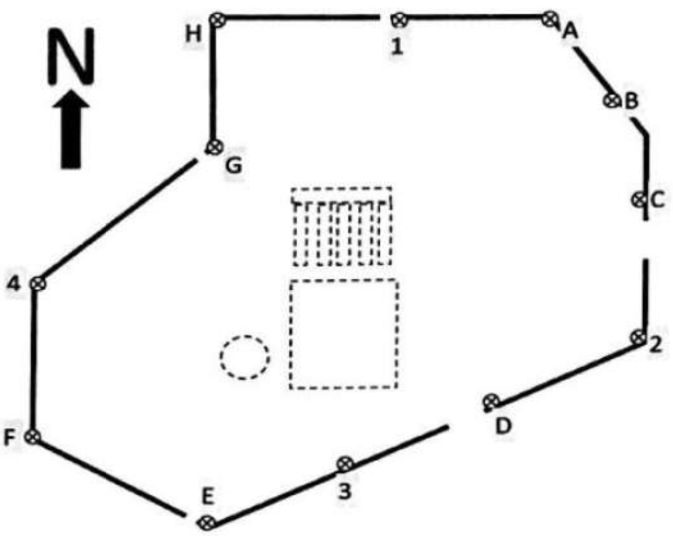
Start Time: 745		**Wind Speed & Direction:** 27°F, 0-5 mph				**Comments** shallow excavation near H5 and load-out, and moving backfill							
End Time: 755													
Initials: TRW													
AMS:	1	A	B	C	2	D	3	E	F	4	G	H	
Dust	0.035	0.013	0.024	0.014	0.013	0.038	0.012	0.015	0.022	0.007	0.019	0.022	
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Benzene													

Start Time: 930		**Wind Speed & Direction:** 32°F, ~10mph				**Comments** starting shallow excavation in SE corner of site near AMS 2						
End Time: 935												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.046	0.023	0.027	0.022	0.017	0.019	0.015	0.018	0.011	0.021	0.014	0.030
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1050		**Wind Speed & Direction:** 36°F, 10-15 mph				**Comments** shallow excavation near I6/H5 loading out waste soils, moving backfill						
End Time: 1100												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.029	0.019	0.010	0.047	0.026	0.007	0.014	0.037	0.018	0.022	0.026	0.023
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1225		**Wind Speed & Direction:** 45°F, 10-15				**Comments** No activity ~lunch break						
End Time: 1235												
Initials: TRW												
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.010	0.007	0.026	0.028	0.018	0.008	0.012	0.008	0.005	0.008	0.023	0.012
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~PDR1000-AN~~ AM520
SN: 5201735007

Date: 12-22-20

Start Time: 1445 Wind Speed & Direction: 46°F
End Time: 1455 N W E S 10-15mph
Initials: TRW

Comments: Shallow excavation near I5 backing trucks in - starting to backfill in front of gate

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.045	0.011	0.030	0.004	0.012	0.019	0.054	0.036	0.054	0.009	0.008	0.022
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1605 Wind Speed & Direction: 50°F
End Time: 1615 N W E S 15-20
Initials: TRW

Comments: Shallow excavation near I5 backfilling near east gate loading newer 235 hoe

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.012	0.016	0.011	0.012	0.026	0.037	0.010	0.008	0.017	0.015	0.005	0.011
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction:
End Time: ______ N W · E S
Initials: ______

Comments

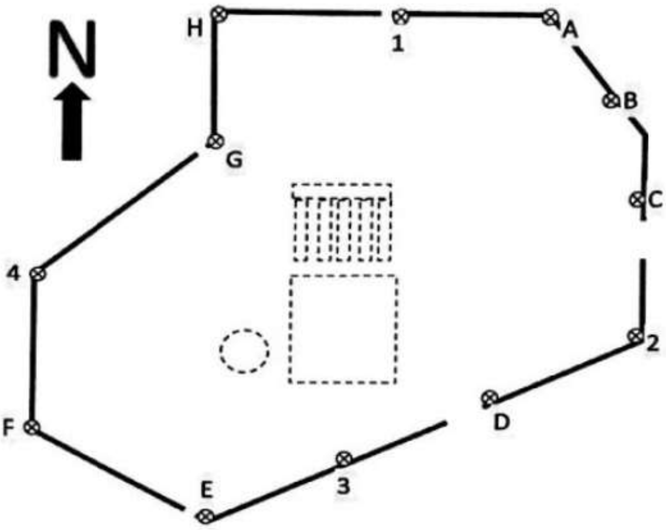
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction:
End Time: ______ N W · E S
Initials: ______

Comments

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM 520
SN: 5201735007

Date: 12-23-2020

Start Time: 755 Wind Speed & Direction: 50°F ~20mph
End Time:
Initials: TRW
W N E S

Comments: shallow excavation near H6 and loadout - back fill coming in East gate

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.057	0.032	0.036	0.043	0.024	0.027	0.027	0.022	0.022	0.021	0.067	0.031
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 922 Wind Speed & Direction: 54°F ~25mph
End Time: 933
Initials: TRW
W N E S

Comments: Shallow excavation near G7 and loadout, backfill moving / compaction

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.023	0.040	0.022	0.077	0.112	0.029	0.030	0.040	0.029	0.015	0.051	0.019
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1050 Wind Speed & Direction: 48°F ~25 mph
End Time:
Initials: TRW
W N E S

Comments: shallow excavation near NE and east sides of building

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.036	0.039	0.011	0.018	0.103	0.052	0.033	0.016	0.101	0.025	1.050	0.048
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1310 Wind Speed & Direction: 36°F ~25 mph
End Time: 1325
Initials: TRW
W N E S

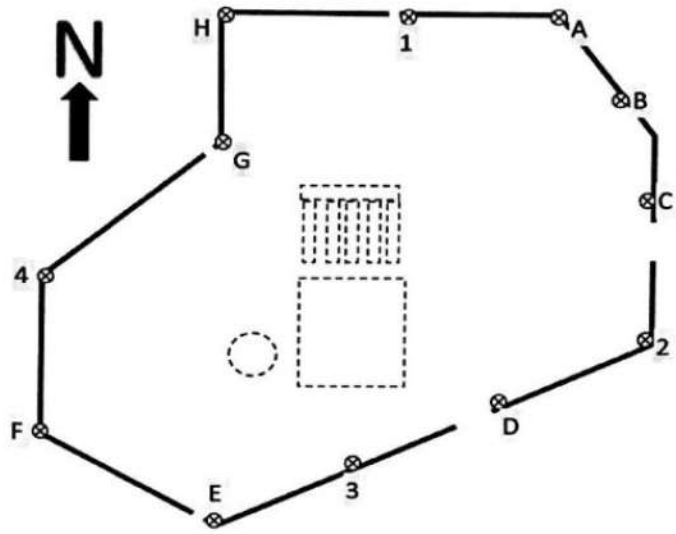
Comments: digging out trench to lay new culvert at south gate (drive) backfilling

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.038	0.035	0.044	0.031	0.081	0.024	0.068	0.049	0.055	0.054	0.033	0.036
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: ~~pDR1000-AN~~ AM520
SN: 5201735007

Date: 12-23-2020



Start Time: 1525 Wind Speed & Direction: 32°F Comments: excavating to 5' near FG where "steam" manway was backfilling
End Time:
Initials: JRW W → E 25-30mph

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.040	0.032	0.014	0.017	0.044	0.009	0.021	0.047	0.033	0.030	0.096	0.049
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

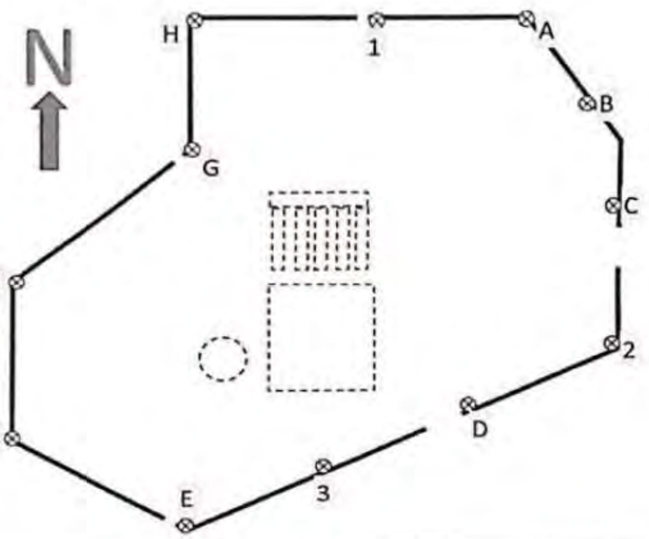
Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments



Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust ~~SDR1000-AN~~ AM520
SN: 5201735007

Date: 1-4-21

Start Time: 835 Wind Speed & Direction: 32°F Comments: about to resume excavation
End Time: 850 N / E 5-10mph - clearing snow
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.071	0.059	0.058	0.031	0.063	0.051	0.022	~~0.061~~ 0.064	0.039	0.071	0.036	0.031
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1120 Wind Speed & Direction: 32°F Comments: excavation / loadout near F7
End Time: 1130 N / E 5-10mph - clearing snow
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.044	0.047	0.035	0.048	0.030	0.043	0.072	0.059	0.032	0.047	0.037	0.033
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1315 Wind Speed & Direction: 32°F Comments: waiting for trucks to loadout materials near F7 - backfill coming onsite
End Time: 1325 N W → E ~10 from WSW
Initials: TRW

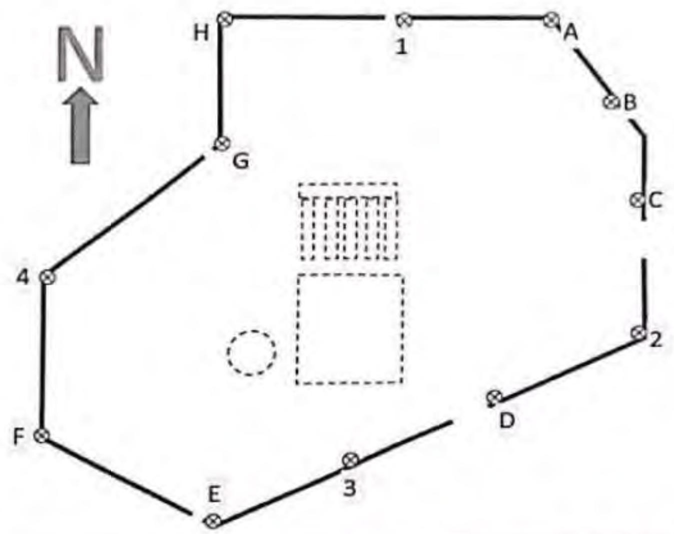
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.063	0.035	0.070	0.044	0.038	0.041	0.058	0.040	0.051	0.074	0.036	0.063
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1445 Wind Speed & Direction: 35°F Comments: Occasional excavation near E8, backfill coming onsite
End Time: 1455 N W → E ~5-10 from W
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.044	0.072	0.050	0.045	0.059	0.061	0.047	0.051	0.046	0.055	0.048	0.053
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN
SN: 5201735007



Date: 1/5/2021

Start Time: 0825 Wind Speed & Direction: 18° Comments: final excavation in progress · spreading fill
End Time: 0837
Initials: DAP
W N S E 1/0 wind

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.039	0.66	0.027	0.040	0.045	0.040	0.070	0.045	0.024	0.064	0.031	0.036
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1027 Wind Speed & Direction: 29° Comments: in between truck for haul out
End Time: 1034
Initials: DAP
W N S E 1/0

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.053	0.060	0.039	0.070	0.037	0.035	0.028	0.044	0.041	0.039	0.045	0.057
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1140 Wind Speed & Direction: 35° Comments: excavating/loading last soil compacting fill
End Time: 1146
Initials: DAP
W N S E 2/0

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.070	0.030	0.043	0.037	0.039	0.032	0.050	0.051	0.046	0.036	0.034	0.028
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1338 Wind Speed & Direction: 43° Comments: Cleaning excavator waiting for soil
End Time: 1345
Initials: DAP
W N S E 6/0

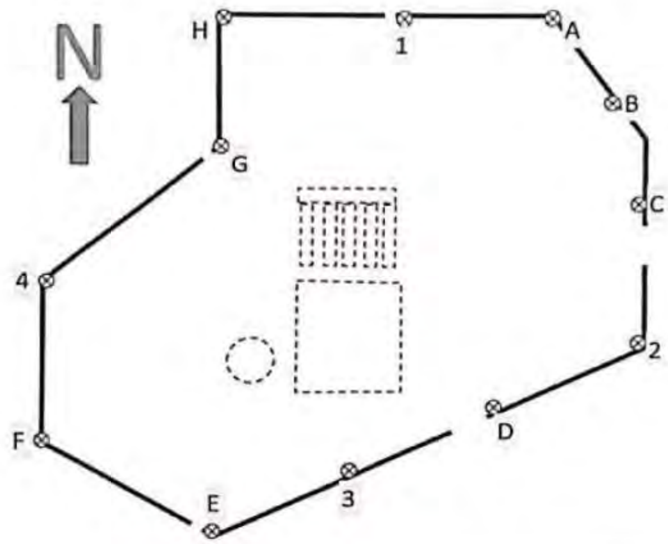
AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.025	0.034	0.038	0.036	0.055	0.024	0.035	0.033	0.028	0.037	0.032	0.021
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:

PID/Benzene: UltraRAE 3000
SN: 596-908042
Dust: pDR1000-AN
SN: 5201735007

Date: 1/5/2021



Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Start Time: 1550 Wind Speed & Direction: 4,0 Comments backfilling
End Time: ______ N
Initials: DAP W · ← E 6/0
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.022	0.018	0.021	0.025	0.024	0.025	0.036	0.024	0.026	0.050	0.026	0.025
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

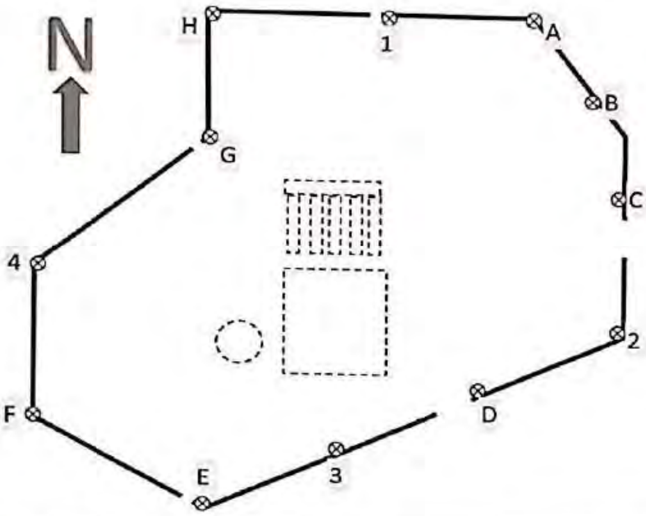
Start Time: ______ Wind Speed & Direction: Comments
End Time: ______ N
Initials: ______ W · E
S

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

IPL Albia MGP IRA
Perimeter Air Monitoring Data Sheet
Direct Read Instruments

Instruments:
PID/Benzene: UltraRAE 3000
SN 596-908042
Dust-~~pDR1000-AN~~ AM520
SN 5201735007

Date: 1-6-2021



Start Time: 820 Wind Speed & Direction: N W E S 30°F 10-15 Comments backfilling /Compacting
End Time: 835
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.077	0.069	0.082	0.074	0.077	0.092	0.082	0.079	0.079	0.069	0.058	0.061
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1200 Wind Speed & Direction: N W E S 32°F ~10mph Comments backfilling / Compacting
End Time:
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.068	0.072	0.077	0.080	0.070	0.051	0.078	0.068	0.065	0.080	0.082	0.080
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: 1435 Wind Speed & Direction: N W E S 10-15 mph Comments Back filling compacting - backfill over all native / remaining soils
End Time:
Initials: TRW

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust	0.083	0.073	0.071	0.071	0.081	0.083	0.073	0.092	0.073	0.085	0.080	0.065
PID	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Benzene												

Start Time: ______ Wind Speed & Direction: N W E S Comments
End Time: ______
Initials: ______

AMS:	1	A	B	C	2	D	3	E	F	4	G	H
Dust												
PID												
Benzene												

Appendix C

UCL Calculations for Soil Data

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:28:35 AM
From File	Albia 0-2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	5
Minimum Detect	2	Minimum Non-Detect	1.12
Maximum Detect	10	Maximum Non-Detect	7.79
Variance Detects	11.01	Percent Non-Detects	55.56%
Mean Detects	5.76	SD Detects	3.318
Median Detects	5.52	CV Detects	0.576
Skewness Detects	0.41	Kurtosis Detects	0.905
Mean of Logged Detects	1.6	SD of Logged Detects	0.674

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 on Detects Only

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.906	KM Standard Error of Mean	1.245
KM SD	2.869	95% KM (BCA) UCL	N/A
95% KM (t) UCL	6.222	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	5.954	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	7.642	95% KM Chebyshev UCL	9.334
97.5% KM Chebyshev UCL	11.68	99% KM Chebyshev UCL	16.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.228	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.467	k star (bias corrected MLE)	1.033

	A–E	F	G–K	L
53	Theta hat (MLE)	1.661	Theta star (bias corrected MLE)	5.574
54	nu hat (MLE)	27.74	nu star (bias corrected)	8.267
55	Mean (detects)	5.76		
56				
57	**Gamma ROS Statistics using Imputed Non-Detects**			
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
59	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
60	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
61	This is especially true when the sample size is small.			
62	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
63	Minimum	0.164	Mean	3.62
64	Maximum	10	Median	2.691
65	SD	2.984	CV	0.824
66	k hat (MLE)	1.341	k star (bias corrected MLE)	0.968
67	Theta hat (MLE)	2.699	Theta star (bias corrected MLE)	3.739
68	nu hat (MLE)	24.14	nu star (bias corrected)	17.43
69	Adjusted Level of Significance (β)	0.0231		
70	Approximate Chi Square Value (17.43, α)	8.978	Adjusted Chi Square Value (17.43, β)	7.733
71	95% Gamma Approximate UCL (use when n>=50)	7.026	95% Gamma Adjusted UCL (use when n<50)	N/A
72				
73	**Estimates of Gamma Parameters using KM Estimates**			
74	Mean (KM)	3.906	SD (KM)	2.869
75	Variance (KM)	8.232	SE of Mean (KM)	1.245
76	k hat (KM)	1.853	k star (KM)	1.309
77	nu hat (KM)	33.36	nu star (KM)	23.57
78	theta hat (KM)	2.108	theta star (KM)	2.983
79	80% gamma percentile (KM)	6.131	90% gamma percentile (KM)	8.414
80	95% gamma percentile (KM)	10.65	99% gamma percentile (KM)	15.75
81				
82	**Gamma Kaplan-Meier (KM) Statistics**			
83	Approximate Chi Square Value (23.57, α)	13.52	Adjusted Chi Square Value (23.57, β)	11.95
84	95% Gamma Approximate KM-UCL (use when n>=50)	6.808	95% Gamma Adjusted KM-UCL (use when n<50)	7.705
85				
86	**Lognormal GOF Test on Detected Observations Only**			
87	Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**	
88	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
89	Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**	
90	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
91	**Detected Data appear Lognormal at 5% Significance Level**			
92				
93	**Lognormal ROS Statistics Using Imputed Non-Detects**			
94	Mean in Original Scale	3.749	Mean in Log Scale	1.107
95	SD in Original Scale	2.827	SD in Log Scale	0.676
96	95% t UCL (assumes normality of ROS data)	5.502	95% Percentile Bootstrap UCL	5.308
97	95% BCA Bootstrap UCL	5.859	95% Bootstrap t UCL	7.236
98	95% H-UCL (Log ROS)	7.036		
99				
100	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
101	KM Mean (logged)	1.076	KM Geo Mean	2.933
102	KM SD (logged)	0.773	95% Critical H Value (KM-Log)	2.758
103	KM Standard Error of Mean (logged)	0.361	95% H-UCL (KM -Log)	8.401
104	KM SD (logged)	0.773	95% Critical H Value (KM-Log)	2.758

	A–E	F	G–K	L
105	KM Standard Error of Mean (logged)	0.361		
106				
107	**DL/2 Statistics**			
108	**DL/2 Normal**		**DL/2 Log-Transformed**	
109	Mean in Original Scale	3.998	Mean in Log Scale	1.096
110	SD in Original Scale	2.873	SD in Log Scale	0.896
111	95% t UCL (Assumes normality)	5.779	95% H-Stat UCL	11.6
112	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
113				
114	**Nonparametric Distribution Free UCL Statistics**			
115	**Detected Data appear Normal Distributed at 5% Significance Level**			
116				
117	**Suggested UCL to Use**			
118	95% KM (t) UCL	6.222		
119				
120	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
121	Recommendations are based upon data size, data distribution, and skewness.			
122	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
123	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
124				
125				
126	**Lead**			
127				
128	**General Statistics**			
129	Total Number of Observations	9	Number of Distinct Observations	9
130			Number of Missing Observations	0
131	Minimum	15.4	Mean	43.01
132	Maximum	214	Median	18.7
133	SD	64.4	Std. Error of Mean	21.47
134	Coefficient of Variation	1.497	Skewness	2.95
135				
136	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
137	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
138	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
139	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
140				
141	**Normal GOF Test**			
142	Shapiro Wilk Test Statistic	0.471	**Shapiro Wilk GOF Test**	
143	5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level	
144	Lilliefors Test Statistic	0.446	**Lilliefors GOF Test**	
145	5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level	
146	**Data Not Normal at 5% Significance Level**			
147				
148	**Assuming Normal Distribution**			
149	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
150	95% Student's-t UCL	82.93	95% Adjusted-CLT UCL (Chen-1995)	100.9
151			95% Modified-t UCL (Johnson-1978)	86.45
152				
153	**Gamma GOF Test**			
154	A-D Test Statistic	1.732	**Anderson-Darling Gamma GOF Test**	
155	5% A-D Critical Value	0.74	Data Not Gamma Distributed at 5% Significance Level	
156	K-S Test Statistic	0.367	**Kolmogorov-Smirnov Gamma GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
157					5% K-S Critical Value	0.286	Data Not Gamma Distributed at 5% Significance Level					
158	**Data Not Gamma Distributed at 5% Significance Level**											
159												
160	**Gamma Statistics**											
161					k hat (MLE)	1.217					k star (bias corrected MLE)	0.886
162					Theta hat (MLE)	35.33					Theta star (bias corrected MLE)	48.56
163					nu hat (MLE)	21.91					nu star (bias corrected)	15.94
164					MLE Mean (bias corrected)	43.01					MLE Sd (bias corrected)	45.7
165											Approximate Chi Square Value (0.05)	7.922
166					Adjusted Level of Significance	0.0231					Adjusted Chi Square Value	6.765
167												
168	**Assuming Gamma Distribution**											
169					95% Approximate Gamma UCL (use when n>=50))	86.56					95% Adjusted Gamma UCL (use when n<50)	101.4
170												
171	**Lognormal GOF Test**											
172					Shapiro Wilk Test Statistic	0.672	**Shapiro Wilk Lognormal GOF Test**					
173					5% Shapiro Wilk Critical Value	0.829	Data Not Lognormal at 5% Significance Level					
174					Lilliefors Test Statistic	0.282	**Lilliefors Lognormal GOF Test**					
175					5% Lilliefors Critical Value	0.274	Data Not Lognormal at 5% Significance Level					
176	**Data Not Lognormal at 5% Significance Level**											
177												
178	**Lognormal Statistics**											
179					Minimum of Logged Data	2.734					Mean of logged Data	3.298
180					Maximum of Logged Data	5.366					SD of logged Data	0.818
181												
182	**Assuming Lognormal Distribution**											
183					95% H-UCL	86.2					90% Chebyshev (MVUE) UCL	66.54
184					95% Chebyshev (MVUE) UCL	80.32					97.5% Chebyshev (MVUE) UCL	99.45
185					99% Chebyshev (MVUE) UCL	137						
186												
187	**Nonparametric Distribution Free UCL Statistics**											
188	**Data do not follow a Discernible Distribution (0.05)**											
189												
190	**Nonparametric Distribution Free UCLs**											
191					95% CLT UCL	78.32					95% Jackknife UCL	82.93
192					95% Standard Bootstrap UCL	75.9					95% Bootstrap-t UCL	409.1
193					95% Hall's Bootstrap UCL	250.3					95% Percentile Bootstrap UCL	85.06
194					95% BCA Bootstrap UCL	107.6						
195					90% Chebyshev(Mean, Sd) UCL	107.4					95% Chebyshev(Mean, Sd) UCL	136.6
196					97.5% Chebyshev(Mean, Sd) UCL	177.1					99% Chebyshev(Mean, Sd) UCL	256.6
197												
198	**Suggested UCL to Use**											
199					95% Chebyshev (Mean, Sd) UCL	136.6						
200												
201	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
202	Recommendations are based upon data size, data distribution, and skewness.											
203	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
204	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
205												
206	**2-Methylnaphthalene**											
207												
208	**General Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
209					Total Number of Observations	10					Number of Distinct Observations	10
210					Number of Detects	2					Number of Non-Detects	8
211					Number of Distinct Detects	2					Number of Distinct Non-Detects	8
212					Minimum Detect	0.0678					Minimum Non-Detect	0.0126
213					Maximum Detect	0.129					Maximum Non-Detect	0.122
214					Variance Detects	0.00187					Percent Non-Detects	80%
215					Mean Detects	0.0984					SD Detects	0.0433
216					Median Detects	0.0984					CV Detects	0.44
217					Skewness Detects	N/A					Kurtosis Detects	N/A
218					Mean of Logged Detects	-2.37					SD of Logged Detects	0.455
219												
220	**Warning: Data set has only 2 Detected Values.**											
221	**This is not enough to compute meaningful or reliable statistics and estimates.**											
222												
223												
224	**Normal GOF Test on Detects Only**											
225	**Not Enough Data to Perform GOF Test**											
226												
227	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
228					KM Mean	0.0367					KM Standard Error of Mean	0.0205
229					KM SD	0.0382					95% KM (BCA) UCL	N/A
230					95% KM (t) UCL	0.0743					95% KM (Percentile Bootstrap) UCL	N/A
231					95% KM (z) UCL	0.0704					95% KM Bootstrap t UCL	N/A
232					90% KM Chebyshev UCL	0.0982					95% KM Chebyshev UCL	0.126
233					97.5% KM Chebyshev UCL	0.165					99% KM Chebyshev UCL	0.241
234												
235	**Gamma GOF Tests on Detected Observations Only**											
236	**Not Enough Data to Perform GOF Test**											
237												
238	**Gamma Statistics on Detected Data Only**											
239					k hat (MLE)	9.996					k star (bias corrected MLE)	N/A
240					Theta hat (MLE)	0.00984					Theta star (bias corrected MLE)	N/A
241					nu hat (MLE)	39.98					nu star (bias corrected)	N/A
242					Mean (detects)	0.0984						
243												
244	**Estimates of Gamma Parameters using KM Estimates**											
245					Mean (KM)	0.0367					SD (KM)	0.0382
246					Variance (KM)	0.00146					SE of Mean (KM)	0.0205
247					k hat (KM)	0.92					k star (KM)	0.71
248					nu hat (KM)	18.39					nu star (KM)	14.21
249					theta hat (KM)	0.0399					theta star (KM)	0.0516
250					80% gamma percentile (KM)	0.0602					90% gamma percentile (KM)	0.0917
251					95% gamma percentile (KM)	0.124					99% gamma percentile (KM)	0.201
252												
253	**Gamma Kaplan-Meier (KM) Statistics**											
254											Adjusted Level of Significance (β)	0.0267
255					Approximate Chi Square Value (14.21, α)	6.713					Adjusted Chi Square Value (14.21, β)	5.841
256					95% Gamma Approximate KM-UCL (use when n>=50)	0.0776					95% Gamma Adjusted KM-UCL (use when n<50)	0.0892
257												
258	**Lognormal GOF Test on Detected Observations Only**											
259	**Not Enough Data to Perform GOF Test**											
260												

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0446	Mean in Log Scale	-3.255
SD in Original Scale	0.032	SD in Log Scale	0.501
95% t UCL (assumes normality of ROS data)	0.0631	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	0.0634		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.763	KM Geo Mean	0.0232
KM SD (logged)	0.897	95% Critical H Value (KM-Log)	2.896
KM Standard Error of Mean (logged)	0.53	95% H-UCL (KM -Log)	0.0825
KM SD (logged)	0.897	95% Critical H Value (KM-Log)	2.896
KM Standard Error of Mean (logged)	0.53		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.053	Mean in Log Scale	-3.251
SD in Original Scale	0.0348	SD in Log Scale	0.993
95% t UCL (Assumes normality)	0.0731	95% H-Stat UCL	0.176
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0743	KM H-UCL	0.0825
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Acenaphthylene			
General Statistics			
Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	2	Number of Non-Detects	8
Number of Distinct Detects	2	Number of Distinct Non-Detects	7
Minimum Detect	0.146	Minimum Non-Detect	0.0126
Maximum Detect	0.181	Maximum Non-Detect	0.122
Variance Detects	6.1250E-4	Percent Non-Detects	80%
Mean Detects	0.164	SD Detects	0.0247
Median Detects	0.164	CV Detects	0.151
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.817	SD of Logged Detects	0.152
Warning: Data set has only 2 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0428	KM Standard Error of Mean	0.0272
KM SD	0.0609	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0927	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0876	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.124	95% KM Chebyshev UCL	0.161
97.5% KM Chebyshev UCL	0.213	99% KM Chebyshev UCL	0.314

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	86.95	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00188	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	347.8	nu star (bias corrected)	N/A
Mean (detects)	0.164		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0428	SD (KM)	0.0609
Variance (KM)	0.0037	SE of Mean (KM)	0.0272
k hat (KM)	0.494	k star (KM)	0.412
nu hat (KM)	9.88	nu star (KM)	8.25
theta hat (KM)	0.0866	theta star (KM)	0.104
80% gamma percentile (KM)	0.0693	90% gamma percentile (KM)	0.12
95% gamma percentile (KM)	0.176	99% gamma percentile (KM)	0.315

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (8.25, α)	2.88	Adjusted Chi Square Value (8.25, β)	2.358
95% Gamma Approximate KM-UCL (use when n>=50)	0.123	95% Gamma Adjusted KM-UCL (use when n<50)	0.15

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.088	Mean in Log Scale	-2.505
SD in Original Scale	0.0411	SD in Log Scale	0.378
95% t UCL (assumes normality of ROS data)	0.112	95% Percentile Bootstrap UCL	0.11
95% BCA Bootstrap UCL	0.117	95% Bootstrap t UCL	0.201
95% H-UCL (Log ROS)	0.114		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.863	KM Geo Mean	0.021
KM SD (logged)	1.024	95% Critical H Value (KM-Log)	3.153
KM Standard Error of Mean (logged)	0.458	95% H-UCL (KM -Log)	0.104
KM SD (logged)	1.024	95% Critical H Value (KM-Log)	3.153
KM Standard Error of Mean (logged)	0.458		

DL/2 Statistics

365	**DL/2 Normal**		**DL/2 Log-Transformed**	
366	Mean in Original Scale	0.0671	Mean in Log Scale	-3.12
367	SD in Original Scale	0.0558	SD in Log Scale	1.117
368	95% t UCL (Assumes normality)	0.0994	95% H-Stat UCL	0.286
369	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
370				
371	**Nonparametric Distribution Free UCL Statistics**			
372	**Data do not follow a Discernible Distribution at 5% Significance Level**			
373				
374	**Suggested UCL to Use**			
375	95% KM (t) UCL	0.0927	KM H-UCL	0.104
376	95% KM (BCA) UCL	N/A		
377	**Warning: One or more Recommended UCL(s) not available!**			
378				
379	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
380	Recommendations are based upon data size, data distribution, and skewness.			
381	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
382	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
383				
384	**Anthracene**			
385				
386	**General Statistics**			
387	Total Number of Observations	10	Number of Distinct Observations	9
388	Number of Detects	3	Number of Non-Detects	7
389	Number of Distinct Detects	3	Number of Distinct Non-Detects	6
390	Minimum Detect	0.0477	Minimum Non-Detect	0.0126
391	Maximum Detect	0.169	Maximum Non-Detect	0.121
392	Variance Detects	0.00453	Percent Non-Detects	70%
393	Mean Detects	0.125	SD Detects	0.0673
394	Median Detects	0.159	CV Detects	0.538
395	Skewness Detects	-1.689	Kurtosis Detects	N/A
396	Mean of Logged Detects	-2.22	SD of Logged Detects	0.713
397				
398	**Warning: Data set has only 3 Detected Values.**			
399	**This is not enough to compute meaningful or reliable statistics and estimates.**			
400				
401				
402	**Normal GOF Test on Detects Only**			
403	Shapiro Wilk Test Statistic	0.811	**Shapiro Wilk GOF Test**	
404	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
405	Lilliefors Test Statistic	0.359	**Lilliefors GOF Test**	
406	5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
407	**Detected Data appear Normal at 5% Significance Level**			
408				
409	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
410	KM Mean	0.0522	KM Standard Error of Mean	0.0236
411	KM SD	0.0578	95% KM (BCA) UCL	N/A
412	95% KM (t) UCL	0.0955	95% KM (Percentile Bootstrap) UCL	N/A
413	95% KM (z) UCL	0.0911	95% KM Bootstrap t UCL	N/A
414	90% KM Chebyshev UCL	0.123	95% KM Chebyshev UCL	0.155
415	97.5% KM Chebyshev UCL	0.2	99% KM Chebyshev UCL	0.287
416				

417	**Gamma GOF Tests on Detected Observations Only**			
418	**Not Enough Data to Perform GOF Test**			
419				
420	**Gamma Statistics on Detected Data Only**			
421	k hat (MLE)	3.673	k star (bias corrected MLE)	N/A
422	Theta hat (MLE)	0.0341	Theta star (bias corrected MLE)	N/A
423	nu hat (MLE)	22.04	nu star (bias corrected)	N/A
424	Mean (detects)	0.125		
425				
426	**Gamma ROS Statistics using Imputed Non-Detects**			
427	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
428	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
429	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
430	This is especially true when the sample size is small.			
431	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
432	Minimum	0.01	Mean	0.0461
433	Maximum	0.169	Median	0.01
434	SD	0.0633	CV	1.374
435	k hat (MLE)	0.822	k star (bias corrected MLE)	0.642
436	Theta hat (MLE)	0.0561	Theta star (bias corrected MLE)	0.0718
437	nu hat (MLE)	16.43	nu star (bias corrected)	12.84
438	Adjusted Level of Significance (β)	0.0267		
439	Approximate Chi Square Value (12.84, α)	5.783	Adjusted Chi Square Value (12.84, β)	4.984
440	95% Gamma Approximate UCL (use when n>=50)	0.102	95% Gamma Adjusted UCL (use when n<50)	N/A
441				
442	**Estimates of Gamma Parameters using KM Estimates**			
443	Mean (KM)	0.0522	SD (KM)	0.0578
444	Variance (KM)	0.00335	SE of Mean (KM)	0.0236
445	k hat (KM)	0.815	k star (KM)	0.637
446	nu hat (KM)	16.31	nu star (KM)	12.75
447	theta hat (KM)	0.0641	theta star (KM)	0.0819
448	80% gamma percentile (KM)	0.0861	90% gamma percentile (KM)	0.134
449	95% gamma percentile (KM)	0.184	99% gamma percentile (KM)	0.304
450				
451	**Gamma Kaplan-Meier (KM) Statistics**			
452	Approximate Chi Square Value (12.75, α)	5.725	Adjusted Chi Square Value (12.75, β)	4.931
453	95% Gamma Approximate KM-UCL (use when n>=50)	0.116	95% Gamma Adjusted KM-UCL (use when n<50)	0.135
454				
455	**Lognormal GOF Test on Detected Observations Only**			
456	Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**	
457	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
458	Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**	
459	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
460	**Detected Data appear Lognormal at 5% Significance Level**			
461				
462	**Lognormal ROS Statistics Using Imputed Non-Detects**			
463	Mean in Original Scale	0.0519	Mean in Log Scale	-3.423
464	SD in Original Scale	0.06	SD in Log Scale	0.937
465	95% t UCL (assumes normality of ROS data)	0.0867	95% Percentile Bootstrap UCL	0.0826
466	95% BCA Bootstrap UCL	0.0936	95% Bootstrap t UCL	0.213
467	95% H-UCL (Log ROS)	0.128		
468				

	A–E	F	G–K	L
469	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
470	KM Mean (logged)	-3.506	KM Geo Mean	0.03
471	KM SD (logged)	1.018	95% Critical H Value (KM-Log)	3.139
472	KM Standard Error of Mean (logged)	0.484	95% H-UCL (KM -Log)	0.146
473	KM SD (logged)	1.018	95% Critical H Value (KM-Log)	3.139
474	KM Standard Error of Mean (logged)	0.484		
475				
476	**DL/2 Statistics**			
477	**DL/2 Normal**		**DL/2 Log-Transformed**	
478	Mean in Original Scale	0.0659	Mean in Log Scale	-3.143
479	SD in Original Scale	0.0557	SD in Log Scale	1.113
480	95% t UCL (Assumes normality)	0.0982	95% H-Stat UCL	0.276
481	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
482				
483	**Nonparametric Distribution Free UCL Statistics**			
484	**Detected Data appear Normal Distributed at 5% Significance Level**			
485				
486	**Suggested UCL to Use**			
487	95% KM (t) UCL	0.0955		
488				
489	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
490	Recommendations are based upon data size, data distribution, and skewness.			
491	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
492	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
493				
494	**Benzo[a]anthracene**			
495				
496	**General Statistics**			
497	Total Number of Observations	10	Number of Distinct Observations	9
498	Number of Detects	5	Number of Non-Detects	5
499	Number of Distinct Detects	5	Number of Distinct Non-Detects	4
500	Minimum Detect	0.0159	Minimum Non-Detect	0.0137
501	Maximum Detect	0.888	Maximum Non-Detect	0.121
502	Variance Detects	0.139	Percent Non-Detects	50%
503	Mean Detects	0.345	SD Detects	0.373
504	Median Detects	0.198	CV Detects	1.081
505	Skewness Detects	0.874	Kurtosis Detects	-0.972
506	Mean of Logged Detects	-1.862	SD of Logged Detects	1.655
507				
508	**Normal GOF Test on Detects Only**			
509	Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**	
510	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
511	Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**	
512	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
513	**Detected Data appear Normal at 5% Significance Level**			
514				
515	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
516	KM Mean	0.185	KM Standard Error of Mean	0.101
517	KM SD	0.285	95% KM (BCA) UCL	0.35
518	95% KM (t) UCL	0.37	95% KM (Percentile Bootstrap) UCL	0.357
519	95% KM (z) UCL	0.351	95% KM Bootstrap t UCL	0.661
520	90% KM Chebyshev UCL	0.488	95% KM Chebyshev UCL	0.625

521	97.5% KM Chebyshev UCL	0.816	99% KM Chebyshev UCL	1.19
522				
523	**Gamma GOF Tests on Detected Observations Only**			
524	A-D Test Statistic	0.228	**Anderson-Darling GOF Test**	
525	5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level	
526	K-S Test Statistic	0.2	**Kolmogorov-Smirnov GOF**	
527	5% K-S Critical Value	0.367	Detected data appear Gamma Distributed at 5% Significance Level	
528	**Detected data appear Gamma Distributed at 5% Significance Level**			
529				
530	**Gamma Statistics on Detected Data Only**			
531	k hat (MLE)	0.751	k star (bias corrected MLE)	0.434
532	Theta hat (MLE)	0.459	Theta star (bias corrected MLE)	0.795
533	nu hat (MLE)	7.509	nu star (bias corrected)	4.337
534	Mean (detects)	0.345		
535				
536	**Gamma ROS Statistics using Imputed Non-Detects**			
537	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
538	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
539	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
540	This is especially true when the sample size is small.			
541	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
542	Minimum	0.01	Mean	0.177
543	Maximum	0.888	Median	0.013
544	SD	0.305	CV	1.718
545	k hat (MLE)	0.432	k star (bias corrected MLE)	0.369
546	Theta hat (MLE)	0.41	Theta star (bias corrected MLE)	0.48
547	nu hat (MLE)	8.643	nu star (bias corrected)	7.383
548	Adjusted Level of Significance (β)	0.0267		
549	Approximate Chi Square Value (7.38, α)	2.383	Adjusted Chi Square Value (7.38, β)	1.92
550	95% Gamma Approximate UCL (use when n>=50)	0.549	95% Gamma Adjusted UCL (use when n<50)	0.682
551				
552	**Estimates of Gamma Parameters using KM Estimates**			
553	Mean (KM)	0.185	SD (KM)	0.285
554	Variance (KM)	0.0811	SE of Mean (KM)	0.101
555	k hat (KM)	0.423	k star (KM)	0.363
556	nu hat (KM)	8.463	nu star (KM)	7.257
557	theta hat (KM)	0.438	theta star (KM)	0.511
558	80% gamma percentile (KM)	0.295	90% gamma percentile (KM)	0.532
559	95% gamma percentile (KM)	0.796	99% gamma percentile (KM)	1.467
560				
561	**Gamma Kaplan-Meier (KM) Statistics**			
562	Approximate Chi Square Value (7.26, α)	2.313	Adjusted Chi Square Value (7.26, β)	1.858
563	95% Gamma Approximate KM-UCL (use when n>=50)	0.581	95% Gamma Adjusted KM-UCL (use when n<50)	0.724
564				
565	**Lognormal GOF Test on Detected Observations Only**			
566	Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**	
567	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
568	Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**	
569	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
570	**Detected Data appear Lognormal at 5% Significance Level**			
571				
572	**Lognormal ROS Statistics Using Imputed Non-Detects**			

	A	B	C	D	E	F	G	H	I	J	K	L
573					Mean in Original Scale	0.179					Mean in Log Scale	-3.238
574					SD in Original Scale	0.304					SD in Log Scale	1.939
575					95% t UCL (assumes normality of ROS data)	0.355					95% Percentile Bootstrap UCL	0.351
576					95% BCA Bootstrap UCL	0.389					95% Bootstrap t UCL	0.915
577					95% H-UCL (Log ROS)	7.646						
578												
579	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
580					KM Mean (logged)	-2.866					KM Geo Mean	0.0569
581					KM SD (logged)	1.513					95% Critical H Value (KM-Log)	4.237
582					KM Standard Error of Mean (logged)	0.578					95% H-UCL (KM -Log)	1.515
583					KM SD (logged)	1.513					95% Critical H Value (KM-Log)	4.237
584					KM Standard Error of Mean (logged)	0.578						
585												
586	**DL/2 Statistics**											
587	**DL/2 Normal**						**DL/2 Log-Transformed**					
588					Mean in Original Scale	0.194					Mean in Log Scale	-2.62
589					SD in Original Scale	0.295					SD in Log Scale	1.497
590					95% t UCL (Assumes normality)	0.365					95% H-Stat UCL	1.818
591	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
592												
593	**Nonparametric Distribution Free UCL Statistics**											
594	**Detected Data appear Normal Distributed at 5% Significance Level**											
595												
596	**Suggested UCL to Use**											
597					95% KM (t) UCL	0.37						
598												
599	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
600	Recommendations are based upon data size, data distribution, and skewness.											
601	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
602	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
603												
604	**Benzo[a]pyrene**											
605												
606	**General Statistics**											
607					Total Number of Observations	10					Number of Distinct Observations	9
608					Number of Detects	6					Number of Non-Detects	4
609					Number of Distinct Detects	6					Number of Distinct Non-Detects	3
610					Minimum Detect	0.0224					Minimum Non-Detect	0.0137
611					Maximum Detect	0.969					Maximum Non-Detect	0.121
612					Variance Detects	0.173					Percent Non-Detects	40%
613					Mean Detects	0.414					SD Detects	0.416
614					Median Detects	0.258					CV Detects	1.003
615					Skewness Detects	0.658					Kurtosis Detects	-1.956
616					Mean of Logged Detects	-1.549					SD of Logged Detects	1.458
617												
618	**Normal GOF Test on Detects Only**											
619					Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**					
620					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level					
621					Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**					
622					5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level					
623	**Detected Data appear Normal at 5% Significance Level**											
624												

	A–E	F	G–K	L
625	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
626	KM Mean	0.263	KM Standard Error of Mean	0.121
627	KM SD	0.348	95% KM (BCA) UCL	0.442
628	95% KM (t) UCL	0.485	95% KM (Percentile Bootstrap) UCL	0.451
629	95% KM (z) UCL	0.462	95% KM Bootstrap t UCL	0.731
630	90% KM Chebyshev UCL	0.626	95% KM Chebyshev UCL	0.791
631	97.5% KM Chebyshev UCL	1.019	99% KM Chebyshev UCL	1.467
632				
633	**Gamma GOF Tests on Detected Observations Only**			
634	A-D Test Statistic	0.308	**Anderson-Darling GOF Test**	
635	5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level	
636	K-S Test Statistic	0.208	**Kolmogorov-Smirnov GOF**	
637	5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level	
638	**Detected data appear Gamma Distributed at 5% Significance Level**			
639				
640	**Gamma Statistics on Detected Data Only**			
641	k hat (MLE)	0.878	k star (bias corrected MLE)	0.55
642	Theta hat (MLE)	0.472	Theta star (bias corrected MLE)	0.753
643	nu hat (MLE)	10.53	nu star (bias corrected)	6.601
644	Mean (detects)	0.414		
645				
646	**Gamma ROS Statistics using Imputed Non-Detects**			
647	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
648	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
649	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
650	This is especially true when the sample size is small.			
651	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
652	Minimum	0.01	Mean	0.253
653	Maximum	0.969	Median	0.0597
654	SD	0.374	CV	1.479
655	k hat (MLE)	0.461	k star (bias corrected MLE)	0.389
656	Theta hat (MLE)	0.548	Theta star (bias corrected MLE)	0.649
657	nu hat (MLE)	9.219	nu star (bias corrected)	7.787
658	Adjusted Level of Significance (β)	0.0267		
659	Approximate Chi Square Value (7.79, α)	2.612	Adjusted Chi Square Value (7.79, β)	2.121
660	95% Gamma Approximate UCL (use when n>=50)	0.753	95% Gamma Adjusted UCL (use when n<50)	0.927
661				
662	**Estimates of Gamma Parameters using KM Estimates**			
663	Mean (KM)	0.263	SD (KM)	0.348
664	Variance (KM)	0.121	SE of Mean (KM)	0.121
665	k hat (KM)	0.572	k star (KM)	0.467
666	nu hat (KM)	11.44	nu star (KM)	9.343
667	theta hat (KM)	0.46	theta star (KM)	0.564
668	80% gamma percentile (KM)	0.431	90% gamma percentile (KM)	0.722
669	95% gamma percentile (KM)	1.036	99% gamma percentile (KM)	1.813
670				
671	**Gamma Kaplan-Meier (KM) Statistics**			
672	Approximate Chi Square Value (9.34, α)	3.536	Adjusted Chi Square Value (9.34, β)	2.943
673	95% Gamma Approximate KM-UCL (use when n>=50)	0.696	95% Gamma Adjusted KM-UCL (use when n<50)	0.836
674				
675	**Lognormal GOF Test on Detected Observations Only**			
676	Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**	

5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.257	Mean in Log Scale	-2.568
SD in Original Scale	0.37	SD in Log Scale	1.785
95% t UCL (assumes normality of ROS data)	0.472	95% Percentile Bootstrap UCL	0.44
95% BCA Bootstrap UCL	0.504	95% Bootstrap t UCL	0.83
95% H-UCL (Log ROS)	6.881		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.401	KM Geo Mean	0.0907
KM SD (logged)	1.552	95% Critical H Value (KM-Log)	4.327
KM Standard Error of Mean (logged)	0.582	95% H-UCL (KM -Log)	2.833
KM SD (logged)	1.552	95% Critical H Value (KM-Log)	4.327
KM Standard Error of Mean (logged)	0.582		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.267	Mean in Log Scale	-2.276
SD in Original Scale	0.364	SD in Log Scale	1.565
95% t UCL (Assumes normality)	0.478	95% H-Stat UCL	3.395
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.485		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[b]fluoranthene			
General Statistics			
Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	7	Number of Non-Detects	3
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.0212	Minimum Non-Detect	0.113
Maximum Detect	1.32	Maximum Non-Detect	0.121
Variance Detects	0.267	Percent Non-Detects	30%
Mean Detects	0.417	SD Detects	0.516
Median Detects	0.159	CV Detects	1.238
Skewness Detects	1.267	Kurtosis Detects	-0.0223
Mean of Logged Detects	-1.716	SD of Logged Detects	1.519
Normal GOF Test on Detects Only			

	A	B	C	D	E	F	G	H	I	J	K	L
729					Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**					
730					5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level					
731					Lilliefors Test Statistic	0.311	**Lilliefors GOF Test**					
732					5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level					
733	**Detected Data Not Normal at 5% Significance Level**											
734												
735	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
736					KM Mean	0.309					KM Standard Error of Mean	0.148
737					KM SD	0.433					95% KM (BCA) UCL	0.552
738					95% KM (t) UCL	0.581					95% KM (Percentile Bootstrap) UCL	0.554
739					95% KM (z) UCL	0.553					95% KM Bootstrap t UCL	1.392
740					90% KM Chebyshev UCL	0.754					95% KM Chebyshev UCL	0.955
741					97.5% KM Chebyshev UCL	1.235					99% KM Chebyshev UCL	1.784
742												
743	**Gamma GOF Tests on Detected Observations Only**											
744					A-D Test Statistic	0.313	**Anderson-Darling GOF Test**					
745					5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level					
746					K-S Test Statistic	0.184	**Kolmogorov-Smirnov GOF**					
747					5% K-S Critical Value	0.323	Detected data appear Gamma Distributed at 5% Significance Level					
748	**Detected data appear Gamma Distributed at 5% Significance Level**											
749												
750	**Gamma Statistics on Detected Data Only**											
751					k hat (MLE)	0.716					k star (bias corrected MLE)	0.505
752					Theta hat (MLE)	0.582					Theta star (bias corrected MLE)	0.826
753					nu hat (MLE)	10.03					nu star (bias corrected)	7.064
754					Mean (detects)	0.417						
755												
756	**Gamma ROS Statistics using Imputed Non-Detects**											
757	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
758	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
759	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
760	This is especially true when the sample size is small.											
761	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
762					Minimum	0.01					Mean	0.298
763					Maximum	1.32					Median	0.0763
764					SD	0.463					CV	1.552
765					k hat (MLE)	0.516					k star (bias corrected MLE)	0.428
766					Theta hat (MLE)	0.578					Theta star (bias corrected MLE)	0.697
767					nu hat (MLE)	10.32					nu star (bias corrected)	8.56
768					Adjusted Level of Significance (β)	0.0267						
769					Approximate Chi Square Value (8.56, α)	3.063					Adjusted Chi Square Value (8.56, β)	2.521
770					95% Gamma Approximate UCL (use when n>=50)	0.833					95% Gamma Adjusted UCL (use when n<50)	1.013
771												
772	**Estimates of Gamma Parameters using KM Estimates**											
773					Mean (KM)	0.309					SD (KM)	0.433
774					Variance (KM)	0.187					SE of Mean (KM)	0.148
775					k hat (KM)	0.51					k star (KM)	0.424
776					nu hat (KM)	10.2					nu star (KM)	8.475
777					theta hat (KM)	0.606					theta star (KM)	0.73
778					80% gamma percentile (KM)	0.502					90% gamma percentile (KM)	0.864
779					95% gamma percentile (KM)	1.259					99% gamma percentile (KM)	2.247
780												

	A–E	F	G–K	L
781	**Gamma Kaplan-Meier (KM) Statistics**			
782	Approximate Chi Square Value (8.48, α)	3.013	Adjusted Chi Square Value (8.48, β)	2.476
783	95% Gamma Approximate KM-UCL (use when n>=50)	0.87	95% Gamma Adjusted KM-UCL (use when n<50)	1.059
784				
785	**Lognormal GOF Test on Detected Observations Only**			
786	Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**	
787	5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
788	Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**	
789	5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
790	**Detected Data appear Lognormal at 5% Significance Level**			
791				
792	**Lognormal ROS Statistics Using Imputed Non-Detects**			
793	Mean in Original Scale	0.307	Mean in Log Scale	-2.132
794	SD in Original Scale	0.458	SD in Log Scale	1.43
795	95% t UCL (assumes normality of ROS data)	0.572	95% Percentile Bootstrap UCL	0.556
796	95% BCA Bootstrap UCL	0.617	95% Bootstrap t UCL	1.516
797	95% H-UCL (Log ROS)	2.267		
798				
799	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
800	KM Mean (logged)	-2.12	KM Geo Mean	0.12
801	KM SD (logged)	1.378	95% Critical H Value (KM-Log)	3.926
802	KM Standard Error of Mean (logged)	0.503	95% H-UCL (KM -Log)	1.884
803	KM SD (logged)	1.378	95% Critical H Value (KM-Log)	3.926
804	KM Standard Error of Mean (logged)	0.503		
805				
806	**DL/2 Statistics**			
807	**DL/2 Normal**		**DL/2 Log-Transformed**	
808	Mean in Original Scale	0.31	Mean in Log Scale	-2.049
809	SD in Original Scale	0.456	SD in Log Scale	1.352
810	95% t UCL (Assumes normality)	0.574	95% H-Stat UCL	1.836
811	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
812				
813	**Nonparametric Distribution Free UCL Statistics**			
814	**Detected Data appear Gamma Distributed at 5% Significance Level**			
815				
816	**Suggested UCL to Use**			
817	95% KM Bootstrap t UCL	1.392	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	1.059
818				
819	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
820	Recommendations are based upon data size, data distribution, and skewness.			
821	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
822	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
823				
824	**Benzo[g,h,i]perylene**			
825				
826	**General Statistics**			
827	Total Number of Observations	10	Number of Distinct Observations	9
828	Number of Detects	6	Number of Non-Detects	4
829	Number of Distinct Detects	6	Number of Distinct Non-Detects	3
830	Minimum Detect	0.0289	Minimum Non-Detect	0.0137
831	Maximum Detect	0.918	Maximum Non-Detect	0.121
832	Variance Detects	0.118	Percent Non-Detects	40%

	A–E	F	G–K	L
833	Mean Detects	0.369	SD Detects	0.343
834	Median Detects	0.258	CV Detects	0.93
835	Skewness Detects	0.938	Kurtosis Detects	-0.422
836	Mean of Logged Detects	-1.505	SD of Logged Detects	1.259
837				
838	**Normal GOF Test on Detects Only**			
839	Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**	
840	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
841	Lilliefors Test Statistic	0.281	**Lilliefors GOF Test**	
842	5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
843	**Detected Data appear Normal at 5% Significance Level**			
844				
845	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
846	KM Mean	0.238	KM Standard Error of Mean	0.102
847	KM SD	0.292	95% KM (BCA) UCL	0.419
848	95% KM (t) UCL	0.424	95% KM (Percentile Bootstrap) UCL	0.397
849	95% KM (z) UCL	0.405	95% KM Bootstrap t UCL	0.617
850	90% KM Chebyshev UCL	0.543	95% KM Chebyshev UCL	0.681
851	97.5% KM Chebyshev UCL	0.873	99% KM Chebyshev UCL	1.25
852				
853	**Gamma GOF Tests on Detected Observations Only**			
854	A-D Test Statistic	0.208	**Anderson-Darling GOF Test**	
855	5% A-D Critical Value	0.713	Detected data appear Gamma Distributed at 5% Significance Level	
856	K-S Test Statistic	0.164	**Kolmogorov-Smirnov GOF**	
857	5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level	
858	**Detected data appear Gamma Distributed at 5% Significance Level**			
859				
860	**Gamma Statistics on Detected Data Only**			
861	k hat (MLE)	1.121	k star (bias corrected MLE)	0.672
862	Theta hat (MLE)	0.329	Theta star (bias corrected MLE)	0.549
863	nu hat (MLE)	13.45	nu star (bias corrected)	8.059
864	Mean (detects)	0.369		
865				
866	**Gamma ROS Statistics using Imputed Non-Detects**			
867	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
868	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
869	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
870	This is especially true when the sample size is small.			
871	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
872	Minimum	0.01	Mean	0.226
873	Maximum	0.918	Median	0.067
874	SD	0.315	CV	1.391
875	k hat (MLE)	0.53	k star (bias corrected MLE)	0.437
876	Theta hat (MLE)	0.428	Theta star (bias corrected MLE)	0.518
877	nu hat (MLE)	10.59	nu star (bias corrected)	8.747
878	Adjusted Level of Significance (β)	0.0267		
879	Approximate Chi Square Value (8.75, α)	3.175	Adjusted Chi Square Value (8.75, β)	2.62
880	95% Gamma Approximate UCL (use when n>=50)	0.624	95% Gamma Adjusted UCL (use when n<50)	0.756
881				
882	**Estimates of Gamma Parameters using KM Estimates**			
883	Mean (KM)	0.238	SD (KM)	0.292
884	Variance (KM)	0.0853	SE of Mean (KM)	0.102

	A	B	C	D	E	F	G	H	I	J	K	L
885					k hat (KM)	0.661					k star (KM)	0.529
886					nu hat (KM)	13.22					nu star (KM)	10.59
887					theta hat (KM)	0.359					theta star (KM)	0.449
888					80% gamma percentile (KM)	0.391					90% gamma percentile (KM)	0.635
889					95% gamma percentile (KM)	0.894					99% gamma percentile (KM)	1.528
890												
891	**Gamma Kaplan-Meier (KM) Statistics**											
892					Approximate Chi Square Value (10.59, α)	4.313					Adjusted Chi Square Value (10.59, β)	3.643
893					95% Gamma Approximate KM-UCL (use when n>=50)	0.583					95% Gamma Adjusted KM-UCL (use when n<50)	0.69
894												
895	**Lognormal GOF Test on Detected Observations Only**											
896					Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**					
897					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level					
898					Lilliefors Test Statistic	0.201	**Lilliefors GOF Test**					
899					5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level					
900	**Detected Data appear Lognormal at 5% Significance Level**											
901												
902	**Lognormal ROS Statistics Using Imputed Non-Detects**											
903					Mean in Original Scale	0.233					Mean in Log Scale	-2.399
904					SD in Original Scale	0.31					SD in Log Scale	1.557
905					95% t UCL (assumes normality of ROS data)	0.413					95% Percentile Bootstrap UCL	0.396
906					95% BCA Bootstrap UCL	0.454					95% Bootstrap t UCL	0.679
907					95% H-UCL (Log ROS)	2.899						
908												
909	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
910					KM Mean (logged)	-2.341					KM Geo Mean	0.0962
911					KM SD (logged)	1.455					95% Critical H Value (KM-Log)	4.102
912					KM Standard Error of Mean (logged)	0.552					95% H-UCL (KM -Log)	2.027
913					KM SD (logged)	1.455					95% Critical H Value (KM-Log)	4.102
914					KM Standard Error of Mean (logged)	0.552						
915												
916	**DL/2 Statistics**											
917	**DL/2 Normal**						**DL/2 Log-Transformed**					
918					Mean in Original Scale	0.24					Mean in Log Scale	-2.25
919					SD in Original Scale	0.306					SD in Log Scale	1.48
920					95% t UCL (Assumes normality)	0.417					95% H-Stat UCL	2.459
921	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
922												
923	**Nonparametric Distribution Free UCL Statistics**											
924	**Detected Data appear Normal Distributed at 5% Significance Level**											
925												
926	**Suggested UCL to Use**											
927					95% KM (t) UCL	0.424						
928												
929	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
930	Recommendations are based upon data size, data distribution, and skewness.											
931	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
932	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
933												
934	**Benzo[k]fluoranthene**											
935												
936	**General Statistics**											

	A–E	F	G–K	L
937	Total Number of Observations	10	Number of Distinct Observations	9
938	Number of Detects	4	Number of Non-Detects	6
939	Number of Distinct Detects	4	Number of Distinct Non-Detects	5
940	Minimum Detect	0.0441	Minimum Non-Detect	0.0126
941	Maximum Detect	0.409	Maximum Non-Detect	0.121
942	Variance Detects	0.0324	Percent Non-Detects	60%
943	Mean Detects	0.237	SD Detects	0.18
944	Median Detects	0.247	CV Detects	0.76
945	Skewness Detects	-0.127	Kurtosis Detects	-4.826
946	Mean of Logged Detects	-1.774	SD of Logged Detects	1.048
947				
948	**Normal GOF Test on Detects Only**			
949	Shapiro Wilk Test Statistic	0.877	**Shapiro Wilk GOF Test**	
950	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
951	Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**	
952	5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
953	**Detected Data appear Normal at 5% Significance Level**			
954				
955	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
956	KM Mean	0.106	KM Standard Error of Mean	0.0534
957	KM SD	0.145	95% KM (BCA) UCL	N/A
958	95% KM (t) UCL	0.204	95% KM (Percentile Bootstrap) UCL	N/A
959	95% KM (z) UCL	0.194	95% KM Bootstrap t UCL	N/A
960	90% KM Chebyshev UCL	0.267	95% KM Chebyshev UCL	0.339
961	97.5% KM Chebyshev UCL	0.44	99% KM Chebyshev UCL	0.637
962				
963	**Gamma GOF Tests on Detected Observations Only**			
964	A-D Test Statistic	0.38	**Anderson-Darling GOF Test**	
965	5% A-D Critical Value	0.662	Detected data appear Gamma Distributed at 5% Significance Level	
966	K-S Test Statistic	0.308	**Kolmogorov-Smirnov GOF**	
967	5% K-S Critical Value	0.399	Detected data appear Gamma Distributed at 5% Significance Level	
968	**Detected data appear Gamma Distributed at 5% Significance Level**			
969				
970	**Gamma Statistics on Detected Data Only**			
971	k hat (MLE)	1.646	k star (bias corrected MLE)	0.578
972	Theta hat (MLE)	0.144	Theta star (bias corrected MLE)	0.41
973	nu hat (MLE)	13.17	nu star (bias corrected)	4.625
974	Mean (detects)	0.237		
975				
976	**Gamma ROS Statistics using Imputed Non-Detects**			
977	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
978	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
979	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
980	This is especially true when the sample size is small.			
981	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
982	Minimum	0.01	Mean	0.101
983	Maximum	0.409	Median	0.01
984	SD	0.157	CV	1.555
985	k hat (MLE)	0.534	k star (bias corrected MLE)	0.441
986	Theta hat (MLE)	0.189	Theta star (bias corrected MLE)	0.229
987	nu hat (MLE)	10.68	nu star (bias corrected)	8.81
988	Adjusted Level of Significance (β)	0.0267		

	A	B	C	D	E	F	G	H	I	J	K	L
989					Approximate Chi Square Value (8.81, α)	3.213					Adjusted Chi Square Value (8.81, β)	2.654
990					95% Gamma Approximate UCL (use when n>=50)	0.276					95% Gamma Adjusted UCL (use when n<50)	N/A
991												
992	**Estimates of Gamma Parameters using KM Estimates**											
993					Mean (KM)	0.106					SD (KM)	0.145
994					Variance (KM)	0.0211					SE of Mean (KM)	0.0534
995					k hat (KM)	0.536					k star (KM)	0.442
996					nu hat (KM)	10.72					nu star (KM)	8.838
997					theta hat (KM)	0.199					theta star (KM)	0.241
998					80% gamma percentile (KM)	0.174					90% gamma percentile (KM)	0.295
999					95% gamma percentile (KM)	0.427					99% gamma percentile (KM)	0.756
1000												
1001	**Gamma Kaplan-Meier (KM) Statistics**											
1002					Approximate Chi Square Value (8.84, α)	3.229					Adjusted Chi Square Value (8.84, β)	2.668
1003					95% Gamma Approximate KM-UCL (use when n>=50)	0.291					95% Gamma Adjusted KM-UCL (use when n<50)	0.353
1004												
1005	**Lognormal GOF Test on Detected Observations Only**											
1006					Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**					
1007					5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level					
1008					Lilliefors Test Statistic	0.272	**Lilliefors GOF Test**					
1009					5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level					
1010	**Detected Data appear Lognormal at 5% Significance Level**											
1011												
1012	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1013					Mean in Original Scale	0.103					Mean in Log Scale	-3.369
1014					SD in Original Scale	0.155					SD in Log Scale	1.549
1015					95% t UCL (assumes normality of ROS data)	0.193					95% Percentile Bootstrap UCL	0.182
1016					95% BCA Bootstrap UCL	0.208					95% Bootstrap t UCL	0.424
1017					95% H-UCL (Log ROS)	1.064						
1018												
1019	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1020					KM Mean (logged)	-3.167					KM Geo Mean	0.0421
1021					KM SD (logged)	1.336					95% Critical H Value (KM-Log)	3.831
1022					KM Standard Error of Mean (logged)	0.531					95% H-UCL (KM -Log)	0.567
1023					KM SD (logged)	1.336					95% Critical H Value (KM-Log)	3.831
1024					KM Standard Error of Mean (logged)	0.531						
1025												
1026	**DL/2 Statistics**											
1027	**DL/2 Normal**						**DL/2 Log-Transformed**					
1028					Mean in Original Scale	0.117					Mean in Log Scale	-2.905
1029					SD in Original Scale	0.148					SD in Log Scale	1.402
1030					95% t UCL (Assumes normality)	0.203					95% H-Stat UCL	0.94
1031	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1032												
1033	**Nonparametric Distribution Free UCL Statistics**											
1034	**Detected Data appear Normal Distributed at 5% Significance Level**											
1035												
1036	**Suggested UCL to Use**											
1037					95% KM (t) UCL	0.204						
1038												
1039	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1040	Recommendations are based upon data size, data distribution, and skewness.											

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics			
Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	5	Number of Non-Detects	5
Number of Distinct Detects	5	Number of Distinct Non-Detects	4
Minimum Detect	0.034	Minimum Non-Detect	0.0137
Maximum Detect	1.15	Maximum Non-Detect	0.121
Variance Detects	0.24	Percent Non-Detects	50%
Mean Detects	0.444	SD Detects	0.49
Median Detects	0.196	CV Detects	1.103
Skewness Detects	0.889	Kurtosis Detects	-1.32
Mean of Logged Detects	-1.532	SD of Logged Detects	1.481
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.237	KM Standard Error of Mean	0.132
KM SD	0.373	95% KM (BCA) UCL	0.468
95% KM (t) UCL	0.479	95% KM (Percentile Bootstrap) UCL	0.456
95% KM (z) UCL	0.454	95% KM Bootstrap t UCL	1.15
90% KM Chebyshev UCL	0.633	95% KM Chebyshev UCL	0.813
97.5% KM Chebyshev UCL	1.062	99% KM Chebyshev UCL	1.551
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.297	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.696	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.366	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.821	k star (bias corrected MLE)	0.462
Theta hat (MLE)	0.541	Theta star (bias corrected MLE)	0.962
nu hat (MLE)	8.207	nu star (bias corrected)	4.616
Mean (detects)	0.444		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.227

	A	B	C	D	E	F	G	H	I	J	K	L
1093					Maximum	1.15					Median	0.022
1094					SD	0.399					CV	1.756
1095					k hat (MLE)	0.413					k star (bias corrected MLE)	0.356
1096					Theta hat (MLE)	0.55					Theta star (bias corrected MLE)	0.639
1097					nu hat (MLE)	8.255					nu star (bias corrected)	7.112
1098					Adjusted Level of Significance (β)	0.0267						
1099					Approximate Chi Square Value (7.11, α)	2.232					Adjusted Chi Square Value (7.11, β)	1.788
1100					95% Gamma Approximate UCL (use when n>=50)	0.724					95% Gamma Adjusted UCL (use when n<50)	0.903
1101												
1102	Estimates of Gamma Parameters using KM Estimates											
1103					Mean (KM)	0.237					SD (KM)	0.373
1104					Variance (KM)	0.139					SE of Mean (KM)	0.132
1105					k hat (KM)	0.405					k star (KM)	0.35
1106					nu hat (KM)	8.097					nu star (KM)	7.001
1107					theta hat (KM)	0.586					theta star (KM)	0.678
1108					80% gamma percentile (KM)	0.376					90% gamma percentile (KM)	0.685
1109					95% gamma percentile (KM)	1.032					99% gamma percentile (KM)	1.916
1110												
1111	Gamma Kaplan-Meier (KM) Statistics											
1112					Approximate Chi Square Value (7.00, α)	2.171					Adjusted Chi Square Value (7.00, β)	1.735
1113					95% Gamma Approximate KM-UCL (use when n>=50)	0.765					95% Gamma Adjusted KM-UCL (use when n<50)	0.958
1114												
1115	Lognormal GOF Test on Detected Observations Only											
1116					Shapiro Wilk Test Statistic	0.946	Shapiro Wilk GOF Test					
1117					5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level					
1118					Lilliefors Test Statistic	0.202	Lilliefors GOF Test					
1119					5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level					
1120	Detected Data appear Lognormal at 5% Significance Level											
1121												
1122	Lognormal ROS Statistics Using Imputed Non-Detects											
1123					Mean in Original Scale	0.231					Mean in Log Scale	-2.889
1124					SD in Original Scale	0.396					SD in Log Scale	1.827
1125					95% t UCL (assumes normality of ROS data)	0.461					95% Percentile Bootstrap UCL	0.45
1126					95% BCA Bootstrap UCL	0.523					95% Bootstrap t UCL	1.51
1127					95% H-UCL (Log ROS)	6.131						
1128												
1129	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1130					KM Mean (logged)	-2.631					KM Geo Mean	0.072
1131					KM SD (logged)	1.515					95% Critical H Value (KM-Log)	4.242
1132					KM Standard Error of Mean (logged)	0.575					95% H-UCL (KM -Log)	1.936
1133					KM SD (logged)	1.515					95% Critical H Value (KM-Log)	4.242
1134					KM Standard Error of Mean (logged)	0.575						
1135												
1136	DL/2 Statistics											
1137	DL/2 Normal						DL/2 Log-Transformed					
1138					Mean in Original Scale	0.244					Mean in Log Scale	-2.455
1139					SD in Original Scale	0.389					SD in Log Scale	1.519
1140					95% t UCL (Assumes normality)	0.469					95% H-Stat UCL	2.345
1141	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1142												
1143	Nonparametric Distribution Free UCL Statistics											
1144	Detected Data appear Normal Distributed at 5% Significance Level											

Suggested UCL to Use

95% KM (t) UCL	0.479

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	3	Number of Non-Detects	7
Number of Distinct Detects	3	Number of Distinct Non-Detects	6
Minimum Detect	0.0337	Minimum Non-Detect	0.0126
Maximum Detect	0.185	Maximum Non-Detect	0.121
Variance Detects	0.00661	Percent Non-Detects	70%
Mean Detects	0.127	SD Detects	0.0813
Median Detects	0.161	CV Detects	0.642
Skewness Detects	-1.564	Kurtosis Detects	N/A
Mean of Logged Detects	-2.301	SD of Logged Detects	0.946

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.865	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0503	KM Standard Error of Mean	0.0245
KM SD	0.0622	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0952	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0906	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.124	95% KM Chebyshev UCL	0.157
97.5% KM Chebyshev UCL	0.203	99% KM Chebyshev UCL	0.294

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.286	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0554	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	13.72	nu star (bias corrected)	N/A
Mean (detects)	0.127		

Gamma ROS Statistics using Imputed Non-Detects

	A	B	C	D	E	F	G	H	I	J	K	L
1197	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1198	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1199	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1200	This is especially true when the sample size is small.											
1201	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1202	Minimum					0.01	Mean					0.045
1203	Maximum					0.185	Median					0.01
1204	SD					0.0681	CV					1.515
1205	k hat (MLE)					0.739	k star (bias corrected MLE)					0.584
1206	Theta hat (MLE)					0.0609	Theta star (bias corrected MLE)					0.0771
1207	nu hat (MLE)					14.77	nu star (bias corrected)					11.67
1208	Adjusted Level of Significance (β)					0.0267						
1209	Approximate Chi Square Value (11.67, α)					5.012	Adjusted Chi Square Value (11.67, β)					4.279
1210	95% Gamma Approximate UCL (use when n>=50)					0.105	95% Gamma Adjusted UCL (use when n<50)					N/A
1211												
1212	**Estimates of Gamma Parameters using KM Estimates**											
1213	Mean (KM)					0.0503	SD (KM)					0.0622
1214	Variance (KM)					0.00387	SE of Mean (KM)					0.0245
1215	k hat (KM)					0.654	k star (KM)					0.524
1216	nu hat (KM)					13.07	nu star (KM)					10.49
1217	theta hat (KM)					0.077	theta star (KM)					0.096
1218	80% gamma percentile (KM)					0.0828	90% gamma percentile (KM)					0.135
1219	95% gamma percentile (KM)					0.19	99% gamma percentile (KM)					0.325
1220												
1221	**Gamma Kaplan-Meier (KM) Statistics**											
1222	Approximate Chi Square Value (10.49, α)					4.247	Adjusted Chi Square Value (10.49, β)					3.584
1223	95% Gamma Approximate KM-UCL (use when n>=50)					0.124	95% Gamma Adjusted KM-UCL (use when n<50)					0.147
1224												
1225	**Lognormal GOF Test on Detected Observations Only**											
1226	Shapiro Wilk Test Statistic					0.811	**Shapiro Wilk GOF Test**					
1227	5% Shapiro Wilk Critical Value					0.767	Detected Data appear Lognormal at 5% Significance Level					
1228	Lilliefors Test Statistic					0.359	**Lilliefors GOF Test**					
1229	5% Lilliefors Critical Value					0.425	Detected Data appear Lognormal at 5% Significance Level					
1230	**Detected Data appear Lognormal at 5% Significance Level**											
1231												
1232	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1233	Mean in Original Scale					0.0457	Mean in Log Scale					-3.912
1234	SD in Original Scale					0.0679	SD in Log Scale					1.253
1235	95% t UCL (assumes normality of ROS data)					0.085	95% Percentile Bootstrap UCL					0.0797
1236	95% BCA Bootstrap UCL					0.0915	95% Bootstrap t UCL					0.304
1237	95% H-UCL (Log ROS)					0.201						
1238												
1239	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1240	KM Mean (logged)					-3.588	KM Geo Mean					0.0276
1241	KM SD (logged)					1.006	95% Critical H Value (KM-Log)					3.115
1242	KM Standard Error of Mean (logged)					0.441	95% H-UCL (KM -Log)					0.13
1243	KM SD (logged)					1.006	95% Critical H Value (KM-Log)					3.115
1244	KM Standard Error of Mean (logged)					0.441						
1245												
1246	**DL/2 Statistics**											
1247	**DL/2 Normal**						**DL/2 Log-Transformed**					
1248	Mean in Original Scale					0.0663	Mean in Log Scale					-3.168

	A–E	F	G–K	L
1249	SD in Original Scale	0.0602	SD in Log Scale	1.129
1250	95% t UCL (Assumes normality)	0.101	95% H-Stat UCL	0.284
1251	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1252				
1253	**Nonparametric Distribution Free UCL Statistics**			
1254	**Detected Data appear Normal Distributed at 5% Significance Level**			
1255				
1256	**Suggested UCL to Use**			
1257	95% KM (t) UCL	0.0952		
1258				
1259	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1260	Recommendations are based upon data size, data distribution, and skewness.			
1261	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1262	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1263				
1264	**Fluoranthene**			
1265				
1266	**General Statistics**			
1267	Total Number of Observations	10	Number of Distinct Observations	9
1268	Number of Detects	5	Number of Non-Detects	5
1269	Number of Distinct Detects	5	Number of Distinct Non-Detects	4
1270	Minimum Detect	0.0373	Minimum Non-Detect	0.0137
1271	Maximum Detect	1.16	Maximum Non-Detect	0.121
1272	Variance Detects	0.227	Percent Non-Detects	50%
1273	Mean Detects	0.429	SD Detects	0.477
1274	Median Detects	0.233	CV Detects	1.11
1275	Skewness Detects	1.095	Kurtosis Detects	-0.0022
1276	Mean of Logged Detects	-1.553	SD of Logged Detects	1.466
1277				
1278	**Normal GOF Test on Detects Only**			
1279	Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk GOF Test**	
1280	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
1281	Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
1282	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
1283	**Detected Data appear Normal at 5% Significance Level**			
1284				
1285	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1286	KM Mean	0.231	KM Standard Error of Mean	0.128
1287	KM SD	0.361	95% KM (BCA) UCL	0.451
1288	95% KM (t) UCL	0.466	95% KM (Percentile Bootstrap) UCL	0.442
1289	95% KM (z) UCL	0.442	95% KM Bootstrap t UCL	0.877
1290	90% KM Chebyshev UCL	0.615	95% KM Chebyshev UCL	0.789
1291	97.5% KM Chebyshev UCL	1.03	99% KM Chebyshev UCL	1.503
1292				
1293	**Gamma GOF Tests on Detected Observations Only**			
1294	A-D Test Statistic	0.271	**Anderson-Darling GOF Test**	
1295	5% A-D Critical Value	0.696	Detected data appear Gamma Distributed at 5% Significance Level	
1296	K-S Test Statistic	0.222	**Kolmogorov-Smirnov GOF**	
1297	5% K-S Critical Value	0.366	Detected data appear Gamma Distributed at 5% Significance Level	
1298	**Detected data appear Gamma Distributed at 5% Significance Level**			
1299				
1300	**Gamma Statistics on Detected Data Only**			

1301	k hat (MLE)	0.834	k star (bias corrected MLE)	0.467
1302	Theta hat (MLE)	0.515	Theta star (bias corrected MLE)	0.919
1303	nu hat (MLE)	8.341	nu star (bias corrected)	4.67
1304	Mean (detects)	0.429		
1305				
1306	**Gamma ROS Statistics using Imputed Non-Detects**			
1307	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1308	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1309	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1310	This is especially true when the sample size is small.			
1311	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1312	Minimum	0.01	Mean	0.22
1313	Maximum	1.16	Median	0.0237
1314	SD	0.387	CV	1.762
1315	k hat (MLE)	0.418	k star (bias corrected MLE)	0.359
1316	Theta hat (MLE)	0.526	Theta star (bias corrected MLE)	0.612
1317	nu hat (MLE)	8.358	nu star (bias corrected)	7.184
1318	Adjusted Level of Significance (β)	0.0267		
1319	Approximate Chi Square Value (7.18, α)	2.272	Adjusted Chi Square Value (7.18, β)	1.823
1320	95% Gamma Approximate UCL (use when n>=50)	0.695	95% Gamma Adjusted UCL (use when n<50)	0.866
1321				
1322	**Estimates of Gamma Parameters using KM Estimates**			
1323	Mean (KM)	0.231	SD (KM)	0.361
1324	Variance (KM)	0.13	SE of Mean (KM)	0.128
1325	k hat (KM)	0.411	k star (KM)	0.355
1326	nu hat (KM)	8.224	nu star (KM)	7.09
1327	theta hat (KM)	0.563	theta star (KM)	0.653
1328	80% gamma percentile (KM)	0.367	90% gamma percentile (KM)	0.667
1329	95% gamma percentile (KM)	1.002	99% gamma percentile (KM)	1.856
1330				
1331	**Gamma Kaplan-Meier (KM) Statistics**			
1332	Approximate Chi Square Value (7.09, α)	2.22	Adjusted Chi Square Value (7.09, β)	1.778
1333	95% Gamma Approximate KM-UCL (use when n>=50)	0.739	95% Gamma Adjusted KM-UCL (use when n<50)	0.923
1334				
1335	**Lognormal GOF Test on Detected Observations Only**			
1336	Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**	
1337	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
1338	Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
1339	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
1340	**Detected Data appear Lognormal at 5% Significance Level**			
1341				
1342	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1343	Mean in Original Scale	0.227	Mean in Log Scale	-2.773
1344	SD in Original Scale	0.383	SD in Log Scale	1.719
1345	95% t UCL (assumes normality of ROS data)	0.449	95% Percentile Bootstrap UCL	0.434
1346	95% BCA Bootstrap UCL	0.509	95% Bootstrap t UCL	1.243
1347	95% H-UCL (Log ROS)	4.096		
1348				
1349	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1350	KM Mean (logged)	-2.582	KM Geo Mean	0.0756
1351	KM SD (logged)	1.463	95% Critical H Value (KM-Log)	4.12
1352	KM Standard Error of Mean (logged)	0.562	95% H-UCL (KM -Log)	1.644

KM SD (logged)	1.463	95% Critical H Value (KM-Log)	4.12
KM Standard Error of Mean (logged)	0.562		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.236	Mean in Log Scale	-2.465
SD in Original Scale	0.378	SD in Log Scale	1.506
95% t UCL (Assumes normality)	0.455	95% H-Stat UCL	2.195
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.466		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Indeno[1,2,3-cd]pyrene			
General Statistics			
Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	6	Number of Non-Detects	4
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.0301	Minimum Non-Detect	0.0137
Maximum Detect	0.832	Maximum Non-Detect	0.121
Variance Detects	0.113	Percent Non-Detects	40%
Mean Detects	0.352	SD Detects	0.336
Median Detects	0.233	CV Detects	0.953
Skewness Detects	0.765	Kurtosis Detects	-1.546
Mean of Logged Detects	-1.583	SD of Logged Detects	1.274
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.225	KM Standard Error of Mean	0.0988
KM SD	0.284	95% KM (BCA) UCL	0.389
95% KM (t) UCL	0.406	95% KM (Percentile Bootstrap) UCL	0.392
95% KM (z) UCL	0.388	95% KM Bootstrap t UCL	0.643
90% KM Chebyshev UCL	0.522	95% KM Chebyshev UCL	0.656
97.5% KM Chebyshev UCL	0.842	99% KM Chebyshev UCL	1.208
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.249	**Anderson-Darling GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
1405					5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level					
1406					K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**					
1407					5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level					
1408	**Detected data appear Gamma Distributed at 5% Significance Level**											
1409												
1410	**Gamma Statistics on Detected Data Only**											
1411					k hat (MLE)	1.063					k star (bias corrected MLE)	0.643
1412					Theta hat (MLE)	0.331					Theta star (bias corrected MLE)	0.548
1413					nu hat (MLE)	12.76					nu star (bias corrected)	7.712
1414					Mean (detects)	0.352						
1415												
1416	**Gamma ROS Statistics using Imputed Non-Detects**											
1417	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1418	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1419	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1420	This is especially true when the sample size is small.											
1421	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1422					Minimum	0.01					Mean	0.216
1423					Maximum	0.832					Median	0.0553
1424					SD	0.306					CV	1.416
1425					k hat (MLE)	0.523					k star (bias corrected MLE)	0.433
1426					Theta hat (MLE)	0.413					Theta star (bias corrected MLE)	0.5
1427					nu hat (MLE)	10.45					nu star (bias corrected)	8.65
1428					Adjusted Level of Significance (β)	0.0267						
1429					Approximate Chi Square Value (8.65, α)	3.117					Adjusted Chi Square Value (8.65, β)	2.568
1430					95% Gamma Approximate UCL (use when n>=50)	0.6					95% Gamma Adjusted UCL (use when n<50)	0.728
1431												
1432	**Estimates of Gamma Parameters using KM Estimates**											
1433					Mean (KM)	0.225					SD (KM)	0.284
1434					Variance (KM)	0.0809					SE of Mean (KM)	0.0988
1435					k hat (KM)	0.627					k star (KM)	0.505
1436					nu hat (KM)	12.54					nu star (KM)	10.11
1437					theta hat (KM)	0.359					theta star (KM)	0.445
1438					80% gamma percentile (KM)	0.37					90% gamma percentile (KM)	0.608
1439					95% gamma percentile (KM)	0.862					99% gamma percentile (KM)	1.485
1440												
1441	**Gamma Kaplan-Meier (KM) Statistics**											
1442					Approximate Chi Square Value (10.11, α)	4.01					Adjusted Chi Square Value (10.11, β)	3.369
1443					95% Gamma Approximate KM-UCL (use when n>=50)	0.568					95% Gamma Adjusted KM-UCL (use when n<50)	0.676
1444												
1445	**Lognormal GOF Test on Detected Observations Only**											
1446					Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**					
1447					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level					
1448					Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**					
1449					5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level					
1450	**Detected Data appear Lognormal at 5% Significance Level**											
1451												
1452	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1453					Mean in Original Scale	0.222					Mean in Log Scale	-2.494
1454					SD in Original Scale	0.302					SD in Log Scale	1.584
1455					95% t UCL (assumes normality of ROS data)	0.397					95% Percentile Bootstrap UCL	0.379
1456					95% BCA Bootstrap UCL	0.416					95% Bootstrap t UCL	0.72

95% H-UCL (Log ROS)	2.956		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.41	KM Geo Mean	0.0898
KM SD (logged)	1.432	95% Critical H Value (KM-Log)	4.049
KM Standard Error of Mean (logged)	0.533	95% H-UCL (KM -Log)	1.731
KM SD (logged)	1.432	95% Critical H Value (KM-Log)	4.049
KM Standard Error of Mean (logged)	0.533		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.23	Mean in Log Scale	-2.296
SD in Original Scale	0.296	SD in Log Scale	1.462
95% t UCL (Assumes normality)	0.402	95% H-Stat UCL	2.185

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.406		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	2	Number of Non-Detects	8
Number of Distinct Detects	2	Number of Distinct Non-Detects	7
Minimum Detect	0.169	Minimum Non-Detect	0.0126
Maximum Detect	0.231	Maximum Non-Detect	0.122
Variance Detects	0.00192	Percent Non-Detects	80%
Mean Detects	0.2	SD Detects	0.0438
Median Detects	0.2	CV Detects	0.219
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.622	SD of Logged Detects	0.221

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0501	KM Standard Error of Mean	0.0341
KM SD	0.0762	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.113	95% KM (Percentile Bootstrap) UCL	N/A

	A–E	F	G–K	L
1509	95% KM (z) UCL	0.106	95% KM Bootstrap t UCL	N/A
1510	90% KM Chebyshev UCL	0.152	95% KM Chebyshev UCL	0.199
1511	97.5% KM Chebyshev UCL	0.263	99% KM Chebyshev UCL	0.389
1512				
1513	**Gamma GOF Tests on Detected Observations Only**			
1514	**Not Enough Data to Perform GOF Test**			
1515				
1516	**Gamma Statistics on Detected Data Only**			
1517	k hat (MLE)	41.29	k star (bias corrected MLE)	N/A
1518	Theta hat (MLE)	0.00484	Theta star (bias corrected MLE)	N/A
1519	nu hat (MLE)	165.1	nu star (bias corrected)	N/A
1520	Mean (detects)	0.2		
1521				
1522	**Estimates of Gamma Parameters using KM Estimates**			
1523	Mean (KM)	0.0501	SD (KM)	0.0762
1524	Variance (KM)	0.00581	SE of Mean (KM)	0.0341
1525	k hat (KM)	0.432	k star (KM)	0.369
1526	nu hat (KM)	8.632	nu star (KM)	7.375
1527	theta hat (KM)	0.116	theta star (KM)	0.136
1528	80% gamma percentile (KM)	0.08	90% gamma percentile (KM)	0.143
1529	95% gamma percentile (KM)	0.214	99% gamma percentile (KM)	0.393
1530				
1531	**Gamma Kaplan-Meier (KM) Statistics**			
1532			Adjusted Level of Significance (β)	0.0267
1533	Approximate Chi Square Value (7.38, α)	2.379	Adjusted Chi Square Value (7.38, β)	1.916
1534	95% Gamma Approximate KM-UCL (use when n>=50)	0.155	95% Gamma Adjusted KM-UCL (use when n<50)	0.193
1535				
1536	**Lognormal GOF Test on Detected Observations Only**			
1537	**Not Enough Data to Perform GOF Test**			
1538				
1539	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1540	Mean in Original Scale	0.0857	Mean in Log Scale	-2.623
1541	SD in Original Scale	0.0625	SD in Log Scale	0.549
1542	95% t UCL (assumes normality of ROS data)	0.122	95% Percentile Bootstrap UCL	0.118
1543	95% BCA Bootstrap UCL	0.127	95% Bootstrap t UCL	0.3
1544	95% H-UCL (Log ROS)	0.128		
1545				
1546	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1547	KM Mean (logged)	-3.824	KM Geo Mean	0.0218
1548	KM SD (logged)	1.103	95% Critical H Value (KM-Log)	3.318
1549	KM Standard Error of Mean (logged)	0.493	95% H-UCL (KM -Log)	0.136
1550	KM SD (logged)	1.103	95% Critical H Value (KM-Log)	3.318
1551	KM Standard Error of Mean (logged)	0.493		
1552				
1553	**DL/2 Statistics**			
1554	**DL/2 Normal**		**DL/2 Log-Transformed**	
1555	Mean in Original Scale	0.0761	Mean in Log Scale	-3.04
1556	SD in Original Scale	0.0702	SD in Log Scale	1.165
1557	95% t UCL (Assumes normality)	0.117	95% H-Stat UCL	0.36
1558	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1559				
1560	**Nonparametric Distribution Free UCL Statistics**			

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.113	KM H-UCL	0.136
95% KM (BCA) UCL	N/A		

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	5	Number of Non-Detects	5
Number of Distinct Detects	5	Number of Distinct Non-Detects	4
Minimum Detect	0.0223	Minimum Non-Detect	0.0137
Maximum Detect	0.72	Maximum Non-Detect	0.121
Variance Detects	0.1	Percent Non-Detects	50%
Mean Detects	0.303	SD Detects	0.316
Median Detects	0.135	CV Detects	1.042
Skewness Detects	0.675	Kurtosis Detects	-2.449
Mean of Logged Detects	-1.856	SD of Logged Detects	1.441

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.165	KM Standard Error of Mean	0.0865
KM SD	0.244	95% KM (BCA) UCL	0.32
95% KM (t) UCL	0.323	95% KM (Percentile Bootstrap) UCL	0.306
95% KM (z) UCL	0.307	95% KM Bootstrap t UCL	0.703
90% KM Chebyshev UCL	0.424	95% KM Chebyshev UCL	0.542
97.5% KM Chebyshev UCL	0.705	99% KM Chebyshev UCL	1.025

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.319	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.695	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.365	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.884	k star (bias corrected MLE)	0.487
Theta hat (MLE)	0.343	Theta star (bias corrected MLE)	0.623
nu hat (MLE)	8.836	nu star (bias corrected)	4.868

	A–E	F	G–K	L
1613	Mean (detects)	0.303		
1614				
1615	**Gamma ROS Statistics using Imputed Non-Detects**			
1616	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1617	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1618	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1619	This is especially true when the sample size is small.			
1620	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1621	Minimum	0.01	Mean	0.157
1622	Maximum	0.72	Median	0.0162
1623	SD	0.261	CV	1.668
1624	k hat (MLE)	0.466	k star (bias corrected MLE)	0.393
1625	Theta hat (MLE)	0.336	Theta star (bias corrected MLE)	0.399
1626	nu hat (MLE)	9.327	nu star (bias corrected)	7.862
1627	Adjusted Level of Significance (β)	0.0267		
1628	Approximate Chi Square Value (7.86, α)	2.655	Adjusted Chi Square Value (7.86, β)	2.159
1629	95% Gamma Approximate UCL (use when n>=50)	0.464	95% Gamma Adjusted UCL (use when n<50)	0.57
1630				
1631	**Estimates of Gamma Parameters using KM Estimates**			
1632	Mean (KM)	0.165	SD (KM)	0.244
1633	Variance (KM)	0.0595	SE of Mean (KM)	0.0865
1634	k hat (KM)	0.456	k star (KM)	0.386
1635	nu hat (KM)	9.115	nu star (KM)	7.714
1636	theta hat (KM)	0.361	theta star (KM)	0.427
1637	80% gamma percentile (KM)	0.264	90% gamma percentile (KM)	0.468
1638	95% gamma percentile (KM)	0.693	99% gamma percentile (KM)	1.26
1639				
1640	**Gamma Kaplan-Meier (KM) Statistics**			
1641	Approximate Chi Square Value (7.71, α)	2.57	Adjusted Chi Square Value (7.71, β)	2.084
1642	95% Gamma Approximate KM-UCL (use when n>=50)	0.494	95% Gamma Adjusted KM-UCL (use when n<50)	0.609
1643				
1644	**Lognormal GOF Test on Detected Observations Only**			
1645	Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
1646	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
1647	Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**	
1648	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
1649	**Detected Data appear Lognormal at 5% Significance Level**			
1650				
1651	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1652	Mean in Original Scale	0.159	Mean in Log Scale	-3.171
1653	SD in Original Scale	0.26	SD in Log Scale	1.773
1654	95% t UCL (assumes normality of ROS data)	0.31	95% Percentile Bootstrap UCL	0.294
1655	95% BCA Bootstrap UCL	0.35	95% Bootstrap t UCL	0.946
1656	95% H-UCL (Log ROS)	3.553		
1657				
1658	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1659	KM Mean (logged)	-2.865	KM Geo Mean	0.057
1660	KM SD (logged)	1.422	95% Critical H Value (KM-Log)	4.026
1661	KM Standard Error of Mean (logged)	0.535	95% H-UCL (KM -Log)	1.056
1662	KM SD (logged)	1.422	95% Critical H Value (KM-Log)	4.026
1663	KM Standard Error of Mean (logged)	0.535		
1664				

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.173	Mean in Log Scale	-2.616
SD in Original Scale	0.252	SD in Log Scale	1.397
95% t UCL (Assumes normality)	0.319	95% H-Stat UCL	1.232

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.323		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pyrene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	6	Number of Non-Detects	4
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.0329	Minimum Non-Detect	0.0137
Maximum Detect	1.09	Maximum Non-Detect	0.121
Variance Detects	0.211	Percent Non-Detects	40%
Mean Detects	0.433	SD Detects	0.459
Median Detects	0.236	CV Detects	1.061
Skewness Detects	0.778	Kurtosis Detects	-1.663
Mean of Logged Detects	-1.523	SD of Logged Detects	1.41

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.829	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.279	KM Standard Error of Mean	0.131
KM SD	0.376	95% KM (BCA) UCL	0.49
95% KM (t) UCL	0.518	95% KM (Percentile Bootstrap) UCL	0.496
95% KM (z) UCL	0.493	95% KM Bootstrap t UCL	0.944
90% KM Chebyshev UCL	0.67	95% KM Chebyshev UCL	0.848
97.5% KM Chebyshev UCL	1.094	99% KM Chebyshev UCL	1.578

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.391	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.267	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level

1717	**Detected data appear Gamma Distributed at 5% Significance Level**			
1718				
1719	**Gamma Statistics on Detected Data Only**			
1720	k hat (MLE)	0.858	k star (bias corrected MLE)	0.54
1721	Theta hat (MLE)	0.504	Theta star (bias corrected MLE)	0.801
1722	nu hat (MLE)	10.3	nu star (bias corrected)	6.482
1723	Mean (detects)	0.433		
1724				
1725	**Gamma ROS Statistics using Imputed Non-Detects**			
1726	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1727	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1728	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1729	This is especially true when the sample size is small.			
1730	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1731	Minimum	0.01	Mean	0.271
1732	Maximum	1.09	Median	0.0891
1733	SD	0.401	CV	1.478
1734	k hat (MLE)	0.512	k star (bias corrected MLE)	0.425
1735	Theta hat (MLE)	0.53	Theta star (bias corrected MLE)	0.638
1736	nu hat (MLE)	10.25	nu star (bias corrected)	8.506
1737	Adjusted Level of Significance (β)	0.0267		
1738	Approximate Chi Square Value (8.51, α)	3.031	Adjusted Chi Square Value (8.51, β)	2.492
1739	95% Gamma Approximate UCL (use when n>=50)	0.761	95% Gamma Adjusted UCL (use when n<50)	0.926
1740				
1741	**Estimates of Gamma Parameters using KM Estimates**			
1742	Mean (KM)	0.279	SD (KM)	0.376
1743	Variance (KM)	0.141	SE of Mean (KM)	0.131
1744	k hat (KM)	0.548	k star (KM)	0.45
1745	nu hat (KM)	10.97	nu star (KM)	9.009
1746	theta hat (KM)	0.508	theta star (KM)	0.618
1747	80% gamma percentile (KM)	0.455	90% gamma percentile (KM)	0.77
1748	95% gamma percentile (KM)	1.11	99% gamma percentile (KM)	1.957
1749				
1750	**Gamma Kaplan-Meier (KM) Statistics**			
1751	Approximate Chi Square Value (9.01, α)	3.333	Adjusted Chi Square Value (9.01, β)	2.761
1752	95% Gamma Approximate KM-UCL (use when n>=50)	0.753	95% Gamma Adjusted KM-UCL (use when n<50)	0.909
1753				
1754	**Lognormal GOF Test on Detected Observations Only**			
1755	Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**	
1756	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
1757	Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**	
1758	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
1759	**Detected Data appear Lognormal at 5% Significance Level**			
1760				
1761	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1762	Mean in Original Scale	0.275	Mean in Log Scale	-2.337
1763	SD in Original Scale	0.398	SD in Log Scale	1.598
1764	95% t UCL (assumes normality of ROS data)	0.506	95% Percentile Bootstrap UCL	0.474
1765	95% BCA Bootstrap UCL	0.571	95% Bootstrap t UCL	0.982
1766	95% H-UCL (Log ROS)	3.674		
1767				
1768	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			

	A	B	C	D	E	F	G	H	I	J	K	L
1769					KM Mean (logged)	-2.276					KM Geo Mean	0.103
1770					KM SD (logged)	1.464					95% Critical H Value (KM-Log)	4.123
1771					KM Standard Error of Mean (logged)	0.546					95% H-UCL (KM -Log)	2.24
1772					KM SD (logged)	1.464					95% Critical H Value (KM-Log)	4.123
1773					KM Standard Error of Mean (logged)	0.546						
1774												
1775	**DL/2 Statistics**											
1776	**DL/2 Normal**						**DL/2 Log-Transformed**					
1777					Mean in Original Scale	0.278					Mean in Log Scale	-2.261
1778					SD in Original Scale	0.396					SD in Log Scale	1.549
1779					95% t UCL (Assumes normality)	0.508					95% H-Stat UCL	3.217
1780	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1781												
1782	**Nonparametric Distribution Free UCL Statistics**											
1783	**Detected Data appear Normal Distributed at 5% Significance Level**											
1784												
1785	**Suggested UCL to Use**											
1786					95% KM (t) UCL	0.518						
1787												
1788	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1789	Recommendations are based upon data size, data distribution, and skewness.											
1790	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1791	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1792												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:34:27 AM
From File	Albia GT2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	2	Number of Non-Detects	5
Number of Distinct Detects	2	Number of Distinct Non-Detects	5
Minimum Detect	8.37	Minimum Non-Detect	3.65
Maximum Detect	9.1	Maximum Non-Detect	7.93
Variance Detects	0.266	Percent Non-Detects	71.43%
Mean Detects	8.735	SD Detects	0.516
Median Detects	8.735	CV Detects	0.0591
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.166	SD of Logged Detects	0.0591

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	5.103	KM Standard Error of Mean	1.232
KM SD	2.305	95% KM (BCA) UCL	N/A
95% KM (t) UCL	7.497	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	7.13	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	8.8	95% KM Chebyshev UCL	10.47
97.5% KM Chebyshev UCL	12.8	99% KM Chebyshev UCL	17.36

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	572.4	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0153	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2290	nu star (bias corrected)	N/A
Mean (detects)	8.735		

Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	5.103	SD (KM)	2.305
Variance (KM)	5.315	SE of Mean (KM)	1.232
k hat (KM)	4.899	k star (KM)	2.895
nu hat (KM)	68.59	nu star (KM)	40.53
theta hat (KM)	1.042	theta star (KM)	1.763
80% gamma percentile (KM)	7.31	90% gamma percentile (KM)	9.124
95% gamma percentile (KM)	10.82	99% gamma percentile (KM)	14.5
Gamma Kaplan-Meier (KM) Statistics			
		Adjusted Level of Significance (β)	0.0158
Approximate Chi Square Value (40.53, α)	26.94	Adjusted Chi Square Value (40.53, β)	23.65
95% Gamma Approximate KM-UCL (use when n>=50)	7.677	95% Gamma Adjusted KM-UCL (use when n<50)	8.745
Lognormal GOF Test on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	7.199	Mean in Log Scale	1.965
SD in Original Scale	1.07	SD in Log Scale	0.14
95% t UCL (assumes normality of ROS data)	7.985	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	8.037		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	1.544	KM Geo Mean	4.682
KM SD (logged)	0.394	95% Critical H Value (KM-Log)	2.282
KM Standard Error of Mean (logged)	0.211	95% H-UCL (KM -Log)	7.309
KM SD (logged)	0.394	95% Critical H Value (KM-Log)	2.282
KM Standard Error of Mean (logged)	0.211		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.444	Mean in Log Scale	1.293
SD in Original Scale	3.065	SD in Log Scale	0.674
95% t UCL (Assumes normality)	6.695	95% H-Stat UCL	9.99
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	7.497	KM H-UCL	7.309
95% KM (BCA) UCL	N/A		
Warning: One or more Recommended UCL(s) not available!			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

Lead

General Statistics			
Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	8.33	Mean	12.75
Maximum	16.6	Median	12.7
SD	3.376	Std. Error of Mean	1.276
Coefficient of Variation	0.265	Skewness	-0.282

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	0.902	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	15.23	95% Adjusted-CLT UCL (Chen-1995)	14.7
		95% Modified-t UCL (Johnson-1978)	15.2

Gamma GOF Test			
A-D Test Statistic	0.404	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.199	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	15.39	k star (bias corrected MLE)	8.889
Theta hat (MLE)	0.828	Theta star (bias corrected MLE)	1.434
nu hat (MLE)	215.5	nu star (bias corrected)	124.5
MLE Mean (bias corrected)	12.75	MLE Sd (bias corrected)	4.275
		Approximate Chi Square Value (0.05)	99.69
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	93

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	15.91	95% Adjusted Gamma UCL (use when n<50)	17.06

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.187	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.304	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics

Minimum of Logged Data	2.12	Mean of logged Data	2.512
Maximum of Logged Data	2.809	SD of logged Data	0.283

Assuming Lognormal Distribution

95% H-UCL	16.5	90% Chebyshev (MVUE) UCL	16.87
95% Chebyshev (MVUE) UCL	18.73	97.5% Chebyshev (MVUE) UCL	21.31
99% Chebyshev (MVUE) UCL	26.38		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	14.85	95% Jackknife UCL	15.23
95% Standard Bootstrap UCL	14.7	95% Bootstrap-t UCL	14.99
95% Hall's Bootstrap UCL	14.62	95% Percentile Bootstrap UCL	14.64
95% BCA Bootstrap UCL	14.71		
90% Chebyshev(Mean, Sd) UCL	16.58	95% Chebyshev(Mean, Sd) UCL	18.31
97.5% Chebyshev(Mean, Sd) UCL	20.72	99% Chebyshev(Mean, Sd) UCL	25.44

Suggested UCL to Use

95% Student's-t UCL	15.23		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

2-Methylnaphthalene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	8
Minimum Detect	0.331	Minimum Non-Detect	0.0125
Maximum Detect	2.49	Maximum Non-Detect	0.133
Variance Detects	2.331	Percent Non-Detects	81.82%
Mean Detects	1.411	SD Detects	1.527
Median Detects	1.411	CV Detects	1.082
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.0967	SD of Logged Detects	1.427

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

	A	B	C	D	E	F	G	H	I	J	K	L
209	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
210					KM Mean	0.267					KM Standard Error of Mean	0.302
211					KM SD	0.709					95% KM (BCA) UCL	N/A
212					95% KM (t) UCL	0.815					95% KM (Percentile Bootstrap) UCL	N/A
213					95% KM (z) UCL	0.764					95% KM Bootstrap t UCL	N/A
214					90% KM Chebyshev UCL	1.174					95% KM Chebyshev UCL	1.584
215					97.5% KM Chebyshev UCL	2.155					99% KM Chebyshev UCL	3.275
216												
217	**Gamma GOF Tests on Detected Observations Only**											
218	**Not Enough Data to Perform GOF Test**											
219												
220	**Gamma Statistics on Detected Data Only**											
221					k hat (MLE)	1.276					k star (bias corrected MLE)	N/A
222					Theta hat (MLE)	1.106					Theta star (bias corrected MLE)	N/A
223					nu hat (MLE)	5.103					nu star (bias corrected)	N/A
224					Mean (detects)	1.411						
225												
226	**Estimates of Gamma Parameters using KM Estimates**											
227					Mean (KM)	0.267					SD (KM)	0.709
228					Variance (KM)	0.503					SE of Mean (KM)	0.302
229					k hat (KM)	0.141					k star (KM)	0.164
230					nu hat (KM)	3.113					nu star (KM)	3.597
231					theta hat (KM)	1.885					theta star (KM)	1.631
232					80% gamma percentile (KM)	0.31					90% gamma percentile (KM)	0.799
233					95% gamma percentile (KM)	1.442					99% gamma percentile (KM)	3.277
234												
235	**Gamma Kaplan-Meier (KM) Statistics**											
236											Adjusted Level of Significance (β)	0.0278
237					Approximate Chi Square Value (3.60, α)	0.569					Adjusted Chi Square Value (3.60, β)	0.41
238					95% Gamma Approximate KM-UCL (use when n>=50)	1.685					95% Gamma Adjusted KM-UCL (use when n<50)	2.342
239												
240	**Lognormal GOF Test on Detected Observations Only**											
241	**Not Enough Data to Perform GOF Test**											
242												
243	**Lognormal ROS Statistics Using Imputed Non-Detects**											
244					Mean in Original Scale	0.257					Mean in Log Scale	-7.003
245					SD in Original Scale	0.747					SD in Log Scale	3.548
246					95% t UCL (assumes normality of ROS data)	0.665					95% Percentile Bootstrap UCL	0.679
247					95% BCA Bootstrap UCL	0.936					95% Bootstrap t UCL	595.5
248					95% H-UCL (Log ROS)	9356						
249												
250	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
251					KM Mean (logged)	-3.603					KM Geo Mean	0.0272
252					KM SD (logged)	1.708					95% Critical H Value (KM-Log)	4.492
253					KM Standard Error of Mean (logged)	0.728					95% H-UCL (KM -Log)	1.326
254					KM SD (logged)	1.708					95% Critical H Value (KM-Log)	4.492
255					KM Standard Error of Mean (logged)	0.728						
256												
257	**DL/2 Statistics**											
258	**DL/2 Normal**						**DL/2 Log-Transformed**					
259					Mean in Original Scale	0.285					Mean in Log Scale	-3.11
260					SD in Original Scale	0.737					SD in Log Scale	1.838

95% t UCL (Assumes normality)	0.688	95% H-Stat UCL	3.895

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1.584		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[a]pyrene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	8
Minimum Detect	0.201	Minimum Non-Detect	0.0125
Maximum Detect	2.22	Maximum Non-Detect	0.133
Variance Detects	2.038	Percent Non-Detects	81.82%
Mean Detects	1.211	SD Detects	1.428
Median Detects	1.211	CV Detects	1.179
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.403	SD of Logged Detects	1.698

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.23	KM Standard Error of Mean	0.269
KM SD	0.631	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.718	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.673	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.038	95% KM Chebyshev UCL	1.404
97.5% KM Chebyshev UCL	1.912	99% KM Chebyshev UCL	2.91

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.974	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.243	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.896	nu star (bias corrected)	N/A
Mean (detects)	1.211		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.23	SD (KM)	0.631
Variance (KM)	0.399	SE of Mean (KM)	0.269
k hat (KM)	0.133	k star (KM)	0.157
nu hat (KM)	2.926	nu star (KM)	3.462
theta hat (KM)	1.731	theta star (KM)	1.464
80% gamma percentile (KM)	0.26	90% gamma percentile (KM)	0.687
95% gamma percentile (KM)	1.256	99% gamma percentile (KM)	2.889

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.46, α)	0.521	Adjusted Chi Square Value (3.46, β)	0.373
95% Gamma Approximate KM-UCL (use when n>=50)	1.529	95% Gamma Adjusted KM-UCL (use when n<50)	2.139

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.22	Mean in Log Scale	-8.624
SD in Original Scale	0.666	SD in Log Scale	4.223
95% t UCL (assumes normality of ROS data)	0.584	95% Percentile Bootstrap UCL	0.606
95% BCA Bootstrap UCL	0.826	95% Bootstrap t UCL	2047
95% H-UCL (Log ROS)	1458702		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.659	KM Geo Mean	0.0258
KM SD (logged)	1.618	95% Critical H Value (KM-Log)	4.291
KM Standard Error of Mean (logged)	0.69	95% H-UCL (KM -Log)	0.856
KM SD (logged)	1.618	95% Critical H Value (KM-Log)	4.291
KM Standard Error of Mean (logged)	0.69		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.247	Mean in Log Scale	-3.219
SD in Original Scale	0.657	SD in Log Scale	1.761
95% t UCL (Assumes normality)	0.606	95% H-Stat UCL	2.458

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

975% KM (Chebyshev) UCL	1.912		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[b]fluoranthene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	8
Minimum Detect	0.182	Minimum Non-Detect	0.0125
Maximum Detect	1.87	Maximum Non-Detect	0.133
Variance Detects	1.425	Percent Non-Detects	81.82%
Mean Detects	1.026	SD Detects	1.194
Median Detects	1.026	CV Detects	1.163
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.539	SD of Logged Detects	1.647

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.197	KM Standard Error of Mean	0.227
KM SD	0.531	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.607	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.569	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.876	95% KM Chebyshev UCL	1.184
97.5% KM Chebyshev UCL	1.612	99% KM Chebyshev UCL	2.451

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.02	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.006	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.08	nu star (bias corrected)	N/A
Mean (detects)	1.026		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.197	SD (KM)	0.531
Variance (KM)	0.282	SE of Mean (KM)	0.227
k hat (KM)	0.137	k star (KM)	0.16
nu hat (KM)	3.017	nu star (KM)	3.528
theta hat (KM)	1.435	theta star (KM)	1.227
80% gamma percentile (KM)	0.226	90% gamma percentile (KM)	0.588
95% gamma percentile (KM)	1.068	99% gamma percentile (KM)	2.444

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.53, α)	0.545	Adjusted Chi Square Value (3.53, β)	0.39
95% Gamma Approximate KM-UCL (use when n>=50)	1.275	95% Gamma Adjusted KM-UCL (use when n<50)	1.778

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

	A–E	F	G–K	L
417	**Lognormal ROS Statistics Using Imputed Non-Detects**			
418	Mean in Original Scale	0.187	Mean in Log Scale	-8.512
419	SD in Original Scale	0.561	SD in Log Scale	4.096
420	95% t UCL (assumes normality of ROS data)	0.493	95% Percentile Bootstrap UCL	0.51
421	95% BCA Bootstrap UCL	0.697	95% Bootstrap t UCL	1352
422	95% H-UCL (Log ROS)	426525		
423				
424	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
425	KM Mean (logged)	-3.683	KM Geo Mean	0.0251
426	KM SD (logged)	1.563	95% Critical H Value (KM-Log)	4.171
427	KM Standard Error of Mean (logged)	0.667	95% H-UCL (KM -Log)	0.671
428	KM SD (logged)	1.563	95% Critical H Value (KM-Log)	4.171
429	KM Standard Error of Mean (logged)	0.667		
430				
431	**DL/2 Statistics**			
432	**DL/2 Normal**		**DL/2 Log-Transformed**	
433	Mean in Original Scale	0.213	Mean in Log Scale	-3.244
434	SD in Original Scale	0.552	SD in Log Scale	1.713
435	95% t UCL (Assumes normality)	0.515	95% H-Stat UCL	1.941
436	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
437				
438	**Nonparametric Distribution Free UCL Statistics**			
439	**Data do not follow a Discernible Distribution at 5% Significance Level**			
440				
441	**Suggested UCL to Use**			
442	975% KM (Chebyshev) UCL	1.612		
443				
444	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
445	Recommendations are based upon data size, data distribution, and skewness.			
446	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
447	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
448				
449	**Benzo[g,h,i]perylene**			
450				
451	**General Statistics**			
452	Total Number of Observations	11	Number of Distinct Observations	10
453	Number of Detects	2	Number of Non-Detects	9
454	Number of Distinct Detects	2	Number of Distinct Non-Detects	8
455	Minimum Detect	0.138	Minimum Non-Detect	0.0125
456	Maximum Detect	1.32	Maximum Non-Detect	0.133
457	Variance Detects	0.699	Percent Non-Detects	81.82%
458	Mean Detects	0.729	SD Detects	0.836
459	Median Detects	0.729	CV Detects	1.147
460	Skewness Detects	N/A	Kurtosis Detects	N/A
461	Mean of Logged Detects	-0.851	SD of Logged Detects	1.597
462				
463	**Warning: Data set has only 2 Detected Values.**			
464	**This is not enough to compute meaningful or reliable statistics and estimates.**			
465				
466				
467	**Normal GOF Test on Detects Only**			
468	**Not Enough Data to Perform GOF Test**			

	A–E	F	G–K	L
469				
470	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
471	KM Mean	0.143	KM Standard Error of Mean	0.159
472	KM SD	0.374	95% KM (BCA) UCL	N/A
473	95% KM (t) UCL	0.432	95% KM (Percentile Bootstrap) UCL	N/A
474	95% KM (z) UCL	0.405	95% KM Bootstrap t UCL	N/A
475	90% KM Chebyshev UCL	0.621	95% KM Chebyshev UCL	0.838
476	97.5% KM Chebyshev UCL	1.139	99% KM Chebyshev UCL	1.73
477				
478	**Gamma GOF Tests on Detected Observations Only**			
479	**Not Enough Data to Perform GOF Test**			
480				
481	**Gamma Statistics on Detected Data Only**			
482	k hat (MLE)	1.07	k star (bias corrected MLE)	N/A
483	Theta hat (MLE)	0.681	Theta star (bias corrected MLE)	N/A
484	nu hat (MLE)	4.279	nu star (bias corrected)	N/A
485	Mean (detects)	0.729		
486				
487	**Estimates of Gamma Parameters using KM Estimates**			
488	Mean (KM)	0.143	SD (KM)	0.374
489	Variance (KM)	0.14	SE of Mean (KM)	0.159
490	k hat (KM)	0.146	k star (KM)	0.167
491	nu hat (KM)	3.206	nu star (KM)	3.665
492	theta hat (KM)	0.98	theta star (KM)	0.857
493	80% gamma percentile (KM)	0.168	90% gamma percentile (KM)	0.428
494	95% gamma percentile (KM)	0.769	99% gamma percentile (KM)	1.737
495				
496	**Gamma Kaplan-Meier (KM) Statistics**			
497			Adjusted Level of Significance (β)	0.0278
498	Approximate Chi Square Value (3.67, α)	0.594	Adjusted Chi Square Value (3.67, β)	0.429
499	95% Gamma Approximate KM-UCL (use when n>=50)	0.881	95% Gamma Adjusted KM-UCL (use when n<50)	1.22
500				
501	**Lognormal GOF Test on Detected Observations Only**			
502	**Not Enough Data to Perform GOF Test**			
503				
504	**Lognormal ROS Statistics Using Imputed Non-Detects**			
505	Mean in Original Scale	0.133	Mean in Log Scale	-8.579
506	SD in Original Scale	0.396	SD in Log Scale	3.97
507	95% t UCL (assumes normality of ROS data)	0.349	95% Percentile Bootstrap UCL	0.36
508	95% BCA Bootstrap UCL	0.48	95% Bootstrap t UCL	739
509	95% H-UCL (Log ROS)	109736		
510				
511	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
512	KM Mean (logged)	-3.74	KM Geo Mean	0.0238
513	KM SD (logged)	1.444	95% Critical H Value (KM-Log)	3.912
514	KM Standard Error of Mean (logged)	0.616	95% H-UCL (KM -Log)	0.402
515	KM SD (logged)	1.444	95% Critical H Value (KM-Log)	3.912
516	KM Standard Error of Mean (logged)	0.616		
517				
518	**DL/2 Statistics**			
519	**DL/2 Normal**		**DL/2 Log-Transformed**	
520	Mean in Original Scale	0.159	Mean in Log Scale	-3.301

	A–E	F	G–K	L
521	SD in Original Scale	0.387	SD in Log Scale	1.611
522	95% t UCL (Assumes normality)	0.371	95% H-Stat UCL	1.193
523	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
524				
525	**Nonparametric Distribution Free UCL Statistics**			
526	**Data do not follow a Discernible Distribution at 5% Significance Level**			
527				
528	**Suggested UCL to Use**			
529	975% KM (Chebyshev) UCL	1.139		
530				
531	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
532	Recommendations are based upon data size, data distribution, and skewness.			
533	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
534	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
535				
536	**Fluoranthene**			
537				
538	**General Statistics**			
539	Total Number of Observations	11	Number of Distinct Observations	10
540	Number of Detects	2	Number of Non-Detects	9
541	Number of Distinct Detects	2	Number of Distinct Non-Detects	8
542	Minimum Detect	0.162	Minimum Non-Detect	0.0125
543	Maximum Detect	8.77	Maximum Non-Detect	0.133
544	Variance Detects	37.05	Percent Non-Detects	81.82%
545	Mean Detects	4.466	SD Detects	6.087
546	Median Detects	4.466	CV Detects	1.363
547	Skewness Detects	N/A	Kurtosis Detects	N/A
548	Mean of Logged Detects	0.176	SD of Logged Detects	2.822
549				
550	**Warning: Data set has only 2 Detected Values.**			
551	**This is not enough to compute meaningful or reliable statistics and estimates.**			
552				
553				
554	**Normal GOF Test on Detects Only**			
555	**Not Enough Data to Perform GOF Test**			
556				
557	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
558	KM Mean	0.822	KM Standard Error of Mean	1.072
559	KM SD	2.514	95% KM (BCA) UCL	N/A
560	95% KM (t) UCL	2.765	95% KM (Percentile Bootstrap) UCL	N/A
561	95% KM (z) UCL	2.585	95% KM Bootstrap t UCL	N/A
562	90% KM Chebyshev UCL	4.038	95% KM Chebyshev UCL	5.494
563	97.5% KM Chebyshev UCL	7.516	99% KM Chebyshev UCL	11.49
564				
565	**Gamma GOF Tests on Detected Observations Only**			
566	**Not Enough Data to Perform GOF Test**			
567				
568	**Gamma Statistics on Detected Data Only**			
569	k hat (MLE)	0.483	k star (bias corrected MLE)	N/A
570	Theta hat (MLE)	9.239	Theta star (bias corrected MLE)	N/A
571	nu hat (MLE)	1.934	nu star (bias corrected)	N/A
572	Mean (detects)	4.466		

	A–E	F	G–K	L
573				
574	**Estimates of Gamma Parameters using KM Estimates**			
575	Mean (KM)	0.822	SD (KM)	2.514
576	Variance (KM)	6.319	SE of Mean (KM)	1.072
577	k hat (KM)	0.107	k star (KM)	0.138
578	nu hat (KM)	2.354	nu star (KM)	3.045
579	theta hat (KM)	7.685	theta star (KM)	5.94
580	80% gamma percentile (KM)	0.835	90% gamma percentile (KM)	2.407
581	95% gamma percentile (KM)	4.593	99% gamma percentile (KM)	11.04
582				
583	**Gamma Kaplan-Meier (KM) Statistics**			
584			Adjusted Level of Significance (β)	0.0278
585	Approximate Chi Square Value (3.05, α)	0.386	Adjusted Chi Square Value (3.05, β)	0.271
586	95% Gamma Approximate KM-UCL (use when n>=50)	6.488	95% Gamma Adjusted KM-UCL (use when n<50)	9.232
587				
588	**Lognormal GOF Test on Detected Observations Only**			
589	**Not Enough Data to Perform GOF Test**			
590				
591	**Lognormal ROS Statistics Using Imputed Non-Detects**			
592	Mean in Original Scale	0.812	Mean in Log Scale	-13.48
593	SD in Original Scale	2.64	SD in Log Scale	7.018
594	95% t UCL (assumes normality of ROS data)	2.255	95% Percentile Bootstrap UCL	2.392
595	95% BCA Bootstrap UCL	3.189	95% Bootstrap t UCL	2850812
596	95% H-UCL (Log ROS)	2.299E+21		
597				
598	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
599	KM Mean (logged)	-3.553	KM Geo Mean	0.0286
600	KM SD (logged)	1.953	95% Critical H Value (KM-Log)	5.046
601	KM Standard Error of Mean (logged)	0.833	95% H-UCL (KM -Log)	4.351
602	KM SD (logged)	1.953	95% Critical H Value (KM-Log)	5.046
603	KM Standard Error of Mean (logged)	0.833		
604				
605	**DL/2 Statistics**			
606	**DL/2 Normal**		**DL/2 Log-Transformed**	
607	Mean in Original Scale	0.838	Mean in Log Scale	-3.114
608	SD in Original Scale	2.631	SD in Log Scale	2.078
609	95% t UCL (Assumes normality)	2.276	95% H-Stat UCL	12.77
610	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
611				
612	**Nonparametric Distribution Free UCL Statistics**			
613	**Data do not follow a Discernible Distribution at 5% Significance Level**			
614				
615	**Suggested UCL to Use**			
616	KM Bootstrap t UCL	N/A		
617				
618	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
619	Recommendations are based upon data size, data distribution, and skewness.			
620	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
621	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
622				
623	**Indeno[1,2,3-cd]pyrene**			
624				

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
		Number of Missing Observations	1
Number of Detects	2	Number of Non-Detects	8
Number of Distinct Detects	2	Number of Distinct Non-Detects	7
Minimum Detect	0.144	Minimum Non-Detect	0.0125
Maximum Detect	1.23	Maximum Non-Detect	0.133
Variance Detects	0.59	Percent Non-Detects	80%
Mean Detects	0.687	SD Detects	0.768
Median Detects	0.687	CV Detects	1.118
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.865	SD of Logged Detects	1.517

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.147	KM Standard Error of Mean	0.162
KM SD	0.363	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.445	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.414	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.634	95% KM Chebyshev UCL	0.855
97.5% KM Chebyshev UCL	1.161	99% KM Chebyshev UCL	1.763

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.159	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.593	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.634	nu star (bias corrected)	N/A
Mean (detects)	0.687		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.147	SD (KM)	0.363
Variance (KM)	0.132	SE of Mean (KM)	0.162
k hat (KM)	0.165	k star (KM)	0.182
nu hat (KM)	3.298	nu star (KM)	3.642
theta hat (KM)	0.894	theta star (KM)	0.809
80% gamma percentile (KM)	0.184	90% gamma percentile (KM)	0.445
95% gamma percentile (KM)	0.778	99% gamma percentile (KM)	1.709

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (3.64, α)	0.586	Adjusted Chi Square Value (3.64, β)	0.413
95% Gamma Approximate KM-UCL (use when n>=50)	0.917	95% Gamma Adjusted KM-UCL (use when n<50)	1.3

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.137	Mean in Log Scale	-7.739
SD in Original Scale	0.387	SD in Log Scale	3.77
95% t UCL (assumes normality of ROS data)	0.362	95% Percentile Bootstrap UCL	0.383
95% BCA Bootstrap UCL	0.492	95% Bootstrap t UCL	370
95% H-UCL (Log ROS)	118920		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.679	KM Geo Mean	0.0253
KM SD (logged)	1.486	95% Critical H Value (KM-Log)	4.175
KM Standard Error of Mean (logged)	0.665	95% H-UCL (KM -Log)	0.603
KM SD (logged)	1.486	95% Critical H Value (KM-Log)	4.175
KM Standard Error of Mean (logged)	0.665		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.163	Mean in Log Scale	-3.288
SD in Original Scale	0.377	SD in Log Scale	1.685
95% t UCL (Assumes normality)	0.382	95% H-Stat UCL	2.089

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

975% KM (Chebyshev) UCL	1.161		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pyrene

General Statistics

Total Number of Observations	11	Number of Distinct Observations	10
Number of Detects	2	Number of Non-Detects	9
Number of Distinct Detects	2	Number of Distinct Non-Detects	8
Minimum Detect	0.23	Minimum Non-Detect	0.0125
Maximum Detect	11.1	Maximum Non-Detect	0.133
Variance Detects	59.08	Percent Non-Detects	81.82%
Mean Detects	5.665	SD Detects	7.686
Median Detects	5.665	CV Detects	1.357
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.469	SD of Logged Detects	2.741

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.04	KM Standard Error of Mean	1.357
KM SD	3.182	95% KM (BCA) UCL	N/A
95% KM (t) UCL	3.499	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	3.272	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.11	95% KM Chebyshev UCL	6.954
97.5% KM Chebyshev UCL	9.513	99% KM Chebyshev UCL	14.54

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.502	k star (bias corrected MLE)	N/A
Theta hat (MLE)	11.29	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.006	nu star (bias corrected)	N/A
Mean (detects)	5.665		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.04	SD (KM)	3.182
Variance (KM)	10.12	SE of Mean (KM)	1.357
k hat (KM)	0.107	k star (KM)	0.138
nu hat (KM)	2.351	nu star (KM)	3.043
theta hat (KM)	9.732	theta star (KM)	7.519
80% gamma percentile (KM)	1.055	90% gamma percentile (KM)	3.045
95% gamma percentile (KM)	5.811	99% gamma percentile (KM)	13.98

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0278
Approximate Chi Square Value (3.04, α)	0.385	Adjusted Chi Square Value (3.04, β)	0.271
95% Gamma Approximate KM-UCL (use when n>=50)	8.214	95% Gamma Adjusted KM-UCL (use when n<50)	11.69

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.03	Mean in Log Scale	-12.8
SD in Original Scale	3.341	SD in Log Scale	6.816
95% t UCL (assumes normality of ROS data)	2.856	95% Percentile Bootstrap UCL	3.027
95% BCA Bootstrap UCL	4.057	95% Bootstrap t UCL	2343018
95% H-UCL (Log ROS)	1.325E+20		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.5	KM Geo Mean	0.0302
KM SD (logged)	2.045	95% Critical H Value (KM-Log)	5.258
KM Standard Error of Mean (logged)	0.872	95% H-UCL (KM -Log)	7.331
KM SD (logged)	2.045	95% Critical H Value (KM-Log)	5.258
KM Standard Error of Mean (logged)	0.872		

DL/2 Statistics

	A	B	C	D	E	F	G	H	I	J	K	L
781	**DL/2 Normal**						**DL/2 Log-Transformed**					
782	Mean in Original Scale					1.056	Mean in Log Scale					-3.061
783	SD in Original Scale					3.332	SD in Log Scale					2.161
784	95% t UCL (Assumes normality)					2.877	95% H-Stat UCL					21.11
785	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
786												
787	**Nonparametric Distribution Free UCL Statistics**											
788	**Data do not follow a Discernible Distribution at 5% Significance Level**											
789												
790	**Suggested UCL to Use**											
791	KM Bootstrap t UCL					N/A						
792												
793	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
794	Recommendations are based upon data size, data distribution, and skewness.											
795	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
796	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
797												

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Data Sets with Non-Detects											
2												
3	User Selected Options											
4	Date/Time of Computation			ProUCL 5.12/16/2021 10:38:39 AM								
5	From File			CVEC 0-2ft.xls								
6	Full Precision			OFF								
7	Confidence Coefficient			95%								
8	Number of Bootstrap Operations			2000								
9												
10												
11	Arsenic											
12												
13	General Statistics											
14	Total Number of Observations					3	Number of Distinct Observations					3
15							Number of Missing Observations					0
16	Minimum					1.43	Mean					8.033
17	Maximum					16.9	Median					5.77
18	SD					7.979	Std. Error of Mean					4.607
19	Coefficient of Variation					0.993	Skewness					1.174
20												
21	Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use											
22	guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.											
23	For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).											
24	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1											
25												
26	Normal GOF Test											
27	Shapiro Wilk Test Statistic					0.94	Shapiro Wilk GOF Test					
28	5% Shapiro Wilk Critical Value					0.767	Data appear Normal at 5% Significance Level					
29	Lilliefors Test Statistic					0.278	Lilliefors GOF Test					
30	5% Lilliefors Critical Value					0.425	Data appear Normal at 5% Significance Level					
31	Data appear Normal at 5% Significance Level											
32												
33	Assuming Normal Distribution											
34	95% Normal UCL						95% UCLs (Adjusted for Skewness)					
35	95% Student's-t UCL					21.49	95% Adjusted-CLT UCL (Chen-1995)					18.95
36							95% Modified-t UCL (Johnson-1978)					22.01
37												
38	Gamma GOF Test											
39	Not Enough Data to Perform GOF Test											
40												
41	Gamma Statistics											
42	k hat (MLE)					1.283	k star (bias corrected MLE)					N/A
43	Theta hat (MLE)					6.26	Theta star (bias corrected MLE)					N/A
44	nu hat (MLE)					7.7	nu star (bias corrected)					N/A
45	MLE Mean (bias corrected)					N/A	MLE Sd (bias corrected)					N/A
46							Approximate Chi Square Value (0.05)					N/A
47	Adjusted Level of Significance					N/A	Adjusted Chi Square Value					N/A
48												
49	Assuming Gamma Distribution											
50	95% Approximate Gamma UCL (use when n>=50))					N/A	95% Adjusted Gamma UCL (use when n<50)					N/A
51												
52	Lognormal GOF Test											

Shapiro Wilk Test Statistic	0.994	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.201	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.358	Mean of logged Data	1.646
Maximum of Logged Data	2.827	SD of logged Data	1.238

Assuming Lognormal Distribution

95% H-UCL	15810888	90% Chebyshev (MVUE) UCL	23.09
95% Chebyshev (MVUE) UCL	29.84	97.5% Chebyshev (MVUE) UCL	39.2
99% Chebyshev (MVUE) UCL	57.6		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	15.61	95% Jackknife UCL	21.49
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	21.85	95% Chebyshev(Mean, Sd) UCL	28.11
97.5% Chebyshev(Mean, Sd) UCL	36.8	99% Chebyshev(Mean, Sd) UCL	53.87

Suggested UCL to Use

95% Student's-t UCL	21.49		

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Lead

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	0
Minimum	13.8	Mean	27.4
Maximum	53.1	Median	15.3
SD	22.27	Std. Error of Mean	12.86
Coefficient of Variation	0.813	Skewness	1.723

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

	A–E	F	G–K	L
105	**Normal GOF Test**			
106	Shapiro Wilk Test Statistic	0.779	**Shapiro Wilk GOF Test**	
107	5% Shapiro Wilk Critical Value	0.767	Data appear Normal at 5% Significance Level	
108	Lilliefors Test Statistic	0.373	**Lilliefors GOF Test**	
109	5% Lilliefors Critical Value	0.425	Data appear Normal at 5% Significance Level	
110	**Data appear Normal at 5% Significance Level**			
111				
112	**Assuming Normal Distribution**			
113	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
114	95% Student's-t UCL	64.94	95% Adjusted-CLT UCL (Chen-1995)	62.22
115			95% Modified-t UCL (Johnson-1978)	67.08
116				
117	**Gamma GOF Test**			
118	**Not Enough Data to Perform GOF Test**			
119				
120	**Gamma Statistics**			
121	k hat (MLE)	2.626	k star (bias corrected MLE)	N/A
122	Theta hat (MLE)	10.43	Theta star (bias corrected MLE)	N/A
123	nu hat (MLE)	15.76	nu star (bias corrected)	N/A
124	MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
125			Approximate Chi Square Value (0.05)	N/A
126	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A
127				
128	**Assuming Gamma Distribution**			
129	95% Approximate Gamma UCL (use when n>=50))	N/A	95% Adjusted Gamma UCL (use when n<50)	N/A
130				
131	**Lognormal GOF Test**			
132	Shapiro Wilk Test Statistic	0.807	**Shapiro Wilk Lognormal GOF Test**	
133	5% Shapiro Wilk Critical Value	0.767	Data appear Lognormal at 5% Significance Level	
134	Lilliefors Test Statistic	0.361	**Lilliefors Lognormal GOF Test**	
135	5% Lilliefors Critical Value	0.425	Data appear Lognormal at 5% Significance Level	
136	**Data appear Lognormal at 5% Significance Level**			
137				
138	**Lognormal Statistics**			
139	Minimum of Logged Data	2.625	Mean of logged Data	3.108
140	Maximum of Logged Data	3.972	SD of logged Data	0.75
141				
142	**Assuming Lognormal Distribution**			
143	95% H-UCL	5288	90% Chebyshev (MVUE) UCL	59.33
144	95% Chebyshev (MVUE) UCL	74.08	97.5% Chebyshev (MVUE) UCL	94.54
145	99% Chebyshev (MVUE) UCL	134.7		
146				
147	**Nonparametric Distribution Free UCL Statistics**			
148	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
149				
150	**Nonparametric Distribution Free UCLs**			
151	95% CLT UCL	48.55	95% Jackknife UCL	64.94
152	95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
153	95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
154	95% BCA Bootstrap UCL	N/A		
155	90% Chebyshev(Mean, Sd) UCL	65.97	95% Chebyshev(Mean, Sd) UCL	83.44
156	97.5% Chebyshev(Mean, Sd) UCL	107.7	99% Chebyshev(Mean, Sd) UCL	155.3

Suggested UCL to Use

95% Student's-t UCL	64.94		

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylnaphthalene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	9
Number of Detects	2	Number of Non-Detects	8
Number of Distinct Detects	2	Number of Distinct Non-Detects	7
Minimum Detect	0.127	Minimum Non-Detect	0.0115
Maximum Detect	0.133	Maximum Non-Detect	0.115
Variance Detects	1.8000E-5	Percent Non-Detects	80%
Mean Detects	0.13	SD Detects	0.00424
Median Detects	0.13	CV Detects	0.0326
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.04	SD of Logged Detects	0.0326

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0352	KM Standard Error of Mean	0.0212
KM SD	0.0474	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0741	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0701	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0988	95% KM Chebyshev UCL	0.128
97.5% KM Chebyshev UCL	0.168	99% KM Chebyshev UCL	0.246

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1877	k star (bias corrected MLE)	N/A
Theta hat (MLE)	6.9243E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	7510	nu star (bias corrected)	N/A
Mean (detects)	0.13		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0352	SD (KM)	0.0474
Variance (KM)	0.00225	SE of Mean (KM)	0.0212

	A B C D E	F	G H I J K	L
209	k hat (KM)	0.551	k star (KM)	0.452
210	nu hat (KM)	11.02	nu star (KM)	9.048
211	theta hat (KM)	0.0639	theta star (KM)	0.0778
212	80% gamma percentile (KM)	0.0575	90% gamma percentile (KM)	0.0972
213	95% gamma percentile (KM)	0.14	99% gamma percentile (KM)	0.247
214				
215	**Gamma Kaplan-Meier (KM) Statistics**			
216			Adjusted Level of Significance (β)	0.0267
217	Approximate Chi Square Value (9.05, α)	3.356	Adjusted Chi Square Value (9.05, β)	2.782
218	95% Gamma Approximate KM-UCL (use when n>=50)	0.0949	95% Gamma Adjusted KM-UCL (use when n<50)	0.115
219				
220	**Lognormal GOF Test on Detected Observations Only**			
221	**Not Enough Data to Perform GOF Test**			
222				
223	**Lognormal ROS Statistics Using Imputed Non-Detects**			
224	Mean in Original Scale	0.112	Mean in Log Scale	-2.188
225	SD in Original Scale	0.0096	SD in Log Scale	0.0811
226	95% t UCL (assumes normality of ROS data)	0.118	95% Percentile Bootstrap UCL	0.117
227	95% BCA Bootstrap UCL	0.119	95% Bootstrap t UCL	0.131
228	95% H-UCL (Log ROS)	N/A		
229				
230	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
231	KM Mean (logged)	-3.98	KM Geo Mean	0.0187
232	KM SD (logged)	0.97	95% Critical H Value (KM-Log)	3.042
233	KM Standard Error of Mean (logged)	0.434	95% H-UCL (KM -Log)	0.0799
234	KM SD (logged)	0.97	95% Critical H Value (KM-Log)	3.042
235	KM Standard Error of Mean (logged)	0.434		
236				
237	**DL/2 Statistics**			
238	**DL/2 Normal**		**DL/2 Log-Transformed**	
239	Mean in Original Scale	0.0482	Mean in Log Scale	-3.468
240	SD in Original Scale	0.0455	SD in Log Scale	1.059
241	95% t UCL (Assumes normality)	0.0746	95% H-Stat UCL	0.17
242	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
243				
244	**Nonparametric Distribution Free UCL Statistics**			
245	**Data do not follow a Discernible Distribution at 5% Significance Level**			
246				
247	**Suggested UCL to Use**			
248	95% KM (t) UCL	0.0741	KM H-UCL	0.0799
249	95% KM (BCA) UCL	N/A		
250	**Warning: One or more Recommended UCL(s) not available!**			
251				
252	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
253	Recommendations are based upon data size, data distribution, and skewness.			
254	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
255	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
256				
257	**Acenaphthylene**			
258				
259	**General Statistics**			
260	Total Number of Observations	10	Number of Distinct Observations	10

	A	B	C	D	E	F	G	H	I	J	K	L
261					Number of Detects	8					Number of Non-Detects	2
262					Number of Distinct Detects	8					Number of Distinct Non-Detects	2
263					Minimum Detect	0.106					Minimum Non-Detect	0.0115
264					Maximum Detect	0.492					Maximum Non-Detect	0.0118
265					Variance Detects	0.0179					Percent Non-Detects	20%
266					Mean Detects	0.262					SD Detects	0.134
267					Median Detects	0.228					CV Detects	0.51
268					Skewness Detects	0.621					Kurtosis Detects	-0.631
269					Mean of Logged Detects	-1.458					SD of Logged Detects	0.532
270												
271	**Normal GOF Test on Detects Only**											
272					Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**					
273					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level					
274					Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**					
275					5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level					
276	**Detected Data appear Normal at 5% Significance Level**											
277												
278	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
279					KM Mean	0.212					KM Standard Error of Mean	0.0508
280					KM SD	0.15					95% KM (BCA) UCL	0.286
281					95% KM (t) UCL	0.305					95% KM (Percentile Bootstrap) UCL	0.292
282					95% KM (z) UCL	0.296					95% KM Bootstrap t UCL	0.306
283					90% KM Chebyshev UCL	0.364					95% KM Chebyshev UCL	0.433
284					97.5% KM Chebyshev UCL	0.529					99% KM Chebyshev UCL	0.717
285												
286	**Gamma GOF Tests on Detected Observations Only**											
287					A-D Test Statistic	0.19	**Anderson-Darling GOF Test**					
288					5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level					
289					K-S Test Statistic	0.147	**Kolmogorov-Smirnov GOF**					
290					5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level					
291	**Detected data appear Gamma Distributed at 5% Significance Level**											
292												
293	**Gamma Statistics on Detected Data Only**											
294					k hat (MLE)	4.351					k star (bias corrected MLE)	2.803
295					Theta hat (MLE)	0.0602					Theta star (bias corrected MLE)	0.0935
296					nu hat (MLE)	69.61					nu star (bias corrected)	44.84
297					Mean (detects)	0.262						
298												
299	**Gamma ROS Statistics using Imputed Non-Detects**											
300	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
301	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
302	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
303	This is especially true when the sample size is small.											
304	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
305					Minimum	0.01					Mean	0.212
306					Maximum	0.492					Median	0.192
307					SD	0.159					CV	0.75
308					k hat (MLE)	1.07					k star (bias corrected MLE)	0.816
309					Theta hat (MLE)	0.198					Theta star (bias corrected MLE)	0.259
310					nu hat (MLE)	21.41					nu star (bias corrected)	16.32
311					Adjusted Level of Significance (β)	0.0267						
312					Approximate Chi Square Value (16.32, α)	8.188					Adjusted Chi Square Value (16.32, β)	7.209

	A	B	C	D	E	F	G	H	I	J	K	L
313					95% Gamma Approximate UCL (use when n>=50)	0.422					95% Gamma Adjusted UCL (use when n<50)	0.479
314												
315	**Estimates of Gamma Parameters using KM Estimates**											
316					Mean (KM)	0.212					SD (KM)	0.15
317					Variance (KM)	0.0226					SE of Mean (KM)	0.0508
318					k hat (KM)	1.992					k star (KM)	1.461
319					nu hat (KM)	39.84					nu star (KM)	29.22
320					theta hat (KM)	0.106					theta star (KM)	0.145
321					80% gamma percentile (KM)	0.329					90% gamma percentile (KM)	0.445
322					95% gamma percentile (KM)	0.557					99% gamma percentile (KM)	0.812
323												
324	**Gamma Kaplan-Meier (KM) Statistics**											
325					Approximate Chi Square Value (29.22, α)	17.88					Adjusted Chi Square Value (29.22, β)	16.36
326					95% Gamma Approximate KM-UCL (use when n>=50)	0.346					95% Gamma Adjusted KM-UCL (use when n<50)	0.379
327												
328	**Lognormal GOF Test on Detected Observations Only**											
329					Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**					
330					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					
331					Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**					
332					5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level					
333	**Detected Data appear Lognormal at 5% Significance Level**											
334												
335	**Lognormal ROS Statistics Using Imputed Non-Detects**											
336					Mean in Original Scale	0.222					Mean in Log Scale	-1.719
337					SD in Original Scale	0.145					SD in Log Scale	0.722
338					95% t UCL (assumes normality of ROS data)	0.306					95% Percentile Bootstrap UCL	0.297
339					95% BCA Bootstrap UCL	0.303					95% Bootstrap t UCL	0.327
340					95% H-UCL (Log ROS)	0.432						
341												
342	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
343					KM Mean (logged)	-2.06					KM Geo Mean	0.127
344					KM SD (logged)	1.282					95% Critical H Value (KM-Log)	3.711
345					KM Standard Error of Mean (logged)	0.434					95% H-UCL (KM -Log)	1.418
346					KM SD (logged)	1.282					95% Critical H Value (KM-Log)	3.711
347					KM Standard Error of Mean (logged)	0.434						
348												
349	**DL/2 Statistics**											
350	**DL/2 Normal**						**DL/2 Log-Transformed**					
351					Mean in Original Scale	0.211					Mean in Log Scale	-2.196
352					SD in Original Scale	0.16					SD in Log Scale	1.624
353					95% t UCL (Assumes normality)	0.304					95% H-Stat UCL	4.742
354	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
355												
356	**Nonparametric Distribution Free UCL Statistics**											
357	**Detected Data appear Normal Distributed at 5% Significance Level**											
358												
359	**Suggested UCL to Use**											
360					95% KM (t) UCL	0.305						
361												
362	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
363	Recommendations are based upon data size, data distribution, and skewness.											
364	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	6	Number of Non-Detects	4
Number of Distinct Detects	6	Number of Distinct Non-Detects	4
Minimum Detect	0.0617	Minimum Non-Detect	0.0115
Maximum Detect	0.192	Maximum Non-Detect	0.0657
Variance Detects	0.00261	Percent Non-Detects	40%
Mean Detects	0.106	SD Detects	0.0511
Median Detects	0.0863	CV Detects	0.483
Skewness Detects	1.156	Kurtosis Detects	0.264
Mean of Logged Detects	-2.334	SD of Logged Detects	0.448

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0693	KM Standard Error of Mean	0.0203
KM SD	0.058	95% KM (BCA) UCL	0.105
95% KM (t) UCL	0.106	95% KM (Percentile Bootstrap) UCL	0.104
95% KM (z) UCL	0.103	95% KM Bootstrap t UCL	0.108
90% KM Chebyshev UCL	0.13	95% KM Chebyshev UCL	0.158
97.5% KM Chebyshev UCL	0.196	99% KM Chebyshev UCL	0.271

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.377	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.232	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.333	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.842	k star (bias corrected MLE)	3.032
Theta hat (MLE)	0.0181	Theta star (bias corrected MLE)	0.0349
nu hat (MLE)	70.1	nu star (bias corrected)	36.38
Mean (detects)	0.106		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0675
Maximum	0.192	Median	0.0646

	A	B	C	D	E	F	G	H	I	J	K	L
417					SD	0.0624					CV	0.925
418					k hat (MLE)	1.05					k star (bias corrected MLE)	0.802
419					Theta hat (MLE)	0.0643					Theta star (bias corrected MLE)	0.0842
420					nu hat (MLE)	21					nu star (bias corrected)	16.03
421					Adjusted Level of Significance (β)	0.0267						
422					Approximate Chi Square Value (16.03, α)	7.986					Adjusted Chi Square Value (16.03, β)	7.021
423					95% Gamma Approximate UCL (use when n>=50)	0.135					95% Gamma Adjusted UCL (use when n<50)	0.154
424												
425	**Estimates of Gamma Parameters using KM Estimates**											
426					Mean (KM)	0.0693					SD (KM)	0.058
427					Variance (KM)	0.00336					SE of Mean (KM)	0.0203
428					k hat (KM)	1.431					k star (KM)	1.068
429					nu hat (KM)	28.61					nu star (KM)	21.36
430					theta hat (KM)	0.0485					theta star (KM)	0.0649
431					80% gamma percentile (KM)	0.111					90% gamma percentile (KM)	0.157
432					95% gamma percentile (KM)	0.203					99% gamma percentile (KM)	0.309
433												
434	**Gamma Kaplan-Meier (KM) Statistics**											
435					Approximate Chi Square Value (21.36, α)	11.86					Adjusted Chi Square Value (21.36, β)	10.65
436					95% Gamma Approximate KM-UCL (use when n>=50)	0.125					95% Gamma Adjusted KM-UCL (use when n<50)	0.139
437												
438	**Lognormal GOF Test on Detected Observations Only**											
439					Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk GOF Test**					
440					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level					
441					Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**					
442					5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level					
443	**Detected Data appear Lognormal at 5% Significance Level**											
444												
445	**Lognormal ROS Statistics Using Imputed Non-Detects**											
446					Mean in Original Scale	0.076					Mean in Log Scale	-2.786
447					SD in Original Scale	0.0541					SD in Log Scale	0.673
448					95% t UCL (assumes normality of ROS data)	0.107					95% Percentile Bootstrap UCL	0.106
449					95% BCA Bootstrap UCL	0.112					95% Bootstrap t UCL	0.129
450					95% H-UCL (Log ROS)	0.135						
451												
452	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
453					KM Mean (logged)	-3.145					KM Geo Mean	0.0431
454					KM SD (logged)	1.073					95% Critical H Value (KM-Log)	3.255
455					KM Standard Error of Mean (logged)	0.382					95% H-UCL (KM -Log)	0.245
456					KM SD (logged)	1.073					95% Critical H Value (KM-Log)	3.255
457					KM Standard Error of Mean (logged)	0.382						
458												
459	**DL/2 Statistics**											
460	**DL/2 Normal**						**DL/2 Log-Transformed**					
461					Mean in Original Scale	0.0709					Mean in Log Scale	-3.122
462					SD in Original Scale	0.0596					SD in Log Scale	1.209
463					95% t UCL (Assumes normality)	0.105					95% H-Stat UCL	0.382
464	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
465												
466	**Nonparametric Distribution Free UCL Statistics**											
467	**Detected Data appear Normal Distributed at 5% Significance Level**											
468												

Suggested UCL to Use

95% KM (t) UCL	0.106

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[a]anthracene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.0292	Minimum Non-Detect	0.0115
Maximum Detect	0.991	Maximum Non-Detect	0.0118
Variance Detects	0.0746	Percent Non-Detects	20%
Mean Detects	0.472	SD Detects	0.273
Median Detects	0.459	CV Detects	0.578
Skewness Detects	0.502	Kurtosis Detects	2.02
Mean of Logged Detects	-1.042	SD of Logged Detects	1.061

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.38	KM Standard Error of Mean	0.0992
KM SD	0.294	95% KM (BCA) UCL	0.552
95% KM (t) UCL	0.562	95% KM (Percentile Bootstrap) UCL	0.539
95% KM (z) UCL	0.543	95% KM Bootstrap t UCL	0.566
90% KM Chebyshev UCL	0.678	95% KM Chebyshev UCL	0.813
97.5% KM Chebyshev UCL	1	99% KM Chebyshev UCL	1.367

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.736	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.282	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.864	k star (bias corrected MLE)	1.248
Theta hat (MLE)	0.253	Theta star (bias corrected MLE)	0.378
nu hat (MLE)	29.82	nu star (bias corrected)	19.97
Mean (detects)	0.472		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

	A	B	C	D	E	F	G	H	I	J	K	L
521	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
522	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
523	This is especially true when the sample size is small.											
524	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
525					Minimum	0.0292					Mean	0.386
526					Maximum	0.991					Median	0.425
527					SD	0.301					CV	0.78
528					k hat (MLE)	1.114					k star (bias corrected MLE)	0.846
529					Theta hat (MLE)	0.347					Theta star (bias corrected MLE)	0.457
530					nu hat (MLE)	22.27					nu star (bias corrected)	16.92
531					Adjusted Level of Significance (β)	0.0267						
532					Approximate Chi Square Value (16.92, α)	8.618					Adjusted Chi Square Value (16.92, β)	7.609
533					95% Gamma Approximate UCL (use when n>=50)	0.759					95% Gamma Adjusted UCL (use when n<50)	0.859
534												
535	**Estimates of Gamma Parameters using KM Estimates**											
536					Mean (KM)	0.38					SD (KM)	0.294
537					Variance (KM)	0.0862					SE of Mean (KM)	0.0992
538					k hat (KM)	1.676					k star (KM)	1.24
539					nu hat (KM)	33.52					nu star (KM)	24.8
540					theta hat (KM)	0.227					theta star (KM)	0.306
541					80% gamma percentile (KM)	0.6					90% gamma percentile (KM)	0.83
542					95% gamma percentile (KM)	1.056					99% gamma percentile (KM)	1.574
543												
544	**Gamma Kaplan-Meier (KM) Statistics**											
545					Approximate Chi Square Value (24.80, α)	14.46					Adjusted Chi Square Value (24.80, β)	13.1
546					95% Gamma Approximate KM-UCL (use when n>=50)	0.652					95% Gamma Adjusted KM-UCL (use when n<50)	0.719
547												
548	**Lognormal GOF Test on Detected Observations Only**											
549					Shapiro Wilk Test Statistic	0.721	**Shapiro Wilk GOF Test**					
550					5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level					
551					Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**					
552					5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level					
553	**Detected Data Not Lognormal at 5% Significance Level**											
554												
555	**Lognormal ROS Statistics Using Imputed Non-Detects**											
556					Mean in Original Scale	0.387					Mean in Log Scale	-1.448
557					SD in Original Scale	0.3					SD in Log Scale	1.268
558					95% t UCL (assumes normality of ROS data)	0.561					95% Percentile Bootstrap UCL	0.546
559					95% BCA Bootstrap UCL	0.575					95% Bootstrap t UCL	0.582
560					95% H-UCL (Log ROS)	2.49						
561												
562	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
563					KM Mean (logged)	-1.727					KM Geo Mean	0.178
564					KM SD (logged)	1.632					95% Critical H Value (KM-Log)	4.515
565					KM Standard Error of Mean (logged)	0.552					95% H-UCL (KM -Log)	7.855
566					KM SD (logged)	1.632					95% Critical H Value (KM-Log)	4.515
567					KM Standard Error of Mean (logged)	0.552						
568												
569	**DL/2 Statistics**											
570	**DL/2 Normal**						**DL/2 Log-Transformed**					
571					Mean in Original Scale	0.379					Mean in Log Scale	-1.863
572					SD in Original Scale	0.311					SD in Log Scale	1.967

	A–E	F	G–K	L
573	95% t UCL (Assumes normality)	0.559	95% H-Stat UCL	35.1
574	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
575				
576	**Nonparametric Distribution Free UCL Statistics**			
577	**Detected Data appear Normal Distributed at 5% Significance Level**			
578				
579	**Suggested UCL to Use**			
580	95% KM (t) UCL	0.562		
581				
582	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
583	Recommendations are based upon data size, data distribution, and skewness.			
584	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
585	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
586				
587	**Benzo[a]pyrene**			
588				
589	**General Statistics**			
590	Total Number of Observations	10	Number of Distinct Observations	10
591	Number of Detects	8	Number of Non-Detects	2
592	Number of Distinct Detects	8	Number of Distinct Non-Detects	2
593	Minimum Detect	0.0808	Minimum Non-Detect	0.0115
594	Maximum Detect	1.61	Maximum Non-Detect	0.0118
595	Variance Detects	0.19	Percent Non-Detects	20%
596	Mean Detects	0.763	SD Detects	0.436
597	Median Detects	0.77	CV Detects	0.572
598	Skewness Detects	0.604	Kurtosis Detects	2.118
599	Mean of Logged Detects	-0.504	SD of Logged Detects	0.888
600				
601	**Normal GOF Test on Detects Only**			
602	Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
603	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
604	Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
605	5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
606	**Detected Data appear Normal at 5% Significance Level**			
607				
608	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
609	KM Mean	0.613	KM Standard Error of Mean	0.16
610	KM SD	0.473	95% KM (BCA) UCL	0.887
611	95% KM (t) UCL	0.906	95% KM (Percentile Bootstrap) UCL	0.855
612	95% KM (z) UCL	0.876	95% KM Bootstrap t UCL	0.923
613	90% KM Chebyshev UCL	1.092	95% KM Chebyshev UCL	1.31
614	97.5% KM Chebyshev UCL	1.611	99% KM Chebyshev UCL	2.203
615				
616	**Gamma GOF Tests on Detected Observations Only**			
617	A-D Test Statistic	0.555	**Anderson-Darling GOF Test**	
618	5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
619	K-S Test Statistic	0.239	**Kolmogorov-Smirnov GOF**	
620	5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	
621	**Detected data appear Gamma Distributed at 5% Significance Level**			
622				
623	**Gamma Statistics on Detected Data Only**			
624	k hat (MLE)	2.289	k star (bias corrected MLE)	1.514

	A–E	F	G–K	L
625	Theta hat (MLE)	0.333	Theta star (bias corrected MLE)	0.504
626	nu hat (MLE)	36.62	nu star (bias corrected)	24.22
627	Mean (detects)	0.763		
628				
629	**Gamma ROS Statistics using Imputed Non-Detects**			
630	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
631	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
632	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
633	This is especially true when the sample size is small.			
634	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
635	Minimum	0.0487	Mean	0.62
636	Maximum	1.61	Median	0.676
637	SD	0.489	CV	0.788
638	k hat (MLE)	1.079	k star (bias corrected MLE)	0.822
639	Theta hat (MLE)	0.575	Theta star (bias corrected MLE)	0.755
640	nu hat (MLE)	21.58	nu star (bias corrected)	16.44
641	Adjusted Level of Significance (β)	0.0267		
642	Approximate Chi Square Value (16.44, α)	8.273	Adjusted Chi Square Value (16.44, β)	7.288
643	95% Gamma Approximate UCL (use when n>=50)	1.232	95% Gamma Adjusted UCL (use when n<50)	1.399
644				
645	**Estimates of Gamma Parameters using KM Estimates**			
646	Mean (KM)	0.613	SD (KM)	0.473
647	Variance (KM)	0.224	SE of Mean (KM)	0.16
648	k hat (KM)	1.68	k star (KM)	1.242
649	nu hat (KM)	33.59	nu star (KM)	24.85
650	theta hat (KM)	0.365	theta star (KM)	0.493
651	80% gamma percentile (KM)	0.967	90% gamma percentile (KM)	1.337
652	95% gamma percentile (KM)	1.702	99% gamma percentile (KM)	2.535
653				
654	**Gamma Kaplan-Meier (KM) Statistics**			
655	Approximate Chi Square Value (24.85, α)	14.5	Adjusted Chi Square Value (24.85, β)	13.14
656	95% Gamma Approximate KM-UCL (use when n>=50)	1.05	95% Gamma Adjusted KM-UCL (use when n<50)	1.159
657				
658	**Lognormal GOF Test on Detected Observations Only**			
659	Shapiro Wilk Test Statistic	0.792	**Shapiro Wilk GOF Test**	
660	5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
661	Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**	
662	5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
663	**Detected Data appear Approximate Lognormal at 5% Significance Level**			
664				
665	**Lognormal ROS Statistics Using Imputed Non-Detects**			
666	Mean in Original Scale	0.63	Mean in Log Scale	-0.865
667	SD in Original Scale	0.476	SD in Log Scale	1.092
668	95% t UCL (assumes normality of ROS data)	0.906	95% Percentile Bootstrap UCL	0.874
669	95% BCA Bootstrap UCL	0.894	95% Bootstrap t UCL	0.95
670	95% H-UCL (Log ROS)	2.533		
671				
672	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
673	KM Mean (logged)	-1.297	KM Geo Mean	0.273
674	KM SD (logged)	1.75	95% Critical H Value (KM-Log)	4.795
675	KM Standard Error of Mean (logged)	0.592	95% H-UCL (KM -Log)	20.72
676	KM SD (logged)	1.75	95% Critical H Value (KM-Log)	4.795

KM Standard Error of Mean (logged)	0.592		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.612	Mean in Log Scale	-1.433
SD in Original Scale	0.5	SD in Log Scale	2.108
95% t UCL (Assumes normality)	0.901	95% H-Stat UCL	117.1

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.906		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[b]fluoranthene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	0.015	Minimum Non-Detect	0.0118
Maximum Detect	1.9	Maximum Non-Detect	0.0118
Variance Detects	0.316	Percent Non-Detects	10%
Mean Detects	0.859	SD Detects	0.562
Median Detects	0.885	CV Detects	0.655
Skewness Detects	0.267	Kurtosis Detects	0.592
Mean of Logged Detects	-0.642	SD of Logged Detects	1.482

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.146	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.774	KM Standard Error of Mean	0.189
KM SD	0.563	95% KM (BCA) UCL	1.048
95% KM (t) UCL	1.121	95% KM (Percentile Bootstrap) UCL	1.075
95% KM (z) UCL	1.085	95% KM Bootstrap t UCL	1.127
90% KM Chebyshev UCL	1.341	95% KM Chebyshev UCL	1.598
97.5% KM Chebyshev UCL	1.954	99% KM Chebyshev UCL	2.655

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.733	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
729					K-S Test Statistic	0.302	Kolmogorov-Smirnov GOF					
730					5% K-S Critical Value	0.286	Detected Data Not Gamma Distributed at 5% Significance Level					
731	**Detected data follow Appr. Gamma Distribution at 5% Significance Level**											
732												
733	**Gamma Statistics on Detected Data Only**											
734					k hat (MLE)	1.159					k star (bias corrected MLE)	0.847
735					Theta hat (MLE)	0.741					Theta star (bias corrected MLE)	1.014
736					nu hat (MLE)	20.87					nu star (bias corrected)	15.25
737					Mean (detects)	0.859						
738												
739	**Gamma ROS Statistics using Imputed Non-Detects**											
740	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
741	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
742	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
743	This is especially true when the sample size is small.											
744	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
745					Minimum	0.015					Mean	0.785
746					Maximum	1.9					Median	0.842
747					SD	0.579					CV	0.737
748					k hat (MLE)	1.052					k star (bias corrected MLE)	0.803
749					Theta hat (MLE)	0.747					Theta star (bias corrected MLE)	0.978
750					nu hat (MLE)	21.03					nu star (bias corrected)	16.06
751					Adjusted Level of Significance (β)	0.0267						
752					Approximate Chi Square Value (16.06, α)	8.002					Adjusted Chi Square Value (16.06, β)	7.036
753					95% Gamma Approximate UCL (use when n>=50)	1.575					95% Gamma Adjusted UCL (use when n<50)	1.792
754												
755	**Estimates of Gamma Parameters using KM Estimates**											
756					Mean (KM)	0.774					SD (KM)	0.563
757					Variance (KM)	0.318					SE of Mean (KM)	0.189
758					k hat (KM)	1.887					k star (KM)	1.388
759					nu hat (KM)	37.74					nu star (KM)	27.75
760					theta hat (KM)	0.41					theta star (KM)	0.558
761					80% gamma percentile (KM)	1.208					90% gamma percentile (KM)	1.644
762					95% gamma percentile (KM)	2.07					99% gamma percentile (KM)	3.037
763												
764	**Gamma Kaplan-Meier (KM) Statistics**											
765					Approximate Chi Square Value (27.75, α)	16.74					Adjusted Chi Square Value (27.75, β)	15.27
766					95% Gamma Approximate KM-UCL (use when n>=50)	1.284					95% Gamma Adjusted KM-UCL (use when n<50)	1.407
767												
768	**Lognormal GOF Test on Detected Observations Only**											
769					Shapiro Wilk Test Statistic	0.735	**Shapiro Wilk GOF Test**					
770					5% Shapiro Wilk Critical Value	0.829	Detected Data Not Lognormal at 5% Significance Level					
771					Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**					
772					5% Lilliefors Critical Value	0.274	Detected Data Not Lognormal at 5% Significance Level					
773	**Detected Data Not Lognormal at 5% Significance Level**											
774												
775	**Lognormal ROS Statistics Using Imputed Non-Detects**											
776					Mean in Original Scale	0.776					Mean in Log Scale	-0.941
777					SD in Original Scale	0.592					SD in Log Scale	1.687
778					95% t UCL (assumes normality of ROS data)	1.119					95% Percentile Bootstrap UCL	1.081
779					95% BCA Bootstrap UCL	1.074					95% Bootstrap t UCL	1.13
780					95% H-UCL (Log ROS)	22.07						

781				
782	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
783	KM Mean (logged)	-1.022	KM Geo Mean	0.36
784	KM SD (logged)	1.748	95% Critical H Value (KM-Log)	4.79
785	KM Standard Error of Mean (logged)	0.586	95% H-UCL (KM -Log)	27.01
786	KM SD (logged)	1.748	95% Critical H Value (KM-Log)	4.79
787	KM Standard Error of Mean (logged)	0.586		
788				
789	**DL/2 Statistics**			
790	**DL/2 Normal**		**DL/2 Log-Transformed**	
791	Mean in Original Scale	0.773	Mean in Log Scale	-1.091
792	SD in Original Scale	0.595	SD in Log Scale	1.992
793	95% t UCL (Assumes normality)	1.118	95% H-Stat UCL	86.83
794	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
795				
796	**Nonparametric Distribution Free UCL Statistics**			
797	**Detected Data appear Normal Distributed at 5% Significance Level**			
798				
799	**Suggested UCL to Use**			
800	95% KM (t) UCL	1.121		
801				
802	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
803	Recommendations are based upon data size, data distribution, and skewness.			
804	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
805	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
806				
807	**Benzo[g,h,i]perylene**			
808				
809	**General Statistics**			
810	Total Number of Observations	10	Number of Distinct Observations	10
811	Number of Detects	8	Number of Non-Detects	2
812	Number of Distinct Detects	8	Number of Distinct Non-Detects	2
813	Minimum Detect	0.207	Minimum Non-Detect	0.0115
814	Maximum Detect	1.2	Maximum Non-Detect	0.0118
815	Variance Detects	0.103	Percent Non-Detects	20%
816	Mean Detects	0.766	SD Detects	0.321
817	Median Detects	0.795	CV Detects	0.42
818	Skewness Detects	-0.511	Kurtosis Detects	-0.106
819	Mean of Logged Detects	-0.379	SD of Logged Detects	0.565
820				
821	**Normal GOF Test on Detects Only**			
822	Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**	
823	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
824	Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**	
825	5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
826	**Detected Data appear Normal at 5% Significance Level**			
827				
828	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
829	KM Mean	0.615	KM Standard Error of Mean	0.137
830	KM SD	0.404	95% KM (BCA) UCL	0.827
831	95% KM (t) UCL	0.866	95% KM (Percentile Bootstrap) UCL	0.814
832	95% KM (z) UCL	0.84	95% KM Bootstrap t UCL	0.83

	A	B	C	D	E	F	G	H	I	J	K	L
833					90% KM Chebyshev UCL	1.025					95% KM Chebyshev UCL	1.211
834					97.5% KM Chebyshev UCL	1.468					99% KM Chebyshev UCL	1.975
835												
836	**Gamma GOF Tests on Detected Observations Only**											
837					A-D Test Statistic	0.36	**Anderson-Darling GOF Test**					
838					5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level					
839					K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**					
840					5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level					
841	**Detected data appear Gamma Distributed at 5% Significance Level**											
842												
843	**Gamma Statistics on Detected Data Only**											
844					k hat (MLE)	4.621					k star (bias corrected MLE)	2.971
845					Theta hat (MLE)	0.166					Theta star (bias corrected MLE)	0.258
846					nu hat (MLE)	73.94					nu star (bias corrected)	47.54
847					Mean (detects)	0.766						
848												
849	**Gamma ROS Statistics using Imputed Non-Detects**											
850	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
851	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
852	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
853	This is especially true when the sample size is small.											
854	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
855					Minimum	0.171					Mean	0.647
856					Maximum	1.2					Median	0.699
857					SD	0.379					CV	0.585
858					k hat (MLE)	2.419					k star (bias corrected MLE)	1.76
859					Theta hat (MLE)	0.267					Theta star (bias corrected MLE)	0.368
860					nu hat (MLE)	48.39					nu star (bias corrected)	35.21
861					Adjusted Level of Significance (β)	0.0267						
862					Approximate Chi Square Value (35.21, α)	22.63					Adjusted Chi Square Value (35.21, β)	20.89
863					95% Gamma Approximate UCL (use when n>=50)	1.006					95% Gamma Adjusted UCL (use when n<50)	1.09
864												
865	**Estimates of Gamma Parameters using KM Estimates**											
866					Mean (KM)	0.615					SD (KM)	0.404
867					Variance (KM)	0.163					SE of Mean (KM)	0.137
868					k hat (KM)	2.315					k star (KM)	1.687
869					nu hat (KM)	46.29					nu star (KM)	33.74
870					theta hat (KM)	0.266					theta star (KM)	0.365
871					80% gamma percentile (KM)	0.939					90% gamma percentile (KM)	1.246
872					95% gamma percentile (KM)	1.541					99% gamma percentile (KM)	2.203
873												
874	**Gamma Kaplan-Meier (KM) Statistics**											
875					Approximate Chi Square Value (33.74, α)	21.46					Adjusted Chi Square Value (33.74, β)	19.77
876					95% Gamma Approximate KM-UCL (use when n>=50)	0.967					95% Gamma Adjusted KM-UCL (use when n<50)	1.05
877												
878	**Lognormal GOF Test on Detected Observations Only**											
879					Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**					
880					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					
881					Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**					
882					5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level					
883	**Detected Data appear Lognormal at 5% Significance Level**											
884												

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.653	Mean in Log Scale	-0.625
SD in Original Scale	0.371	SD in Log Scale	0.72
95% t UCL (assumes normality of ROS data)	0.867	95% Percentile Bootstrap UCL	0.837
95% BCA Bootstrap UCL	0.82	95% Bootstrap t UCL	0.873
95% H-UCL (Log ROS)	1.284		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.196	KM Geo Mean	0.302
KM SD (logged)	1.702	95% Critical H Value (KM-Log)	4.68
KM Standard Error of Mean (logged)	0.575	95% H-UCL (KM -Log)	18.28
KM SD (logged)	1.702	95% Critical H Value (KM-Log)	4.68
KM Standard Error of Mean (logged)	0.575		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.614	Mean in Log Scale	-1.332
SD in Original Scale	0.428	SD in Log Scale	2.071
95% t UCL (Assumes normality)	0.862	95% H-Stat UCL	105.1
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.866		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[k]fluoranthene			
General Statistics			
Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.0522	Minimum Non-Detect	0.0115
Maximum Detect	0.632	Maximum Non-Detect	0.0118
Variance Detects	0.0284	Percent Non-Detects	20%
Mean Detects	0.311	SD Detects	0.169
Median Detects	0.287	CV Detects	0.542
Skewness Detects	0.622	Kurtosis Detects	1.599
Mean of Logged Detects	-1.347	SD of Logged Detects	0.733
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			

	A	B	C	D	E	F	G	H	I	J	K	L
937												
938	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
939					KM Mean	0.251					KM Standard Error of Mean	0.0626
940					KM SD	0.185					95% KM (BCA) UCL	0.351
941					95% KM (t) UCL	0.366					95% KM (Percentile Bootstrap) UCL	0.354
942					95% KM (z) UCL	0.354					95% KM Bootstrap t UCL	0.373
943					90% KM Chebyshev UCL	0.439					95% KM Chebyshev UCL	0.524
944					97.5% KM Chebyshev UCL	0.642					99% KM Chebyshev UCL	0.873
945												
946	**Gamma GOF Tests on Detected Observations Only**											
947					A-D Test Statistic	0.371	**Anderson-Darling GOF Test**					
948					5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level					
949					K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**					
950					5% K-S Critical Value	0.296	Detected data appear Gamma Distributed at 5% Significance Level					
951	**Detected data appear Gamma Distributed at 5% Significance Level**											
952												
953	**Gamma Statistics on Detected Data Only**											
954					k hat (MLE)	2.947					k star (bias corrected MLE)	1.925
955					Theta hat (MLE)	0.105					Theta star (bias corrected MLE)	0.161
956					nu hat (MLE)	47.15					nu star (bias corrected)	30.8
957					Mean (detects)	0.311						
958												
959	**Gamma ROS Statistics using Imputed Non-Detects**											
960	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
961	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
962	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
963	This is especially true when the sample size is small.											
964	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
965					Minimum	0.0138					Mean	0.251
966					Maximum	0.632					Median	0.249
967					SD	0.194					CV	0.773
968					k hat (MLE)	1.036					k star (bias corrected MLE)	0.792
969					Theta hat (MLE)	0.243					Theta star (bias corrected MLE)	0.318
970					nu hat (MLE)	20.72					nu star (bias corrected)	15.84
971					Adjusted Level of Significance (β)	0.0267						
972					Approximate Chi Square Value (15.84, α)	7.848					Adjusted Chi Square Value (15.84, β)	6.893
973					95% Gamma Approximate UCL (use when n>=50)	0.507					95% Gamma Adjusted UCL (use when n<50)	0.578
974												
975	**Estimates of Gamma Parameters using KM Estimates**											
976					Mean (KM)	0.251					SD (KM)	0.185
977					Variance (KM)	0.0342					SE of Mean (KM)	0.0626
978					k hat (KM)	1.84					k star (KM)	1.355
979					nu hat (KM)	36.8					nu star (KM)	27.09
980					theta hat (KM)	0.136					theta star (KM)	0.185
981					80% gamma percentile (KM)	0.393					90% gamma percentile (KM)	0.536
982					95% gamma percentile (KM)	0.677					99% gamma percentile (KM)	0.996
983												
984	**Gamma Kaplan-Meier (KM) Statistics**											
985					Approximate Chi Square Value (27.09, α)	16.22					Adjusted Chi Square Value (27.09, β)	14.78
986					95% Gamma Approximate KM-UCL (use when n>=50)	0.419					95% Gamma Adjusted KM-UCL (use when n<50)	0.46
987												
988	**Lognormal GOF Test on Detected Observations Only**											

	A	B	C	D	E	F	G	H	I	J	K	L
989					Shapiro Wilk Test Statistic	0.854	**Shapiro Wilk GOF Test**					
990					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					
991					Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**					
992					5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level					
993	**Detected Data appear Approximate Lognormal at 5% Significance Level**											
994												
995	**Lognormal ROS Statistics Using Imputed Non-Detects**											
996					Mean in Original Scale	0.259					Mean in Log Scale	-1.662
997					SD in Original Scale	0.184					SD in Log Scale	0.926
998					95% t UCL (assumes normality of ROS data)	0.366					95% Percentile Bootstrap UCL	0.351
999					95% BCA Bootstrap UCL	0.366					95% Bootstrap t UCL	0.385
1000					95% H-UCL (Log ROS)	0.725						
1001												
1002	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1003					KM Mean (logged)	-1.971					KM Geo Mean	0.139
1004					KM SD (logged)	1.39					95% Critical H Value (KM-Log)	3.952
1005					KM Standard Error of Mean (logged)	0.47					95% H-UCL (KM -Log)	2.283
1006					KM SD (logged)	1.39					95% Critical H Value (KM-Log)	3.952
1007					KM Standard Error of Mean (logged)	0.47						
1008												
1009	**DL/2 Statistics**											
1010	**DL/2 Normal**						**DL/2 Log-Transformed**					
1011					Mean in Original Scale	0.25					Mean in Log Scale	-2.107
1012					SD in Original Scale	0.197					SD in Log Scale	1.727
1013					95% t UCL (Assumes normality)	0.364					95% H-Stat UCL	8.269
1014	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1015												
1016	**Nonparametric Distribution Free UCL Statistics**											
1017	**Detected Data appear Normal Distributed at 5% Significance Level**											
1018												
1019	**Suggested UCL to Use**											
1020					95% KM (t) UCL	0.366						
1021												
1022	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1023	Recommendations are based upon data size, data distribution, and skewness.											
1024	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1025	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1026												
1027	**Chrysene**											
1028												
1029	**General Statistics**											
1030					Total Number of Observations	10					Number of Distinct Observations	10
1031					Number of Detects	8					Number of Non-Detects	2
1032					Number of Distinct Detects	8					Number of Distinct Non-Detects	2
1033					Minimum Detect	0.0621					Minimum Non-Detect	0.0115
1034					Maximum Detect	1.28					Maximum Non-Detect	0.0118
1035					Variance Detects	0.122					Percent Non-Detects	20%
1036					Mean Detects	0.627					SD Detects	0.349
1037					Median Detects	0.573					CV Detects	0.558
1038					Skewness Detects	0.467					Kurtosis Detects	1.72
1039					Mean of Logged Detects	-0.702					SD of Logged Detects	0.902
1040												

	A	B	C	D	E	F	G	H	I	J	K	L
1041	**Normal GOF Test on Detects Only**											
1042					Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**					
1043					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level					
1044					Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**					
1045					5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level					
1046	**Detected Data appear Normal at 5% Significance Level**											
1047												
1048	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1049					KM Mean	0.504					KM Standard Error of Mean	0.129
1050					KM SD	0.382					95% KM (BCA) UCL	0.711
1051					95% KM (t) UCL	0.74					95% KM (Percentile Bootstrap) UCL	0.706
1052					95% KM (z) UCL	0.716					95% KM Bootstrap t UCL	0.748
1053					90% KM Chebyshev UCL	0.891					95% KM Chebyshev UCL	1.067
1054					97.5% KM Chebyshev UCL	1.31					99% KM Chebyshev UCL	1.789
1055												
1056	**Gamma GOF Tests on Detected Observations Only**											
1057					A-D Test Statistic	0.583	**Anderson-Darling GOF Test**					
1058					5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level					
1059					K-S Test Statistic	0.273	**Kolmogorov-Smirnov GOF**					
1060					5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level					
1061	**Detected data appear Gamma Distributed at 5% Significance Level**											
1062												
1063	**Gamma Statistics on Detected Data Only**											
1064					k hat (MLE)	2.284					k star (bias corrected MLE)	1.511
1065					Theta hat (MLE)	0.274					Theta star (bias corrected MLE)	0.415
1066					nu hat (MLE)	36.54					nu star (bias corrected)	24.17
1067					Mean (detects)	0.627						
1068												
1069	**Gamma ROS Statistics using Imputed Non-Detects**											
1070	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1071	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1072	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1073	This is especially true when the sample size is small.											
1074	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1075					Minimum	0.0458					Mean	0.51
1076					Maximum	1.28					Median	0.534
1077					SD	0.394					CV	0.771
1078					k hat (MLE)	1.125					k star (bias corrected MLE)	0.854
1079					Theta hat (MLE)	0.454					Theta star (bias corrected MLE)	0.597
1080					nu hat (MLE)	22.51					nu star (bias corrected)	17.09
1081					Adjusted Level of Significance (β)	0.0267						
1082					Approximate Chi Square Value (17.09, α)	8.736					Adjusted Chi Square Value (17.09, β)	7.72
1083					95% Gamma Approximate UCL (use when n>=50)	0.999					95% Gamma Adjusted UCL (use when n<50)	1.13
1084												
1085	**Estimates of Gamma Parameters using KM Estimates**											
1086					Mean (KM)	0.504					SD (KM)	0.382
1087					Variance (KM)	0.146					SE of Mean (KM)	0.129
1088					k hat (KM)	1.737					k star (KM)	1.282
1089					nu hat (KM)	34.73					nu star (KM)	25.65
1090					theta hat (KM)	0.29					theta star (KM)	0.393
1091					80% gamma percentile (KM)	0.792					90% gamma percentile (KM)	1.091
1092					95% gamma percentile (KM)	1.383					99% gamma percentile (KM)	2.052

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (25.65, α)	15.11	Adjusted Chi Square Value (25.65, β)	13.72
95% Gamma Approximate KM-UCL (use when n>=50)	0.855	95% Gamma Adjusted KM-UCL (use when n<50)	0.941

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.518	Mean in Log Scale	-1.063
SD in Original Scale	0.384	SD in Log Scale	1.1
95% t UCL (assumes normality of ROS data)	0.74	95% Percentile Bootstrap UCL	0.717
95% BCA Bootstrap UCL	0.725	95% Bootstrap t UCL	0.766
95% H-UCL (Log ROS)	2.133		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.455	KM Geo Mean	0.233
KM SD (logged)	1.684	95% Critical H Value (KM-Log)	4.637
KM Standard Error of Mean (logged)	0.569	95% H-UCL (KM -Log)	13.01
KM SD (logged)	1.684	95% Critical H Value (KM-Log)	4.637
KM Standard Error of Mean (logged)	0.569		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.502	Mean in Log Scale	-1.591
SD in Original Scale	0.404	SD in Log Scale	2.035
95% t UCL (Assumes normality)	0.737	95% H-Stat UCL	66.68

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.74		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dibenz(a,h)anthracene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.0298	Minimum Non-Detect	0.0115
Maximum Detect	0.188	Maximum Non-Detect	0.0118

	A	B	C	D	E	F	G	H	I	J	K	L
1145					Variance Detects	0.00289					Percent Non-Detects	20%
1146					Mean Detects	0.115					SD Detects	0.0538
1147					Median Detects	0.115					CV Detects	0.468
1148					Skewness Detects	-0.203					Kurtosis Detects	-0.93
1149					Mean of Logged Detects	-2.294					SD of Logged Detects	0.604
1150												
1151	**Normal GOF Test on Detects Only**											
1152					Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**					
1153					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level					
1154					Lilliefors Test Statistic	0.129	**Lilliefors GOF Test**					
1155					5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level					
1156	**Detected Data appear Normal at 5% Significance Level**											
1157												
1158	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1159					KM Mean	0.0943					KM Standard Error of Mean	0.0207
1160					KM SD	0.0612					95% KM (BCA) UCL	0.124
1161					95% KM (t) UCL	0.132					95% KM (Percentile Bootstrap) UCL	0.125
1162					95% KM (z) UCL	0.128					95% KM Bootstrap t UCL	0.129
1163					90% KM Chebyshev UCL	0.156					95% KM Chebyshev UCL	0.184
1164					97.5% KM Chebyshev UCL	0.223					99% KM Chebyshev UCL	0.3
1165												
1166	**Gamma GOF Tests on Detected Observations Only**											
1167					A-D Test Statistic	0.257	**Anderson-Darling GOF Test**					
1168					5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level					
1169					K-S Test Statistic	0.149	**Kolmogorov-Smirnov GOF**					
1170					5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level					
1171	**Detected data appear Gamma Distributed at 5% Significance Level**											
1172												
1173	**Gamma Statistics on Detected Data Only**											
1174					k hat (MLE)	3.964					k star (bias corrected MLE)	2.561
1175					Theta hat (MLE)	0.029					Theta star (bias corrected MLE)	0.0449
1176					nu hat (MLE)	63.42					nu star (bias corrected)	40.97
1177					Mean (detects)	0.115						
1178												
1179	**Gamma ROS Statistics using Imputed Non-Detects**											
1180	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1181	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1182	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1183	This is especially true when the sample size is small.											
1184	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1185					Minimum	0.0159					Mean	0.0952
1186					Maximum	0.188					Median	0.0937
1187					SD	0.0632					CV	0.664
1188					k hat (MLE)	1.751					k star (bias corrected MLE)	1.292
1189					Theta hat (MLE)	0.0544					Theta star (bias corrected MLE)	0.0737
1190					nu hat (MLE)	35.02					nu star (bias corrected)	25.85
1191					Adjusted Level of Significance (β)	0.0267						
1192					Approximate Chi Square Value (25.85, α)	15.26					Adjusted Chi Square Value (25.85, β)	13.87
1193					95% Gamma Approximate UCL (use when n>=50)	0.161					95% Gamma Adjusted UCL (use when n<50)	0.177
1194												
1195	**Estimates of Gamma Parameters using KM Estimates**											
1196					Mean (KM)	0.0943					SD (KM)	0.0612

	A–E	F	G–K	L
1197	Variance (KM)	0.00374	SE of Mean (KM)	0.0207
1198	k hat (KM)	2.379	k star (KM)	1.732
1199	nu hat (KM)	47.58	nu star (KM)	34.64
1200	theta hat (KM)	0.0396	theta star (KM)	0.0545
1201	80% gamma percentile (KM)	0.144	90% gamma percentile (KM)	0.19
1202	95% gamma percentile (KM)	0.234	99% gamma percentile (KM)	0.334
1203				
1204	**Gamma Kaplan-Meier (KM) Statistics**			
1205	Approximate Chi Square Value (34.64, α)	22.17	Adjusted Chi Square Value (34.64, β)	20.46
1206	95% Gamma Approximate KM-UCL (use when n>=50)	0.147	95% Gamma Adjusted KM-UCL (use when n<50)	0.16
1207				
1208	**Lognormal GOF Test on Detected Observations Only**			
1209	Shapiro Wilk Test Statistic	0.903	**Shapiro Wilk GOF Test**	
1210	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
1211	Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**	
1212	5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
1213	**Detected Data appear Lognormal at 5% Significance Level**			
1214				
1215	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1216	Mean in Original Scale	0.0972	Mean in Log Scale	-2.567
1217	SD in Original Scale	0.0606	SD in Log Scale	0.784
1218	95% t UCL (assumes normality of ROS data)	0.132	95% Percentile Bootstrap UCL	0.128
1219	95% BCA Bootstrap UCL	0.126	95% Bootstrap t UCL	0.134
1220	95% H-UCL (Log ROS)	0.21		
1221				
1222	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1223	KM Mean (logged)	-2.728	KM Geo Mean	0.0653
1224	KM SD (logged)	1.005	95% Critical H Value (KM-Log)	3.113
1225	KM Standard Error of Mean (logged)	0.34	95% H-UCL (KM -Log)	0.307
1226	KM SD (logged)	1.005	95% Critical H Value (KM-Log)	3.113
1227	KM Standard Error of Mean (logged)	0.34		
1228				
1229	**DL/2 Statistics**			
1230	**DL/2 Normal**		**DL/2 Log-Transformed**	
1231	Mean in Original Scale	0.0932	Mean in Log Scale	-2.864
1232	SD in Original Scale	0.0661	SD in Log Scale	1.315
1233	95% t UCL (Assumes normality)	0.132	95% H-Stat UCL	0.711
1234	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1235				
1236	**Nonparametric Distribution Free UCL Statistics**			
1237	**Detected Data appear Normal Distributed at 5% Significance Level**			
1238				
1239	**Suggested UCL to Use**			
1240	95% KM (t) UCL	0.132		
1241				
1242	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1243	Recommendations are based upon data size, data distribution, and skewness.			
1244	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1245	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1246				
1247	**Fluoranthene**			
1248				

1249	**General Statistics**			
1250	Total Number of Observations	10	Number of Distinct Observations	10
1251	Number of Detects	8	Number of Non-Detects	2
1252	Number of Distinct Detects	8	Number of Distinct Non-Detects	2
1253	Minimum Detect	0.0816	Minimum Non-Detect	0.0115
1254	Maximum Detect	1.45	Maximum Non-Detect	0.0118
1255	Variance Detects	0.155	Percent Non-Detects	20%
1256	Mean Detects	0.707	SD Detects	0.394
1257	Median Detects	0.645	CV Detects	0.557
1258	Skewness Detects	0.504	Kurtosis Detects	1.706
1259	Mean of Logged Detects	-0.567	SD of Logged Detects	0.855
1260				
1261	**Normal GOF Test on Detects Only**			
1262	Shapiro Wilk Test Statistic	0.95	**Shapiro Wilk GOF Test**	
1263	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
1264	Lilliefors Test Statistic	0.185	**Lilliefors GOF Test**	
1265	5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
1266	**Detected Data appear Normal at 5% Significance Level**			
1267				
1268	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1269	KM Mean	0.568	KM Standard Error of Mean	0.146
1270	KM SD	0.431	95% KM (BCA) UCL	0.794
1271	95% KM (t) UCL	0.835	95% KM (Percentile Bootstrap) UCL	0.798
1272	95% KM (z) UCL	0.808	95% KM Bootstrap t UCL	0.843
1273	90% KM Chebyshev UCL	1.005	95% KM Chebyshev UCL	1.203
1274	97.5% KM Chebyshev UCL	1.478	99% KM Chebyshev UCL	2.018
1275				
1276	**Gamma GOF Tests on Detected Observations Only**			
1277	A-D Test Statistic	0.514	**Anderson-Darling GOF Test**	
1278	5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
1279	K-S Test Statistic	0.236	**Kolmogorov-Smirnov GOF**	
1280	5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	
1281	**Detected data appear Gamma Distributed at 5% Significance Level**			
1282				
1283	**Gamma Statistics on Detected Data Only**			
1284	k hat (MLE)	2.426	k star (bias corrected MLE)	1.599
1285	Theta hat (MLE)	0.291	Theta star (bias corrected MLE)	0.442
1286	nu hat (MLE)	38.81	nu star (bias corrected)	25.59
1287	Mean (detects)	0.707		
1288				
1289	**Gamma ROS Statistics using Imputed Non-Detects**			
1290	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1291	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1292	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1293	This is especially true when the sample size is small.			
1294	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1295	Minimum	0.0452	Mean	0.575
1296	Maximum	1.45	Median	0.611
1297	SD	0.445	CV	0.775
1298	k hat (MLE)	1.101	k star (bias corrected MLE)	0.837
1299	Theta hat (MLE)	0.522	Theta star (bias corrected MLE)	0.686
1300	nu hat (MLE)	22.01	nu star (bias corrected)	16.74

Adjusted Level of Significance (β)	0.0267		
Approximate Chi Square Value (16.74, α)	8.489	Adjusted Chi Square Value (16.74, β)	7.489
95% Gamma Approximate UCL (use when n>=50)	1.133	95% Gamma Adjusted UCL (use when n<50)	1.284
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.568	SD (KM)	0.431
Variance (KM)	0.186	SE of Mean (KM)	0.146
k hat (KM)	1.734	k star (KM)	1.28
nu hat (KM)	34.67	nu star (KM)	25.61
theta hat (KM)	0.327	theta star (KM)	0.443
80% gamma percentile (KM)	0.893	90% gamma percentile (KM)	1.23
95% gamma percentile (KM)	1.561	99% gamma percentile (KM)	2.315
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (25.61, α)	15.08	Adjusted Chi Square Value (25.61, β)	13.69
95% Gamma Approximate KM-UCL (use when n>=50)	0.964	95% Gamma Adjusted KM-UCL (use when n<50)	1.062
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.797	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level	
Detected Data Not Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.585	Mean in Log Scale	-0.917
SD in Original Scale	0.432	SD in Log Scale	1.054
95% t UCL (assumes normality of ROS data)	0.835	95% Percentile Bootstrap UCL	0.794
95% BCA Bootstrap UCL	0.841	95% Bootstrap t UCL	0.871
95% H-UCL (Log ROS)	2.158		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.347	KM Geo Mean	0.26
KM SD (logged)	1.715	95% Critical H Value (KM-Log)	4.713
KM Standard Error of Mean (logged)	0.58	95% H-UCL (KM -Log)	16.77
KM SD (logged)	1.715	95% Critical H Value (KM-Log)	4.713
KM Standard Error of Mean (logged)	0.58		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.567	Mean in Log Scale	-1.483
SD in Original Scale	0.456	SD in Log Scale	2.072
95% t UCL (Assumes normality)	0.831	95% H-Stat UCL	91.25
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.835		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Indeno[1,2,3-cd]pyrene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.156	Minimum Non-Detect	0.0115
Maximum Detect	1.03	Maximum Non-Detect	0.0118
Variance Detects	0.078	Percent Non-Detects	20%
Mean Detects	0.623	SD Detects	0.279
Median Detects	0.657	CV Detects	0.448
Skewness Detects	-0.389	Kurtosis Detects	-0.153
Mean of Logged Detects	-0.602	SD of Logged Detects	0.607

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.981	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.501	KM Standard Error of Mean	0.114
KM SD	0.338	95% KM (BCA) UCL	0.682
95% KM (t) UCL	0.71	95% KM (Percentile Bootstrap) UCL	0.666
95% KM (z) UCL	0.689	95% KM Bootstrap t UCL	0.689
90% KM Chebyshev UCL	0.843	95% KM Chebyshev UCL	0.999
97.5% KM Chebyshev UCL	1.214	99% KM Chebyshev UCL	1.638

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.371	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.204	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.042	k star (bias corrected MLE)	2.61
Theta hat (MLE)	0.154	Theta star (bias corrected MLE)	0.239
nu hat (MLE)	64.68	nu star (bias corrected)	41.76
Mean (detects)	0.623		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

	A	B	C	D	E	F	G	H	I	J	K	L
1405					Minimum	0.114					Mean	0.521
1406					Maximum	1.03					Median	0.582
1407					SD	0.327					CV	0.627
1408					k hat (MLE)	2.039					k star (bias corrected MLE)	1.494
1409					Theta hat (MLE)	0.255					Theta star (bias corrected MLE)	0.349
1410					nu hat (MLE)	40.78					nu star (bias corrected)	29.88
1411					Adjusted Level of Significance (β)	0.0267						
1412					Approximate Chi Square Value (29.88, α)	18.4					Adjusted Chi Square Value (29.88, β)	16.85
1413					95% Gamma Approximate UCL (use when n>=50)	0.846					95% Gamma Adjusted UCL (use when n<50)	0.924
1414												
1415	**Estimates of Gamma Parameters using KM Estimates**											
1416					Mean (KM)	0.501					SD (KM)	0.338
1417					Variance (KM)	0.114					SE of Mean (KM)	0.114
1418					k hat (KM)	2.19					k star (KM)	1.6
1419					nu hat (KM)	43.8					nu star (KM)	32
1420					theta hat (KM)	0.229					theta star (KM)	0.313
1421					80% gamma percentile (KM)	0.769					90% gamma percentile (KM)	1.027
1422					95% gamma percentile (KM)	1.276					99% gamma percentile (KM)	1.837
1423												
1424	**Gamma Kaplan-Meier (KM) Statistics**											
1425					Approximate Chi Square Value (32.00, α)	20.07					Adjusted Chi Square Value (32.00, β)	18.44
1426					95% Gamma Approximate KM-UCL (use when n>=50)	0.798					95% Gamma Adjusted KM-UCL (use when n<50)	0.868
1427												
1428	**Lognormal GOF Test on Detected Observations Only**											
1429					Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**					
1430					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					
1431					Lilliefors Test Statistic	0.23	**Lilliefors GOF Test**					
1432					5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level					
1433	**Detected Data appear Lognormal at 5% Significance Level**											
1434												
1435	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1436					Mean in Original Scale	0.527					Mean in Log Scale	-0.869
1437					SD in Original Scale	0.318					SD in Log Scale	0.776
1438					95% t UCL (assumes normality of ROS data)	0.712					95% Percentile Bootstrap UCL	0.689
1439					95% BCA Bootstrap UCL	0.679					95% Bootstrap t UCL	0.714
1440					95% H-UCL (Log ROS)	1.13						
1441												
1442	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1443					KM Mean (logged)	-1.375					KM Geo Mean	0.253
1444					KM SD (logged)	1.627					95% Critical H Value (KM-Log)	4.502
1445					KM Standard Error of Mean (logged)	0.55					95% H-UCL (KM -Log)	10.9
1446					KM SD (logged)	1.627					95% Critical H Value (KM-Log)	4.502
1447					KM Standard Error of Mean (logged)	0.55						
1448												
1449	**DL/2 Statistics**											
1450	**DL/2 Normal**						**DL/2 Log-Transformed**					
1451					Mean in Original Scale	0.499					Mean in Log Scale	-1.511
1452					SD in Original Scale	0.358					SD in Log Scale	1.989
1453					95% t UCL (Assumes normality)	0.707					95% H-Stat UCL	56.1
1454	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1455												
1456	**Nonparametric Distribution Free UCL Statistics**											

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.71

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	3	Number of Non-Detects	7
Number of Distinct Detects	3	Number of Distinct Non-Detects	7
Minimum Detect	0.07	Minimum Non-Detect	0.0115
Maximum Detect	0.36	Maximum Non-Detect	0.115
Variance Detects	0.0213	Percent Non-Detects	70%
Mean Detects	0.205	SD Detects	0.146
Median Detects	0.185	CV Detects	0.712
Skewness Detects	0.605	Kurtosis Detects	N/A
Mean of Logged Detects	-1.789	SD of Logged Detects	0.824

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.221	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0704	KM Standard Error of Mean	0.0427
KM SD	0.11	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.149	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.141	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.198	95% KM Chebyshev UCL	0.256
97.5% KM Chebyshev UCL	0.337	99% KM Chebyshev UCL	0.495

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.597	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0789	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	15.58	nu star (bias corrected)	N/A
Mean (detects)	0.205		

	A	B	C	D	E	F	G	H	I	J	K	L
1509	**Gamma ROS Statistics using Imputed Non-Detects**											
1510	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1511	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1512	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1513	This is especially true when the sample size is small.											
1514	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1515					Minimum	0.01					Mean	0.0685
1516					Maximum	0.36					Median	0.01
1517					SD	0.117					CV	1.703
1518					k hat (MLE)	0.576					k star (bias corrected MLE)	0.47
1519					Theta hat (MLE)	0.119					Theta star (bias corrected MLE)	0.146
1520					nu hat (MLE)	11.52					nu star (bias corrected)	9.395
1521					Adjusted Level of Significance (β)	0.0267						
1522					Approximate Chi Square Value (9.40, α)	3.567					Adjusted Chi Square Value (9.40, β)	2.971
1523					95% Gamma Approximate UCL (use when n>=50)	0.18					95% Gamma Adjusted UCL (use when n<50)	N/A
1524												
1525	**Estimates of Gamma Parameters using KM Estimates**											
1526					Mean (KM)	0.0704					SD (KM)	0.11
1527					Variance (KM)	0.0121					SE of Mean (KM)	0.0427
1528					k hat (KM)	0.41					k star (KM)	0.354
1529					nu hat (KM)	8.203					nu star (KM)	7.075
1530					theta hat (KM)	0.172					theta star (KM)	0.199
1531					80% gamma percentile (KM)	0.112					90% gamma percentile (KM)	0.203
1532					95% gamma percentile (KM)	0.305					99% gamma percentile (KM)	0.565
1533												
1534	**Gamma Kaplan-Meier (KM) Statistics**											
1535					Approximate Chi Square Value (7.08, α)	2.212					Adjusted Chi Square Value (7.08, β)	1.77
1536					95% Gamma Approximate KM-UCL (use when n>=50)	0.225					95% Gamma Adjusted KM-UCL (use when n<50)	0.281
1537												
1538	**Lognormal GOF Test on Detected Observations Only**											
1539					Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk GOF Test**					
1540					5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level					
1541					Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**					
1542					5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level					
1543	**Detected Data appear Lognormal at 5% Significance Level**											
1544												
1545	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1546					Mean in Original Scale	0.0683					Mean in Log Scale	-3.782
1547					SD in Original Scale	0.117					SD in Log Scale	1.431
1548					95% t UCL (assumes normality of ROS data)	0.136					95% Percentile Bootstrap UCL	0.132
1549					95% BCA Bootstrap UCL	0.156					95% Bootstrap t UCL	0.39
1550					95% H-UCL (Log ROS)	0.438						
1551												
1552	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1553					KM Mean (logged)	-3.637					KM Geo Mean	0.0263
1554					KM SD (logged)	1.282					95% Critical H Value (KM-Log)	3.71
1555					KM Standard Error of Mean (logged)	0.503					95% H-UCL (KM -Log)	0.293
1556					KM SD (logged)	1.282					95% Critical H Value (KM-Log)	3.71
1557					KM Standard Error of Mean (logged)	0.503						
1558												
1559	**DL/2 Statistics**											
1560	**DL/2 Normal**						**DL/2 Log-Transformed**					

Mean in Original Scale	0.0807	Mean in Log Scale	-3.247
SD in Original Scale	0.111	SD in Log Scale	1.305
95% t UCL (Assumes normality)	0.145	95% H-Stat UCL	0.468

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.149		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.126	Minimum Non-Detect	0.0115
Maximum Detect	0.5	Maximum Non-Detect	0.0118
Variance Detects	0.0143	Percent Non-Detects	20%
Mean Detects	0.327	SD Detects	0.12
Median Detects	0.361	CV Detects	0.366
Skewness Detects	-0.433	Kurtosis Detects	-0.273
Mean of Logged Detects	-1.192	SD of Logged Detects	0.444

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.264	KM Standard Error of Mean	0.0545
KM SD	0.161	95% KM (BCA) UCL	0.343
95% KM (t) UCL	0.364	95% KM (Percentile Bootstrap) UCL	0.347
95% KM (z) UCL	0.354	95% KM Bootstrap t UCL	0.353
90% KM Chebyshev UCL	0.428	95% KM Chebyshev UCL	0.502
97.5% KM Chebyshev UCL	0.604	99% KM Chebyshev UCL	0.806

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.374	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.718	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.245	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
1613	**Gamma Statistics on Detected Data Only**											
1614					k hat (MLE)	6.84					k star (bias corrected MLE)	4.358
1615					Theta hat (MLE)	0.0478					Theta star (bias corrected MLE)	0.0751
1616					nu hat (MLE)	109.4					nu star (bias corrected)	69.73
1617					Mean (detects)	0.327						
1618												
1619	**Gamma ROS Statistics using Imputed Non-Detects**											
1620	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1621	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1622	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1623	This is especially true when the sample size is small.											
1624	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1625					Minimum	0.0966					Mean	0.281
1626					Maximum	0.5					Median	0.305
1627					SD	0.144					CV	0.511
1628					k hat (MLE)	3.446					k star (bias corrected MLE)	2.479
1629					Theta hat (MLE)	0.0816					Theta star (bias corrected MLE)	0.113
1630					nu hat (MLE)	68.92					nu star (bias corrected)	49.58
1631					Adjusted Level of Significance (β)	0.0267						
1632					Approximate Chi Square Value (49.58, α)	34.41					Adjusted Chi Square Value (49.58, β)	32.23
1633					95% Gamma Approximate UCL (use when n>=50)	0.405					95% Gamma Adjusted UCL (use when n<50)	0.432
1634												
1635	**Estimates of Gamma Parameters using KM Estimates**											
1636					Mean (KM)	0.264					SD (KM)	0.161
1637					Variance (KM)	0.026					SE of Mean (KM)	0.0545
1638					k hat (KM)	2.684					k star (KM)	1.945
1639					nu hat (KM)	53.67					nu star (KM)	38.9
1640					theta hat (KM)	0.0984					theta star (KM)	0.136
1641					80% gamma percentile (KM)	0.397					90% gamma percentile (KM)	0.517
1642					95% gamma percentile (KM)	0.632					99% gamma percentile (KM)	0.887
1643												
1644	**Gamma Kaplan-Meier (KM) Statistics**											
1645					Approximate Chi Square Value (38.90, α)	25.62					Adjusted Chi Square Value (38.90, β)	23.76
1646					95% Gamma Approximate KM-UCL (use when n>=50)	0.401					95% Gamma Adjusted KM-UCL (use when n<50)	0.432
1647												
1648	**Lognormal GOF Test on Detected Observations Only**											
1649					Shapiro Wilk Test Statistic	0.896	**Shapiro Wilk GOF Test**					
1650					5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level					
1651					Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**					
1652					5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level					
1653	**Detected Data appear Lognormal at 5% Significance Level**											
1654												
1655	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1656					Mean in Original Scale	0.284					Mean in Log Scale	-1.391
1657					SD in Original Scale	0.139					SD in Log Scale	0.574
1658					95% t UCL (assumes normality of ROS data)	0.365					95% Percentile Bootstrap UCL	0.355
1659					95% BCA Bootstrap UCL	0.351					95% Bootstrap t UCL	0.363
1660					95% H-UCL (Log ROS)	0.458						
1661												
1662	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1663					KM Mean (logged)	-1.847					KM Geo Mean	0.158
1664					KM SD (logged)	1.361					95% Critical H Value (KM-Log)	3.887

KM Standard Error of Mean (logged)	0.46	95% H-UCL (KM -Log)	2.323
KM SD (logged)	1.361	95% Critical H Value (KM-Log)	3.887
KM Standard Error of Mean (logged)	0.46		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.263	Mean in Log Scale	-1.983
SD in Original Scale	0.172	SD in Log Scale	1.712
95% t UCL (Assumes normality)	0.363	95% H-Stat UCL	8.75
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.364		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Pyrene			
General Statistics			
Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.122	Minimum Non-Detect	0.0115
Maximum Detect	2.43	Maximum Non-Detect	0.0118
Variance Detects	0.433	Percent Non-Detects	20%
Mean Detects	1.124	SD Detects	0.658
Median Detects	0.979	CV Detects	0.585
Skewness Detects	0.816	Kurtosis Detects	2.33
Mean of Logged Detects	-0.115	SD of Logged Detects	0.876
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.901	KM Standard Error of Mean	0.239
KM SD	0.708	95% KM (BCA) UCL	1.251
95% KM (t) UCL	1.34	95% KM (Percentile Bootstrap) UCL	1.286
95% KM (z) UCL	1.295	95% KM Bootstrap t UCL	1.382
90% KM Chebyshev UCL	1.619	95% KM Chebyshev UCL	1.944
97.5% KM Chebyshev UCL	2.395	99% KM Chebyshev UCL	3.281
Gamma GOF Tests on Detected Observations Only			

	A	B	C	D	E	F	G	H	I	J	K	L
1717					A-D Test Statistic	0.566	**Anderson-Darling GOF Test**					
1718					5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level					
1719					K-S Test Statistic	0.273	**Kolmogorov-Smirnov GOF**					
1720					5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level					
1721	**Detected data appear Gamma Distributed at 5% Significance Level**											
1722												
1723	**Gamma Statistics on Detected Data Only**											
1724					k hat (MLE)	2.313					k star (bias corrected MLE)	1.529
1725					Theta hat (MLE)	0.486					Theta star (bias corrected MLE)	0.735
1726					nu hat (MLE)	37					nu star (bias corrected)	24.46
1727					Mean (detects)	1.124						
1728												
1729	**Gamma ROS Statistics using Imputed Non-Detects**											
1730	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1731	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1732	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1733	This is especially true when the sample size is small.											
1734	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1735					Minimum	0.0349					Mean	0.906
1736					Maximum	2.43					Median	0.937
1737					SD	0.74					CV	0.817
1738					k hat (MLE)	0.882					k star (bias corrected MLE)	0.684
1739					Theta hat (MLE)	1.026					Theta star (bias corrected MLE)	1.323
1740					nu hat (MLE)	17.65					nu star (bias corrected)	13.69
1741					Adjusted Level of Significance (β)	0.0267						
1742					Approximate Chi Square Value (13.69, α)	6.358					Adjusted Chi Square Value (13.69, β)	5.514
1743					95% Gamma Approximate UCL (use when n>=50)	1.95					95% Gamma Adjusted UCL (use when n<50)	2.249
1744												
1745	**Estimates of Gamma Parameters using KM Estimates**											
1746					Mean (KM)	0.901					SD (KM)	0.708
1747					Variance (KM)	0.501					SE of Mean (KM)	0.239
1748					k hat (KM)	1.622					k star (KM)	1.202
1749					nu hat (KM)	32.44					nu star (KM)	24.04
1750					theta hat (KM)	0.556					theta star (KM)	0.75
1751					80% gamma percentile (KM)	1.427					90% gamma percentile (KM)	1.983
1752					95% gamma percentile (KM)	2.531					99% gamma percentile (KM)	3.788
1753												
1754	**Gamma Kaplan-Meier (KM) Statistics**											
1755					Approximate Chi Square Value (24.04, α)	13.88					Adjusted Chi Square Value (24.04, β)	12.56
1756					95% Gamma Approximate KM-UCL (use when n>=50)	1.561					95% Gamma Adjusted KM-UCL (use when n<50)	1.725
1757												
1758	**Lognormal GOF Test on Detected Observations Only**											
1759					Shapiro Wilk Test Statistic	0.789	**Shapiro Wilk GOF Test**					
1760					5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level					
1761					Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**					
1762					5% Lilliefors Critical Value	0.283	Detected Data Not Lognormal at 5% Significance Level					
1763	**Detected Data Not Lognormal at 5% Significance Level**											
1764												
1765	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1766					Mean in Original Scale	0.929					Mean in Log Scale	-0.471
1767					SD in Original Scale	0.71					SD in Log Scale	1.077
1768					95% t UCL (assumes normality of ROS data)	1.341					95% Percentile Bootstrap UCL	1.309

	A–E	F	G–K	L
1769	95% BCA Bootstrap UCL	1.333	95% Bootstrap t UCL	1.408
1770	95% H-UCL (Log ROS)	3.597		
1771				
1772	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1773	KM Mean (logged)	-0.985	KM Geo Mean	0.373
1774	KM SD (logged)	1.888	95% Critical H Value (KM-Log)	5.125
1775	KM Standard Error of Mean (logged)	0.638	95% H-UCL (KM -Log)	55.87
1776	KM SD (logged)	1.888	95% Critical H Value (KM-Log)	5.125
1777	KM Standard Error of Mean (logged)	0.638		
1778				
1779	**DL/2 Statistics**			
1780	**DL/2 Normal**		**DL/2 Log-Transformed**	
1781	Mean in Original Scale	0.9	Mean in Log Scale	-1.121
1782	SD in Original Scale	0.747	SD in Log Scale	2.257
1783	95% t UCL (Assumes normality)	1.333	95% H-Stat UCL	387
1784	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1785				
1786	**Nonparametric Distribution Free UCL Statistics**			
1787	**Detected Data appear Normal Distributed at 5% Significance Level**			
1788				
1789	**Suggested UCL to Use**			
1790	95% KM (t) UCL	1.34		
1791				
1792	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1793	Recommendations are based upon data size, data distribution, and skewness.			
1794	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1795	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1796				

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:41:35 AM
From File	CVEC GT2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics			
Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	5	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	9
Minimum Detect	2.54	Minimum Non-Detect	1.85
Maximum Detect	16.7	Maximum Non-Detect	12
Variance Detects	35.58	Percent Non-Detects	64.29%
Mean Detects	6.618	SD Detects	5.965
Median Detects	3.55	CV Detects	0.901
Skewness Detects	1.721	Kurtosis Detects	2.758
Mean of Logged Detects	1.615	SD of Logged Detects	0.789
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	3.904	KM Standard Error of Mean	1.195
KM SD	3.877	95% KM (BCA) UCL	5.926
95% KM (t) UCL	6.02	95% KM (Percentile Bootstrap) UCL	5.893
95% KM (z) UCL	5.869	95% KM Bootstrap t UCL	9.909
90% KM Chebyshev UCL	7.488	95% KM Chebyshev UCL	9.112
97.5% KM Chebyshev UCL	11.36	99% KM Chebyshev UCL	15.79
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.482	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.306	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.972	k star (bias corrected MLE)	0.922
Theta hat (MLE)	3.356	Theta star (bias corrected MLE)	7.177
nu hat (MLE)	19.72	nu star (bias corrected)	9.221
Mean (detects)	6.618		
Gamma ROS Statistics using Imputed Non-Detects			

	A–E	F	G–K	L
53	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
54	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
55	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
56	This is especially true when the sample size is small.			
57	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
58	Minimum	0.01	Mean	2.44
59	Maximum	16.7	Median	0.335
60	SD	4.627	CV	1.897
61	k hat (MLE)	0.277	k star (bias corrected MLE)	0.265
62	Theta hat (MLE)	8.81	Theta star (bias corrected MLE)	9.2
63	nu hat (MLE)	7.753	nu star (bias corrected)	7.425
64	Adjusted Level of Significance (β)	0.0312		
65	Approximate Chi Square Value (7.43, α)	2.407	Adjusted Chi Square Value (7.43, β)	2.045
66	95% Gamma Approximate UCL (use when n>=50)	7.526	95% Gamma Adjusted UCL (use when n<50)	8.857
67				
68	**Estimates of Gamma Parameters using KM Estimates**			
69	Mean (KM)	3.904	SD (KM)	3.877
70	Variance (KM)	15.03	SE of Mean (KM)	1.195
71	k hat (KM)	1.014	k star (KM)	0.845
72	nu hat (KM)	28.4	nu star (KM)	23.65
73	theta hat (KM)	3.849	theta star (KM)	4.623
74	80% gamma percentile (KM)	6.36	90% gamma percentile (KM)	9.37
75	95% gamma percentile (KM)	12.42	99% gamma percentile (KM)	19.6
76				
77	**Gamma Kaplan-Meier (KM) Statistics**			
78	Approximate Chi Square Value (23.65, α)	13.58	Adjusted Chi Square Value (23.65, β)	12.58
79	95% Gamma Approximate KM-UCL (use when n>=50)	6.798	95% Gamma Adjusted KM-UCL (use when n<50)	7.341
80				
81	**Lognormal GOF Test on Detected Observations Only**			
82	Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**	
83	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
84	Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**	
85	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
86	**Detected Data appear Lognormal at 5% Significance Level**			
87				
88	**Lognormal ROS Statistics Using Imputed Non-Detects**			
89	Mean in Original Scale	3.298	Mean in Log Scale	0.781
90	SD in Original Scale	4.204	SD in Log Scale	0.833
91	95% t UCL (assumes normality of ROS data)	5.288	95% Percentile Bootstrap UCL	5.272
92	95% BCA Bootstrap UCL	6.481	95% Bootstrap t UCL	11.41
93	95% H-UCL (Log ROS)	5.537		
94				
95	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
96	KM Mean (logged)	1.098	KM Geo Mean	2.998
97	KM SD (logged)	0.626	95% Critical H Value (KM-Log)	2.247
98	KM Standard Error of Mean (logged)	0.206	95% H-UCL (KM -Log)	5.389
99	KM SD (logged)	0.626	95% Critical H Value (KM-Log)	2.247
100	KM Standard Error of Mean (logged)	0.206		
101				
102	**DL/2 Statistics**			
103	**DL/2 Normal**		**DL/2 Log-Transformed**	
104	Mean in Original Scale	4.199	Mean in Log Scale	1.119

	A–E	F	G–K	L
105	SD in Original Scale	4.042	SD in Log Scale	0.81
106	95% t UCL (Assumes normality)	6.112	95% H-Stat UCL	7.451
107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
108				
109	**Nonparametric Distribution Free UCL Statistics**			
110	**Detected Data appear Normal Distributed at 5% Significance Level**			
111				
112	**Suggested UCL to Use**			
113	95% KM (t) UCL	6.02		
114				
115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
116	Recommendations are based upon data size, data distribution, and skewness.			
117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
119				
120	**Lead**			
121				
122	**General Statistics**			
123	Total Number of Observations	14	Number of Distinct Observations	14
124	Number of Detects	13	Number of Non-Detects	1
125	Number of Distinct Detects	13	Number of Distinct Non-Detects	1
126	Minimum Detect	11.9	Minimum Non-Detect	9.2
127	Maximum Detect	33.2	Maximum Non-Detect	9.2
128	Variance Detects	32.89	Percent Non-Detects	7.143%
129	Mean Detects	19.3	SD Detects	5.735
130	Median Detects	18.1	CV Detects	0.297
131	Skewness Detects	1.403	Kurtosis Detects	2.039
132	Mean of Logged Detects	2.924	SD of Logged Detects	0.271
133				
134	**Normal GOF Test on Detects Only**			
135	Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**	
136	5% Shapiro Wilk Critical Value	0.866	Detected Data appear Normal at 5% Significance Level	
137	Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**	
138	5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level	
139	**Detected Data appear Approximate Normal at 5% Significance Level**			
140				
141	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
142	KM Mean	18.58	KM Standard Error of Mean	1.645
143	KM SD	5.912	95% KM (BCA) UCL	21.32
144	95% KM (t) UCL	21.49	95% KM (Percentile Bootstrap) UCL	21.31
145	95% KM (z) UCL	21.28	95% KM Bootstrap t UCL	22.4
146	90% KM Chebyshev UCL	23.51	95% KM Chebyshev UCL	25.75
147	97.5% KM Chebyshev UCL	28.85	99% KM Chebyshev UCL	34.94
148				
149	**Gamma GOF Tests on Detected Observations Only**			
150	A-D Test Statistic	0.503	**Anderson-Darling GOF Test**	
151	5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level	
152	K-S Test Statistic	0.234	**Kolmogorov-Smirnov GOF**	
153	5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level	
154	**Detected data appear Gamma Distributed at 5% Significance Level**			
155				
156	**Gamma Statistics on Detected Data Only**			

	A–E	F	G–K	L
157	k hat (MLE)	14.12	k star (bias corrected MLE)	10.91
158	Theta hat (MLE)	1.367	Theta star (bias corrected MLE)	1.768
159	nu hat (MLE)	367.2	nu star (bias corrected)	283.8
160	Mean (detects)	19.3		
161				
162	**Gamma ROS Statistics using Imputed Non-Detects**			
163	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
164	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
165	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
166	This is especially true when the sample size is small.			
167	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
168	Minimum	7.77	Mean	18.48
169	Maximum	33.2	Median	17.75
170	SD	6.313	CV	0.342
171	k hat (MLE)	9.314	k star (bias corrected MLE)	7.366
172	Theta hat (MLE)	1.984	Theta star (bias corrected MLE)	2.508
173	nu hat (MLE)	260.8	nu star (bias corrected)	206.2
174	Adjusted Level of Significance (β)	0.0312		
175	Approximate Chi Square Value (206.24, α)	174	Adjusted Chi Square Value (206.24, β)	170.1
176	95% Gamma Approximate UCL (use when n>=50)	21.9	95% Gamma Adjusted UCL (use when n<50)	22.4
177				
178	**Estimates of Gamma Parameters using KM Estimates**			
179	Mean (KM)	18.58	SD (KM)	5.912
180	Variance (KM)	34.96	SE of Mean (KM)	1.645
181	k hat (KM)	9.874	k star (KM)	7.806
182	nu hat (KM)	276.5	nu star (KM)	218.6
183	theta hat (KM)	1.882	theta star (KM)	2.38
184	80% gamma percentile (KM)	23.82	90% gamma percentile (KM)	27.45
185	95% gamma percentile (KM)	30.69	99% gamma percentile (KM)	37.43
186				
187	**Gamma Kaplan-Meier (KM) Statistics**			
188	Approximate Chi Square Value (218.56, α)	185.3	Adjusted Chi Square Value (218.56, β)	181.3
189	95% Gamma Approximate KM-UCL (use when n>=50)	21.91	95% Gamma Adjusted KM-UCL (use when n<50)	22.4
190				
191	**Lognormal GOF Test on Detected Observations Only**			
192	Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**	
193	5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
194	Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**	
195	5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level	
196	**Detected Data appear Lognormal at 5% Significance Level**			
197				
198	**Lognormal ROS Statistics Using Imputed Non-Detects**			
199	Mean in Original Scale	18.61	Mean in Log Scale	2.878
200	SD in Original Scale	6.08	SD in Log Scale	0.314
201	95% t UCL (assumes normality of ROS data)	21.49	95% Percentile Bootstrap UCL	21.14
202	95% BCA Bootstrap UCL	21.64	95% Bootstrap t UCL	22.45
203	95% H-UCL (Log ROS)	22.04		
204				
205	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
206	KM Mean (logged)	2.874	KM Geo Mean	17.71
207	KM SD (logged)	0.31	95% Critical H Value (KM-Log)	1.902
208	KM Standard Error of Mean (logged)	0.0862	95% H-UCL (KM -Log)	21.88

209	KM SD (logged)	0.31	95% Critical H Value (KM-Log)	1.902
210	KM Standard Error of Mean (logged)	0.0862		
211				
212	**DL/2 Statistics**			
213	**DL/2 Normal**		**DL/2 Log-Transformed**	
214	Mean in Original Scale	18.25	Mean in Log Scale	2.824
215	SD in Original Scale	6.767	SD in Log Scale	0.456
216	95% t UCL (Assumes normality)	21.45	95% H-Stat UCL	24.09
217	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
218				
219	**Nonparametric Distribution Free UCL Statistics**			
220	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
221				
222	**Suggested UCL to Use**			
223	95% KM (t) UCL	21.49		
224				
225	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
226	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
227				
228	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
229	Recommendations are based upon data size, data distribution, and skewness.			
230	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
231	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
232				
233	**2-Methylnaphthalene**			
234				
235	**General Statistics**			
236	Total Number of Observations	26	Number of Distinct Observations	22
237	Number of Detects	4	Number of Non-Detects	22
238	Number of Distinct Detects	4	Number of Distinct Non-Detects	18
239	Minimum Detect	0.0146	Minimum Non-Detect	0.0118
240	Maximum Detect	0.319	Maximum Non-Detect	2.47
241	Variance Detects	0.0176	Percent Non-Detects	84.62%
242	Mean Detects	0.139	SD Detects	0.133
243	Median Detects	0.11	CV Detects	0.958
244	Skewness Detects	1.041	Kurtosis Detects	0.67
245	Mean of Logged Detects	-2.482	SD of Logged Detects	1.319
246				
247	**Normal GOF Test on Detects Only**			
248	Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**	
249	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
250	Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
251	5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
252	**Detected Data appear Normal at 5% Significance Level**			
253				
254	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
255	KM Mean	0.0335	KM Standard Error of Mean	0.0154
256	KM SD	0.0658	95% KM (BCA) UCL	N/A
257	95% KM (t) UCL	0.0598	95% KM (Percentile Bootstrap) UCL	N/A
258	95% KM (z) UCL	0.0588	95% KM Bootstrap t UCL	N/A
259	90% KM Chebyshev UCL	0.0797	95% KM Chebyshev UCL	0.101
260	97.5% KM Chebyshev UCL	0.13	99% KM Chebyshev UCL	0.187

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.193	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.666	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.17	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.402	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.128	k star (bias corrected MLE)	0.449
Theta hat (MLE)	0.123	Theta star (bias corrected MLE)	0.309
nu hat (MLE)	9.02	nu star (bias corrected)	3.588
Mean (detects)	0.139		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0298
Maximum	0.319	Median	0.01
SD	0.066	CV	2.216
k hat (MLE)	0.779	k star (bias corrected MLE)	0.715
Theta hat (MLE)	0.0382	Theta star (bias corrected MLE)	0.0416
nu hat (MLE)	40.52	nu star (bias corrected)	37.18
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (37.18, α)	24.22	Adjusted Chi Square Value (37.18, β)	23.53
95% Gamma Approximate UCL (use when n>=50)	0.0457	95% Gamma Adjusted UCL (use when n<50)	N/A
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0335	SD (KM)	0.0658
Variance (KM)	0.00433	SE of Mean (KM)	0.0154
k hat (KM)	0.258	k star (KM)	0.254
nu hat (KM)	13.44	nu star (KM)	13.22
theta hat (KM)	0.129	theta star (KM)	0.132
80% gamma percentile (KM)	0.0489	90% gamma percentile (KM)	0.1
95% gamma percentile (KM)	0.161	99% gamma percentile (KM)	0.323
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (13.22, α)	6.041	Adjusted Chi Square Value (13.22, β)	5.722
95% Gamma Approximate KM-UCL (use when n>=50)	0.0732	95% Gamma Adjusted KM-UCL (use when n<50)	0.0773
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0224	Mean in Log Scale	-6.138

SD in Original Scale	0.0683	SD in Log Scale	1.767
95% t UCL (assumes normality of ROS data)	0.0453	95% Percentile Bootstrap UCL	0.0474
95% BCA Bootstrap UCL	0.0559	95% Bootstrap t UCL	0.114
95% H-UCL (Log ROS)	0.0371		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.087	KM Geo Mean	0.0168
KM SD (logged)	0.875	95% Critical H Value (KM-Log)	2.353
KM Standard Error of Mean (logged)	0.212	95% H-UCL (KM -Log)	0.0372
KM SD (logged)	0.875	95% Critical H Value (KM-Log)	2.353
KM Standard Error of Mean (logged)	0.212		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0947	Mean in Log Scale	-3.703
SD in Original Scale	0.243	SD in Log Scale	1.525
95% t UCL (Assumes normality)	0.176	95% H-Stat UCL	0.213
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0598		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Acenaphthene			
General Statistics			
Total Number of Observations	26	Number of Distinct Observations	22
Number of Detects	4	Number of Non-Detects	22
Number of Distinct Detects	4	Number of Distinct Non-Detects	18
Minimum Detect	0.0223	Minimum Non-Detect	0.0121
Maximum Detect	0.135	Maximum Non-Detect	2.47
Variance Detects	0.0023	Percent Non-Detects	84.62%
Mean Detects	0.0677	SD Detects	0.048
Median Detects	0.0567	CV Detects	0.709
Skewness Detects	1.244	Kurtosis Detects	2.11
Mean of Logged Detects	-2.89	SD of Logged Detects	0.741
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.916	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			

	A	B	C	D	E	F	G	H	I	J	K	L
365					KM Mean	0.0234					KM Standard Error of Mean	0.00703
366					KM SD	0.0278					95% KM (BCA) UCL	N/A
367					95% KM (t) UCL	0.0354					95% KM (Percentile Bootstrap) UCL	N/A
368					95% KM (z) UCL	0.035					95% KM Bootstrap t UCL	N/A
369					90% KM Chebyshev UCL	0.0445					95% KM Chebyshev UCL	0.0541
370					97.5% KM Chebyshev UCL	0.0674					99% KM Chebyshev UCL	0.0934
371												
372	**Gamma GOF Tests on Detected Observations Only**											
373					A-D Test Statistic	0.236	**Anderson-Darling GOF Test**					
374					5% A-D Critical Value	0.66	Detected data appear Gamma Distributed at 5% Significance Level					
375					K-S Test Statistic	0.213	**Kolmogorov-Smirnov GOF**					
376					5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level					
377	**Detected data appear Gamma Distributed at 5% Significance Level**											
378												
379	**Gamma Statistics on Detected Data Only**											
380					k hat (MLE)	2.699					k star (bias corrected MLE)	0.841
381					Theta hat (MLE)	0.0251					Theta star (bias corrected MLE)	0.0804
382					nu hat (MLE)	21.59					nu star (bias corrected)	6.731
383					Mean (detects)	0.0677						
384												
385	**Gamma ROS Statistics using Imputed Non-Detects**											
386	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
387	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
388	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
389	This is especially true when the sample size is small.											
390	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
391					Minimum	0.01					Mean	0.0189
392					Maximum	0.135					Median	0.01
393					SD	0.027					CV	1.429
394					k hat (MLE)	1.492					k star (bias corrected MLE)	1.345
395					Theta hat (MLE)	0.0127					Theta star (bias corrected MLE)	0.014
396					nu hat (MLE)	77.57					nu star (bias corrected)	69.95
397					Adjusted Level of Significance (β)	0.0398						
398					Approximate Chi Square Value (69.95, α)	51.7					Adjusted Chi Square Value (69.95, β)	50.66
399					95% Gamma Approximate UCL (use when n>=50)	0.0255					95% Gamma Adjusted UCL (use when n<50)	N/A
400												
401	**Estimates of Gamma Parameters using KM Estimates**											
402					Mean (KM)	0.0234					SD (KM)	0.0278
403					Variance (KM)	7.7532E-4					SE of Mean (KM)	0.00703
404					k hat (KM)	0.708					k star (KM)	0.652
405					nu hat (KM)	36.8					nu star (KM)	33.89
406					theta hat (KM)	0.0331					theta star (KM)	0.0359
407					80% gamma percentile (KM)	0.0386					90% gamma percentile (KM)	0.0598
408					95% gamma percentile (KM)	0.0818					99% gamma percentile (KM)	0.135
409												
410	**Gamma Kaplan-Meier (KM) Statistics**											
411					Approximate Chi Square Value (33.89, α)	21.58					Adjusted Chi Square Value (33.89, β)	20.93
412					95% Gamma Approximate KM-UCL (use when n>=50)	0.0368					95% Gamma Adjusted KM-UCL (use when n<50)	0.0379
413												
414	**Lognormal GOF Test on Detected Observations Only**											
415					Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk GOF Test**					
416					5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level					

	A–E	F	G–K	L
417	Lilliefors Test Statistic	0.196	Lilliefors GOF Test	
418	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
419	**Detected Data appear Lognormal at 5% Significance Level**			
420				
421	**Lognormal ROS Statistics Using Imputed Non-Detects**			
422	Mean in Original Scale	0.016	Mean in Log Scale	-4.74
423	SD in Original Scale	0.028	SD in Log Scale	0.913
424	95% t UCL (assumes normality of ROS data)	0.0254	95% Percentile Bootstrap UCL	0.0262
425	95% BCA Bootstrap UCL	0.0319	95% Bootstrap t UCL	0.0407
426	95% H-UCL (Log ROS)	0.0205		
427				
428	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
429	KM Mean (logged)	-4.086	KM Geo Mean	0.0168
430	KM SD (logged)	0.673	95% Critical H Value (KM-Log)	2.126
431	KM Standard Error of Mean (logged)	0.179	95% H-UCL (KM -Log)	0.0281
432	KM SD (logged)	0.673	95% Critical H Value (KM-Log)	2.126
433	KM Standard Error of Mean (logged)	0.179		
434				
435	**DL/2 Statistics**			
436	**DL/2 Normal**		**DL/2 Log-Transformed**	
437	Mean in Original Scale	0.0838	Mean in Log Scale	-3.761
438	SD in Original Scale	0.238	SD in Log Scale	1.426
439	95% t UCL (Assumes normality)	0.164	95% H-Stat UCL	0.156
440	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
441				
442	**Nonparametric Distribution Free UCL Statistics**			
443	**Detected Data appear Normal Distributed at 5% Significance Level**			
444				
445	**Suggested UCL to Use**			
446	95% KM (t) UCL	0.0354		
447				
448	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
449	Recommendations are based upon data size, data distribution, and skewness.			
450	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
451	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
452				
453	Acenaphthylene			
454				
455	**General Statistics**			
456	Total Number of Observations	26	Number of Distinct Observations	23
457	Number of Detects	7	Number of Non-Detects	19
458	Number of Distinct Detects	7	Number of Distinct Non-Detects	16
459	Minimum Detect	0.0212	Minimum Non-Detect	0.0118
460	Maximum Detect	1.25	Maximum Non-Detect	2.47
461	Variance Detects	0.206	Percent Non-Detects	73.08%
462	Mean Detects	0.399	SD Detects	0.454
463	Median Detects	0.227	CV Detects	1.136
464	Skewness Detects	1.23	Kurtosis Detects	1.015
465	Mean of Logged Detects	-1.767	SD of Logged Detects	1.608
466				
467	**Normal GOF Test on Detects Only**			
468	Shapiro Wilk Test Statistic	0.852	**Shapiro Wilk GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
469					5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level					
470					Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**					
471					5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level					
472	**Detected Data appear Normal at 5% Significance Level**											
473												
474	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
475					KM Mean	0.123					KM Standard Error of Mean	0.061
476					KM SD	0.282					95% KM (BCA) UCL	0.235
477					95% KM (t) UCL	0.227					95% KM (Percentile Bootstrap) UCL	0.224
478					95% KM (z) UCL	0.223					95% KM Bootstrap t UCL	0.316
479					90% KM Chebyshev UCL	0.306					95% KM Chebyshev UCL	0.388
480					97.5% KM Chebyshev UCL	0.503					99% KM Chebyshev UCL	0.729
481												
482	**Gamma GOF Tests on Detected Observations Only**											
483					A-D Test Statistic	0.293	**Anderson-Darling GOF Test**					
484					5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level					
485					K-S Test Statistic	0.195	**Kolmogorov-Smirnov GOF**					
486					5% K-S Critical Value	0.323	Detected data appear Gamma Distributed at 5% Significance Level					
487	**Detected data appear Gamma Distributed at 5% Significance Level**											
488												
489	**Gamma Statistics on Detected Data Only**											
490					k hat (MLE)	0.71					k star (bias corrected MLE)	0.501
491					Theta hat (MLE)	0.562					Theta star (bias corrected MLE)	0.797
492					nu hat (MLE)	9.944					nu star (bias corrected)	7.016
493					Mean (detects)	0.399						
494												
495	**Gamma ROS Statistics using Imputed Non-Detects**											
496	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
497	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
498	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
499	This is especially true when the sample size is small.											
500	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
501					Minimum	0.01					Mean	0.115
502					Maximum	1.25					Median	0.01
503					SD	0.284					CV	2.469
504					k hat (MLE)	0.393					k star (bias corrected MLE)	0.374
505					Theta hat (MLE)	0.292					Theta star (bias corrected MLE)	0.307
506					nu hat (MLE)	20.46					nu star (bias corrected)	19.43
507					Adjusted Level of Significance (β)	0.0398						
508					Approximate Chi Square Value (19.43, α)	10.43					Adjusted Chi Square Value (19.43, β)	10
509					95% Gamma Approximate UCL (use when n>=50)	0.214					95% Gamma Adjusted UCL (use when n<50)	0.223
510												
511	**Estimates of Gamma Parameters using KM Estimates**											
512					Mean (KM)	0.123					SD (KM)	0.282
513					Variance (KM)	0.0794					SE of Mean (KM)	0.061
514					k hat (KM)	0.19					k star (KM)	0.194
515					nu hat (KM)	9.871					nu star (KM)	10.07
516					theta hat (KM)	0.647					theta star (KM)	0.634
517					80% gamma percentile (KM)	0.159					90% gamma percentile (KM)	0.371
518					95% gamma percentile (KM)	0.638					99% gamma percentile (KM)	1.376
519												
520	**Gamma Kaplan-Meier (KM) Statistics**											

Approximate Chi Square Value (10.07, α)	3.982	Adjusted Chi Square Value (10.07, β)	3.732
95% Gamma Approximate KM-UCL (use when n>=50)	0.31	95% Gamma Adjusted KM-UCL (use when n<50)	0.331
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.109	Mean in Log Scale	-5.129
SD in Original Scale	0.286	SD in Log Scale	2.319
95% t UCL (assumes normality of ROS data)	0.205	95% Percentile Bootstrap UCL	0.21
95% BCA Bootstrap UCL	0.252	95% Bootstrap t UCL	0.328
95% H-UCL (Log ROS)	0.715		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.615	KM Geo Mean	0.0269
KM SD (logged)	1.433	95% Critical H Value (KM-Log)	3.114
KM Standard Error of Mean (logged)	0.319	95% H-UCL (KM -Log)	0.183
KM SD (logged)	1.433	95% Critical H Value (KM-Log)	3.114
KM Standard Error of Mean (logged)	0.319		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.18	Mean in Log Scale	-3.266
SD in Original Scale	0.352	SD in Log Scale	1.788
95% t UCL (Assumes normality)	0.297	95% H-Stat UCL	0.7
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.227		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Anthracene			
General Statistics			
Total Number of Observations	26	Number of Distinct Observations	22
Number of Detects	5	Number of Non-Detects	21
Number of Distinct Detects	5	Number of Distinct Non-Detects	17
Minimum Detect	0.0205	Minimum Non-Detect	0.0121
Maximum Detect	0.351	Maximum Non-Detect	2.47
Variance Detects	0.0254	Percent Non-Detects	80.77%
Mean Detects	0.21	SD Detects	0.159

	A–E	F	G–K	L
573	Median Detects	0.277	CV Detects	0.76
574	Skewness Detects	-0.498	Kurtosis Detects	-3.021
575	Mean of Logged Detects	-2.031	SD of Logged Detects	1.285
576				
577	**Normal GOF Test on Detects Only**			
578	Shapiro Wilk Test Statistic	0.821	**Shapiro Wilk GOF Test**	
579	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
580	Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
581	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
582	**Detected Data appear Normal at 5% Significance Level**			
583				
584	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
585	KM Mean	0.0529	KM Standard Error of Mean	0.0227
586	KM SD	0.101	95% KM (BCA) UCL	0.0929
587	95% KM (t) UCL	0.0917	95% KM (Percentile Bootstrap) UCL	0.0898
588	95% KM (z) UCL	0.0903	95% KM Bootstrap t UCL	0.0865
589	90% KM Chebyshev UCL	0.121	95% KM Chebyshev UCL	0.152
590	97.5% KM Chebyshev UCL	0.195	99% KM Chebyshev UCL	0.279
591				
592	**Gamma GOF Tests on Detected Observations Only**			
593	A-D Test Statistic	0.576	**Anderson-Darling GOF Test**	
594	5% A-D Critical Value	0.689	Detected data appear Gamma Distributed at 5% Significance Level	
595	K-S Test Statistic	0.332	**Kolmogorov-Smirnov GOF**	
596	5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level	
597	**Detected data appear Gamma Distributed at 5% Significance Level**			
598				
599	**Gamma Statistics on Detected Data Only**			
600	k hat (MLE)	1.204	k star (bias corrected MLE)	0.615
601	Theta hat (MLE)	0.174	Theta star (bias corrected MLE)	0.341
602	nu hat (MLE)	12.04	nu star (bias corrected)	6.149
603	Mean (detects)	0.21		
604				
605	**Gamma ROS Statistics using Imputed Non-Detects**			
606	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
607	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
608	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
609	This is especially true when the sample size is small.			
610	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
611	Minimum	0.01	Mean	0.0484
612	Maximum	0.351	Median	0.01
613	SD	0.103	CV	2.118
614	k hat (MLE)	0.574	k star (bias corrected MLE)	0.534
615	Theta hat (MLE)	0.0843	Theta star (bias corrected MLE)	0.0907
616	nu hat (MLE)	29.87	nu star (bias corrected)	27.76
617	Adjusted Level of Significance (β)	0.0398		
618	Approximate Chi Square Value (27.76, α)	16.74	Adjusted Chi Square Value (27.76, β)	16.18
619	95% Gamma Approximate UCL (use when n>=50)	0.0803	95% Gamma Adjusted UCL (use when n<50)	0.0831
620				
621	**Estimates of Gamma Parameters using KM Estimates**			
622	Mean (KM)	0.0529	SD (KM)	0.101
623	Variance (KM)	0.0103	SE of Mean (KM)	0.0227
624	k hat (KM)	0.272	k star (KM)	0.266

nu hat (KM)	14.14	nu star (KM)	13.84
theta hat (KM)	0.194	theta star (KM)	0.199
80% gamma percentile (KM)	0.0784	90% gamma percentile (KM)	0.158
95% gamma percentile (KM)	0.251	99% gamma percentile (KM)	0.497
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (13.84, α)	6.463	Adjusted Chi Square Value (13.84, β)	6.131
95% Gamma Approximate KM-UCL (use when n>=50)	0.113	95% Gamma Adjusted KM-UCL (use when n<50)	0.119
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.817	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.32	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0421	Mean in Log Scale	-5.5
SD in Original Scale	0.105	SD in Log Scale	1.908
95% t UCL (assumes normality of ROS data)	0.0773	95% Percentile Bootstrap UCL	0.0798
95% BCA Bootstrap UCL	0.0902	95% Bootstrap t UCL	0.0991
95% H-UCL (Log ROS)	0.11		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.89	KM Geo Mean	0.0204
KM SD (logged)	1.089	95% Critical H Value (KM-Log)	2.625
KM Standard Error of Mean (logged)	0.252	95% H-UCL (KM -Log)	0.0655
KM SD (logged)	1.089	95% Critical H Value (KM-Log)	2.625
KM Standard Error of Mean (logged)	0.252		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.113	Mean in Log Scale	-3.569
SD in Original Scale	0.25	SD in Log Scale	1.636
95% t UCL (Assumes normality)	0.197	95% H-Stat UCL	0.329
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0917		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[a]anthracene			
General Statistics			
Total Number of Observations	26	Number of Distinct Observations	23

Number of Detects	9	Number of Non-Detects	17
Number of Distinct Detects	9	Number of Distinct Non-Detects	14
Minimum Detect	0.0192	Minimum Non-Detect	0.0121
Maximum Detect	1.31	Maximum Non-Detect	0.135
Variance Detects	0.178	Percent Non-Detects	65.38%
Mean Detects	0.255	SD Detects	0.422
Median Detects	0.0791	CV Detects	1.656
Skewness Detects	2.429	Kurtosis Detects	6.07
Mean of Logged Detects	-2.355	SD of Logged Detects	1.442
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.63	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0986	KM Standard Error of Mean	0.0542
KM SD	0.26	95% KM (BCA) UCL	0.194
95% KM (t) UCL	0.191	95% KM (Percentile Bootstrap) UCL	0.191
95% KM (z) UCL	0.188	95% KM Bootstrap t UCL	0.547
90% KM Chebyshev UCL	0.261	95% KM Chebyshev UCL	0.335
97.5% KM Chebyshev UCL	0.437	99% KM Chebyshev UCL	0.638
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.599	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.761	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.209	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.292	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.623	k star (bias corrected MLE)	0.489
Theta hat (MLE)	0.409	Theta star (bias corrected MLE)	0.52
nu hat (MLE)	11.21	nu star (bias corrected)	8.809
Mean (detects)	0.255		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0947
Maximum	1.31	Median	0.01
SD	0.266	CV	2.814
k hat (MLE)	0.441	k star (bias corrected MLE)	0.416
Theta hat (MLE)	0.215	Theta star (bias corrected MLE)	0.228
nu hat (MLE)	22.94	nu star (bias corrected)	21.62
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (21.62, α)	12.06	Adjusted Chi Square Value (21.62, β)	11.58

	A B C D E	F	G H I J K	L
729	95% Gamma Approximate UCL (use when n>=50)	0.17	95% Gamma Adjusted UCL (use when n<50)	0.177
730				
731	**Estimates of Gamma Parameters using KM Estimates**			
732	Mean (KM)	0.0986	SD (KM)	0.26
733	Variance (KM)	0.0677	SE of Mean (KM)	0.0542
734	k hat (KM)	0.144	k star (KM)	0.153
735	nu hat (KM)	7.475	nu star (KM)	7.946
736	theta hat (KM)	0.686	theta star (KM)	0.645
737	80% gamma percentile (KM)	0.109	90% gamma percentile (KM)	0.293
738	95% gamma percentile (KM)	0.541	99% gamma percentile (KM)	1.257
739				
740	**Gamma Kaplan-Meier (KM) Statistics**			
741	Approximate Chi Square Value (7.95, α)	2.704	Adjusted Chi Square Value (7.95, β)	2.505
742	95% Gamma Approximate KM-UCL (use when n>=50)	0.29	95% Gamma Adjusted KM-UCL (use when n<50)	0.313
743				
744	**Lognormal GOF Test on Detected Observations Only**			
745	Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**	
746	5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
747	Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**	
748	5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
749	**Detected Data appear Lognormal at 5% Significance Level**			
750				
751	**Lognormal ROS Statistics Using Imputed Non-Detects**			
752	Mean in Original Scale	0.0904	Mean in Log Scale	-4.623
753	SD in Original Scale	0.268	SD in Log Scale	1.954
754	95% t UCL (assumes normality of ROS data)	0.18	95% Percentile Bootstrap UCL	0.19
755	95% BCA Bootstrap UCL	0.246	95% Bootstrap t UCL	0.557
756	95% H-UCL (Log ROS)	0.308		
757				
758	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
759	KM Mean (logged)	-3.598	KM Geo Mean	0.0274
760	KM SD (logged)	1.252	95% Critical H Value (KM-Log)	2.849
761	KM Standard Error of Mean (logged)	0.271	95% H-UCL (KM -Log)	0.122
762	KM SD (logged)	1.252	95% Critical H Value (KM-Log)	2.849
763	KM Standard Error of Mean (logged)	0.271		
764				
765	**DL/2 Statistics**			
766	**DL/2 Normal**		**DL/2 Log-Transformed**	
767	Mean in Original Scale	0.106	Mean in Log Scale	-3.486
768	SD in Original Scale	0.263	SD in Log Scale	1.459
769	95% t UCL (Assumes normality)	0.195	95% H-Stat UCL	0.223
770	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
771				
772	**Nonparametric Distribution Free UCL Statistics**			
773	**Detected Data appear Gamma Distributed at 5% Significance Level**			
774				
775	**Suggested UCL to Use**			
776	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.313		
777				
778	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
779	Recommendations are based upon data size, data distribution, and skewness.			
780	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[a]pyrene			
General Statistics			
Total Number of Observations	25	Number of Distinct Observations	23
		Number of Missing Observations	1
Number of Detects	12	Number of Non-Detects	13
Number of Distinct Detects	12	Number of Distinct Non-Detects	11
Minimum Detect	0.0159	Minimum Non-Detect	0.0121
Maximum Detect	0.699	Maximum Non-Detect	0.135
Variance Detects	0.051	Percent Non-Detects	52%
Mean Detects	0.162	SD Detects	0.226
Median Detects	0.0582	CV Detects	1.396
Skewness Detects	1.955	Kurtosis Detects	2.708
Mean of Logged Detects	-2.537	SD of Logged Detects	1.201
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.653	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.356	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0888	KM Standard Error of Mean	0.0349
KM SD	0.166	95% KM (BCA) UCL	0.152
95% KM (t) UCL	0.148	95% KM (Percentile Bootstrap) UCL	0.148
95% KM (z) UCL	0.146	95% KM Bootstrap t UCL	0.273
90% KM Chebyshev UCL	0.193	95% KM Chebyshev UCL	0.241
97.5% KM Chebyshev UCL	0.307	99% KM Chebyshev UCL	0.436
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.781	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.763	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.216	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.254	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data follow Appr. Gamma Distribution at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.826	k star (bias corrected MLE)	0.675
Theta hat (MLE)	0.196	Theta star (bias corrected MLE)	0.24
nu hat (MLE)	19.82	nu star (bias corrected)	16.2
Mean (detects)	0.162		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0829

	A–E	F	G–K	L
833	Maximum	0.699	Median	0.01
834	SD	0.171	CV	2.069
835	k hat (MLE)	0.557	k star (bias corrected MLE)	0.517
836	Theta hat (MLE)	0.149	Theta star (bias corrected MLE)	0.16
837	nu hat (MLE)	27.84	nu star (bias corrected)	25.84
838	Adjusted Level of Significance (β)	0.0395		
839	Approximate Chi Square Value (25.84, α)	15.25	Adjusted Chi Square Value (25.84, β)	14.7
840	95% Gamma Approximate UCL (use when n>=50)	0.14	95% Gamma Adjusted UCL (use when n<50)	0.146
841				
842	**Estimates of Gamma Parameters using KM Estimates**			
843	Mean (KM)	0.0888	SD (KM)	0.166
844	Variance (KM)	0.0276	SE of Mean (KM)	0.0349
845	k hat (KM)	0.286	k star (KM)	0.278
846	nu hat (KM)	14.28	nu star (KM)	13.9
847	theta hat (KM)	0.311	theta star (KM)	0.319
848	80% gamma percentile (KM)	0.133	90% gamma percentile (KM)	0.264
849	95% gamma percentile (KM)	0.416	99% gamma percentile (KM)	0.815
850				
851	**Gamma Kaplan-Meier (KM) Statistics**			
852	Approximate Chi Square Value (13.90, α)	6.503	Adjusted Chi Square Value (13.90, β)	6.159
853	95% Gamma Approximate KM-UCL (use when n>=50)	0.19	95% Gamma Adjusted KM-UCL (use when n<50)	0.2
854				
855	**Lognormal GOF Test on Detected Observations Only**			
856	Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	
857	5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
858	Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**	
859	5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
860	**Detected Data appear Lognormal at 5% Significance Level**			
861				
862	**Lognormal ROS Statistics Using Imputed Non-Detects**			
863	Mean in Original Scale	0.0834	Mean in Log Scale	-3.674
864	SD in Original Scale	0.171	SD in Log Scale	1.464
865	95% t UCL (assumes normality of ROS data)	0.142	95% Percentile Bootstrap UCL	0.145
866	95% BCA Bootstrap UCL	0.169	95% Bootstrap t UCL	0.287
867	95% H-UCL (Log ROS)	0.189		
868				
869	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
870	KM Mean (logged)	-3.343	KM Geo Mean	0.0353
871	KM SD (logged)	1.191	95% Critical H Value (KM-Log)	2.748
872	KM Standard Error of Mean (logged)	0.265	95% H-UCL (KM -Log)	0.14
873	KM SD (logged)	1.191	95% Critical H Value (KM-Log)	2.748
874	KM Standard Error of Mean (logged)	0.265		
875				
876	**DL/2 Statistics**			
877	**DL/2 Normal**		**DL/2 Log-Transformed**	
878	Mean in Original Scale	0.0944	Mean in Log Scale	-3.263
879	SD in Original Scale	0.168	SD in Log Scale	1.34
880	95% t UCL (Assumes normality)	0.152	95% H-Stat UCL	0.211
881	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
882				
883	**Nonparametric Distribution Free UCL Statistics**			
884	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**			

Suggested UCL to Use

Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.2		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[b]fluoranthene

General Statistics

Total Number of Observations	26	Number of Distinct Observations	25
Number of Detects	14	Number of Non-Detects	12
Number of Distinct Detects	14	Number of Distinct Non-Detects	11
Minimum Detect	0.0143	Minimum Non-Detect	0.0121
Maximum Detect	1.31	Maximum Non-Detect	0.135
Variance Detects	0.129	Percent Non-Detects	46.15%
Mean Detects	0.241	SD Detects	0.36
Median Detects	0.075	CV Detects	1.494
Skewness Detects	2.348	Kurtosis Detects	5.948
Mean of Logged Detects	-2.328	SD of Logged Detects	1.406

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.673	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.274	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.14	KM Standard Error of Mean	0.0565
KM SD	0.277	95% KM (BCA) UCL	0.237
95% KM (t) UCL	0.236	95% KM (Percentile Bootstrap) UCL	0.238
95% KM (z) UCL	0.233	95% KM Bootstrap t UCL	0.357
90% KM Chebyshev UCL	0.309	95% KM Chebyshev UCL	0.386
97.5% KM Chebyshev UCL	0.493	99% KM Chebyshev UCL	0.702

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.58	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.778	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.672	k star (bias corrected MLE)	0.576
Theta hat (MLE)	0.358	Theta star (bias corrected MLE)	0.418
nu hat (MLE)	18.82	nu star (bias corrected)	16.12

Mean (detects)	0.241		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.134
Maximum	1.31	Median	0.0162
SD	0.285	CV	2.12
k hat (MLE)	0.468	k star (bias corrected MLE)	0.44
Theta hat (MLE)	0.287	Theta star (bias corrected MLE)	0.305
nu hat (MLE)	24.34	nu star (bias corrected)	22.86
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (22.86, α)	12.99	Adjusted Chi Square Value (22.86, β)	12.49
95% Gamma Approximate UCL (use when n>=50)	0.236	95% Gamma Adjusted UCL (use when n<50)	0.246

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.14	SD (KM)	0.277
Variance (KM)	0.0768	SE of Mean (KM)	0.0565
k hat (KM)	0.255	k star (KM)	0.251
nu hat (KM)	13.27	nu star (KM)	13.07
theta hat (KM)	0.549	theta star (KM)	0.557
80% gamma percentile (KM)	0.204	90% gamma percentile (KM)	0.42
95% gamma percentile (KM)	0.677	99% gamma percentile (KM)	1.359

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.07, α)	5.94	Adjusted Chi Square Value (13.07, β)	5.624
95% Gamma Approximate KM-UCL (use when n>=50)	0.308	95% Gamma Adjusted KM-UCL (use when n<50)	0.325

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.226	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.135	Mean in Log Scale	-3.467
SD in Original Scale	0.285	SD in Log Scale	1.697
95% t UCL (assumes normality of ROS data)	0.23	95% Percentile Bootstrap UCL	0.229
95% BCA Bootstrap UCL	0.27	95% Bootstrap t UCL	0.343
95% H-UCL (Log ROS)	0.435		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.125	KM Geo Mean	0.0439
KM SD (logged)	1.38	95% Critical H Value (KM-Log)	3.036
KM Standard Error of Mean (logged)	0.294	95% H-UCL (KM -Log)	0.263
KM SD (logged)	1.38	95% Critical H Value (KM-Log)	3.036
KM Standard Error of Mean (logged)	0.294		

989	**DL/2 Statistics**			
990	**DL/2 Normal**		**DL/2 Log-Transformed**	
991	Mean in Original Scale	0.145	Mean in Log Scale	-3.044
992	SD in Original Scale	0.281	SD in Log Scale	1.47
993	95% t UCL (Assumes normality)	0.239	95% H-Stat UCL	0.357
994	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
995				
996	**Nonparametric Distribution Free UCL Statistics**			
997	**Detected Data appear Gamma Distributed at 5% Significance Level**			
998				
999	**Suggested UCL to Use**			
1000	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.325		
1001				
1002	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1003	Recommendations are based upon data size, data distribution, and skewness.			
1004	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1005	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1006				
1007	**Benzo[g,h,i]perylene**			
1008				
1009	**General Statistics**			
1010	Total Number of Observations	26	Number of Distinct Observations	25
1011	Number of Detects	12	Number of Non-Detects	14
1012	Number of Distinct Detects	12	Number of Distinct Non-Detects	13
1013	Minimum Detect	0.0205	Minimum Non-Detect	0.0118
1014	Maximum Detect	1.27	Maximum Non-Detect	2.47
1015	Variance Detects	0.12	Percent Non-Detects	53.85%
1016	Mean Detects	0.206	SD Detects	0.346
1017	Median Detects	0.0978	CV Detects	1.682
1018	Skewness Detects	3.116	Kurtosis Detects	10.18
1019	Mean of Logged Detects	-2.305	SD of Logged Detects	1.15
1020				
1021	**Normal GOF Test on Detects Only**			
1022	Shapiro Wilk Test Statistic	0.539	**Shapiro Wilk GOF Test**	
1023	5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
1024	Lilliefors Test Statistic	0.32	**Lilliefors GOF Test**	
1025	5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
1026	**Detected Data Not Normal at 5% Significance Level**			
1027				
1028	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1029	KM Mean	0.111	KM Standard Error of Mean	0.0519
1030	KM SD	0.248	95% KM (BCA) UCL	0.208
1031	95% KM (t) UCL	0.199	95% KM (Percentile Bootstrap) UCL	0.204
1032	95% KM (z) UCL	0.196	95% KM Bootstrap t UCL	0.38
1033	90% KM Chebyshev UCL	0.266	95% KM Chebyshev UCL	0.337
1034	97.5% KM Chebyshev UCL	0.435	99% KM Chebyshev UCL	0.627
1035				
1036	**Gamma GOF Tests on Detected Observations Only**			
1037	A-D Test Statistic	0.721	**Anderson-Darling GOF Test**	
1038	5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level	
1039	K-S Test Statistic	0.217	**Kolmogorov-Smirnov GOF**	
1040	5% K-S Critical Value	0.254	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.818	k star (bias corrected MLE)	0.669
Theta hat (MLE)	0.251	Theta star (bias corrected MLE)	0.307
nu hat (MLE)	19.64	nu star (bias corrected)	16.07
Mean (detects)	0.206		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.1
Maximum	1.27	Median	0.01
SD	0.25	CV	2.493
k hat (MLE)	0.509	k star (bias corrected MLE)	0.476
Theta hat (MLE)	0.197	Theta star (bias corrected MLE)	0.211
nu hat (MLE)	26.49	nu star (bias corrected)	24.76
Adjusted Level of Significance (β)	0.0398		
Approximate Chi Square Value (24.76, α)	14.43	Adjusted Chi Square Value (24.76, β)	13.91
95% Gamma Approximate UCL (use when n>=50)	0.172	95% Gamma Adjusted UCL (use when n<50)	0.178

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.111	SD (KM)	0.248
Variance (KM)	0.0614	SE of Mean (KM)	0.0519
k hat (KM)	0.199	k star (KM)	0.202
nu hat (KM)	10.35	nu star (KM)	10.49
theta hat (KM)	0.555	theta star (KM)	0.548
80% gamma percentile (KM)	0.146	90% gamma percentile (KM)	0.334
95% gamma percentile (KM)	0.568	99% gamma percentile (KM)	1.211

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (10.49, α)	4.248	Adjusted Chi Square Value (10.49, β)	3.988
95% Gamma Approximate KM-UCL (use when n>=50)	0.273	95% Gamma Adjusted KM-UCL (use when n<50)	0.291

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.102	Mean in Log Scale	-3.475
SD in Original Scale	0.249	SD in Log Scale	1.414
95% t UCL (assumes normality of ROS data)	0.186	95% Percentile Bootstrap UCL	0.197
95% BCA Bootstrap UCL	0.259	95% Bootstrap t UCL	0.414
95% H-UCL (Log ROS)	0.201		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.249	KM Geo Mean	0.0388
KM SD (logged)	1.278	95% Critical H Value (KM-Log)	2.887
KM Standard Error of Mean (logged)	0.283	95% H-UCL (KM -Log)	0.184
KM SD (logged)	1.278	95% Critical H Value (KM-Log)	2.887
KM Standard Error of Mean (logged)	0.283		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.161	Mean in Log Scale	-3.059
SD in Original Scale	0.329	SD in Log Scale	1.589
95% t UCL (Assumes normality)	0.272	95% H-Stat UCL	0.482

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.291		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[k]fluoranthene

General Statistics

Total Number of Observations	26	Number of Distinct Observations	23
Number of Detects	6	Number of Non-Detects	20
Number of Distinct Detects	6	Number of Distinct Non-Detects	17
Minimum Detect	0.0165	Minimum Non-Detect	0.0118
Maximum Detect	0.219	Maximum Non-Detect	2.47
Variance Detects	0.00831	Percent Non-Detects	76.92%
Mean Detects	0.0945	SD Detects	0.0911
Median Detects	0.0623	CV Detects	0.965
Skewness Detects	0.607	Kurtosis Detects	-1.991
Mean of Logged Detects	-2.892	SD of Logged Detects	1.204

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.826	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0348	KM Standard Error of Mean	0.013
KM SD	0.0561	95% KM (BCA) UCL	0.0562
95% KM (t) UCL	0.057	95% KM (Percentile Bootstrap) UCL	0.0564
95% KM (z) UCL	0.0562	95% KM Bootstrap t UCL	0.0736
90% KM Chebyshev UCL	0.0738	95% KM Chebyshev UCL	0.0914
97.5% KM Chebyshev UCL	0.116	99% KM Chebyshev UCL	0.164

	A–E	F	G–K	L
1145				
1146	**Gamma GOF Tests on Detected Observations Only**			
1147	A-D Test Statistic	0.535	**Anderson-Darling GOF Test**	
1148	5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level	
1149	K-S Test Statistic	0.28	**Kolmogorov-Smirnov GOF**	
1150	5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level	
1151	**Detected data appear Gamma Distributed at 5% Significance Level**			
1152				
1153	**Gamma Statistics on Detected Data Only**			
1154	k hat (MLE)	1.074	k star (bias corrected MLE)	0.648
1155	Theta hat (MLE)	0.0879	Theta star (bias corrected MLE)	0.146
1156	nu hat (MLE)	12.89	nu star (bias corrected)	7.778
1157	Mean (detects)	0.0945		
1158				
1159	**Gamma ROS Statistics using Imputed Non-Detects**			
1160	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1161	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1162	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1163	This is especially true when the sample size is small.			
1164	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1165	Minimum	0.01	Mean	0.0295
1166	Maximum	0.219	Median	0.01
1167	SD	0.0546	CV	1.851
1168	k hat (MLE)	0.857	k star (bias corrected MLE)	0.784
1169	Theta hat (MLE)	0.0344	Theta star (bias corrected MLE)	0.0376
1170	nu hat (MLE)	44.57	nu star (bias corrected)	40.76
1171	Adjusted Level of Significance (β)	0.0398		
1172	Approximate Chi Square Value (40.76, α)	27.13	Adjusted Chi Square Value (40.76, β)	26.39
1173	95% Gamma Approximate UCL (use when n>=50)	0.0443	95% Gamma Adjusted UCL (use when n<50)	0.0455
1174				
1175	**Estimates of Gamma Parameters using KM Estimates**			
1176	Mean (KM)	0.0348	SD (KM)	0.0561
1177	Variance (KM)	0.00314	SE of Mean (KM)	0.013
1178	k hat (KM)	0.385	k star (KM)	0.366
1179	nu hat (KM)	20.02	nu star (KM)	19.04
1180	theta hat (KM)	0.0904	theta star (KM)	0.095
1181	80% gamma percentile (KM)	0.0555	90% gamma percentile (KM)	0.0997
1182	95% gamma percentile (KM)	0.149	99% gamma percentile (KM)	0.274
1183				
1184	**Gamma Kaplan-Meier (KM) Statistics**			
1185	Approximate Chi Square Value (19.04, α)	10.15	Adjusted Chi Square Value (19.04, β)	9.718
1186	95% Gamma Approximate KM-UCL (use when n>=50)	0.0653	95% Gamma Adjusted KM-UCL (use when n<50)	0.0682
1187				
1188	**Lognormal GOF Test on Detected Observations Only**			
1189	Shapiro Wilk Test Statistic	0.837	**Shapiro Wilk GOF Test**	
1190	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
1191	Lilliefors Test Statistic	0.242	**Lilliefors GOF Test**	
1192	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
1193	**Detected Data appear Lognormal at 5% Significance Level**			
1194				
1195	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1196	Mean in Original Scale	0.0239	Mean in Log Scale	-5.316

	A–E	F	G–K	L
1197	SD in Original Scale	0.0567	SD in Log Scale	1.546
1198	95% t UCL (assumes normality of ROS data)	0.0429	95% Percentile Bootstrap UCL	0.0452
1199	95% BCA Bootstrap UCL	0.0506	95% Bootstrap t UCL	0.072
1200	95% H-UCL (Log ROS)	0.0449		
1201				
1202	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1203	KM Mean (logged)	-3.981	KM Geo Mean	0.0187
1204	KM SD (logged)	0.891	95% Critical H Value (KM-Log)	2.372
1205	KM Standard Error of Mean (logged)	0.213	95% H-UCL (KM -Log)	0.0424
1206	KM SD (logged)	0.891	95% Critical H Value (KM-Log)	2.372
1207	KM Standard Error of Mean (logged)	0.213		
1208				
1209	**DL/2 Statistics**			
1210	**DL/2 Normal**		**DL/2 Log-Transformed**	
1211	Mean in Original Scale	0.095	Mean in Log Scale	-3.591
1212	SD in Original Scale	0.24	SD in Log Scale	1.471
1213	95% t UCL (Assumes normality)	0.175	95% H-Stat UCL	0.207
1214	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1215				
1216	**Nonparametric Distribution Free UCL Statistics**			
1217	**Detected Data appear Normal Distributed at 5% Significance Level**			
1218				
1219	**Suggested UCL to Use**			
1220	95% KM (t) UCL	0.057		
1221				
1222	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1223	Recommendations are based upon data size, data distribution, and skewness.			
1224	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1225	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1226				
1227	Chrysene			
1228				
1229	**General Statistics**			
1230	Total Number of Observations	26	Number of Distinct Observations	23
1231	Number of Detects	11	Number of Non-Detects	15
1232	Number of Distinct Detects	11	Number of Distinct Non-Detects	13
1233	Minimum Detect	0.0133	Minimum Non-Detect	0.0121
1234	Maximum Detect	0.51	Maximum Non-Detect	2.47
1235	Variance Detects	0.0335	Percent Non-Detects	57.69%
1236	Mean Detects	0.156	SD Detects	0.183
1237	Median Detects	0.0522	CV Detects	1.173
1238	Skewness Detects	1.32	Kurtosis Detects	0.473
1239	Mean of Logged Detects	-2.594	SD of Logged Detects	1.342
1240				
1241	**Normal GOF Test on Detects Only**			
1242	Shapiro Wilk Test Statistic	0.769	**Shapiro Wilk GOF Test**	
1243	5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
1244	Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
1245	5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level	
1246	**Detected Data Not Normal at 5% Significance Level**			
1247				
1248	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			

	A–E	F	G–K	L
1249	KM Mean	0.0795	KM Standard Error of Mean	0.0287
1250	KM SD	0.136	95% KM (BCA) UCL	0.123
1251	95% KM (t) UCL	0.129	95% KM (Percentile Bootstrap) UCL	0.128
1252	95% KM (z) UCL	0.127	95% KM Bootstrap t UCL	0.176
1253	90% KM Chebyshev UCL	0.166	95% KM Chebyshev UCL	0.205
1254	97.5% KM Chebyshev UCL	0.259	99% KM Chebyshev UCL	0.365
1255				
1256	**Gamma GOF Tests on Detected Observations Only**			
1257	A-D Test Statistic	0.497	**Anderson-Darling GOF Test**	
1258	5% A-D Critical Value	0.76	Detected data appear Gamma Distributed at 5% Significance Level	
1259	K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**	
1260	5% K-S Critical Value	0.264	Detected data appear Gamma Distributed at 5% Significance Level	
1261	**Detected data appear Gamma Distributed at 5% Significance Level**			
1262				
1263	**Gamma Statistics on Detected Data Only**			
1264	k hat (MLE)	0.806	k star (bias corrected MLE)	0.647
1265	Theta hat (MLE)	0.193	Theta star (bias corrected MLE)	0.241
1266	nu hat (MLE)	17.74	nu star (bias corrected)	14.24
1267	Mean (detects)	0.156		
1268				
1269	**Gamma ROS Statistics using Imputed Non-Detects**			
1270	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1271	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1272	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1273	This is especially true when the sample size is small.			
1274	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1275	Minimum	0.01	Mean	0.0717
1276	Maximum	0.51	Median	0.01
1277	SD	0.137	CV	1.911
1278	k hat (MLE)	0.558	k star (bias corrected MLE)	0.519
1279	Theta hat (MLE)	0.129	Theta star (bias corrected MLE)	0.138
1280	nu hat (MLE)	29.02	nu star (bias corrected)	27
1281	Adjusted Level of Significance (β)	0.0398		
1282	Approximate Chi Square Value (27.00, α)	16.15	Adjusted Chi Square Value (27.00, β)	15.6
1283	95% Gamma Approximate UCL (use when n>=50)	0.12	95% Gamma Adjusted UCL (use when n<50)	0.124
1284				
1285	**Estimates of Gamma Parameters using KM Estimates**			
1286	Mean (KM)	0.0795	SD (KM)	0.136
1287	Variance (KM)	0.0184	SE of Mean (KM)	0.0287
1288	k hat (KM)	0.344	k star (KM)	0.33
1289	nu hat (KM)	17.88	nu star (KM)	17.15
1290	theta hat (KM)	0.231	theta star (KM)	0.241
1291	80% gamma percentile (KM)	0.124	90% gamma percentile (KM)	0.231
1292	95% gamma percentile (KM)	0.352	99% gamma percentile (KM)	0.663
1293				
1294	**Gamma Kaplan-Meier (KM) Statistics**			
1295	Approximate Chi Square Value (17.15, α)	8.779	Adjusted Chi Square Value (17.15, β)	8.384
1296	95% Gamma Approximate KM-UCL (use when n>=50)	0.155	95% Gamma Adjusted KM-UCL (use when n<50)	0.163
1297				
1298	**Lognormal GOF Test on Detected Observations Only**			
1299	Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**	
1300	5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
1301					Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**					
1302					5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level					
1303	**Detected Data appear Lognormal at 5% Significance Level**											
1304												
1305	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1306					Mean in Original Scale	0.0701					Mean in Log Scale	-4.069
1307					SD in Original Scale	0.138					SD in Log Scale	1.64
1308					95% t UCL (assumes normality of ROS data)	0.116					95% Percentile Bootstrap UCL	0.119
1309					95% BCA Bootstrap UCL	0.127					95% Bootstrap t UCL	0.175
1310					95% H-UCL (Log ROS)	0.202						
1311												
1312	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1313					KM Mean (logged)	-3.489					KM Geo Mean	0.0305
1314					KM SD (logged)	1.229					95% Critical H Value (KM-Log)	2.817
1315					KM Standard Error of Mean (logged)	0.272					95% H-UCL (KM -Log)	0.13
1316					KM SD (logged)	1.229					95% Critical H Value (KM-Log)	2.817
1317					KM Standard Error of Mean (logged)	0.272						
1318												
1319	**DL/2 Statistics**											
1320	**DL/2 Normal**						**DL/2 Log-Transformed**					
1321					Mean in Original Scale	0.135					Mean in Log Scale	-3.195
1322					SD in Original Scale	0.261					SD in Log Scale	1.568
1323					95% t UCL (Assumes normality)	0.222					95% H-Stat UCL	0.397
1324	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1325												
1326	**Nonparametric Distribution Free UCL Statistics**											
1327	**Detected Data appear Gamma Distributed at 5% Significance Level**											
1328												
1329	**Suggested UCL to Use**											
1330					Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.163						
1331												
1332	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1333	Recommendations are based upon data size, data distribution, and skewness.											
1334	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1335	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1336												
1337	**Dibenz(a,h)anthracene**											
1338												
1339	**General Statistics**											
1340					Total Number of Observations	26					Number of Distinct Observations	23
1341					Number of Detects	4					Number of Non-Detects	22
1342					Number of Distinct Detects	4					Number of Distinct Non-Detects	19
1343					Minimum Detect	0.0329					Minimum Non-Detect	0.0118
1344					Maximum Detect	0.185					Maximum Non-Detect	0.9
1345					Variance Detects	0.00553					Percent Non-Detects	84.62%
1346					Mean Detects	0.0736					SD Detects	0.0744
1347					Median Detects	0.0382					CV Detects	1.011
1348					Skewness Detects	1.989					Kurtosis Detects	3.963
1349					Mean of Logged Detects	-2.909					SD of Logged Detects	0.819
1350												
1351	**Normal GOF Test on Detects Only**											
1352					Shapiro Wilk Test Statistic	0.669	**Shapiro Wilk GOF Test**					

	A	B	C	D	E	F	G	H	I	J	K	L
1353					5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level					
1354					Lilliefors Test Statistic	0.421	**Lilliefors GOF Test**					
1355					5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level					
1356	**Detected Data Not Normal at 5% Significance Level**											
1357												
1358	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1359					KM Mean	0.0235					KM Standard Error of Mean	0.00813
1360					KM SD	0.0344					95% KM (BCA) UCL	N/A
1361					95% KM (t) UCL	0.0373					95% KM (Percentile Bootstrap) UCL	N/A
1362					95% KM (z) UCL	0.0368					95% KM Bootstrap t UCL	N/A
1363					90% KM Chebyshev UCL	0.0478					95% KM Chebyshev UCL	0.0589
1364					97.5% KM Chebyshev UCL	0.0742					99% KM Chebyshev UCL	0.104
1365												
1366	**Gamma GOF Tests on Detected Observations Only**											
1367					A-D Test Statistic	0.787	**Anderson-Darling GOF Test**					
1368					5% A-D Critical Value	0.661	Detected Data Not Gamma Distributed at 5% Significance Level					
1369					K-S Test Statistic	0.431	**Kolmogorov-Smirnov GOF**					
1370					5% K-S Critical Value	0.398	Detected Data Not Gamma Distributed at 5% Significance Level					
1371	**Detected Data Not Gamma Distributed at 5% Significance Level**											
1372												
1373	**Gamma Statistics on Detected Data Only**											
1374					k hat (MLE)	1.819					k star (bias corrected MLE)	0.621
1375					Theta hat (MLE)	0.0405					Theta star (bias corrected MLE)	0.118
1376					nu hat (MLE)	14.55					nu star (bias corrected)	4.971
1377					Mean (detects)	0.0736						
1378												
1379	**Gamma ROS Statistics using Imputed Non-Detects**											
1380	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1381	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1382	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1383	This is especially true when the sample size is small.											
1384	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1385					Minimum	0.01					Mean	0.0198
1386					Maximum	0.185					Median	0.01
1387					SD	0.0348					CV	1.759
1388					k hat (MLE)	1.329					k star (bias corrected MLE)	1.201
1389					Theta hat (MLE)	0.0149					Theta star (bias corrected MLE)	0.0165
1390					nu hat (MLE)	69.12					nu star (bias corrected)	62.48
1391					Adjusted Level of Significance (β)	0.0398						
1392					Approximate Chi Square Value (62.48, α)	45.29					Adjusted Chi Square Value (62.48, β)	44.33
1393					95% Gamma Approximate UCL (use when n>=50)	0.0273					95% Gamma Adjusted UCL (use when n<50)	N/A
1394												
1395	**Estimates of Gamma Parameters using KM Estimates**											
1396					Mean (KM)	0.0235					SD (KM)	0.0344
1397					Variance (KM)	0.00118					SE of Mean (KM)	0.00813
1398					k hat (KM)	0.465					k star (KM)	0.437
1399					nu hat (KM)	24.2					nu star (KM)	22.74
1400					theta hat (KM)	0.0504					theta star (KM)	0.0536
1401					80% gamma percentile (KM)	0.0382					90% gamma percentile (KM)	0.0652
1402					95% gamma percentile (KM)	0.0945					99% gamma percentile (KM)	0.167
1403												
1404	**Gamma Kaplan-Meier (KM) Statistics**											

	A	B	C	D	E	F	G	H	I	J	K	L
1405					Approximate Chi Square Value (22.74, α)	12.89					Adjusted Chi Square Value (22.74, β)	12.4
1406					95% Gamma Approximate KM-UCL (use when n>=50)	0.0414					95% Gamma Adjusted KM-UCL (use when n<50)	0.043
1407												
1408	**Lognormal GOF Test on Detected Observations Only**											
1409					Shapiro Wilk Test Statistic	0.725	**Shapiro Wilk GOF Test**					
1410					5% Shapiro Wilk Critical Value	0.748	Detected Data Not Lognormal at 5% Significance Level					
1411					Lilliefors Test Statistic	0.391	**Lilliefors GOF Test**					
1412					5% Lilliefors Critical Value	0.375	Detected Data Not Lognormal at 5% Significance Level					
1413	**Detected Data Not Lognormal at 5% Significance Level**											
1414												
1415	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1416					Mean in Original Scale	0.0157					Mean in Log Scale	-4.948
1417					SD in Original Scale	0.036					SD in Log Scale	0.991
1418					95% t UCL (assumes normality of ROS data)	0.0278					95% Percentile Bootstrap UCL	0.029
1419					95% BCA Bootstrap UCL	0.0366					95% Bootstrap t UCL	0.0633
1420					95% H-UCL (Log ROS)	0.019						
1421												
1422	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1423					KM Mean (logged)	-4.114					KM Geo Mean	0.0163
1424					KM SD (logged)	0.664					95% Critical H Value (KM-Log)	2.116
1425					KM Standard Error of Mean (logged)	0.172					95% H-UCL (KM -Log)	0.027
1426					KM SD (logged)	0.664					95% Critical H Value (KM-Log)	2.116
1427					KM Standard Error of Mean (logged)	0.172						
1428												
1429	**DL/2 Statistics**											
1430	**DL/2 Normal**						**DL/2 Log-Transformed**					
1431					Mean in Original Scale	0.0485					Mean in Log Scale	-3.879
1432					SD in Original Scale	0.0903					SD in Log Scale	1.253
1433					95% t UCL (Assumes normality)	0.0788					95% H-Stat UCL	0.0926
1434	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1435												
1436	**Nonparametric Distribution Free UCL Statistics**											
1437	**Data do not follow a Discernible Distribution at 5% Significance Level**											
1438												
1439	**Suggested UCL to Use**											
1440					95% KM (Chebyshev) UCL	0.0589						
1441												
1442	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1443	Recommendations are based upon data size, data distribution, and skewness.											
1444	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1445	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1446												
1447	**Fluoranthene**											
1448												
1449	**General Statistics**											
1450					Total Number of Observations	26					Number of Distinct Observations	24
1451					Number of Detects	12					Number of Non-Detects	14
1452					Number of Distinct Detects	12					Number of Distinct Non-Detects	12
1453					Minimum Detect	0.0142					Minimum Non-Detect	0.0121
1454					Maximum Detect	4.38					Maximum Non-Detect	0.257
1455					Variance Detects	1.886					Percent Non-Detects	53.85%
1456					Mean Detects	0.754					SD Detects	1.373

	A–E	F	G–K	L
1457	Median Detects	0.0656	CV Detects	1.82
1458	Skewness Detects	2.071	Kurtosis Detects	3.984
1459	Mean of Logged Detects	-1.998	SD of Logged Detects	1.931
1460				
1461	**Normal GOF Test on Detects Only**			
1462	Shapiro Wilk Test Statistic	0.617	**Shapiro Wilk GOF Test**	
1463	5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
1464	Lilliefors Test Statistic	0.414	**Lilliefors GOF Test**	
1465	5% Lilliefors Critical Value	0.243	Detected Data Not Normal at 5% Significance Level	
1466	**Detected Data Not Normal at 5% Significance Level**			
1467				
1468	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1469	KM Mean	0.359	KM Standard Error of Mean	0.198
1470	KM SD	0.965	95% KM (BCA) UCL	0.748
1471	95% KM (t) UCL	0.697	95% KM (Percentile Bootstrap) UCL	0.697
1472	95% KM (z) UCL	0.684	95% KM Bootstrap t UCL	1.081
1473	90% KM Chebyshev UCL	0.953	95% KM Chebyshev UCL	1.221
1474	97.5% KM Chebyshev UCL	1.594	99% KM Chebyshev UCL	2.327
1475				
1476	**Gamma GOF Tests on Detected Observations Only**			
1477	A-D Test Statistic	1.239	**Anderson-Darling GOF Test**	
1478	5% A-D Critical Value	0.807	Detected Data Not Gamma Distributed at 5% Significance Level	
1479	K-S Test Statistic	0.32	**Kolmogorov-Smirnov GOF**	
1480	5% K-S Critical Value	0.262	Detected Data Not Gamma Distributed at 5% Significance Level	
1481	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1482				
1483	**Gamma Statistics on Detected Data Only**			
1484	k hat (MLE)	0.386	k star (bias corrected MLE)	0.345
1485	Theta hat (MLE)	1.956	Theta star (bias corrected MLE)	2.187
1486	nu hat (MLE)	9.258	nu star (bias corrected)	8.277
1487	Mean (detects)	0.754		
1488				
1489	**Gamma ROS Statistics using Imputed Non-Detects**			
1490	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1491	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1492	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1493	This is especially true when the sample size is small.			
1494	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1495	Minimum	0.01	Mean	0.354
1496	Maximum	4.38	Median	0.01
1497	SD	0.986	CV	2.79
1498	k hat (MLE)	0.293	k star (bias corrected MLE)	0.285
1499	Theta hat (MLE)	1.206	Theta star (bias corrected MLE)	1.241
1500	nu hat (MLE)	15.24	nu star (bias corrected)	14.81
1501	Adjusted Level of Significance (β)	0.0398		
1502	Approximate Chi Square Value (14.81, α)	7.132	Adjusted Chi Square Value (14.81, β)	6.781
1503	95% Gamma Approximate UCL (use when n>=50)	0.734	95% Gamma Adjusted UCL (use when n<50)	0.772
1504				
1505	**Estimates of Gamma Parameters using KM Estimates**			
1506	Mean (KM)	0.359	SD (KM)	0.965
1507	Variance (KM)	0.932	SE of Mean (KM)	0.198
1508	k hat (KM)	0.138	k star (KM)	0.148

nu hat (KM)	7.199	nu star (KM)	7.701
theta hat (KM)	2.595	theta star (KM)	2.425
80% gamma percentile (KM)	0.387	90% gamma percentile (KM)	1.063
95% gamma percentile (KM)	1.982	99% gamma percentile (KM)	4.654
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (7.70, α)	2.563	Adjusted Chi Square Value (7.70, β)	2.371
95% Gamma Approximate KM-UCL (use when n>=50)	1.079	95% Gamma Adjusted KM-UCL (use when n<50)	1.166
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.243	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.351	Mean in Log Scale	-4.005
SD in Original Scale	0.987	SD in Log Scale	2.401
95% t UCL (assumes normality of ROS data)	0.682	95% Percentile Bootstrap UCL	0.687
95% BCA Bootstrap UCL	0.838	95% Bootstrap t UCL	1.067
95% H-UCL (Log ROS)	3.073		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.15	KM Geo Mean	0.0428
KM SD (logged)	1.702	95% Critical H Value (KM-Log)	3.529
KM Standard Error of Mean (logged)	0.36	95% H-UCL (KM -Log)	0.606
KM SD (logged)	1.702	95% Critical H Value (KM-Log)	3.529
KM Standard Error of Mean (logged)	0.36		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.37	Mean in Log Scale	-3.029
SD in Original Scale	0.981	SD in Log Scale	1.849
95% t UCL (Assumes normality)	0.698	95% H-Stat UCL	1.074
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (Chebyshev) UCL	1.221		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Fluorene			
General Statistics			
Total Number of Observations	26	Number of Distinct Observations	22

	A	B	C	D	E	F	G	H	I	J	K	L
1561					Number of Detects	4					Number of Non-Detects	22
1562					Number of Distinct Detects	4					Number of Distinct Non-Detects	18
1563					Minimum Detect	0.0265					Minimum Non-Detect	0.0121
1564					Maximum Detect	0.604					Maximum Non-Detect	2.47
1565					Variance Detects	0.071					Percent Non-Detects	84.62%
1566					Mean Detects	0.256					SD Detects	0.267
1567					Median Detects	0.198					CV Detects	1.039
1568					Skewness Detects	0.835					Kurtosis Detects	-1.199
1569					Mean of Logged Detects	-1.979					SD of Logged Detects	1.425
1570												
1571	**Normal GOF Test on Detects Only**											
1572					Shapiro Wilk Test Statistic	0.907	**Shapiro Wilk GOF Test**					
1573					5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level					
1574					Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**					
1575					5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level					
1576	**Detected Data appear Normal at 5% Significance Level**											
1577												
1578	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1579					KM Mean	0.0526					KM Standard Error of Mean	0.0297
1580					KM SD	0.128					95% KM (BCA) UCL	N/A
1581					95% KM (t) UCL	0.103					95% KM (Percentile Bootstrap) UCL	N/A
1582					95% KM (z) UCL	0.101					95% KM Bootstrap t UCL	N/A
1583					90% KM Chebyshev UCL	0.142					95% KM Chebyshev UCL	0.182
1584					97.5% KM Chebyshev UCL	0.238					99% KM Chebyshev UCL	0.348
1585												
1586	**Gamma GOF Tests on Detected Observations Only**											
1587					A-D Test Statistic	0.278	**Anderson-Darling GOF Test**					
1588					5% A-D Critical Value	0.667	Detected data appear Gamma Distributed at 5% Significance Level					
1589					K-S Test Statistic	0.247	**Kolmogorov-Smirnov GOF**					
1590					5% K-S Critical Value	0.403	Detected data appear Gamma Distributed at 5% Significance Level					
1591	**Detected data appear Gamma Distributed at 5% Significance Level**											
1592												
1593	**Gamma Statistics on Detected Data Only**											
1594					k hat (MLE)	0.941					k star (bias corrected MLE)	0.402
1595					Theta hat (MLE)	0.273					Theta star (bias corrected MLE)	0.638
1596					nu hat (MLE)	7.525					nu star (bias corrected)	3.215
1597					Mean (detects)	0.256						
1598												
1599	**Gamma ROS Statistics using Imputed Non-Detects**											
1600	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1601	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1602	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1603	This is especially true when the sample size is small.											
1604	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1605					Minimum	0.01					Mean	0.0479
1606					Maximum	0.604					Median	0.01
1607					SD	0.129					CV	2.701
1608					k hat (MLE)	0.54					k star (bias corrected MLE)	0.503
1609					Theta hat (MLE)	0.0887					Theta star (bias corrected MLE)	0.0952
1610					nu hat (MLE)	28.07					nu star (bias corrected)	26.17
1611					Adjusted Level of Significance (β)	0.0398						
1612					Approximate Chi Square Value (26.17, α)	15.51					Adjusted Chi Square Value (26.17, β)	14.97

	A	B	C	D	E	F	G	H	I	J	K	L
1613	95% Gamma Approximate UCL (use when n>=50)					0.0808	95% Gamma Adjusted UCL (use when n<50)					N/A
1614												
1615	**Estimates of Gamma Parameters using KM Estimates**											
1616	Mean (KM)					0.0526	SD (KM)					0.128
1617	Variance (KM)					0.0165	SE of Mean (KM)					0.0297
1618	k hat (KM)					0.168	k star (KM)					0.174
1619	nu hat (KM)					8.714	nu star (KM)					9.042
1620	theta hat (KM)					0.314	theta star (KM)					0.302
1621	80% gamma percentile (KM)					0.0638	90% gamma percentile (KM)					0.158
1622	95% gamma percentile (KM)					0.28	99% gamma percentile (KM)					0.625
1623												
1624	**Gamma Kaplan-Meier (KM) Statistics**											
1625	Approximate Chi Square Value (9.04, α)					3.353	Adjusted Chi Square Value (9.04, β)					3.127
1626	95% Gamma Approximate KM-UCL (use when n>=50)					0.142	95% Gamma Adjusted KM-UCL (use when n<50)					0.152
1627												
1628	**Lognormal GOF Test on Detected Observations Only**											
1629	Shapiro Wilk Test Statistic					0.95	**Shapiro Wilk GOF Test**					
1630	5% Shapiro Wilk Critical Value					0.748	Detected Data appear Lognormal at 5% Significance Level					
1631	Lilliefors Test Statistic					0.226	**Lilliefors GOF Test**					
1632	5% Lilliefors Critical Value					0.375	Detected Data appear Lognormal at 5% Significance Level					
1633	**Detected Data appear Lognormal at 5% Significance Level**											
1634												
1635	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1636	Mean in Original Scale					0.0402	Mean in Log Scale					-6.514
1637	SD in Original Scale					0.132	SD in Log Scale					2.174
1638	95% t UCL (assumes normality of ROS data)					0.0843	95% Percentile Bootstrap UCL					0.0882
1639	95% BCA Bootstrap UCL					0.115	95% Bootstrap t UCL					0.395
1640	95% H-UCL (Log ROS)					0.102						
1641												
1642	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1643	KM Mean (logged)					-3.973	KM Geo Mean					0.0188
1644	KM SD (logged)					1.034	95% Critical H Value (KM-Log)					2.552
1645	KM Standard Error of Mean (logged)					0.249	95% H-UCL (KM -Log)					0.0544
1646	KM SD (logged)					1.034	95% Critical H Value (KM-Log)					2.552
1647	KM Standard Error of Mean (logged)					0.249						
1648												
1649	**DL/2 Statistics**											
1650	**DL/2 Normal**						**DL/2 Log-Transformed**					
1651	Mean in Original Scale					0.114	Mean in Log Scale					-3.591
1652	SD in Original Scale					0.262	SD in Log Scale					1.615
1653	95% t UCL (Assumes normality)					0.202	95% H-Stat UCL					0.304
1654	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1655												
1656	**Nonparametric Distribution Free UCL Statistics**											
1657	**Detected Data appear Normal Distributed at 5% Significance Level**											
1658												
1659	**Suggested UCL to Use**											
1660	95% KM (t) UCL					0.103						
1661												
1662	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1663	Recommendations are based upon data size, data distribution, and skewness.											
1664	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	26	Number of Distinct Observations	25
Number of Detects	13	Number of Non-Detects	13
Number of Distinct Detects	13	Number of Distinct Non-Detects	12
Minimum Detect	0.0163	Minimum Non-Detect	0.0118
Maximum Detect	1.49	Maximum Non-Detect	0.135
Variance Detects	0.237	Percent Non-Detects	50%
Mean Detects	0.291	SD Detects	0.487
Median Detects	0.088	CV Detects	1.67
Skewness Detects	2.126	Kurtosis Detects	3.296
Mean of Logged Detects	-2.24	SD of Logged Detects	1.411

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.589	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.373	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.234	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.155	KM Standard Error of Mean	0.0731
KM SD	0.358	95% KM (BCA) UCL	0.288
95% KM (t) UCL	0.28	95% KM (Percentile Bootstrap) UCL	0.274
95% KM (z) UCL	0.275	95% KM Bootstrap t UCL	0.761
90% KM Chebyshev UCL	0.374	95% KM Chebyshev UCL	0.473
97.5% KM Chebyshev UCL	0.611	99% KM Chebyshev UCL	0.882

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.951	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.781	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.213	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.248	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.612	k star (bias corrected MLE)	0.522
Theta hat (MLE)	0.476	Theta star (bias corrected MLE)	0.558
nu hat (MLE)	15.91	nu star (bias corrected)	13.57
Mean (detects)	0.291		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.151
Maximum	1.49	Median	0.0132

	A	B	C	D	E	F	G	H	I	J	K	L
1717					SD	0.366					CV	2.432
1718					k hat (MLE)	0.426					k star (bias corrected MLE)	0.402
1719					Theta hat (MLE)	0.354					Theta star (bias corrected MLE)	0.375
1720					nu hat (MLE)	22.14					nu star (bias corrected)	20.92
1721					Adjusted Level of Significance (β)	0.0398						
1722					Approximate Chi Square Value (20.92, α)	11.53					Adjusted Chi Square Value (20.92, β)	11.07
1723					95% Gamma Approximate UCL (use when n>=50)	0.273					95% Gamma Adjusted UCL (use when n<50)	0.285
1724												
1725	**Estimates of Gamma Parameters using KM Estimates**											
1726					Mean (KM)	0.155					SD (KM)	0.358
1727					Variance (KM)	0.128					SE of Mean (KM)	0.0731
1728					k hat (KM)	0.187					k star (KM)	0.191
1729					nu hat (KM)	9.724					nu star (KM)	9.935
1730					theta hat (KM)	0.828					theta star (KM)	0.81
1731					80% gamma percentile (KM)	0.199					90% gamma percentile (KM)	0.468
1732					95% gamma percentile (KM)	0.807					99% gamma percentile (KM)	1.747
1733												
1734	**Gamma Kaplan-Meier (KM) Statistics**											
1735					Approximate Chi Square Value (9.94, α)	3.901					Adjusted Chi Square Value (9.94, β)	3.654
1736					95% Gamma Approximate KM-UCL (use when n>=50)	0.394					95% Gamma Adjusted KM-UCL (use when n<50)	0.421
1737												
1738	**Lognormal GOF Test on Detected Observations Only**											
1739					Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**					
1740					5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level					
1741					Lilliefors Test Statistic	0.127	**Lilliefors GOF Test**					
1742					5% Lilliefors Critical Value	0.234	Detected Data appear Lognormal at 5% Significance Level					
1743	**Detected Data appear Lognormal at 5% Significance Level**											
1744												
1745	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1746					Mean in Original Scale	0.149					Mean in Log Scale	-3.696
1747					SD in Original Scale	0.367					SD in Log Scale	1.835
1748					95% t UCL (assumes normality of ROS data)	0.272					95% Percentile Bootstrap UCL	0.271
1749					95% BCA Bootstrap UCL	0.332					95% Bootstrap t UCL	0.743
1750					95% H-UCL (Log ROS)	0.527						
1751												
1752	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1753					KM Mean (logged)	-3.221					KM Geo Mean	0.0399
1754					KM SD (logged)	1.42					95% Critical H Value (KM-Log)	3.095
1755					KM Standard Error of Mean (logged)	0.299					95% H-UCL (KM -Log)	0.263
1756					KM SD (logged)	1.42					95% Critical H Value (KM-Log)	3.095
1757					KM Standard Error of Mean (logged)	0.299						
1758												
1759	**DL/2 Statistics**											
1760	**DL/2 Normal**						**DL/2 Log-Transformed**					
1761					Mean in Original Scale	0.159					Mean in Log Scale	-3.195
1762					SD in Original Scale	0.364					SD in Log Scale	1.565
1763					95% t UCL (Assumes normality)	0.28					95% H-Stat UCL	0.393
1764	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1765												
1766	**Nonparametric Distribution Free UCL Statistics**											
1767	**Detected Data appear Approximate Gamma Distributed at 5% Significance Level**											
1768												

	A–E	F	G–K	L
1769	**Suggested UCL to Use**			
1770	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.421		
1771				
1772	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
1773	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
1774				
1775	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1776	Recommendations are based upon data size, data distribution, and skewness.			
1777	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1778	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1779				
1780	**Naphthalene**			
1781				
1782	**General Statistics**			
1783	Total Number of Observations	26	Number of Distinct Observations	22
1784	Number of Detects	6	Number of Non-Detects	20
1785	Number of Distinct Detects	6	Number of Distinct Non-Detects	16
1786	Minimum Detect	0.0166	Minimum Non-Detect	0.0118
1787	Maximum Detect	13.6	Maximum Non-Detect	0.257
1788	Variance Detects	30.01	Percent Non-Detects	76.92%
1789	Mean Detects	2.42	SD Detects	5.478
1790	Median Detects	0.184	CV Detects	2.264
1791	Skewness Detects	2.447	Kurtosis Detects	5.991
1792	Mean of Logged Detects	-1.284	SD of Logged Detects	2.185
1793				
1794	**Normal GOF Test on Detects Only**			
1795	Shapiro Wilk Test Statistic	0.516	**Shapiro Wilk GOF Test**	
1796	5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
1797	Lilliefors Test Statistic	0.479	**Lilliefors GOF Test**	
1798	5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level	
1799	**Detected Data Not Normal at 5% Significance Level**			
1800				
1801	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1802	KM Mean	0.568	KM Standard Error of Mean	0.56
1803	KM SD	2.608	95% KM (BCA) UCL	1.607
1804	95% KM (t) UCL	1.525	95% KM (Percentile Bootstrap) UCL	1.6
1805	95% KM (z) UCL	1.49	95% KM Bootstrap t UCL	21.71
1806	90% KM Chebyshev UCL	2.249	95% KM Chebyshev UCL	3.01
1807	97.5% KM Chebyshev UCL	4.067	99% KM Chebyshev UCL	6.143
1808				
1809	**Gamma GOF Tests on Detected Observations Only**			
1810	A-D Test Statistic	0.937	**Anderson-Darling GOF Test**	
1811	5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level	
1812	K-S Test Statistic	0.406	**Kolmogorov-Smirnov GOF**	
1813	5% K-S Critical Value	0.356	Detected Data Not Gamma Distributed at 5% Significance Level	
1814	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1815				
1816	**Gamma Statistics on Detected Data Only**			
1817	k hat (MLE)	0.315	k star (bias corrected MLE)	0.269
1818	Theta hat (MLE)	7.671	Theta star (bias corrected MLE)	9.002
1819	nu hat (MLE)	3.786	nu star (bias corrected)	3.226
1820	Mean (detects)	2.42		

1821				
1822	**Gamma ROS Statistics using Imputed Non-Detects**			
1823	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1824	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1825	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1826	This is especially true when the sample size is small.			
1827	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1828	Minimum	0.01	Mean	0.566
1829	Maximum	13.6	Median	0.01
1830	SD	2.66	CV	4.698
1831	k hat (MLE)	0.221	k star (bias corrected MLE)	0.222
1832	Theta hat (MLE)	2.556	Theta star (bias corrected MLE)	2.555
1833	nu hat (MLE)	11.52	nu star (bias corrected)	11.52
1834	Adjusted Level of Significance (β)	0.0398		
1835	Approximate Chi Square Value (11.52, α)	4.913	Adjusted Chi Square Value (11.52, β)	4.63
1836	95% Gamma Approximate UCL (use when n>=50)	1.328	95% Gamma Adjusted UCL (use when n<50)	1.409
1837				
1838	**Estimates of Gamma Parameters using KM Estimates**			
1839	Mean (KM)	0.568	SD (KM)	2.608
1840	Variance (KM)	6.8	SE of Mean (KM)	0.56
1841	k hat (KM)	0.0475	k star (KM)	0.0677
1842	nu hat (KM)	2.471	nu star (KM)	3.52
1843	theta hat (KM)	11.96	theta star (KM)	8.399
1844	80% gamma percentile (KM)	0.188	90% gamma percentile (KM)	1.194
1845	95% gamma percentile (KM)	3.256	99% gamma percentile (KM)	10.88
1846				
1847	**Gamma Kaplan-Meier (KM) Statistics**			
1848	Approximate Chi Square Value (3.52, α)	0.542	Adjusted Chi Square Value (3.52, β)	0.474
1849	95% Gamma Approximate KM-UCL (use when n>=50)	3.694	95% Gamma Adjusted KM-UCL (use when n<50)	4.217
1850	95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
1851				
1852	**Lognormal GOF Test on Detected Observations Only**			
1853	Shapiro Wilk Test Statistic	0.878	**Shapiro Wilk GOF Test**	
1854	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
1855	Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**	
1856	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
1857	**Detected Data appear Lognormal at 5% Significance Level**			
1858				
1859	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1860	Mean in Original Scale	0.559	Mean in Log Scale	-6.769
1861	SD in Original Scale	2.661	SD in Log Scale	3.361
1862	95% t UCL (assumes normality of ROS data)	1.45	95% Percentile Bootstrap UCL	1.595
1863	95% BCA Bootstrap UCL	2.141	95% Bootstrap t UCL	26.99
1864	95% H-UCL (Log ROS)	22.93		
1865				
1866	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1867	KM Mean (logged)	-3.69	KM Geo Mean	0.025
1868	KM SD (logged)	1.641	95% Critical H Value (KM-Log)	3.433
1869	KM Standard Error of Mean (logged)	0.355	95% H-UCL (KM -Log)	0.296
1870	KM SD (logged)	1.641	95% Critical H Value (KM-Log)	3.433
1871	KM Standard Error of Mean (logged)	0.355		
1872				

1873	**DL/2 Statistics**			
1874	**DL/2 Normal**		**DL/2 Log-Transformed**	
1875	Mean in Original Scale	0.579	Mean in Log Scale	-3.546
1876	SD in Original Scale	2.657	SD in Log Scale	1.868
1877	95% t UCL (Assumes normality)	1.47	95% H-Stat UCL	0.681
1878	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1879				
1880	**Nonparametric Distribution Free UCL Statistics**			
1881	**Detected Data appear Lognormal Distributed at 5% Significance Level**			
1882				
1883	**Suggested UCL to Use**			
1884	97.5% KM (Chebyshev) UCL	4.067		
1885				
1886	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1887	Recommendations are based upon data size, data distribution, and skewness.			
1888	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1889	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1890				
1891	**Phenanthrene**			
1892				
1893	**General Statistics**			
1894	Total Number of Observations	26	Number of Distinct Observations	23
1895	Number of Detects	11	Number of Non-Detects	15
1896	Number of Distinct Detects	11	Number of Distinct Non-Detects	12
1897	Minimum Detect	0.0179	Minimum Non-Detect	0.0121
1898	Maximum Detect	9.75	Maximum Non-Detect	0.257
1899	Variance Detects	9.014	Percent Non-Detects	57.69%
1900	Mean Detects	1.281	SD Detects	3.002
1901	Median Detects	0.0801	CV Detects	2.343
1902	Skewness Detects	2.729	Kurtosis Detects	7.549
1903	Mean of Logged Detects	-2.018	SD of Logged Detects	2.059
1904				
1905	**Normal GOF Test on Detects Only**			
1906	Shapiro Wilk Test Statistic	0.499	**Shapiro Wilk GOF Test**	
1907	5% Shapiro Wilk Critical Value	0.85	Detected Data Not Normal at 5% Significance Level	
1908	Lilliefors Test Statistic	0.454	**Lilliefors GOF Test**	
1909	5% Lilliefors Critical Value	0.251	Detected Data Not Normal at 5% Significance Level	
1910	**Detected Data Not Normal at 5% Significance Level**			
1911				
1912	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1913	KM Mean	0.554	KM Standard Error of Mean	0.404
1914	KM SD	1.964	95% KM (BCA) UCL	1.313
1915	95% KM (t) UCL	1.243	95% KM (Percentile Bootstrap) UCL	1.288
1916	95% KM (z) UCL	1.218	95% KM Bootstrap t UCL	19.85
1917	90% KM Chebyshev UCL	1.765	95% KM Chebyshev UCL	2.314
1918	97.5% KM Chebyshev UCL	3.076	99% KM Chebyshev UCL	4.572
1919				
1920	**Gamma GOF Tests on Detected Observations Only**			
1921	A-D Test Statistic	1.538	**Anderson-Darling GOF Test**	
1922	5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level	
1923	K-S Test Statistic	0.359	**Kolmogorov-Smirnov GOF**	
1924	5% K-S Critical Value	0.276	Detected Data Not Gamma Distributed at 5% Significance Level	

	A–E	F	G–K	L
1925	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1926				
1927	**Gamma Statistics on Detected Data Only**			
1928	k hat (MLE)	0.304	k star (bias corrected MLE)	0.281
1929	Theta hat (MLE)	4.219	Theta star (bias corrected MLE)	4.552
1930	nu hat (MLE)	6.681	nu star (bias corrected)	6.192
1931	Mean (detects)	1.281		
1932				
1933	**Gamma ROS Statistics using Imputed Non-Detects**			
1934	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1935	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1936	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1937	This is especially true when the sample size is small.			
1938	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1939	Minimum	0.01	Mean	0.548
1940	Maximum	9.75	Median	0.01
1941	SD	2.004	CV	3.658
1942	k hat (MLE)	0.245	k star (bias corrected MLE)	0.242
1943	Theta hat (MLE)	2.236	Theta star (bias corrected MLE)	2.261
1944	nu hat (MLE)	12.74	nu star (bias corrected)	12.6
1945	Adjusted Level of Significance (β)	0.0398		
1946	Approximate Chi Square Value (12.60, α)	5.626	Adjusted Chi Square Value (12.60, β)	5.32
1947	95% Gamma Approximate UCL (use when n>=50)	1.227	95% Gamma Adjusted UCL (use when n<50)	1.298
1948				
1949	**Estimates of Gamma Parameters using KM Estimates**			
1950	Mean (KM)	0.554	SD (KM)	1.964
1951	Variance (KM)	3.856	SE of Mean (KM)	0.404
1952	k hat (KM)	0.0795	k star (KM)	0.0959
1953	nu hat (KM)	4.133	nu star (KM)	4.989
1954	theta hat (KM)	6.965	theta star (KM)	5.769
1955	80% gamma percentile (KM)	0.361	90% gamma percentile (KM)	1.447
1956	95% gamma percentile (KM)	3.22	99% gamma percentile (KM)	8.976
1957				
1958	**Gamma Kaplan-Meier (KM) Statistics**			
1959	Approximate Chi Square Value (4.99, α)	1.147	Adjusted Chi Square Value (4.99, β)	1.032
1960	95% Gamma Approximate KM-UCL (use when n>=50)	2.407	95% Gamma Adjusted KM-UCL (use when n<50)	2.675
1961	95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)			
1962				
1963	**Lognormal GOF Test on Detected Observations Only**			
1964	Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**	
1965	5% Shapiro Wilk Critical Value	0.85	Detected Data Not Lognormal at 5% Significance Level	
1966	Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**	
1967	5% Lilliefors Critical Value	0.251	Detected Data appear Lognormal at 5% Significance Level	
1968	**Detected Data appear Approximate Lognormal at 5% Significance Level**			
1969				
1970	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1971	Mean in Original Scale	0.544	Mean in Log Scale	-4.437
1972	SD in Original Scale	2.005	SD in Log Scale	2.609
1973	95% t UCL (assumes normality of ROS data)	1.216	95% Percentile Bootstrap UCL	1.297
1974	95% BCA Bootstrap UCL	1.673	95% Bootstrap t UCL	20.15
1975	95% H-UCL (Log ROS)	4.895		
1976				

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.267	KM Geo Mean	0.0381
KM SD (logged)	1.719	95% Critical H Value (KM-Log)	3.555
KM Standard Error of Mean (logged)	0.364	95% H-UCL (KM -Log)	0.567
KM SD (logged)	1.719	95% Critical H Value (KM-Log)	3.555
KM Standard Error of Mean (logged)	0.364		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.563	Mean in Log Scale	-3.16
SD in Original Scale	2	SD in Log Scale	1.886
95% t UCL (Assumes normality)	1.233	95% H-Stat UCL	1.062
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Lognormal Distributed at 5% Significance Level			
Suggested UCL to Use			
97.5% KM (Chebyshev) UCL	3.076		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Pyrene			
General Statistics			
Total Number of Observations	26	Number of Distinct Observations	25
Number of Detects	16	Number of Non-Detects	10
Number of Distinct Detects	16	Number of Distinct Non-Detects	9
Minimum Detect	0.0131	Minimum Non-Detect	0.0121
Maximum Detect	6.37	Maximum Non-Detect	0.257
Variance Detects	2.86	Percent Non-Detects	38.46%
Mean Detects	0.836	SD Detects	1.691
Median Detects	0.102	CV Detects	2.022
Skewness Detects	2.735	Kurtosis Detects	7.953
Mean of Logged Detects	-1.925	SD of Logged Detects	1.941
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.56	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.358	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.213	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.524	KM Standard Error of Mean	0.272
KM SD	1.344	95% KM (BCA) UCL	1.018
95% KM (t) UCL	0.989	95% KM (Percentile Bootstrap) UCL	1.019
95% KM (z) UCL	0.972	95% KM Bootstrap t UCL	1.631
90% KM Chebyshev UCL	1.341	95% KM Chebyshev UCL	1.711

2029	97.5% KM Chebyshev UCL	2.225	99% KM Chebyshev UCL	3.233
2030				
2031	**Gamma GOF Tests on Detected Observations Only**			
2032	A-D Test Statistic	1.176	**Anderson-Darling GOF Test**	
2033	5% A-D Critical Value	0.821	Detected Data Not Gamma Distributed at 5% Significance Level	
2034	K-S Test Statistic	0.273	**Kolmogorov-Smirnov GOF**	
2035	5% K-S Critical Value	0.231	Detected Data Not Gamma Distributed at 5% Significance Level	
2036	**Detected Data Not Gamma Distributed at 5% Significance Level**			
2037				
2038	**Gamma Statistics on Detected Data Only**			
2039	k hat (MLE)	0.38	k star (bias corrected MLE)	0.35
2040	Theta hat (MLE)	2.201	Theta star (bias corrected MLE)	2.387
2041	nu hat (MLE)	12.16	nu star (bias corrected)	11.21
2042	Mean (detects)	0.836		
2043				
2044	**Gamma ROS Statistics using Imputed Non-Detects**			
2045	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
2046	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2047	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2048	This is especially true when the sample size is small.			
2049	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2050	Minimum	0.01	Mean	0.519
2051	Maximum	6.37	Median	0.0222
2052	SD	1.373	CV	2.647
2053	k hat (MLE)	0.3	k star (bias corrected MLE)	0.291
2054	Theta hat (MLE)	1.729	Theta star (bias corrected MLE)	1.782
2055	nu hat (MLE)	15.6	nu star (bias corrected)	15.13
2056	Adjusted Level of Significance (β)	0.0398		
2057	Approximate Chi Square Value (15.13, α)	7.352	Adjusted Chi Square Value (15.13, β)	6.995
2058	95% Gamma Approximate UCL (use when n>=50)	1.067	95% Gamma Adjusted UCL (use when n<50)	1.122
2059				
2060	**Estimates of Gamma Parameters using KM Estimates**			
2061	Mean (KM)	0.524	SD (KM)	1.344
2062	Variance (KM)	1.806	SE of Mean (KM)	0.272
2063	k hat (KM)	0.152	k star (KM)	0.16
2064	nu hat (KM)	7.92	nu star (KM)	8.339
2065	theta hat (KM)	3.444	theta star (KM)	3.27
2066	80% gamma percentile (KM)	0.602	90% gamma percentile (KM)	1.568
2067	95% gamma percentile (KM)	2.848	99% gamma percentile (KM)	6.513
2068				
2069	**Gamma Kaplan-Meier (KM) Statistics**			
2070	Approximate Chi Square Value (8.34, α)	2.933	Adjusted Chi Square Value (8.34, β)	2.725
2071	95% Gamma Approximate KM-UCL (use when n>=50)	1.491	95% Gamma Adjusted KM-UCL (use when n<50)	1.605
2072				
2073	**Lognormal GOF Test on Detected Observations Only**			
2074	Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
2075	5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
2076	Lilliefors Test Statistic	0.158	**Lilliefors GOF Test**	
2077	5% Lilliefors Critical Value	0.213	Detected Data appear Lognormal at 5% Significance Level	
2078	**Detected Data appear Lognormal at 5% Significance Level**			
2079				
2080	**Lognormal ROS Statistics Using Imputed Non-Detects**			

Mean in Original Scale	0.519	Mean in Log Scale	-3.147
SD in Original Scale	1.373	SD in Log Scale	2.291
95% t UCL (assumes normality of ROS data)	0.978	95% Percentile Bootstrap UCL	1.017
95% BCA Bootstrap UCL	1.269	95% Bootstrap t UCL	1.622
95% H-UCL (Log ROS)	4.63		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.727	KM Geo Mean	0.0654
KM SD (logged)	1.839	95% Critical H Value (KM-Log)	3.747
KM Standard Error of Mean (logged)	0.382	95% H-UCL (KM -Log)	1.409
KM SD (logged)	1.839	95% Critical H Value (KM-Log)	3.747
KM Standard Error of Mean (logged)	0.382		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.533	Mean in Log Scale	-2.605
SD in Original Scale	1.368	SD in Log Scale	1.904
95% t UCL (Assumes normality)	0.991	95% H-Stat UCL	1.963

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1.711		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Ethylbenzene

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	4
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.0203	Minimum Non-Detect	0.00251
Maximum Detect	2	Maximum Non-Detect	0.0145
Variance Detects	1.96	Percent Non-Detects	66.67%
Mean Detects	1.01	SD Detects	1.4
Median Detects	1.01	CV Detects	1.386
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.602	SD of Logged Detects	3.246

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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).

	A–E	F	G–K	L
2133	Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1			
2134				
2135	**Normal GOF Test on Detects Only**			
2136	**Not Enough Data to Perform GOF Test**			
2137				
2138	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
2139	KM Mean	0.338	KM Standard Error of Mean	0.429
2140	KM SD	0.743	95% KM (BCA) UCL	N/A
2141	95% KM (t) UCL	1.203	95% KM (Percentile Bootstrap) UCL	N/A
2142	95% KM (z) UCL	1.044	95% KM Bootstrap t UCL	N/A
2143	90% KM Chebyshev UCL	1.626	95% KM Chebyshev UCL	2.209
2144	97.5% KM Chebyshev UCL	3.018	99% KM Chebyshev UCL	4.607
2145				
2146	**Gamma GOF Tests on Detected Observations Only**			
2147	**Not Enough Data to Perform GOF Test**			
2148				
2149	**Gamma Statistics on Detected Data Only**			
2150	k hat (MLE)	0.407	k star (bias corrected MLE)	N/A
2151	Theta hat (MLE)	2.482	Theta star (bias corrected MLE)	N/A
2152	nu hat (MLE)	1.628	nu star (bias corrected)	N/A
2153	Mean (detects)	1.01		
2154				
2155	**Estimates of Gamma Parameters using KM Estimates**			
2156	Mean (KM)	0.338	SD (KM)	0.743
2157	Variance (KM)	0.552	SE of Mean (KM)	0.429
2158	k hat (KM)	0.207	k star (KM)	0.215
2159	nu hat (KM)	2.488	nu star (KM)	2.577
2160	theta hat (KM)	1.632	theta star (KM)	1.575
2161	80% gamma percentile (KM)	0.462	90% gamma percentile (KM)	1.023
2162	95% gamma percentile (KM)	1.711	99% gamma percentile (KM)	3.583
2163				
2164	**Gamma Kaplan-Meier (KM) Statistics**			
2165			Adjusted Level of Significance (β)	0.0122
2166	Approximate Chi Square Value (2.58, α)	0.259	Adjusted Chi Square Value (2.58, β)	0.12
2167	95% Gamma Approximate KM-UCL (use when n>=50)	3.366	95% Gamma Adjusted KM-UCL (use when n<50)	7.296
2168				
2169	**Lognormal GOF Test on Detected Observations Only**			
2170	**Not Enough Data to Perform GOF Test**			
2171				
2172	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2173	Mean in Original Scale	0.337	Mean in Log Scale	-11.16
2174	SD in Original Scale	0.815	SD in Log Scale	7.541
2175	95% t UCL (assumes normality of ROS data)	1.007	95% Percentile Bootstrap UCL	N/A
2176	95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
2177	95% H-UCL (Log ROS)	1.360E+49		
2178				
2179	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2180	KM Mean (logged)	-4.526	KM Geo Mean	0.0108
2181	KM SD (logged)	2.456	95% Critical H Value (KM-Log)	9.381
2182	KM Standard Error of Mean (logged)	1.418	95% H-UCL (KM -Log)	6577
2183	KM SD (logged)	2.456	95% Critical H Value (KM-Log)	9.381
2184	KM Standard Error of Mean (logged)	1.418		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.341	Mean in Log Scale	-4.118
SD in Original Scale	0.813	SD in Log Scale	2.522
95% t UCL (Assumes normality)	1.009	95% H-Stat UCL	20280

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

KM Bootstrap t UCL	N/A		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1,2,4-Trimethylbenzene

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	4
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.0201	Minimum Non-Detect	0.00251
Maximum Detect	0.809	Maximum Non-Detect	0.0145
Variance Detects	0.311	Percent Non-Detects	66.67%
Mean Detects	0.415	SD Detects	0.558
Median Detects	0.415	CV Detects	1.346
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.059	SD of Logged Detects	2.613

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.14	KM Standard Error of Mean	0.173
KM SD	0.299	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.488	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.424	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.658	95% KM Chebyshev UCL	0.893
97.5% KM Chebyshev UCL	1.219	99% KM Chebyshev UCL	1.859

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.533	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.777	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.134	nu star (bias corrected)	N/A
Mean (detects)	0.415		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.14	SD (KM)	0.299
Variance (KM)	0.0896	SE of Mean (KM)	0.173
k hat (KM)	0.218	k star (KM)	0.22
nu hat (KM)	2.62	nu star (KM)	2.643
theta hat (KM)	0.641	theta star (KM)	0.635
80% gamma percentile (KM)	0.193	90% gamma percentile (KM)	0.422
95% gamma percentile (KM)	0.702	99% gamma percentile (KM)	1.46

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0122
Approximate Chi Square Value (2.64, α)	0.275	Adjusted Chi Square Value (2.64, β)	0.126
95% Gamma Approximate KM-UCL (use when n>=50)	1.344	95% Gamma Adjusted KM-UCL (use when n<50)	2.942

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.138	Mean in Log Scale	-9.75
SD in Original Scale	0.329	SD in Log Scale	6.071
95% t UCL (assumes normality of ROS data)	0.409	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	5.793E+30		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.678	KM Geo Mean	0.0093
KM SD (logged)	2.137	95% Critical H Value (KM-Log)	8.204
KM Standard Error of Mean (logged)	1.234	95% H-UCL (KM -Log)	231.7
KM SD (logged)	2.137	95% Critical H Value (KM-Log)	8.204
KM Standard Error of Mean (logged)	1.234		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.142	Mean in Log Scale	-4.27
SD in Original Scale	0.327	SD in Log Scale	2.18
95% t UCL (Assumes normality)	0.411	95% H-Stat UCL	522.5

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

	A	B	C	D	E	F	G	H	I	J	K	L
2289					KM Bootstrap t UCL	N/A						
2290												
2291	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2292	Recommendations are based upon data size, data distribution, and skewness.											
2293	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2294	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2295												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:49:10 AM
From File	Hendersen 0-2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Acenaphthylene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	6	Number of Non-Detects	2
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	0.0359	Minimum Non-Detect	0.0575
Maximum Detect	1.06	Maximum Non-Detect	0.0583
Variance Detects	0.144	Percent Non-Detects	25%
Mean Detects	0.351	SD Detects	0.38
Median Detects	0.215	CV Detects	1.084
Skewness Detects	1.674	Kurtosis Detects	2.754
Mean of Logged Detects	-1.571	SD of Logged Detects	1.188

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 on Detects Only

Shapiro Wilk Test Statistic	0.823	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.272	KM Standard Error of Mean	0.128
KM SD	0.33	95% KM (BCA) UCL	0.503
95% KM (t) UCL	0.514	95% KM (Percentile Bootstrap) UCL	0.476
95% KM (z) UCL	0.482	95% KM Bootstrap t UCL	0.932
90% KM Chebyshev UCL	0.655	95% KM Chebyshev UCL	0.829
97.5% KM Chebyshev UCL	1.07	99% KM Chebyshev UCL	1.543

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.192	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.714	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.092	k star (bias corrected MLE)	0.657

53	Theta hat (MLE)	0.321	Theta star (bias corrected MLE)	0.533
54	nu hat (MLE)	13.11	nu star (bias corrected)	7.887
55	Mean (detects)	0.351		
56				
57	**Gamma ROS Statistics using Imputed Non-Detects**			
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
59	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
60	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
61	This is especially true when the sample size is small.			
62	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
63	Minimum	0.01	Mean	0.265
64	Maximum	1.06	Median	0.144
65	SD	0.358	CV	1.348
66	k hat (MLE)	0.614	k star (bias corrected MLE)	0.467
67	Theta hat (MLE)	0.432	Theta star (bias corrected MLE)	0.568
68	nu hat (MLE)	9.82	nu star (bias corrected)	7.471
69	Adjusted Level of Significance (β)	0.0195		
70	Approximate Chi Square Value (7.47, α)	2.433	Adjusted Chi Square Value (7.47, β)	1.77
71	95% Gamma Approximate UCL (use when n>=50)	0.815	95% Gamma Adjusted UCL (use when n<50)	1.12
72				
73	**Estimates of Gamma Parameters using KM Estimates**			
74	Mean (KM)	0.272	SD (KM)	0.33
75	Variance (KM)	0.109	SE of Mean (KM)	0.128
76	k hat (KM)	0.679	k star (KM)	0.508
77	nu hat (KM)	10.87	nu star (KM)	8.124
78	theta hat (KM)	0.4	theta star (KM)	0.535
79	80% gamma percentile (KM)	0.447	90% gamma percentile (KM)	0.733
80	95% gamma percentile (KM)	1.039	99% gamma percentile (KM)	1.789
81				
82	**Gamma Kaplan-Meier (KM) Statistics**			
83	Approximate Chi Square Value (8.12, α)	2.807	Adjusted Chi Square Value (8.12, β)	2.08
84	95% Gamma Approximate KM-UCL (use when n>=50)	0.787	95% Gamma Adjusted KM-UCL (use when n<50)	1.062
85				
86	**Lognormal GOF Test on Detected Observations Only**			
87	Shapiro Wilk Test Statistic	0.993	**Shapiro Wilk GOF Test**	
88	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
89	Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**	
90	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
91	**Detected Data appear Lognormal at 5% Significance Level**			
92				
93	**Lognormal ROS Statistics Using Imputed Non-Detects**			
94	Mean in Original Scale	0.271	Mean in Log Scale	-2.045
95	SD in Original Scale	0.354	SD in Log Scale	1.333
96	95% t UCL (assumes normality of ROS data)	0.508	95% Percentile Bootstrap UCL	0.49
97	95% BCA Bootstrap UCL	0.548	95% Bootstrap t UCL	0.942
98	95% H-UCL (Log ROS)	2.73		
99				
100	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
101	KM Mean (logged)	-2.01	KM Geo Mean	0.134
102	KM SD (logged)	1.209	95% Critical H Value (KM-Log)	3.958
103	KM Standard Error of Mean (logged)	0.468	95% H-UCL (KM -Log)	1.695
104	KM SD (logged)	1.209	95% Critical H Value (KM-Log)	3.958

	A	B	C	D	E	F	G	H	I	J	K	L
105					KM Standard Error of Mean (logged)	0.468						
106												
107	**DL/2 Statistics**											
108	**DL/2 Normal**						**DL/2 Log-Transformed**					
109					Mean in Original Scale	0.27					Mean in Log Scale	-2.064
110					SD in Original Scale	0.354					SD in Log Scale	1.357
111					95% t UCL (Assumes normality)	0.507					95% H-Stat UCL	2.969
112	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
113												
114	**Nonparametric Distribution Free UCL Statistics**											
115	**Detected Data appear Normal Distributed at 5% Significance Level**											
116												
117	**Suggested UCL to Use**											
118					95% KM (t) UCL	0.514						
119												
120	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
121	Recommendations are based upon data size, data distribution, and skewness.											
122	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
123	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
124												
125	**Anthracene**											
126												
127	**General Statistics**											
128					Total Number of Observations	8					Number of Distinct Observations	8
129					Number of Detects	4					Number of Non-Detects	4
130					Number of Distinct Detects	4					Number of Distinct Non-Detects	4
131					Minimum Detect	0.0129					Minimum Non-Detect	0.0575
132					Maximum Detect	0.241					Maximum Non-Detect	0.0623
133					Variance Detects	0.00965					Percent Non-Detects	50%
134					Mean Detects	0.1					SD Detects	0.0982
135					Median Detects	0.0738					CV Detects	0.979
136					Skewness Detects	1.453					Kurtosis Detects	2.653
137					Mean of Logged Detects	-2.749					SD of Logged Detects	1.208
138												
139	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
140	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
141	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
142	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
143												
144	**Normal GOF Test on Detects Only**											
145					Shapiro Wilk Test Statistic	0.875	**Shapiro Wilk GOF Test**					
146					5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level					
147					Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**					
148					5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level					
149	**Detected Data appear Normal at 5% Significance Level**											
150												
151	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
152					KM Mean	0.0566					KM Standard Error of Mean	0.0304
153					KM SD	0.0744					95% KM (BCA) UCL	N/A
154					95% KM (t) UCL	0.114					95% KM (Percentile Bootstrap) UCL	N/A
155					95% KM (z) UCL	0.107					95% KM Bootstrap t UCL	N/A
156					90% KM Chebyshev UCL	0.148					95% KM Chebyshev UCL	0.189

	A–E	F	G–K	L
157	97.5% KM Chebyshev UCL	0.246	99% KM Chebyshev UCL	0.359
158				
159	**Gamma GOF Tests on Detected Observations Only**			
160	A-D Test Statistic	0.264	**Anderson-Darling GOF Test**	
161	5% A-D Critical Value	0.664	Detected data appear Gamma Distributed at 5% Significance Level	
162	K-S Test Statistic	0.22	**Kolmogorov-Smirnov GOF**	
163	5% K-S Critical Value	0.401	Detected data appear Gamma Distributed at 5% Significance Level	
164	**Detected data appear Gamma Distributed at 5% Significance Level**			
165				
166	**Gamma Statistics on Detected Data Only**			
167	k hat (MLE)	1.251	k star (bias corrected MLE)	0.479
168	Theta hat (MLE)	0.0802	Theta star (bias corrected MLE)	0.209
169	nu hat (MLE)	10.01	nu star (bias corrected)	3.836
170	Mean (detects)	0.1		
171				
172	**Gamma ROS Statistics using Imputed Non-Detects**			
173	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
174	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
175	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
176	This is especially true when the sample size is small.			
177	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
178	Minimum	0.01	Mean	0.0552
179	Maximum	0.241	Median	0.0115
180	SD	0.0804	CV	1.457
181	k hat (MLE)	0.765	k star (bias corrected MLE)	0.562
182	Theta hat (MLE)	0.0721	Theta star (bias corrected MLE)	0.0983
183	nu hat (MLE)	12.25	nu star (bias corrected)	8.987
184	Adjusted Level of Significance (β)	0.0195		
185	Approximate Chi Square Value (8.99, α)	3.319	Adjusted Chi Square Value (8.99, β)	2.51
186	95% Gamma Approximate UCL (use when n>=50)	0.149	95% Gamma Adjusted UCL (use when n<50)	N/A
187				
188	**Estimates of Gamma Parameters using KM Estimates**			
189	Mean (KM)	0.0566	SD (KM)	0.0744
190	Variance (KM)	0.00553	SE of Mean (KM)	0.0304
191	k hat (KM)	0.58	k star (KM)	0.446
192	nu hat (KM)	9.28	nu star (KM)	7.133
193	theta hat (KM)	0.0977	theta star (KM)	0.127
194	80% gamma percentile (KM)	0.0924	90% gamma percentile (KM)	0.157
195	95% gamma percentile (KM)	0.227	99% gamma percentile (KM)	0.4
196				
197	**Gamma Kaplan-Meier (KM) Statistics**			
198	Approximate Chi Square Value (7.13, α)	2.244	Adjusted Chi Square Value (7.13, β)	1.615
199	95% Gamma Approximate KM-UCL (use when n>=50)	0.18	95% Gamma Adjusted KM-UCL (use when n<50)	0.25
200				
201	**Lognormal GOF Test on Detected Observations Only**			
202	Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**	
203	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
204	Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
205	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
206	**Detected Data appear Lognormal at 5% Significance Level**			
207				
208	**Lognormal ROS Statistics Using Imputed Non-Detects**			

	A	B	C	D	E	F	G	H	I	J	K	L
209					Mean in Original Scale	0.0563					Mean in Log Scale	-3.573
210					SD in Original Scale	0.0797					SD in Log Scale	1.184
211					95% t UCL (assumes normality of ROS data)	0.11					95% Percentile Bootstrap UCL	0.105
212					95% BCA Bootstrap UCL	0.124					95% Bootstrap t UCL	0.173
213					95% H-UCL (Log ROS)	0.323						
214												
215	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
216					KM Mean (logged)	-3.55					KM Geo Mean	0.0287
217					KM SD (logged)	1.09					95% Critical H Value (KM-Log)	3.652
218					KM Standard Error of Mean (logged)	0.445					95% H-UCL (KM -Log)	0.234
219					KM SD (logged)	1.09					95% Critical H Value (KM-Log)	3.652
220					KM Standard Error of Mean (logged)	0.445						
221												
222	**DL/2 Statistics**											
223	**DL/2 Normal**						**DL/2 Log-Transformed**					
224					Mean in Original Scale	0.0652					Mean in Log Scale	-3.128
225					SD in Original Scale	0.0745					SD in Log Scale	0.889
226					95% t UCL (Assumes normality)	0.115					95% H-Stat UCL	0.188
227	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
228												
229	**Nonparametric Distribution Free UCL Statistics**											
230	**Detected Data appear Normal Distributed at 5% Significance Level**											
231												
232	**Suggested UCL to Use**											
233					95% KM (t) UCL	0.114						
234												
235	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
236	Recommendations are based upon data size, data distribution, and skewness.											
237	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
238	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
239												
240												
241	**Benzo[a]anthracene**											
242												
243	**General Statistics**											
244					Total Number of Observations	8					Number of Distinct Observations	8
245											Number of Missing Observations	0
246					Minimum	0.0527					Mean	0.247
247					Maximum	0.788					Median	0.223
248					SD	0.234					Std. Error of Mean	0.0826
249					Coefficient of Variation	0.946					Skewness	2.126
250												
251	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
252	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
253	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
254	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
255												
256	**Normal GOF Test**											
257					Shapiro Wilk Test Statistic	0.74	**Shapiro Wilk GOF Test**					
258					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
259					Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**					
260					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					

	A–E	F	G–K	L
261	**Data Not Normal at 5% Significance Level**			
262				
263	**Assuming Normal Distribution**			
264	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
265	95% Student's-t UCL	0.404	95% Adjusted-CLT UCL (Chen-1995)	0.45
266			95% Modified-t UCL (Johnson-1978)	0.414
267				
268	**Gamma GOF Test**			
269	A-D Test Statistic	0.414	**Anderson-Darling Gamma GOF Test**	
270	5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level	
271	K-S Test Statistic	0.248	**Kolmogorov-Smirnov Gamma GOF Test**	
272	5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level	
273	**Detected data appear Gamma Distributed at 5% Significance Level**			
274				
275	**Gamma Statistics**			
276	k hat (MLE)	1.681	k star (bias corrected MLE)	1.134
277	Theta hat (MLE)	0.147	Theta star (bias corrected MLE)	0.218
278	nu hat (MLE)	26.9	nu star (bias corrected)	18.14
279	MLE Mean (bias corrected)	0.247	MLE Sd (bias corrected)	0.232
280			Approximate Chi Square Value (0.05)	9.495
281	Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	7.963
282				
283	**Assuming Gamma Distribution**			
284	95% Approximate Gamma UCL (use when n>=50)	0.472	95% Adjusted Gamma UCL (use when n<50)	0.563
285				
286	**Lognormal GOF Test**			
287	Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk Lognormal GOF Test**	
288	5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
289	Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**	
290	5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
291	**Data appear Lognormal at 5% Significance Level**			
292				
293	**Lognormal Statistics**			
294	Minimum of Logged Data	-2.943	Mean of logged Data	-1.724
295	Maximum of Logged Data	-0.238	SD of logged Data	0.861
296				
297	**Assuming Lognormal Distribution**			
298	95% H-UCL	0.706	90% Chebyshev (MVUE) UCL	0.471
299	95% Chebyshev (MVUE) UCL	0.574	97.5% Chebyshev (MVUE) UCL	0.717
300	99% Chebyshev (MVUE) UCL	0.997		
301				
302	**Nonparametric Distribution Free UCL Statistics**			
303	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
304				
305	**Nonparametric Distribution Free UCLs**			
306	95% CLT UCL	0.383	95% Jackknife UCL	0.404
307	95% Standard Bootstrap UCL	0.374	95% Bootstrap-t UCL	0.543
308	95% Hall's Bootstrap UCL	0.941	95% Percentile Bootstrap UCL	0.386
309	95% BCA Bootstrap UCL	0.444		
310	90% Chebyshev(Mean, Sd) UCL	0.495	95% Chebyshev(Mean, Sd) UCL	0.607
311	97.5% Chebyshev(Mean, Sd) UCL	0.763	99% Chebyshev(Mean, Sd) UCL	1.07
312				

Suggested UCL to Use			
95% Adjusted Gamma UCL	0.563		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[a]pyrene

General Statistics			
Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.0722	Mean	0.503
Maximum	1.32	Median	0.384
SD	0.441	Std. Error of Mean	0.156
Coefficient of Variation	0.878	Skewness	0.927

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	0.901	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.798	95% Adjusted-CLT UCL (Chen-1995)	0.814
		95% Modified-t UCL (Johnson-1978)	0.807
Gamma GOF Test			
A-D Test Statistic	0.236	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.731	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.15	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.3	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	1.303	k star (bias corrected MLE)	0.897
Theta hat (MLE)	0.386	Theta star (bias corrected MLE)	0.56
nu hat (MLE)	20.84	nu star (bias corrected)	14.36
MLE Mean (bias corrected)	0.503	MLE Sd (bias corrected)	0.531
		Approximate Chi Square Value (0.05)	6.818
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	5.558
Assuming Gamma Distribution			

	A	B	C	D	E	F	G	H	I	J	K	L
365	95% Approximate Gamma UCL (use when n>=50))					1.059	95% Adjusted Gamma UCL (use when n<50)					1.299
366												
367	**Lognormal GOF Test**											
368	Shapiro Wilk Test Statistic					0.938	**Shapiro Wilk Lognormal GOF Test**					
369	5% Shapiro Wilk Critical Value					0.818	Data appear Lognormal at 5% Significance Level					
370	Lilliefors Test Statistic					0.147	**Lilliefors Lognormal GOF Test**					
371	5% Lilliefors Critical Value					0.283	Data appear Lognormal at 5% Significance Level					
372	**Data appear Lognormal at 5% Significance Level**											
373												
374	**Lognormal Statistics**											
375	Minimum of Logged Data					-2.628	Mean of logged Data					-1.118
376	Maximum of Logged Data					0.278	SD of logged Data					1.075
377												
378	**Assuming Lognormal Distribution**											
379	95% H-UCL					2.531	90% Chebyshev (MVUE) UCL					1.144
380	95% Chebyshev (MVUE) UCL					1.422	97.5% Chebyshev (MVUE) UCL					1.809
381	99% Chebyshev (MVUE) UCL					2.569						
382												
383	**Nonparametric Distribution Free UCL Statistics**											
384	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
385												
386	**Nonparametric Distribution Free UCLs**											
387	95% CLT UCL					0.759	95% Jackknife UCL					0.798
388	95% Standard Bootstrap UCL					0.746	95% Bootstrap-t UCL					0.877
389	95% Hall's Bootstrap UCL					0.853	95% Percentile Bootstrap UCL					0.757
390	95% BCA Bootstrap UCL					0.768						
391	90% Chebyshev(Mean, Sd) UCL					0.971	95% Chebyshev(Mean, Sd) UCL					1.183
392	97.5% Chebyshev(Mean, Sd) UCL					1.477	99% Chebyshev(Mean, Sd) UCL					2.055
393												
394	**Suggested UCL to Use**											
395	95% Student's-t UCL					0.798						
396												
397	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
398	Recommendations are based upon data size, data distribution, and skewness.											
399	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
400	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
401												
402												
403	**Benzo[b]fluoranthene**											
404												
405	**General Statistics**											
406	Total Number of Observations					8	Number of Distinct Observations					8
407							Number of Missing Observations					0
408	Minimum					0.109	Mean					0.626
409	Maximum					1.83	Median					0.502
410	SD					0.562	Std. Error of Mean					0.199
411	Coefficient of Variation					0.899	Skewness					1.561
412												
413	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
414	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
415	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
416	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											

Row				
417				
418	**Normal GOF Test**			
419	Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**	
420	5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level	
421	Lilliefors Test Statistic	0.216	**Lilliefors GOF Test**	
422	5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	
423	**Data appear Normal at 5% Significance Level**			
424				
425	**Assuming Normal Distribution**			
426	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
427	95% Student's-t UCL	1.002	95% Adjusted-CLT UCL (Chen-1995)	1.07
428			95% Modified-t UCL (Johnson-1978)	1.02
429				
430	**Gamma GOF Test**			
431	A-D Test Statistic	0.232	**Anderson-Darling Gamma GOF Test**	
432	5% A-D Critical Value	0.729	Detected data appear Gamma Distributed at 5% Significance Level	
433	K-S Test Statistic	0.139	**Kolmogorov-Smirnov Gamma GOF Test**	
434	5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level	
435	**Detected data appear Gamma Distributed at 5% Significance Level**			
436				
437	**Gamma Statistics**			
438	k hat (MLE)	1.492	k star (bias corrected MLE)	1.016
439	Theta hat (MLE)	0.419	Theta star (bias corrected MLE)	0.616
440	nu hat (MLE)	23.87	nu star (bias corrected)	16.25
441	MLE Mean (bias corrected)	0.626	MLE Sd (bias corrected)	0.621
442			Approximate Chi Square Value (0.05)	8.139
443	Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	6.74
444				
445	**Assuming Gamma Distribution**			
446	95% Approximate Gamma UCL (use when n>=50))	1.249	95% Adjusted Gamma UCL (use when n<50)	1.509
447				
448	**Lognormal GOF Test**			
449	Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**	
450	5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
451	Lilliefors Test Statistic	0.172	**Lilliefors Lognormal GOF Test**	
452	5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
453	**Data appear Lognormal at 5% Significance Level**			
454				
455	**Lognormal Statistics**			
456	Minimum of Logged Data	-2.216	Mean of logged Data	-0.84
457	Maximum of Logged Data	0.604	SD of logged Data	0.968
458				
459	**Assuming Lognormal Distribution**			
460	95% H-UCL	2.347	90% Chebyshev (MVUE) UCL	1.31
461	95% Chebyshev (MVUE) UCL	1.613	97.5% Chebyshev (MVUE) UCL	2.035
462	99% Chebyshev (MVUE) UCL	2.862		
463				
464	**Nonparametric Distribution Free UCL Statistics**			
465	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
466				
467	**Nonparametric Distribution Free UCLs**			
468	95% CLT UCL	0.953	95% Jackknife UCL	1.002

	A	B	C	D	E	F	G	H	I	J	K	L
469			95% Standard Bootstrap UCL			0.933				95% Bootstrap-t UCL		1.261
470			95% Hall's Bootstrap UCL			2.361				95% Percentile Bootstrap UCL		0.959
471			95% BCA Bootstrap UCL			1.012						
472			90% Chebyshev(Mean, Sd) UCL			1.222				95% Chebyshev(Mean, Sd) UCL		1.492
473			97.5% Chebyshev(Mean, Sd) UCL			1.867				99% Chebyshev(Mean, Sd) UCL		2.603
474												
475						**Suggested UCL to Use**						
476			95% Student's-t UCL			1.002						
477												
478	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
479	Recommendations are based upon data size, data distribution, and skewness.											
480	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
481	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
482												
483												
484	**Benzo[g,h,i]perylene**											
485												
486						**General Statistics**						
487			Total Number of Observations			8				Number of Distinct Observations		8
488										Number of Missing Observations		0
489			Minimum			0.0691				Mean		0.534
490			Maximum			1.51				Median		0.378
491			SD			0.5				Std. Error of Mean		0.177
492			Coefficient of Variation			0.937				Skewness		1.133
493												
494	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
495	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
496	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
497	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
498												
499						**Normal GOF Test**						
500			Shapiro Wilk Test Statistic			0.877			**Shapiro Wilk GOF Test**			
501			5% Shapiro Wilk Critical Value			0.818			Data appear Normal at 5% Significance Level			
502			Lilliefors Test Statistic			0.203			**Lilliefors GOF Test**			
503			5% Lilliefors Critical Value			0.283			Data appear Normal at 5% Significance Level			
504						**Data appear Normal at 5% Significance Level**						
505												
506						**Assuming Normal Distribution**						
507			**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**			
508			95% Student's-t UCL			0.869				95% Adjusted-CLT UCL (Chen-1995)		0.901
509										95% Modified-t UCL (Johnson-1978)		0.881
510												
511						**Gamma GOF Test**						
512			A-D Test Statistic			0.236			**Anderson-Darling Gamma GOF Test**			
513			5% A-D Critical Value			0.732			Detected data appear Gamma Distributed at 5% Significance Level			
514			K-S Test Statistic			0.17			**Kolmogorov-Smirnov Gamma GOF Test**			
515			5% K-S Critical Value			0.3			Detected data appear Gamma Distributed at 5% Significance Level			
516						**Detected data appear Gamma Distributed at 5% Significance Level**						
517												
518						**Gamma Statistics**						
519			k hat (MLE)			1.214				k star (bias corrected MLE)		0.842
520			Theta hat (MLE)			0.44				Theta star (bias corrected MLE)		0.634

	A	B	C	D	E	F	G	H	I	J	K	L
521					nu hat (MLE)	19.42					nu star (bias corrected)	13.47
522					MLE Mean (bias corrected)	0.534					MLE Sd (bias corrected)	0.582
523											Approximate Chi Square Value (0.05)	6.209
524					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	5.018
525												
526	**Assuming Gamma Distribution**											
527					95% Approximate Gamma UCL (use when n>=50))	1.158					95% Adjusted Gamma UCL (use when n<50)	1.433
528												
529	**Lognormal GOF Test**											
530					Shapiro Wilk Test Statistic	0.953	**Shapiro Wilk Lognormal GOF Test**					
531					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
532					Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**					
533					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
534	**Data appear Lognormal at 5% Significance Level**											
535												
536	**Lognormal Statistics**											
537					Minimum of Logged Data	-2.672					Mean of logged Data	-1.093
538					Maximum of Logged Data	0.412					SD of logged Data	1.106
539												
540	**Assuming Lognormal Distribution**											
541					95% H-UCL	2.888					90% Chebyshev (MVUE) UCL	1.222
542					95% Chebyshev (MVUE) UCL	1.524					97.5% Chebyshev (MVUE) UCL	1.943
543					99% Chebyshev (MVUE) UCL	2.765						
544												
545	**Nonparametric Distribution Free UCL Statistics**											
546	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
547												
548	**Nonparametric Distribution Free UCLs**											
549					95% CLT UCL	0.825					95% Jackknife UCL	0.869
550					95% Standard Bootstrap UCL	0.806					95% Bootstrap-t UCL	1.031
551					95% Hall's Bootstrap UCL	0.929					95% Percentile Bootstrap UCL	0.833
552					95% BCA Bootstrap UCL	0.882						
553					90% Chebyshev(Mean, Sd) UCL	1.064					95% Chebyshev(Mean, Sd) UCL	1.305
554					97.5% Chebyshev(Mean, Sd) UCL	1.638					99% Chebyshev(Mean, Sd) UCL	2.293
555												
556	**Suggested UCL to Use**											
557					95% Student's-t UCL	0.869						
558												
559	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
560	Recommendations are based upon data size, data distribution, and skewness.											
561	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
562	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
563												
564	**Benzo[k]fluoranthene**											
565												
566	**General Statistics**											
567					Total Number of Observations	8					Number of Distinct Observations	8
568					Number of Detects	7					Number of Non-Detects	1
569					Number of Distinct Detects	7					Number of Distinct Non-Detects	1
570					Minimum Detect	0.0378					Minimum Non-Detect	0.0583
571					Maximum Detect	0.704					Maximum Non-Detect	0.0583
572					Variance Detects	0.0503					Percent Non-Detects	12.5%

Mean Detects	0.222	SD Detects	0.224
Median Detects	0.152	CV Detects	1.012
Skewness Detects	2.102	Kurtosis Detects	4.943
Mean of Logged Detects	-1.882	SD of Logged Detects	0.942
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 on Detects Only			
Shapiro Wilk Test Statistic	0.748	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.199	KM Standard Error of Mean	0.0777
KM SD	0.203	95% KM (BCA) UCL	0.351
95% KM (t) UCL	0.346	95% KM (Percentile Bootstrap) UCL	0.337
95% KM (z) UCL	0.326	95% KM Bootstrap t UCL	0.499
90% KM Chebyshev UCL	0.432	95% KM Chebyshev UCL	0.537
97.5% KM Chebyshev UCL	0.684	99% KM Chebyshev UCL	0.972
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.346	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.221	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.317	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.479	k star (bias corrected MLE)	0.94
Theta hat (MLE)	0.15	Theta star (bias corrected MLE)	0.236
nu hat (MLE)	20.71	nu star (bias corrected)	13.17
Mean (detects)	0.222		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.195
Maximum	0.704	Median	0.152
SD	0.221	CV	1.131
k hat (MLE)	0.984	k star (bias corrected MLE)	0.698
Theta hat (MLE)	0.198	Theta star (bias corrected MLE)	0.279
nu hat (MLE)	15.74	nu star (bias corrected)	11.17
Adjusted Level of Significance (β)	0.0195		
Approximate Chi Square Value (11.17, α)	4.685	Adjusted Chi Square Value (11.17, β)	3.681

625	95% Gamma Approximate UCL (use when n>=50)	0.465	95% Gamma Adjusted UCL (use when n<50)	0.592
626				
627	**Estimates of Gamma Parameters using KM Estimates**			
628	Mean (KM)	0.199	SD (KM)	0.203
629	Variance (KM)	0.0414	SE of Mean (KM)	0.0777
630	k hat (KM)	0.953	k star (KM)	0.679
631	nu hat (KM)	15.24	nu star (KM)	10.86
632	theta hat (KM)	0.208	theta star (KM)	0.293
633	80% gamma percentile (KM)	0.327	90% gamma percentile (KM)	0.502
634	95% gamma percentile (KM)	0.683	99% gamma percentile (KM)	1.118
635				
636	**Gamma Kaplan-Meier (KM) Statistics**			
637	Approximate Chi Square Value (10.86, α)	4.487	Adjusted Chi Square Value (10.86, β)	3.509
638	95% Gamma Approximate KM-UCL (use when n>=50)	0.481	95% Gamma Adjusted KM-UCL (use when n<50)	0.615
639				
640	**Lognormal GOF Test on Detected Observations Only**			
641	Shapiro Wilk Test Statistic	0.961	**Shapiro Wilk GOF Test**	
642	5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
643	Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**	
644	5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
645	**Detected Data appear Lognormal at 5% Significance Level**			
646				
647	**Lognormal ROS Statistics Using Imputed Non-Detects**			
648	Mean in Original Scale	0.198	Mean in Log Scale	-2.071
649	SD in Original Scale	0.218	SD in Log Scale	1.022
650	95% t UCL (assumes normality of ROS data)	0.344	95% Percentile Bootstrap UCL	0.333
651	95% BCA Bootstrap UCL	0.376	95% Bootstrap t UCL	0.521
652	95% H-UCL (Log ROS)	0.816		
653				
654	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
655	KM Mean (logged)	-2.056	KM Geo Mean	0.128
656	KM SD (logged)	0.937	95% Critical H Value (KM-Log)	3.272
657	KM Standard Error of Mean (logged)	0.358	95% H-UCL (KM -Log)	0.632
658	KM SD (logged)	0.937	95% Critical H Value (KM-Log)	3.272
659	KM Standard Error of Mean (logged)	0.358		
660				
661	**DL/2 Statistics**			
662	**DL/2 Normal**		**DL/2 Log-Transformed**	
663	Mean in Original Scale	0.197	Mean in Log Scale	-2.089
664	SD in Original Scale	0.218	SD in Log Scale	1.05
665	95% t UCL (Assumes normality)	0.344	95% H-Stat UCL	0.878
666	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
667				
668	**Nonparametric Distribution Free UCL Statistics**			
669	**Detected Data appear Gamma Distributed at 5% Significance Level**			
670				
671	**Suggested UCL to Use**			
672	95% KM Bootstrap t UCL	0.499	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	0.615
673				
674	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
675	Recommendations are based upon data size, data distribution, and skewness.			
676	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.0755	Mean	0.336
Maximum	0.974	Median	0.306
SD	0.283	Std. Error of Mean	0.1
Coefficient of Variation	0.843	Skewness	1.888

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	0.799	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.279	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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	0.526	95% Adjusted-CLT UCL (Chen-1995)	0.572
		95% Modified-t UCL (Johnson-1978)	0.537

Gamma GOF Test

A-D Test Statistic	0.303	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.298	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.936	k star (bias corrected MLE)	1.293
Theta hat (MLE)	0.174	Theta star (bias corrected MLE)	0.26
nu hat (MLE)	30.98	nu star (bias corrected)	20.7
MLE Mean (bias corrected)	0.336	MLE Sd (bias corrected)	0.295
		Approximate Chi Square Value (0.05)	11.37
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	9.665

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.612	95% Adjusted Gamma UCL (use when n<50)	0.72

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors Lognormal GOF Test**

5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.584	Mean of logged Data	-1.37
Maximum of Logged Data	-0.0263	SD of logged Data	0.811
Assuming Lognormal Distribution			
95% H-UCL	0.878	90% Chebyshev (MVUE) UCL	0.63
95% Chebyshev (MVUE) UCL	0.763	97.5% Chebyshev (MVUE) UCL	0.948
99% Chebyshev (MVUE) UCL	1.311		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	0.501	95% Jackknife UCL	0.526
95% Standard Bootstrap UCL	0.489	95% Bootstrap-t UCL	0.657
95% Hall's Bootstrap UCL	1.247	95% Percentile Bootstrap UCL	0.503
95% BCA Bootstrap UCL	0.559		
90% Chebyshev(Mean, Sd) UCL	0.637	95% Chebyshev(Mean, Sd) UCL	0.773
97.5% Chebyshev(Mean, Sd) UCL	0.962	99% Chebyshev(Mean, Sd) UCL	1.333
Suggested UCL to Use			
95% Student's-t UCL	0.526		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Dibenz(a,h)anthracene			
General Statistics			
Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	5	Number of Non-Detects	3
Number of Distinct Detects	5	Number of Distinct Non-Detects	3
Minimum Detect	0.0187	Minimum Non-Detect	0.0575
Maximum Detect	0.259	Maximum Non-Detect	0.0623
Variance Detects	0.00792	Percent Non-Detects	37.5%
Mean Detects	0.116	SD Detects	0.089
Median Detects	0.113	CV Detects	0.765
Skewness Detects	1.121	Kurtosis Detects	2.121
Mean of Logged Detects	-2.452	SD of Logged Detects	0.966
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			

781				
782	**Normal GOF Test on Detects Only**			
783	Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**	
784	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
785	Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**	
786	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
787	**Detected Data appear Normal at 5% Significance Level**			
788				
789	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
790	KM Mean	0.0797	KM Standard Error of Mean	0.0311
791	KM SD	0.0787	95% KM (BCA) UCL	0.145
792	95% KM (t) UCL	0.139	95% KM (Percentile Bootstrap) UCL	0.134
793	95% KM (z) UCL	0.131	95% KM Bootstrap t UCL	0.149
794	90% KM Chebyshev UCL	0.173	95% KM Chebyshev UCL	0.215
795	97.5% KM Chebyshev UCL	0.274	99% KM Chebyshev UCL	0.389
796				
797	**Gamma GOF Tests on Detected Observations Only**			
798	A-D Test Statistic	0.276	**Anderson-Darling GOF Test**	
799	5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level	
800	K-S Test Statistic	0.198	**Kolmogorov-Smirnov GOF**	
801	5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level	
802	**Detected data appear Gamma Distributed at 5% Significance Level**			
803				
804	**Gamma Statistics on Detected Data Only**			
805	k hat (MLE)	1.811	k star (bias corrected MLE)	0.858
806	Theta hat (MLE)	0.0642	Theta star (bias corrected MLE)	0.136
807	nu hat (MLE)	18.11	nu star (bias corrected)	8.577
808	Mean (detects)	0.116		
809				
810	**Gamma ROS Statistics using Imputed Non-Detects**			
811	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
812	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
813	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
814	This is especially true when the sample size is small.			
815	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
816	Minimum	0.01	Mean	0.0765
817	Maximum	0.259	Median	0.0463
818	SD	0.0869	CV	1.137
819	k hat (MLE)	0.855	k star (bias corrected MLE)	0.618
820	Theta hat (MLE)	0.0894	Theta star (bias corrected MLE)	0.124
821	nu hat (MLE)	13.68	nu star (bias corrected)	9.88
822	Adjusted Level of Significance (β)	0.0195		
823	Approximate Chi Square Value (9.88, α)	3.867	Adjusted Chi Square Value (9.88, β)	2.976
824	95% Gamma Approximate UCL (use when n>=50)	0.195	95% Gamma Adjusted UCL (use when n<50)	0.254
825				
826	**Estimates of Gamma Parameters using KM Estimates**			
827	Mean (KM)	0.0797	SD (KM)	0.0787
828	Variance (KM)	0.0062	SE of Mean (KM)	0.0311
829	k hat (KM)	1.026	k star (KM)	0.724
830	nu hat (KM)	16.41	nu star (KM)	11.59
831	theta hat (KM)	0.0777	theta star (KM)	0.11
832	80% gamma percentile (KM)	0.131	90% gamma percentile (KM)	0.198

833	95% gamma percentile (KM)	0.268	99% gamma percentile (KM)	0.433
834				
835	**Gamma Kaplan-Meier (KM) Statistics**			
836	Approximate Chi Square Value (11.59, α)	4.957	Adjusted Chi Square Value (11.59, β)	3.918
837	95% Gamma Approximate KM-UCL (use when n>=50)	0.186	95% Gamma Adjusted KM-UCL (use when n<50)	0.236
838				
839	**Lognormal GOF Test on Detected Observations Only**			
840	Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**	
841	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
842	Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**	
843	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
844	**Detected Data appear Lognormal at 5% Significance Level**			
845				
846	**Lognormal ROS Statistics Using Imputed Non-Detects**			
847	Mean in Original Scale	0.0802	Mean in Log Scale	-2.999
848	SD in Original Scale	0.0837	SD in Log Scale	1.05
849	95% t UCL (assumes normality of ROS data)	0.136	95% Percentile Bootstrap UCL	0.129
850	95% BCA Bootstrap UCL	0.14	95% Bootstrap t UCL	0.179
851	95% H-UCL (Log ROS)	0.354		
852				
853	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
854	KM Mean (logged)	-3.025	KM Geo Mean	0.0486
855	KM SD (logged)	1.007	95% Critical H Value (KM-Log)	3.443
856	KM Standard Error of Mean (logged)	0.398	95% H-UCL (KM -Log)	0.299
857	KM SD (logged)	1.007	95% Critical H Value (KM-Log)	3.443
858	KM Standard Error of Mean (logged)	0.398		
859				
860	**DL/2 Statistics**			
861	**DL/2 Normal**		**DL/2 Log-Transformed**	
862	Mean in Original Scale	0.0838	Mean in Log Scale	-2.852
863	SD in Original Scale	0.0809	SD in Log Scale	0.916
864	95% t UCL (Assumes normality)	0.138	95% H-Stat UCL	0.268
865	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
866				
867	**Nonparametric Distribution Free UCL Statistics**			
868	**Detected Data appear Normal Distributed at 5% Significance Level**			
869				
870	**Suggested UCL to Use**			
871	95% KM (t) UCL	0.139		
872				
873	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
874	Recommendations are based upon data size, data distribution, and skewness.			
875	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
876	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
877				
878				
879	**Fluoranthene**			
880				
881	**General Statistics**			
882	Total Number of Observations	8	Number of Distinct Observations	8
883			Number of Missing Observations	0
884	Minimum	0.063	Mean	0.306

	A	B	C	D	E	F	G	H	I	J	K	L
885					Maximum	0.766					Median	0.283
886					SD	0.218					Std. Error of Mean	0.0771
887					Coefficient of Variation	0.712					Skewness	1.395
888												
889	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
890	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
891	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
892	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
893												
894	**Normal GOF Test**											
895					Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**					
896					5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level					
897					Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**					
898					5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level					
899	**Data appear Normal at 5% Significance Level**											
900												
901	**Assuming Normal Distribution**											
902	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
903					95% Student's-t UCL	0.452					95% Adjusted-CLT UCL (Chen-1995)	0.474
904											95% Modified-t UCL (Johnson-1978)	0.459
905												
906	**Gamma GOF Test**											
907					A-D Test Statistic	0.25	**Anderson-Darling Gamma GOF Test**					
908					5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level					
909					K-S Test Statistic	0.171	**Kolmogorov-Smirnov Gamma GOF Test**					
910					5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level					
911	**Detected data appear Gamma Distributed at 5% Significance Level**											
912												
913	**Gamma Statistics**											
914					k hat (MLE)	2.332					k star (bias corrected MLE)	1.541
915					Theta hat (MLE)	0.131					Theta star (bias corrected MLE)	0.199
916					nu hat (MLE)	37.31					nu star (bias corrected)	24.65
917					MLE Mean (bias corrected)	0.306					MLE Sd (bias corrected)	0.247
918											Approximate Chi Square Value (0.05)	14.35
919					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	12.4
920												
921	**Assuming Gamma Distribution**											
922					95% Approximate Gamma UCL (use when n>=50))	0.526					95% Adjusted Gamma UCL (use when n<50)	0.609
923												
924	**Lognormal GOF Test**											
925					Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**					
926					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
927					Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**					
928					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
929	**Data appear Lognormal at 5% Significance Level**											
930												
931	**Lognormal Statistics**											
932					Minimum of Logged Data	-2.765					Mean of logged Data	-1.413
933					Maximum of Logged Data	-0.267					SD of logged Data	0.759
934												
935	**Assuming Lognormal Distribution**											
936					95% H-UCL	0.737					90% Chebyshev (MVUE) UCL	0.566

	A–E	F	G–K	L
937	95% Chebyshev (MVUE) UCL	0.681	97.5% Chebyshev (MVUE) UCL	0.842
938	99% Chebyshev (MVUE) UCL	1.156		
939				
940	**Nonparametric Distribution Free UCL Statistics**			
941	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
942				
943	**Nonparametric Distribution Free UCLs**			
944	95% CLT UCL	0.433	95% Jackknife UCL	0.452
945	95% Standard Bootstrap UCL	0.428	95% Bootstrap-t UCL	0.521
946	95% Hall's Bootstrap UCL	0.966	95% Percentile Bootstrap UCL	0.436
947	95% BCA Bootstrap UCL	0.463		
948	90% Chebyshev(Mean, Sd) UCL	0.538	95% Chebyshev(Mean, Sd) UCL	0.642
949	97.5% Chebyshev(Mean, Sd) UCL	0.788	99% Chebyshev(Mean, Sd) UCL	1.073
950				
951	**Suggested UCL to Use**			
952	95% Student's-t UCL	0.452		
953				
954	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
955	Recommendations are based upon data size, data distribution, and skewness.			
956	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
957	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
958				
959	**Indeno[1,2,3-cd]pyrene**			
960				
961	**General Statistics**			
962	Total Number of Observations	8	Number of Distinct Observations	8
963	Number of Detects	7	Number of Non-Detects	1
964	Number of Distinct Detects	7	Number of Distinct Non-Detects	1
965	Minimum Detect	0.0875	Minimum Non-Detect	0.0583
966	Maximum Detect	1.16	Maximum Non-Detect	0.0583
967	Variance Detects	0.144	Percent Non-Detects	12.5%
968	Mean Detects	0.482	SD Detects	0.38
969	Median Detects	0.376	CV Detects	0.788
970	Skewness Detects	0.886	Kurtosis Detects	0.333
971	Mean of Logged Detects	-1.059	SD of Logged Detects	0.944
972				
973	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
974	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
975	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
976	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
977				
978	**Normal GOF Test on Detects Only**			
979	Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**	
980	5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
981	Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
982	5% Lilliefors Critical Value	0.304	Detected Data appear Normal at 5% Significance Level	
983	**Detected Data appear Normal at 5% Significance Level**			
984				
985	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
986	KM Mean	0.429	KM Standard Error of Mean	0.137
987	KM SD	0.358	95% KM (BCA) UCL	0.644
988	95% KM (t) UCL	0.688	95% KM (Percentile Bootstrap) UCL	0.647

989	95% KM (z) UCL	0.654	95% KM Bootstrap t UCL	0.791
990	90% KM Chebyshev UCL	0.839	95% KM Chebyshev UCL	1.025
991	97.5% KM Chebyshev UCL	1.282	99% KM Chebyshev UCL	1.788
992				
993	**Gamma GOF Tests on Detected Observations Only**			
994	A-D Test Statistic	0.24	**Anderson-Darling GOF Test**	
995	5% A-D Critical Value	0.719	Detected data appear Gamma Distributed at 5% Significance Level	
996	K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**	
997	5% K-S Critical Value	0.316	Detected data appear Gamma Distributed at 5% Significance Level	
998	**Detected data appear Gamma Distributed at 5% Significance Level**			
999				
1000	**Gamma Statistics on Detected Data Only**			
1001	k hat (MLE)	1.665	k star (bias corrected MLE)	1.047
1002	Theta hat (MLE)	0.29	Theta star (bias corrected MLE)	0.461
1003	nu hat (MLE)	23.31	nu star (bias corrected)	14.65
1004	Mean (detects)	0.482		
1005				
1006	**Gamma ROS Statistics using Imputed Non-Detects**			
1007	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1008	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1009	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1010	This is especially true when the sample size is small.			
1011	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1012	Minimum	0.01	Mean	0.423
1013	Maximum	1.16	Median	0.331
1014	SD	0.389	CV	0.92
1015	k hat (MLE)	0.909	k star (bias corrected MLE)	0.652
1016	Theta hat (MLE)	0.465	Theta star (bias corrected MLE)	0.649
1017	nu hat (MLE)	14.55	nu star (bias corrected)	10.43
1018	Adjusted Level of Significance (β)	0.0195		
1019	Approximate Chi Square Value (10.43, α)	4.209	Adjusted Chi Square Value (10.43, β)	3.27
1020	95% Gamma Approximate UCL (use when n>=50)	1.048	95% Gamma Adjusted UCL (use when n<50)	1.349
1021				
1022	**Estimates of Gamma Parameters using KM Estimates**			
1023	Mean (KM)	0.429	SD (KM)	0.358
1024	Variance (KM)	0.128	SE of Mean (KM)	0.137
1025	k hat (KM)	1.44	k star (KM)	0.983
1026	nu hat (KM)	23.04	nu star (KM)	15.73
1027	theta hat (KM)	0.298	theta star (KM)	0.437
1028	80% gamma percentile (KM)	0.692	90% gamma percentile (KM)	0.992
1029	95% gamma percentile (KM)	1.294	99% gamma percentile (KM)	1.994
1030				
1031	**Gamma Kaplan-Meier (KM) Statistics**			
1032	Approximate Chi Square Value (15.73, α)	7.773	Adjusted Chi Square Value (15.73, β)	6.411
1033	95% Gamma Approximate KM-UCL (use when n>=50)	0.869	95% Gamma Adjusted KM-UCL (use when n<50)	1.053
1034				
1035	**Lognormal GOF Test on Detected Observations Only**			
1036	Shapiro Wilk Test Statistic	0.943	**Shapiro Wilk GOF Test**	
1037	5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
1038	Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**	
1039	5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
1040	**Detected Data appear Lognormal at 5% Significance Level**			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.426	Mean in Log Scale	-1.351
SD in Original Scale	0.386	SD in Log Scale	1.202
95% t UCL (assumes normality of ROS data)	0.685	95% Percentile Bootstrap UCL	0.649
95% BCA Bootstrap UCL	0.669	95% Bootstrap t UCL	0.793
95% H-UCL (Log ROS)	3.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.282	KM Geo Mean	0.278
KM SD (logged)	1.008	95% Critical H Value (KM-Log)	3.446
KM Standard Error of Mean (logged)	0.385	95% H-UCL (KM -Log)	1.716
KM SD (logged)	1.008	95% Critical H Value (KM-Log)	3.446
KM Standard Error of Mean (logged)	0.385		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.426	Mean in Log Scale	-1.368
SD in Original Scale	0.387	SD in Log Scale	1.237
95% t UCL (Assumes normality)	0.685	95% H-Stat UCL	3.609

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.688

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	4	Number of Non-Detects	4
Number of Distinct Detects	4	Number of Distinct Non-Detects	4
Minimum Detect	0.0113	Minimum Non-Detect	0.0575
Maximum Detect	0.124	Maximum Non-Detect	0.0659
Variance Detects	0.00213	Percent Non-Detects	50%
Mean Detects	0.0684	SD Detects	0.0462
Median Detects	0.0691	CV Detects	0.676
Skewness Detects	-0.0927	Kurtosis Detects	1.282
Mean of Logged Detects	-2.98	SD of Logged Detects	1.041

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

	A	B	C	D	E	F	G	H	I	J	K	L
1093	**Normal GOF Test on Detects Only**											
1094					Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**					
1095					5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level					
1096					Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**					
1097					5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level					
1098	**Detected Data appear Normal at 5% Significance Level**											
1099												
1100	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1101					KM Mean	0.0412					KM Standard Error of Mean	0.0167
1102					KM SD	0.0401					95% KM (BCA) UCL	N/A
1103					95% KM (t) UCL	0.0728					95% KM (Percentile Bootstrap) UCL	N/A
1104					95% KM (z) UCL	0.0686					95% KM Bootstrap t UCL	N/A
1105					90% KM Chebyshev UCL	0.0913					95% KM Chebyshev UCL	0.114
1106					97.5% KM Chebyshev UCL	0.145					99% KM Chebyshev UCL	0.207
1107												
1108	**Gamma GOF Tests on Detected Observations Only**											
1109					A-D Test Statistic	0.375	**Anderson-Darling GOF Test**					
1110					5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level					
1111					K-S Test Statistic	0.316	**Kolmogorov-Smirnov GOF**					
1112					5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level					
1113	**Detected data appear Gamma Distributed at 5% Significance Level**											
1114												
1115	**Gamma Statistics on Detected Data Only**											
1116					k hat (MLE)	1.831					k star (bias corrected MLE)	0.624
1117					Theta hat (MLE)	0.0373					Theta star (bias corrected MLE)	0.109
1118					nu hat (MLE)	14.65					nu star (bias corrected)	4.996
1119					Mean (detects)	0.0684						
1120												
1121	**Gamma ROS Statistics using Imputed Non-Detects**											
1122	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1123	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1124	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1125	This is especially true when the sample size is small.											
1126	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1127					Minimum	0.0113					Mean	0.0415
1128					Maximum	0.124					Median	0.0163
1129					SD	0.0418					CV	1.008
1130					k hat (MLE)	1.3					k star (bias corrected MLE)	0.896
1131					Theta hat (MLE)	0.0319					Theta star (bias corrected MLE)	0.0463
1132					nu hat (MLE)	20.8					nu star (bias corrected)	14.33
1133					Adjusted Level of Significance (β)	0.0195						
1134					Approximate Chi Square Value (14.33, α)	6.8					Adjusted Chi Square Value (14.33, β)	5.542
1135					95% Gamma Approximate UCL (use when n>=50)	0.0874					95% Gamma Adjusted UCL (use when n<50)	N/A
1136												
1137	**Estimates of Gamma Parameters using KM Estimates**											
1138					Mean (KM)	0.0412					SD (KM)	0.0401
1139					Variance (KM)	0.00161					SE of Mean (KM)	0.0167
1140					k hat (KM)	1.054					k star (KM)	0.742
1141					nu hat (KM)	16.87					nu star (KM)	11.87
1142					theta hat (KM)	0.039					theta star (KM)	0.0555
1143					80% gamma percentile (KM)	0.0675					90% gamma percentile (KM)	0.102
1144					95% gamma percentile (KM)	0.137					99% gamma percentile (KM)	0.221

Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.87, α)	5.144	Adjusted Chi Square Value (11.87, β)	4.081
95% Gamma Approximate KM-UCL (use when n>=50)	0.095	95% Gamma Adjusted KM-UCL (use when n<50)	0.12
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.858	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.339	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0413	Mean in Log Scale	-3.62
SD in Original Scale	0.0419	SD in Log Scale	0.97
95% t UCL (assumes normality of ROS data)	0.0693	95% Percentile Bootstrap UCL	0.0676
95% BCA Bootstrap UCL	0.07	95% Bootstrap t UCL	0.0905
95% H-UCL (Log ROS)	0.146		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-3.688	KM Geo Mean	0.025
KM SD (logged)	0.99	95% Critical H Value (KM-Log)	3.401
KM Standard Error of Mean (logged)	0.419	95% H-UCL (KM -Log)	0.146
KM SD (logged)	0.99	95% Critical H Value (KM-Log)	3.401
KM Standard Error of Mean (logged)	0.419		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0494	Mean in Log Scale	-3.237
SD in Original Scale	0.0364	SD in Log Scale	0.736
95% t UCL (Assumes normality)	0.0738	95% H-Stat UCL	0.113
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0728		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Phenanthrene			
General Statistics			
Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.032	Mean	0.172
Maximum	0.37	Median	0.153

	A–E	F	G–K	L
1197	SD	0.109	Std. Error of Mean	0.0385
1198	Coefficient of Variation	0.634	Skewness	0.745
1199				
1200	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1201	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1202	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1203	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1204				
1205	**Normal GOF Test**			
1206	Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
1207	5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level	
1208	Lilliefors Test Statistic	0.149	**Lilliefors GOF Test**	
1209	5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level	
1210	**Data appear Normal at 5% Significance Level**			
1211				
1212	**Assuming Normal Distribution**			
1213	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1214	95% Student's-t UCL	0.244	95% Adjusted-CLT UCL (Chen-1995)	0.246
1215			95% Modified-t UCL (Johnson-1978)	0.246
1216				
1217	**Gamma GOF Test**			
1218	A-D Test Statistic	0.129	**Anderson-Darling Gamma GOF Test**	
1219	5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
1220	K-S Test Statistic	0.1	**Kolmogorov-Smirnov Gamma GOF Test**	
1221	5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	
1222	**Detected data appear Gamma Distributed at 5% Significance Level**			
1223				
1224	**Gamma Statistics**			
1225	k hat (MLE)	2.479	k star (bias corrected MLE)	1.633
1226	Theta hat (MLE)	0.0692	Theta star (bias corrected MLE)	0.105
1227	nu hat (MLE)	39.66	nu star (bias corrected)	26.12
1228	MLE Mean (bias corrected)	0.172	MLE Sd (bias corrected)	0.134
1229			Approximate Chi Square Value (0.05)	15.47
1230	Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	13.44
1231				
1232	**Assuming Gamma Distribution**			
1233	95% Approximate Gamma UCL (use when n>=50))	0.29	95% Adjusted Gamma UCL (use when n<50)	0.333
1234				
1235	**Lognormal GOF Test**			
1236	Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk Lognormal GOF Test**	
1237	5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
1238	Lilliefors Test Statistic	0.133	**Lilliefors Lognormal GOF Test**	
1239	5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
1240	**Data appear Lognormal at 5% Significance Level**			
1241				
1242	**Lognormal Statistics**			
1243	Minimum of Logged Data	-3.442	Mean of logged Data	-1.978
1244	Maximum of Logged Data	-0.994	SD of logged Data	0.763
1245				
1246	**Assuming Lognormal Distribution**			
1247	95% H-UCL	0.424	90% Chebyshev (MVUE) UCL	0.323
1248	95% Chebyshev (MVUE) UCL	0.389	97.5% Chebyshev (MVUE) UCL	0.481

99% Chebyshev (MVUE) UCL	0.662		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	0.235	95% Jackknife UCL	0.244
95% Standard Bootstrap UCL	0.23	95% Bootstrap-t UCL	0.267
95% Hall's Bootstrap UCL	0.285	95% Percentile Bootstrap UCL	0.231
95% BCA Bootstrap UCL	0.239		
90% Chebyshev(Mean, Sd) UCL	0.287	95% Chebyshev(Mean, Sd) UCL	0.339
97.5% Chebyshev(Mean, Sd) UCL	0.412	99% Chebyshev(Mean, Sd) UCL	0.554

Suggested UCL to Use

95% Student's-t UCL	0.244		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pyrene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.0945	Mean	0.481
Maximum	1.34	Median	0.435
SD	0.387	Std. Error of Mean	0.137
Coefficient of Variation	0.805	Skewness	1.765

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	0.831	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.741	95% Adjusted-CLT UCL (Chen-1995)	0.798
		95% Modified-t UCL (Johnson-1978)	0.755

Gamma GOF Test

A-D Test Statistic	0.232	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level

	A	B	C	D	E	F	G	H	I	J	K	L
1301					K-S Test Statistic	0.16	**Kolmogorov-Smirnov Gamma GOF Test**					
1302					5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level					
1303	**Detected data appear Gamma Distributed at 5% Significance Level**											
1304												
1305	**Gamma Statistics**											
1306					k hat (MLE)	2.018					k star (bias corrected MLE)	1.344
1307					Theta hat (MLE)	0.239					Theta star (bias corrected MLE)	0.358
1308					nu hat (MLE)	32.28					nu star (bias corrected)	21.51
1309					MLE Mean (bias corrected)	0.481					MLE Sd (bias corrected)	0.415
1310											Approximate Chi Square Value (0.05)	11.97
1311					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	10.22
1312												
1313	**Assuming Gamma Distribution**											
1314					95% Approximate Gamma UCL (use when n>=50))	0.865					95% Adjusted Gamma UCL (use when n<50)	1.013
1315												
1316	**Lognormal GOF Test**											
1317					Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk Lognormal GOF Test**					
1318					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
1319					Lilliefors Test Statistic	0.183	**Lilliefors Lognormal GOF Test**					
1320					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
1321	**Data appear Lognormal at 5% Significance Level**											
1322												
1323	**Lognormal Statistics**											
1324					Minimum of Logged Data	-2.359					Mean of logged Data	-0.999
1325					Maximum of Logged Data	0.293					SD of logged Data	0.806
1326												
1327	**Assuming Lognormal Distribution**											
1328					95% H-UCL	1.258					90% Chebyshev (MVUE) UCL	0.908
1329					95% Chebyshev (MVUE) UCL	1.099					97.5% Chebyshev (MVUE) UCL	1.365
1330					99% Chebyshev (MVUE) UCL	1.887						
1331												
1332	**Nonparametric Distribution Free UCL Statistics**											
1333	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
1334												
1335	**Nonparametric Distribution Free UCLs**											
1336					95% CLT UCL	0.707					95% Jackknife UCL	0.741
1337					95% Standard Bootstrap UCL	0.69					95% Bootstrap-t UCL	0.921
1338					95% Hall's Bootstrap UCL	1.776					95% Percentile Bootstrap UCL	0.715
1339					95% BCA Bootstrap UCL	0.791						
1340					90% Chebyshev(Mean, Sd) UCL	0.892					95% Chebyshev(Mean, Sd) UCL	1.078
1341					97.5% Chebyshev(Mean, Sd) UCL	1.336					99% Chebyshev(Mean, Sd) UCL	1.844
1342												
1343	**Suggested UCL to Use**											
1344					95% Student's-t UCL	0.741						
1345												
1346	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1347	Recommendations are based upon data size, data distribution, and skewness.											
1348	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1349	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1350												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:55:14 AM
From File	Hendersen GT2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
Number of Detects	2	Number of Non-Detects	3
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	1.79	Minimum Non-Detect	2.05
Maximum Detect	3.48	Maximum Non-Detect	2.65
Variance Detects	1.428	Percent Non-Detects	60%
Mean Detects	2.635	SD Detects	1.195
Median Detects	2.635	CV Detects	0.454
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.915	SD of Logged Detects	0.47

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.128	KM Standard Error of Mean	0.428
KM SD	0.676	95% KM (BCA) UCL	N/A
95% KM (t) UCL	3.039	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.831	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.411	95% KM Chebyshev UCL	3.992
97.5% KM Chebyshev UCL	4.798	99% KM Chebyshev UCL	6.382

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	9.379	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.281	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	37.51	nu star (bias corrected)	N/A
Mean (detects)	2.635		

	A	B	C	D	E	F	G	H	I	J	K	L
53	Estimates of Gamma Parameters using KM Estimates											
54	Mean (KM)					2.128	SD (KM)					0.676
55	Variance (KM)					0.457	SE of Mean (KM)					0.428
56	k hat (KM)					9.909	k star (KM)					4.097
57	nu hat (KM)					99.09	nu star (KM)					40.97
58	theta hat (KM)					0.215	theta star (KM)					0.519
59	80% gamma percentile (KM)					2.926	90% gamma percentile (KM)					3.537
60	95% gamma percentile (KM)					4.099	99% gamma percentile (KM)					5.298
61												
62	Gamma Kaplan-Meier (KM) Statistics											
63							Adjusted Level of Significance (β)					0.0086
64	Approximate Chi Square Value (40.97, α)					27.3	Adjusted Chi Square Value (40.97, β)					22.54
65	95% Gamma Approximate KM-UCL (use when n>=50)					3.193	95% Gamma Adjusted KM-UCL (use when n<50)					3.867
66												
67	Lognormal GOF Test on Detected Observations Only											
68	Not Enough Data to Perform GOF Test											
69												
70	Lognormal ROS Statistics Using Imputed Non-Detects											
71	Mean in Original Scale					2.128	Mean in Log Scale					0.715
72	SD in Original Scale					0.756	SD in Log Scale					0.297
73	95% t UCL (assumes normality of ROS data)					2.849	95% Percentile Bootstrap UCL					N/A
74	95% BCA Bootstrap UCL					N/A	95% Bootstrap t UCL					N/A
75	95% H-UCL (Log ROS)					3.051						
76												
77	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
78	KM Mean (logged)					0.715	KM Geo Mean					2.045
79	KM SD (logged)					0.266	95% Critical H Value (KM-Log)					2.328
80	KM Standard Error of Mean (logged)					0.168	95% H-UCL (KM -Log)					2.887
81	KM SD (logged)					0.266	95% Critical H Value (KM-Log)					2.328
82	KM Standard Error of Mean (logged)					0.168						
83												
84	DL/2 Statistics											
85	DL/2 Normal						DL/2 Log-Transformed					
86	Mean in Original Scale					1.733	Mean in Log Scale					0.436
87	SD in Original Scale					1.024	SD in Log Scale					0.506
88	95% t UCL (Assumes normality)					2.71	95% H-Stat UCL					3.727
89	DL/2 is not a recommended method, provided for comparisons and historical reasons											
90												
91	Nonparametric Distribution Free UCL Statistics											
92	Data do not follow a Discernible Distribution at 5% Significance Level											
93												
94	Suggested UCL to Use											
95	95% KM (t) UCL					3.039	KM H-UCL					2.887
96	95% KM (BCA) UCL					N/A						
97	Warning: One or more Recommended UCL(s) not available!											
98												
99	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
100	Recommendations are based upon data size, data distribution, and skewness.											
101	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
102	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
103												
104												

Lead

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	16.6	Mean	33.62
Maximum	74	Median	18.9
SD	24.49	Std. Error of Mean	10.95
Coefficient of Variation	0.728	Skewness	1.55

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	0.78	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.326	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	56.97	95% Adjusted-CLT UCL (Chen-1995)	59.75
		95% Modified-t UCL (Johnson-1978)	58.23

Gamma GOF Test

A-D Test Statistic	0.577	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.683	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.355	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.36	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.909	k star (bias corrected MLE)	1.297
Theta hat (MLE)	11.56	Theta star (bias corrected MLE)	25.92
nu hat (MLE)	29.09	nu star (bias corrected)	12.97
MLE Mean (bias corrected)	33.62	MLE Sd (bias corrected)	29.52
		Approximate Chi Square Value (0.05)	5.872
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	3.966

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	74.25	95% Adjusted Gamma UCL (use when n<50)	109.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.833	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.33	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.343	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.809	Mean of logged Data	3.334
Maximum of Logged Data	4.304	SD of logged Data	0.644

Assuming Lognormal Distribution

95% H-UCL	104.8	90% Chebyshev (MVUE) UCL	61
95% Chebyshev (MVUE) UCL	73.71	97.5% Chebyshev (MVUE) UCL	91.34
99% Chebyshev (MVUE) UCL	126		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	51.63	95% Jackknife UCL	56.97
95% Standard Bootstrap UCL	49.35	95% Bootstrap-t UCL	369.2
95% Hall's Bootstrap UCL	308.3	95% Percentile Bootstrap UCL	51.5
95% BCA Bootstrap UCL	55.7		
90% Chebyshev(Mean, Sd) UCL	66.48	95% Chebyshev(Mean, Sd) UCL	81.36
97.5% Chebyshev(Mean, Sd) UCL	102	99% Chebyshev(Mean, Sd) UCL	142.6

Suggested UCL to Use

95% Student's-t UCL	56.97		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthylene

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	1
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.167	Minimum Non-Detect	0.0126
Maximum Detect	1.67	Maximum Non-Detect	0.0126
Variance Detects	0.334	Percent Non-Detects	14.29%
Mean Detects	0.549	SD Detects	0.578
Median Detects	0.294	CV Detects	1.052
Skewness Detects	1.983	Kurtosis Detects	3.923
Mean of Logged Detects	-0.957	SD of Logged Detects	0.866

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 on Detects Only

Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.473	KM Standard Error of Mean	0.217
KM SD	0.523	95% KM (BCA) UCL	0.873
95% KM (t) UCL	0.894	95% KM (Percentile Bootstrap) UCL	0.827
95% KM (z) UCL	0.829	95% KM Bootstrap t UCL	1.943
90% KM Chebyshev UCL	1.123	95% KM Chebyshev UCL	1.417
97.5% KM Chebyshev UCL	1.826	99% KM Chebyshev UCL	2.629

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.535	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.707	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.309	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.337	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.544	k star (bias corrected MLE)	0.883
Theta hat (MLE)	0.356	Theta star (bias corrected MLE)	0.622
nu hat (MLE)	18.53	nu star (bias corrected)	10.6
Mean (detects)	0.549		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.472
Maximum	1.67	Median	0.276
SD	0.566	CV	1.198
k hat (MLE)	0.814	k star (bias corrected MLE)	0.56
Theta hat (MLE)	0.58	Theta star (bias corrected MLE)	0.843
nu hat (MLE)	11.39	nu star (bias corrected)	7.844
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (7.84, α)	2.645	Adjusted Chi Square Value (7.84, β)	1.825
95% Gamma Approximate UCL (use when n>=50)	1.401	95% Gamma Adjusted UCL (use when n<50)	2.03

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.473	SD (KM)	0.523
Variance (KM)	0.274	SE of Mean (KM)	0.217
k hat (KM)	0.816	k star (KM)	0.561
nu hat (KM)	11.42	nu star (KM)	7.857
theta hat (KM)	0.58	theta star (KM)	0.842
80% gamma percentile (KM)	0.779	90% gamma percentile (KM)	1.248
95% gamma percentile (KM)	1.742	99% gamma percentile (KM)	2.945

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (7.86, α)	2.653	Adjusted Chi Square Value (7.86, β)	1.831
95% Gamma Approximate KM-UCL (use when n>=50)	1.4	95% Gamma Adjusted KM-UCL (use when n<50)	2.028

	A	B	C	D	E	F	G	H	I	J	K	L
261	**Lognormal GOF Test on Detected Observations Only**											
262					Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**					
263					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level					
264					Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**					
265					5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level					
266	**Detected Data appear Lognormal at 5% Significance Level**											
267												
268	**Lognormal ROS Statistics Using Imputed Non-Detects**											
269					Mean in Original Scale	0.477					Mean in Log Scale	-1.263
270					SD in Original Scale	0.561					SD in Log Scale	1.133
271					95% t UCL (assumes normality of ROS data)	0.889					95% Percentile Bootstrap UCL	0.857
272					95% BCA Bootstrap UCL	1.018					95% Bootstrap t UCL	2.179
273					95% H-UCL (Log ROS)	3.538						
274												
275	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
276					KM Mean (logged)	-1.445					KM Geo Mean	0.236
277					KM SD (logged)	1.402					95% Critical H Value (KM-Log)	4.883
278					KM Standard Error of Mean (logged)	0.58					95% H-UCL (KM -Log)	10.3
279					KM SD (logged)	1.402					95% Critical H Value (KM-Log)	4.883
280					KM Standard Error of Mean (logged)	0.58						
281												
282	**DL/2 Statistics**											
283	**DL/2 Normal**						**DL/2 Log-Transformed**					
284					Mean in Original Scale	0.472					Mean in Log Scale	-1.544
285					SD in Original Scale	0.566					SD in Log Scale	1.743
286					95% t UCL (Assumes normality)	0.888					95% H-Stat UCL	66.76
287	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
288												
289	**Nonparametric Distribution Free UCL Statistics**											
290	**Detected Data appear Gamma Distributed at 5% Significance Level**											
291												
292	**Suggested UCL to Use**											
293					95% KM Bootstrap t UCL	1.943	ι Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					2.028
294												
295	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
296	Recommendations are based upon data size, data distribution, and skewness.											
297	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
298	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
299												
300	**Anthracene**											
301												
302	**General Statistics**											
303					Total Number of Observations	7					Number of Distinct Observations	7
304					Number of Detects	3					Number of Non-Detects	4
305					Number of Distinct Detects	3					Number of Distinct Non-Detects	4
306					Minimum Detect	0.0745					Minimum Non-Detect	0.0126
307					Maximum Detect	0.423					Maximum Non-Detect	0.309
308					Variance Detects	0.04					Percent Non-Detects	57.14%
309					Mean Detects	0.192					SD Detects	0.2
310					Median Detects	0.0784					CV Detects	1.042
311					Skewness Detects	1.731					Kurtosis Detects	N/A
312					Mean of Logged Detects	-2.001					SD of Logged Detects	0.988

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	0.758	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.382	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0931	KM Standard Error of Mean	0.0641
KM SD	0.138	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.218	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.198	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.285	95% KM Chebyshev UCL	0.372
97.5% KM Chebyshev UCL	0.493	99% KM Chebyshev UCL	0.73

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.572	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.122	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	9.431	nu star (bias corrected)	N/A
Mean (detects)	0.192		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.088
Maximum	0.423	Median	0.01
SD	0.151	CV	1.716
k hat (MLE)	0.586	k star (bias corrected MLE)	0.43
Theta hat (MLE)	0.15	Theta star (bias corrected MLE)	0.205
nu hat (MLE)	8.201	nu star (bias corrected)	6.02
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (6.02, α)	1.65	Adjusted Chi Square Value (6.02, β)	1.054
95% Gamma Approximate UCL (use when n>=50)	0.321	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0931	SD (KM)	0.138

	A–E	F	G–K	L
365	Variance (KM)	0.019	SE of Mean (KM)	0.0641
366	k hat (KM)	0.457	k star (KM)	0.356
367	nu hat (KM)	6.397	nu star (KM)	4.989
368	theta hat (KM)	0.204	theta star (KM)	0.261
369	80% gamma percentile (KM)	0.148	90% gamma percentile (KM)	0.268
370	95% gamma percentile (KM)	0.402	99% gamma percentile (KM)	0.745
371				
372	**Gamma Kaplan-Meier (KM) Statistics**			
373	Approximate Chi Square Value (4.99, α)	1.147	Adjusted Chi Square Value (4.99, β)	0.687
374	95% Gamma Approximate KM-UCL (use when n>=50)	0.405	95% Gamma Adjusted KM-UCL (use when n<50)	0.676
375				
376	**Lognormal GOF Test on Detected Observations Only**			
377	Shapiro Wilk Test Statistic	0.772	**Shapiro Wilk GOF Test**	
378	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
379	Lilliefors Test Statistic	0.376	**Lilliefors GOF Test**	
380	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
381	**Detected Data appear Lognormal at 5% Significance Level**			
382				
383	**Lognormal ROS Statistics Using Imputed Non-Detects**			
384	Mean in Original Scale	0.0914	Mean in Log Scale	-3.26
385	SD in Original Scale	0.149	SD in Log Scale	1.336
386	95% t UCL (assumes normality of ROS data)	0.201	95% Percentile Bootstrap UCL	0.199
387	95% BCA Bootstrap UCL	0.251	95% Bootstrap t UCL	0.525
388	95% H-UCL (Log ROS)	1.208		
389				
390	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
391	KM Mean (logged)	-3.254	KM Geo Mean	0.0386
392	KM SD (logged)	1.274	95% Critical H Value (KM-Log)	4.498
393	KM Standard Error of Mean (logged)	0.614	95% H-UCL (KM -Log)	0.903
394	KM SD (logged)	1.274	95% Critical H Value (KM-Log)	4.498
395	KM Standard Error of Mean (logged)	0.614		
396				
397	**DL/2 Statistics**			
398	**DL/2 Normal**		**DL/2 Log-Transformed**	
399	Mean in Original Scale	0.115	Mean in Log Scale	-2.825
400	SD in Original Scale	0.144	SD in Log Scale	1.332
401	95% t UCL (Assumes normality)	0.221	95% H-Stat UCL	1.826
402	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
403				
404	**Nonparametric Distribution Free UCL Statistics**			
405	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
406				
407	**Suggested UCL to Use**			
408	95% KM (t) UCL	0.218		
409				
410	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
411	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
412				
413	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
414	Recommendations are based upon data size, data distribution, and skewness.			
415	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
416	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			

417				
418	Benzo[a]anthracene			
419				
420	**General Statistics**			
421	Total Number of Observations	7	Number of Distinct Observations	7
422	Number of Detects	5	Number of Non-Detects	2
423	Number of Distinct Detects	5	Number of Distinct Non-Detects	2
424	Minimum Detect	0.143	Minimum Non-Detect	0.0126
425	Maximum Detect	1.54	Maximum Non-Detect	0.0623
426	Variance Detects	0.33	Percent Non-Detects	28.57%
427	Mean Detects	0.543	SD Detects	0.574
428	Median Detects	0.276	CV Detects	1.057
429	Skewness Detects	1.931	Kurtosis Detects	3.788
430	Mean of Logged Detects	-0.978	SD of Logged Detects	0.913
431				
432	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
433	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
434	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
435	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
436				
437	**Normal GOF Test on Detects Only**			
438	Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**	
439	5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
440	Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**	
441	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
442	**Detected Data appear Approximate Normal at 5% Significance Level**			
443				
444	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
445	KM Mean	0.392	KM Standard Error of Mean	0.21
446	KM SD	0.496	95% KM (BCA) UCL	0.787
447	95% KM (t) UCL	0.799	95% KM (Percentile Bootstrap) UCL	0.758
448	95% KM (z) UCL	0.736	95% KM Bootstrap t UCL	1.477
449	90% KM Chebyshev UCL	1.021	95% KM Chebyshev UCL	1.305
450	97.5% KM Chebyshev UCL	1.701	99% KM Chebyshev UCL	2.477
451				
452	**Gamma GOF Tests on Detected Observations Only**			
453	A-D Test Statistic	0.419	**Anderson-Darling GOF Test**	
454	5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level	
455	K-S Test Statistic	0.277	**Kolmogorov-Smirnov GOF**	
456	5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level	
457	**Detected data appear Gamma Distributed at 5% Significance Level**			
458				
459	**Gamma Statistics on Detected Data Only**			
460	k hat (MLE)	1.502	k star (bias corrected MLE)	0.734
461	Theta hat (MLE)	0.362	Theta star (bias corrected MLE)	0.74
462	nu hat (MLE)	15.02	nu star (bias corrected)	7.34
463	Mean (detects)	0.543		
464				
465	**Gamma ROS Statistics using Imputed Non-Detects**			
466	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
467	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
468	For such situations, GROS method may yield incorrect values of UCLs and BTVs			

This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.391
Maximum	1.54	Median	0.237
SD	0.536	CV	1.372
k hat (MLE)	0.578	k star (bias corrected MLE)	0.425
Theta hat (MLE)	0.677	Theta star (bias corrected MLE)	0.919
nu hat (MLE)	8.088	nu star (bias corrected)	5.955
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (5.95, α)	1.617	Adjusted Chi Square Value (5.95, β)	1.029
95% Gamma Approximate UCL (use when n>=50)	1.44	95% Gamma Adjusted UCL (use when n<50)	2.262
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.392	SD (KM)	0.496
Variance (KM)	0.246	SE of Mean (KM)	0.21
k hat (KM)	0.624	k star (KM)	0.452
nu hat (KM)	8.734	nu star (KM)	6.324
theta hat (KM)	0.628	theta star (KM)	0.867
80% gamma percentile (KM)	0.64	90% gamma percentile (KM)	1.082
95% gamma percentile (KM)	1.56	99% gamma percentile (KM)	2.748
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.32, α)	1.808	Adjusted Chi Square Value (6.32, β)	1.173
95% Gamma Approximate KM-UCL (use when n>=50)	1.37	95% Gamma Adjusted KM-UCL (use when n<50)	2.112
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.398	Mean in Log Scale	-1.662
SD in Original Scale	0.531	SD in Log Scale	1.386
95% t UCL (assumes normality of ROS data)	0.788	95% Percentile Bootstrap UCL	0.749
95% BCA Bootstrap UCL	0.853	95% Bootstrap t UCL	1.647
95% H-UCL (Log ROS)	7.627		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.949	KM Geo Mean	0.142
KM SD (logged)	1.682	95% Critical H Value (KM-Log)	5.748
KM Standard Error of Mean (logged)	0.711	95% H-UCL (KM -Log)	30.38
KM SD (logged)	1.682	95% Critical H Value (KM-Log)	5.748
KM Standard Error of Mean (logged)	0.711		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.393	Mean in Log Scale	-1.918
SD in Original Scale	0.534	SD in Log Scale	1.829
95% t UCL (Assumes normality)	0.786	95% H-Stat UCL	80.66
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Row				
521				
522	**Nonparametric Distribution Free UCL Statistics**			
523	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
524				
525	**Suggested UCL to Use**			
526	95% KM (t) UCL	0.799		
527				
528	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
529	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
530				
531	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
532	Recommendations are based upon data size, data distribution, and skewness.			
533	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
534	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
535				
536	**Benzo[a]pyrene**			
537				
538	**General Statistics**			
539	Total Number of Observations	7	Number of Distinct Observations	7
540	Number of Detects	6	Number of Non-Detects	1
541	Number of Distinct Detects	6	Number of Distinct Non-Detects	1
542	Minimum Detect	0.0793	Minimum Non-Detect	0.0126
543	Maximum Detect	2.63	Maximum Non-Detect	0.0126
544	Variance Detects	0.846	Percent Non-Detects	14.29%
545	Mean Detects	0.831	SD Detects	0.92
546	Median Detects	0.491	CV Detects	1.106
547	Skewness Detects	2.018	Kurtosis Detects	4.376
548	Mean of Logged Detects	-0.671	SD of Logged Detects	1.145
549				
550	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
551	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
552	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
553	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
554				
555	**Normal GOF Test on Detects Only**			
556	Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk GOF Test**	
557	5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
558	Lilliefors Test Statistic	0.305	**Lilliefors GOF Test**	
559	5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
560	**Detected Data appear Approximate Normal at 5% Significance Level**			
561				
562	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
563	KM Mean	0.714	KM Standard Error of Mean	0.343
564	KM SD	0.828	95% KM (BCA) UCL	1.371
565	95% KM (t) UCL	1.381	95% KM (Percentile Bootstrap) UCL	1.325
566	95% KM (z) UCL	1.278	95% KM Bootstrap t UCL	2.465
567	90% KM Chebyshev UCL	1.743	95% KM Chebyshev UCL	2.209
568	97.5% KM Chebyshev UCL	2.856	99% KM Chebyshev UCL	4.126
569				
570	**Gamma GOF Tests on Detected Observations Only**			
571	A-D Test Statistic	0.331	**Anderson-Darling GOF Test**	
572	5% A-D Critical Value	0.713	Detected data appear Gamma Distributed at 5% Significance Level	

	A	B	C	D	E	F	G	H	I	J	K	L
573					K-S Test Statistic	0.211			Kolmogorov-Smirnov GOF			
574					5% K-S Critical Value	0.34	Detected data appear Gamma Distributed at 5% Significance Level					
575	Detected data appear Gamma Distributed at 5% Significance Level											
576												
577	Gamma Statistics on Detected Data Only											
578					k hat (MLE)	1.167					k star (bias corrected MLE)	0.694
579					Theta hat (MLE)	0.713					Theta star (bias corrected MLE)	1.197
580					nu hat (MLE)	14					nu star (bias corrected)	8.333
581					Mean (detects)	0.831						
582												
583	Gamma ROS Statistics using Imputed Non-Detects											
584	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
585	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
586	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
587	This is especially true when the sample size is small.											
588	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
589					Minimum	0.01					Mean	0.714
590					Maximum	2.63					Median	0.44
591					SD	0.895					CV	1.254
592					k hat (MLE)	0.677					k star (bias corrected MLE)	0.482
593					Theta hat (MLE)	1.054					Theta star (bias corrected MLE)	1.48
594					nu hat (MLE)	9.485					nu star (bias corrected)	6.753
595					Adjusted Level of Significance (β)	0.0158						
596					Approximate Chi Square Value (6.75, α)	2.036					Adjusted Chi Square Value (6.75, β)	1.347
597					95% Gamma Approximate UCL (use when n>=50)	2.368					95% Gamma Adjusted UCL (use when n<50)	3.578
598												
599	Estimates of Gamma Parameters using KM Estimates											
600					Mean (KM)	0.714					SD (KM)	0.828
601					Variance (KM)	0.686					SE of Mean (KM)	0.343
602					k hat (KM)	0.744					k star (KM)	0.52
603					nu hat (KM)	10.41					nu star (KM)	7.283
604					theta hat (KM)	0.96					theta star (KM)	1.373
605					80% gamma percentile (KM)	1.175					90% gamma percentile (KM)	1.917
606					95% gamma percentile (KM)	2.705					99% gamma percentile (KM)	4.638
607												
608	Gamma Kaplan-Meier (KM) Statistics											
609					Approximate Chi Square Value (7.28, α)	2.327					Adjusted Chi Square Value (7.28, β)	1.574
610					95% Gamma Approximate KM-UCL (use when n>=50)	2.235					95% Gamma Adjusted KM-UCL (use when n<50)	3.306
611												
612	Lognormal GOF Test on Detected Observations Only											
613					Shapiro Wilk Test Statistic	0.95			Shapiro Wilk GOF Test			
614					5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level					
615					Lilliefors Test Statistic	0.249			Lilliefors GOF Test			
616					5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level					
617	Detected Data appear Lognormal at 5% Significance Level											
618												
619	Lognormal ROS Statistics Using Imputed Non-Detects											
620					Mean in Original Scale	0.717					Mean in Log Scale	-1.071
621					SD in Original Scale	0.892					SD in Log Scale	1.486
622					95% t UCL (assumes normality of ROS data)	1.372					95% Percentile Bootstrap UCL	1.284
623					95% BCA Bootstrap UCL	1.497					95% Bootstrap t UCL	2.503
624					95% H-UCL (Log ROS)	23.44						

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.2	KM Geo Mean	0.301
KM SD (logged)	1.617	95% Critical H Value (KM-Log)	5.546
KM Standard Error of Mean (logged)	0.67	95% H-UCL (KM -Log)	43.35
KM SD (logged)	1.617	95% Critical H Value (KM-Log)	5.546
KM Standard Error of Mean (logged)	0.67		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.713	Mean in Log Scale	-1.299
SD in Original Scale	0.895	SD in Log Scale	1.963
95% t UCL (Assumes normality)	1.371	95% H-Stat UCL	380.2

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.381

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[b]fluoranthene

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.533	Minimum Non-Detect	0.0126
Maximum Detect	3.8	Maximum Non-Detect	0.0623
Variance Detects	1.935	Percent Non-Detects	28.57%
Mean Detects	1.404	SD Detects	1.391
Median Detects	0.644	CV Detects	0.991
Skewness Detects	1.877	Kurtosis Detects	3.458
Mean of Logged Detects	0.0223	SD of Logged Detects	0.834

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 on Detects Only

Shapiro Wilk Test Statistic	0.731	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
677					5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level					
678	**Detected Data appear Approximate Normal at 5% Significance Level**											
679												
680	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
681					KM Mean	1.006					KM Standard Error of Mean	0.518
682					KM SD	1.225					95% KM (BCA) UCL	1.915
683					95% KM (t) UCL	2.012					95% KM (Percentile Bootstrap) UCL	1.809
684					95% KM (z) UCL	1.858					95% KM Bootstrap t UCL	3.748
685					90% KM Chebyshev UCL	2.559					95% KM Chebyshev UCL	3.263
686					97.5% KM Chebyshev UCL	4.239					99% KM Chebyshev UCL	6.157
687												
688	**Gamma GOF Tests on Detected Observations Only**											
689					A-D Test Statistic	0.6	**Anderson-Darling GOF Test**					
690					5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level					
691					K-S Test Statistic	0.338	**Kolmogorov-Smirnov GOF**					
692					5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level					
693	**Detected data appear Gamma Distributed at 5% Significance Level**											
694												
695	**Gamma Statistics on Detected Data Only**											
696					k hat (MLE)	1.726					k star (bias corrected MLE)	0.824
697					Theta hat (MLE)	0.813					Theta star (bias corrected MLE)	1.704
698					nu hat (MLE)	17.26					nu star (bias corrected)	8.239
699					Mean (detects)	1.404						
700												
701	**Gamma ROS Statistics using Imputed Non-Detects**											
702	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
703	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
704	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
705	This is especially true when the sample size is small.											
706	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
707					Minimum	0.01					Mean	1.005
708					Maximum	3.8					Median	0.591
709					SD	1.324					CV	1.317
710					k hat (MLE)	0.488					k star (bias corrected MLE)	0.374
711					Theta hat (MLE)	2.059					Theta star (bias corrected MLE)	2.686
712					nu hat (MLE)	6.838					nu star (bias corrected)	5.241
713					Adjusted Level of Significance (β)	0.0158						
714					Approximate Chi Square Value (5.24, α)	1.265					Adjusted Chi Square Value (5.24, β)	0.771
715					95% Gamma Approximate UCL (use when n>=50)	4.165					95% Gamma Adjusted UCL (use when n<50)	6.831
716												
717	**Estimates of Gamma Parameters using KM Estimates**											
718					Mean (KM)	1.006					SD (KM)	1.225
719					Variance (KM)	1.501					SE of Mean (KM)	0.518
720					k hat (KM)	0.675					k star (KM)	0.481
721					nu hat (KM)	9.445					nu star (KM)	6.731
722					theta hat (KM)	1.491					theta star (KM)	2.093
723					80% gamma percentile (KM)	1.649					90% gamma percentile (KM)	2.744
724					95% gamma percentile (KM)	3.92					99% gamma percentile (KM)	6.821
725												
726	**Gamma Kaplan-Meier (KM) Statistics**											
727					Approximate Chi Square Value (6.73, α)	2.024					Adjusted Chi Square Value (6.73, β)	1.338
728					95% Gamma Approximate KM-UCL (use when n>=50)	3.346					95% Gamma Adjusted KM-UCL (use when n<50)	5.061

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.832	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.038	Mean in Log Scale	-0.58
SD in Original Scale	1.296	SD in Log Scale	1.234
95% t UCL (assumes normality of ROS data)	1.99	95% Percentile Bootstrap UCL	1.884
95% BCA Bootstrap UCL	2.145	95% Bootstrap t UCL	4.451
95% H-UCL (Log ROS)	10.88		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.234	KM Geo Mean	0.291
KM SD (logged)	2.084	95% Critical H Value (KM-Log)	7.012
KM Standard Error of Mean (logged)	0.881	95% H-UCL (KM -Log)	994.7
KM SD (logged)	2.084	95% Critical H Value (KM-Log)	7.012
KM Standard Error of Mean (logged)	0.881		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.008	Mean in Log Scale	-1.204
SD in Original Scale	1.322	SD in Log Scale	2.249
95% t UCL (Assumes normality)	1.979	95% H-Stat UCL	3820

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.012

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	1
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.238	Minimum Non-Detect	0.0126
Maximum Detect	3.41	Maximum Non-Detect	0.0126
Variance Detects	1.447	Percent Non-Detects	14.29%

	A–E	F	G–K	L
781	Mean Detects	1.075	SD Detects	1.203
782	Median Detects	0.515	CV Detects	1.119
783	Skewness Detects	1.992	Kurtosis Detects	3.976
784	Mean of Logged Detects	-0.344	SD of Logged Detects	0.947
785				
786	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
787	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
788	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
789	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
790				
791	**Normal GOF Test on Detects Only**			
792	Shapiro Wilk Test Statistic	0.727	**Shapiro Wilk GOF Test**	
793	5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
794	Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**	
795	5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level	
796	**Detected Data Not Normal at 5% Significance Level**			
797				
798	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
799	KM Mean	0.923	KM Standard Error of Mean	0.448
800	KM SD	1.082	95% KM (BCA) UCL	1.721
801	95% KM (t) UCL	1.794	95% KM (Percentile Bootstrap) UCL	1.675
802	95% KM (z) UCL	1.66	95% KM Bootstrap t UCL	4.298
803	90% KM Chebyshev UCL	2.268	95% KM Chebyshev UCL	2.877
804	97.5% KM Chebyshev UCL	3.722	99% KM Chebyshev UCL	5.382
805				
806	**Gamma GOF Tests on Detected Observations Only**			
807	A-D Test Statistic	0.518	**Anderson-Darling GOF Test**	
808	5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level	
809	K-S Test Statistic	0.31	**Kolmogorov-Smirnov GOF**	
810	5% K-S Critical Value	0.339	Detected data appear Gamma Distributed at 5% Significance Level	
811	**Detected data appear Gamma Distributed at 5% Significance Level**			
812				
813	**Gamma Statistics on Detected Data Only**			
814	k hat (MLE)	1.343	k star (bias corrected MLE)	0.783
815	Theta hat (MLE)	0.8	Theta star (bias corrected MLE)	1.373
816	nu hat (MLE)	16.12	nu star (bias corrected)	9.393
817	Mean (detects)	1.075		
818				
819	**Gamma ROS Statistics using Imputed Non-Detects**			
820	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
821	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
822	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
823	This is especially true when the sample size is small.			
824	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
825	Minimum	0.01	Mean	0.923
826	Maximum	3.41	Median	0.463
827	SD	1.17	CV	1.267
828	k hat (MLE)	0.694	k star (bias corrected MLE)	0.492
829	Theta hat (MLE)	1.33	Theta star (bias corrected MLE)	1.877
830	nu hat (MLE)	9.71	nu star (bias corrected)	6.882
831	Adjusted Level of Significance (β)	0.0158		
832	Approximate Chi Square Value (6.88, α)	2.106	Adjusted Chi Square Value (6.88, β)	1.402

	A–E	F	G–K	L
833	95% Gamma Approximate UCL (use when n>=50)	3.015	95% Gamma Adjusted UCL (use when n<50)	4.531
834				
835	**Estimates of Gamma Parameters using KM Estimates**			
836	Mean (KM)	0.923	SD (KM)	1.082
837	Variance (KM)	1.172	SE of Mean (KM)	0.448
838	k hat (KM)	0.727	k star (KM)	0.511
839	nu hat (KM)	10.18	nu star (KM)	7.151
840	theta hat (KM)	1.269	theta star (KM)	1.807
841	80% gamma percentile (KM)	1.517	90% gamma percentile (KM)	2.486
842	95% gamma percentile (KM)	3.519	99% gamma percentile (KM)	6.054
843				
844	**Gamma Kaplan-Meier (KM) Statistics**			
845	Approximate Chi Square Value (7.15, α)	2.254	Adjusted Chi Square Value (7.15, β)	1.516
846	95% Gamma Approximate KM-UCL (use when n>=50)	2.929	95% Gamma Adjusted KM-UCL (use when n<50)	4.353
847				
848	**Lognormal GOF Test on Detected Observations Only**			
849	Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**	
850	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
851	Lilliefors Test Statistic	0.26	**Lilliefors GOF Test**	
852	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
853	**Detected Data appear Lognormal at 5% Significance Level**			
854				
855	**Lognormal ROS Statistics Using Imputed Non-Detects**			
856	Mean in Original Scale	0.931	Mean in Log Scale	-0.68
857	SD in Original Scale	1.162	SD in Log Scale	1.24
858	95% t UCL (assumes normality of ROS data)	1.785	95% Percentile Bootstrap UCL	1.672
859	95% BCA Bootstrap UCL	1.907	95% Bootstrap t UCL	4.523
860	95% H-UCL (Log ROS)	10.09		
861				
862	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
863	KM Mean (logged)	-0.92	KM Geo Mean	0.399
864	KM SD (logged)	1.621	95% Critical H Value (KM-Log)	5.558
865	KM Standard Error of Mean (logged)	0.671	95% H-UCL (KM -Log)	58.77
866	KM SD (logged)	1.621	95% Critical H Value (KM-Log)	5.558
867	KM Standard Error of Mean (logged)	0.671		
868				
869	**DL/2 Statistics**			
870	**DL/2 Normal**		**DL/2 Log-Transformed**	
871	Mean in Original Scale	0.922	Mean in Log Scale	-1.019
872	SD in Original Scale	1.17	SD in Log Scale	1.983
873	95% t UCL (Assumes normality)	1.781	95% H-Stat UCL	583
874	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
875				
876	**Nonparametric Distribution Free UCL Statistics**			
877	**Detected Data appear Gamma Distributed at 5% Significance Level**			
878				
879	**Suggested UCL to Use**			
880	95% KM Bootstrap t UCL	4.298	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.353
881				
882	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
883	Recommendations are based upon data size, data distribution, and skewness.			
884	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.136	Minimum Non-Detect	0.0126
Maximum Detect	1.49	Maximum Non-Detect	0.0623
Variance Detects	0.333	Percent Non-Detects	28.57%
Mean Detects	0.491	SD Detects	0.577
Median Detects	0.195	CV Detects	1.175
Skewness Detects	1.928	Kurtosis Detects	3.702
Mean of Logged Detects	-1.174	SD of Logged Detects	1.014

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 on Detects Only

Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.354	KM Standard Error of Mean	0.206
KM SD	0.486	95% KM (BCA) UCL	0.739
95% KM (t) UCL	0.753	95% KM (Percentile Bootstrap) UCL	0.704
95% KM (z) UCL	0.692	95% KM Bootstrap t UCL	1.957
90% KM Chebyshev UCL	0.971	95% KM Chebyshev UCL	1.25
97.5% KM Chebyshev UCL	1.638	99% KM Chebyshev UCL	2.399

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.548	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.689	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.313	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.363	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.221	k star (bias corrected MLE)	0.622
Theta hat (MLE)	0.402	Theta star (bias corrected MLE)	0.789
nu hat (MLE)	12.21	nu star (bias corrected)	6.219
Mean (detects)	0.491		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

	A–E	F	G–K	L
937	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
938	This is especially true when the sample size is small.			
939	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
940	Minimum	0.01	Mean	0.353
941	Maximum	1.49	Median	0.147
942	SD	0.526	CV	1.489
943	k hat (MLE)	0.56	k star (bias corrected MLE)	0.415
944	Theta hat (MLE)	0.631	Theta star (bias corrected MLE)	0.85
945	nu hat (MLE)	7.844	nu star (bias corrected)	5.815
946	Adjusted Level of Significance (β)	0.0158		
947	Approximate Chi Square Value (5.82, α)	1.546	Adjusted Chi Square Value (5.82, β)	0.977
948	95% Gamma Approximate UCL (use when n>=50)	1.329	95% Gamma Adjusted UCL (use when n<50)	2.103
949				
950	**Estimates of Gamma Parameters using KM Estimates**			
951	Mean (KM)	0.354	SD (KM)	0.486
952	Variance (KM)	0.237	SE of Mean (KM)	0.206
953	k hat (KM)	0.53	k star (KM)	0.398
954	nu hat (KM)	7.415	nu star (KM)	5.571
955	theta hat (KM)	0.668	theta star (KM)	0.89
956	80% gamma percentile (KM)	0.571	90% gamma percentile (KM)	1.001
957	95% gamma percentile (KM)	1.474	99% gamma percentile (KM)	2.663
958				
959	**Gamma Kaplan-Meier (KM) Statistics**			
960	Approximate Chi Square Value (5.57, α)	1.425	Adjusted Chi Square Value (5.57, β)	0.887
961	95% Gamma Approximate KM-UCL (use when n>=50)	1.384	95% Gamma Adjusted KM-UCL (use when n<50)	2.223
962				
963	**Lognormal GOF Test on Detected Observations Only**			
964	Shapiro Wilk Test Statistic	0.858	**Shapiro Wilk GOF Test**	
965	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
966	Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**	
967	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
968	**Detected Data appear Lognormal at 5% Significance Level**			
969				
970	**Lognormal ROS Statistics Using Imputed Non-Detects**			
971	Mean in Original Scale	0.357	Mean in Log Scale	-1.918
972	SD in Original Scale	0.523	SD in Log Scale	1.516
973	95% t UCL (assumes normality of ROS data)	0.741	95% Percentile Bootstrap UCL	0.717
974	95% BCA Bootstrap UCL	0.819	95% Bootstrap t UCL	2.229
975	95% H-UCL (Log ROS)	11.81		
976				
977	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
978	KM Mean (logged)	-2.089	KM Geo Mean	0.124
979	KM SD (logged)	1.636	95% Critical H Value (KM-Log)	5.605
980	KM Standard Error of Mean (logged)	0.691	95% H-UCL (KM -Log)	19.96
981	KM SD (logged)	1.636	95% Critical H Value (KM-Log)	5.605
982	KM Standard Error of Mean (logged)	0.691		
983				
984	**DL/2 Statistics**			
985	**DL/2 Normal**		**DL/2 Log-Transformed**	
986	Mean in Original Scale	0.356	Mean in Log Scale	-2.058
987	SD in Original Scale	0.524	SD in Log Scale	1.783
988	95% t UCL (Assumes normality)	0.741	95% H-Stat UCL	51.52

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.753

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.248	Minimum Non-Detect	0.0126
Maximum Detect	2.12	Maximum Non-Detect	0.0623
Variance Detects	0.588	Percent Non-Detects	28.57%
Mean Detects	0.799	SD Detects	0.767
Median Detects	0.439	CV Detects	0.96
Skewness Detects	1.864	Kurtosis Detects	3.504
Mean of Logged Detects	-0.529	SD of Logged Detects	0.831

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 on Detects Only

Shapiro Wilk Test Statistic	0.771	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.574	KM Standard Error of Mean	0.287
KM SD	0.68	95% KM (BCA) UCL	1.09
95% KM (t) UCL	1.133	95% KM (Percentile Bootstrap) UCL	1.063
95% KM (z) UCL	1.047	95% KM Bootstrap t UCL	1.824
90% KM Chebyshev UCL	1.436	95% KM Chebyshev UCL	1.827
97.5% KM Chebyshev UCL	2.369	99% KM Chebyshev UCL	3.433

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.411	**Anderson-Darling GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
1041					5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level					
1042					K-S Test Statistic	0.28	**Kolmogorov-Smirnov GOF**					
1043					5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level					
1044	**Detected data appear Gamma Distributed at 5% Significance Level**											
1045												
1046	**Gamma Statistics on Detected Data Only**											
1047					k hat (MLE)	1.789					k star (bias corrected MLE)	0.849
1048					Theta hat (MLE)	0.446					Theta star (bias corrected MLE)	0.941
1049					nu hat (MLE)	17.89					nu star (bias corrected)	8.491
1050					Mean (detects)	0.799						
1051												
1052	**Gamma ROS Statistics using Imputed Non-Detects**											
1053	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1054	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1055	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1056	This is especially true when the sample size is small.											
1057	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1058					Minimum	0.01					Mean	0.574
1059					Maximum	2.12					Median	0.381
1060					SD	0.735					CV	1.282
1061					k hat (MLE)	0.55					k star (bias corrected MLE)	0.41
1062					Theta hat (MLE)	1.043					Theta star (bias corrected MLE)	1.4
1063					nu hat (MLE)	7.702					nu star (bias corrected)	5.734
1064					Adjusted Level of Significance (β)	0.0158						
1065					Approximate Chi Square Value (5.73, α)	1.506					Adjusted Chi Square Value (5.73, β)	0.947
1066					95% Gamma Approximate UCL (use when n>=50)	2.184					95% Gamma Adjusted UCL (use when n<50)	3.474
1067												
1068	**Estimates of Gamma Parameters using KM Estimates**											
1069					Mean (KM)	0.574					SD (KM)	0.68
1070					Variance (KM)	0.462					SE of Mean (KM)	0.287
1071					k hat (KM)	0.713					k star (KM)	0.503
1072					nu hat (KM)	9.987					nu star (KM)	7.04
1073					theta hat (KM)	0.805					theta star (KM)	1.142
1074					80% gamma percentile (KM)	0.943					90% gamma percentile (KM)	1.552
1075					95% gamma percentile (KM)	2.202					99% gamma percentile (KM)	3.799
1076												
1077	**Gamma Kaplan-Meier (KM) Statistics**											
1078					Approximate Chi Square Value (7.04, α)	2.193					Adjusted Chi Square Value (7.04, β)	1.469
1079					95% Gamma Approximate KM-UCL (use when n>=50)	1.844					95% Gamma Adjusted KM-UCL (use when n<50)	2.753
1080												
1081	**Lognormal GOF Test on Detected Observations Only**											
1082					Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**					
1083					5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level					
1084					Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**					
1085					5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level					
1086	**Detected Data appear Lognormal at 5% Significance Level**											
1087												
1088	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1089					Mean in Original Scale	0.59					Mean in Log Scale	-1.151
1090					SD in Original Scale	0.721					SD in Log Scale	1.261
1091					95% t UCL (assumes normality of ROS data)	1.119					95% Percentile Bootstrap UCL	1.052
1092					95% BCA Bootstrap UCL	1.265					95% Bootstrap t UCL	2.118

	A B C D E	F	G H I J K	L
1093	95% H-UCL (Log ROS)	6.949		
1094				
1095	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1096	KM Mean (logged)	-1.628	KM Geo Mean	0.196
1097	KM SD (logged)	1.847	95% Critical H Value (KM-Log)	6.264
1098	KM Standard Error of Mean (logged)	0.781	95% H-UCL (KM -Log)	121.8
1099	KM SD (logged)	1.847	95% Critical H Value (KM-Log)	6.264
1100	KM Standard Error of Mean (logged)	0.781		
1101				
1102	**DL/2 Statistics**			
1103	**DL/2 Normal**		**DL/2 Log-Transformed**	
1104	Mean in Original Scale	0.576	Mean in Log Scale	-1.597
1105	SD in Original Scale	0.733	SD in Log Scale	2.001
1106	95% t UCL (Assumes normality)	1.114	95% H-Stat UCL	370.7
1107	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1108				
1109	**Nonparametric Distribution Free UCL Statistics**			
1110	**Detected Data appear Normal Distributed at 5% Significance Level**			
1111				
1112	**Suggested UCL to Use**			
1113	95% KM (t) UCL	1.133		
1114				
1115	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1116	Recommendations are based upon data size, data distribution, and skewness.			
1117	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1118	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1119				
1120	Dibenz(a,h)anthracene			
1121				
1122	**General Statistics**			
1123	Total Number of Observations	7	Number of Distinct Observations	7
1124	Number of Detects	3	Number of Non-Detects	4
1125	Number of Distinct Detects	3	Number of Distinct Non-Detects	4
1126	Minimum Detect	0.0701	Minimum Non-Detect	0.0126
1127	Maximum Detect	0.546	Maximum Non-Detect	0.309
1128	Variance Detects	0.075	Percent Non-Detects	57.14%
1129	Mean Detects	0.23	SD Detects	0.274
1130	Median Detects	0.0734	CV Detects	1.191
1131	Skewness Detects	1.732	Kurtosis Detects	N/A
1132	Mean of Logged Detects	-1.958	SD of Logged Detects	1.172
1133				
1134	**Warning: Data set has only 3 Detected Values.**			
1135	**This is not enough to compute meaningful or reliable statistics and estimates.**			
1136				
1137				
1138	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1139	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1140	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1141	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1142				
1143	**Normal GOF Test on Detects Only**			
1144	Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
1145					5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level					
1146					Lilliefors Test Statistic	0.383	**Lilliefors GOF Test**					
1147					5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level					
1148	**Detected Data appear Approximate Normal at 5% Significance Level**											
1149												
1150	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1151					KM Mean	0.112					KM Standard Error of Mean	0.0834
1152					KM SD	0.179					95% KM (BCA) UCL	N/A
1153					95% KM (t) UCL	0.274					95% KM (Percentile Bootstrap) UCL	N/A
1154					95% KM (z) UCL	0.249					95% KM Bootstrap t UCL	N/A
1155					90% KM Chebyshev UCL	0.362					95% KM Chebyshev UCL	0.476
1156					97.5% KM Chebyshev UCL	0.633					99% KM Chebyshev UCL	0.942
1157												
1158	**Gamma GOF Tests on Detected Observations Only**											
1159	**Not Enough Data to Perform GOF Test**											
1160												
1161	**Gamma Statistics on Detected Data Only**											
1162					k hat (MLE)	1.163					k star (bias corrected MLE)	N/A
1163					Theta hat (MLE)	0.198					Theta star (bias corrected MLE)	N/A
1164					nu hat (MLE)	6.979					nu star (bias corrected)	N/A
1165					Mean (detects)	0.23						
1166												
1167	**Gamma ROS Statistics using Imputed Non-Detects**											
1168	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1169	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1170	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1171	This is especially true when the sample size is small.											
1172	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1173					Minimum	0.01					Mean	0.104
1174					Maximum	0.546					Median	0.01
1175					SD	0.197					CV	1.89
1176					k hat (MLE)	0.522					k star (bias corrected MLE)	0.393
1177					Theta hat (MLE)	0.2					Theta star (bias corrected MLE)	0.265
1178					nu hat (MLE)	7.304					nu star (bias corrected)	5.507
1179					Adjusted Level of Significance (β)	0.0158						
1180					Approximate Chi Square Value (5.51, α)	1.393					Adjusted Chi Square Value (5.51, β)	0.864
1181					95% Gamma Approximate UCL (use when n>=50)	0.412					95% Gamma Adjusted UCL (use when n<50)	N/A
1182												
1183	**Estimates of Gamma Parameters using KM Estimates**											
1184					Mean (KM)	0.112					SD (KM)	0.179
1185					Variance (KM)	0.0321					SE of Mean (KM)	0.0834
1186					k hat (KM)	0.394					k star (KM)	0.32
1187					nu hat (KM)	5.51					nu star (KM)	4.482
1188					theta hat (KM)	0.286					theta star (KM)	0.351
1189					80% gamma percentile (KM)	0.175					90% gamma percentile (KM)	0.329
1190					95% gamma percentile (KM)	0.503					99% gamma percentile (KM)	0.954
1191												
1192	**Gamma Kaplan-Meier (KM) Statistics**											
1193					Approximate Chi Square Value (4.48, α)	0.921					Adjusted Chi Square Value (4.48, β)	0.531
1194					95% Gamma Approximate KM-UCL (use when n>=50)	0.547					95% Gamma Adjusted KM-UCL (use when n<50)	0.949
1195												
1196	**Lognormal GOF Test on Detected Observations Only**											

	A–E	F	G–K	L
1197	Shapiro Wilk Test Statistic	0.767	**Shapiro Wilk GOF Test**	
1198	5% Shapiro Wilk Critical Value	0.767	Detected Data Not Lognormal at 5% Significance Level	
1199	Lilliefors Test Statistic	0.378	**Lilliefors GOF Test**	
1200	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
1201	**Detected Data appear Approximate Lognormal at 5% Significance Level**			
1202				
1203	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1204	Mean in Original Scale	0.108	Mean in Log Scale	-3.198
1205	SD in Original Scale	0.195	SD in Log Scale	1.381
1206	95% t UCL (assumes normality of ROS data)	0.251	95% Percentile Bootstrap UCL	0.252
1207	95% BCA Bootstrap UCL	0.262	95% Bootstrap t UCL	0.874
1208	95% H-UCL (Log ROS)	1.605		
1209				
1210	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1211	KM Mean (logged)	-3.141	KM Geo Mean	0.0432
1212	KM SD (logged)	1.31	95% Critical H Value (KM-Log)	4.604
1213	KM Standard Error of Mean (logged)	0.658	95% H-UCL (KM -Log)	1.195
1214	KM SD (logged)	1.31	95% Critical H Value (KM-Log)	4.604
1215	KM Standard Error of Mean (logged)	0.658		
1216				
1217	**DL/2 Statistics**			
1218	**DL/2 Normal**		**DL/2 Log-Transformed**	
1219	Mean in Original Scale	0.131	Mean in Log Scale	-2.8
1220	SD in Original Scale	0.189	SD in Log Scale	1.391
1221	95% t UCL (Assumes normality)	0.27	95% H-Stat UCL	2.509
1222	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1223				
1224	**Nonparametric Distribution Free UCL Statistics**			
1225	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
1226				
1227	**Suggested UCL to Use**			
1228	95% KM (t) UCL	0.274		
1229				
1230	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
1231	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
1232				
1233	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1234	Recommendations are based upon data size, data distribution, and skewness.			
1235	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1236	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1237				
1238	**Fluoranthene**			
1239				
1240	**General Statistics**			
1241	Total Number of Observations	7	Number of Distinct Observations	7
1242	Number of Detects	5	Number of Non-Detects	2
1243	Number of Distinct Detects	5	Number of Distinct Non-Detects	2
1244	Minimum Detect	0.169	Minimum Non-Detect	0.0126
1245	Maximum Detect	1.51	Maximum Non-Detect	0.0623
1246	Variance Detects	0.271	Percent Non-Detects	28.57%
1247	Mean Detects	0.61	SD Detects	0.52
1248	Median Detects	0.442	CV Detects	0.853

	A–E	F	G–K	L
1249	Skewness Detects	1.857	Kurtosis Detects	3.867
1250	Mean of Logged Detects	-0.747	SD of Logged Detects	0.783
1251				
1252	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1253	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1254	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1255	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1256				
1257	**Normal GOF Test on Detects Only**			
1258	Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**	
1259	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
1260	Lilliefors Test Statistic	0.361	**Lilliefors GOF Test**	
1261	5% Lilliefors Critical Value	0.343	Detected Data Not Normal at 5% Significance Level	
1262	**Detected Data appear Approximate Normal at 5% Significance Level**			
1263				
1264	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1265	KM Mean	0.439	KM Standard Error of Mean	0.202
1266	KM SD	0.477	95% KM (BCA) UCL	0.761
1267	95% KM (t) UCL	0.831	95% KM (Percentile Bootstrap) UCL	0.76
1268	95% KM (z) UCL	0.771	95% KM Bootstrap t UCL	1.004
1269	90% KM Chebyshev UCL	1.044	95% KM Chebyshev UCL	1.318
1270	97.5% KM Chebyshev UCL	1.699	99% KM Chebyshev UCL	2.445
1271				
1272	**Gamma GOF Tests on Detected Observations Only**			
1273	A-D Test Statistic	0.395	**Anderson-Darling GOF Test**	
1274	5% A-D Critical Value	0.684	Detected data appear Gamma Distributed at 5% Significance Level	
1275	K-S Test Statistic	0.287	**Kolmogorov-Smirnov GOF**	
1276	5% K-S Critical Value	0.36	Detected data appear Gamma Distributed at 5% Significance Level	
1277	**Detected data appear Gamma Distributed at 5% Significance Level**			
1278				
1279	**Gamma Statistics on Detected Data Only**			
1280	k hat (MLE)	2.13	k star (bias corrected MLE)	0.985
1281	Theta hat (MLE)	0.286	Theta star (bias corrected MLE)	0.619
1282	nu hat (MLE)	21.3	nu star (bias corrected)	9.854
1283	Mean (detects)	0.61		
1284				
1285	**Gamma ROS Statistics using Imputed Non-Detects**			
1286	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1287	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1288	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1289	This is especially true when the sample size is small.			
1290	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1291	Minimum	0.01	Mean	0.439
1292	Maximum	1.51	Median	0.4
1293	SD	0.516	CV	1.176
1294	k hat (MLE)	0.602	k star (bias corrected MLE)	0.439
1295	Theta hat (MLE)	0.728	Theta star (bias corrected MLE)	0.998
1296	nu hat (MLE)	8.433	nu star (bias corrected)	6.152
1297	Adjusted Level of Significance (β)	0.0158		
1298	Approximate Chi Square Value (6.15, α)	1.718	Adjusted Chi Square Value (6.15, β)	1.105
1299	95% Gamma Approximate UCL (use when n>=50)	1.571	95% Gamma Adjusted UCL (use when n<50)	2.442
1300				

1301	**Estimates of Gamma Parameters using KM Estimates**			
1302	Mean (KM)	0.439	SD (KM)	0.477
1303	Variance (KM)	0.228	SE of Mean (KM)	0.202
1304	k hat (KM)	0.848	k star (KM)	0.58
1305	nu hat (KM)	11.88	nu star (KM)	8.121
1306	theta hat (KM)	0.518	theta star (KM)	0.758
1307	80% gamma percentile (KM)	0.724	90% gamma percentile (KM)	1.152
1308	95% gamma percentile (KM)	1.601	99% gamma percentile (KM)	2.69
1309				
1310	**Gamma Kaplan-Meier (KM) Statistics**			
1311	Approximate Chi Square Value (8.12, α)	2.805	Adjusted Chi Square Value (8.12, β)	1.953
1312	95% Gamma Approximate KM-UCL (use when n>=50)	1.272	95% Gamma Adjusted KM-UCL (use when n<50)	1.828
1313				
1314	**Lognormal GOF Test on Detected Observations Only**			
1315	Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**	
1316	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
1317	Lilliefors Test Statistic	0.243	**Lilliefors GOF Test**	
1318	5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level	
1319	**Detected Data appear Lognormal at 5% Significance Level**			
1320				
1321	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1322	Mean in Original Scale	0.454	Mean in Log Scale	-1.317
1323	SD in Original Scale	0.501	SD in Log Scale	1.165
1324	95% t UCL (assumes normality of ROS data)	0.823	95% Percentile Bootstrap UCL	0.786
1325	95% BCA Bootstrap UCL	0.873	95% Bootstrap t UCL	1.113
1326	95% H-UCL (Log ROS)	3.851		
1327				
1328	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1329	KM Mean (logged)	-1.783	KM Geo Mean	0.168
1330	KM SD (logged)	1.742	95% Critical H Value (KM-Log)	5.936
1331	KM Standard Error of Mean (logged)	0.736	95% H-UCL (KM -Log)	52.29
1332	KM SD (logged)	1.742	95% Critical H Value (KM-Log)	5.936
1333	KM Standard Error of Mean (logged)	0.736		
1334				
1335	**DL/2 Statistics**			
1336	**DL/2 Normal**		**DL/2 Log-Transformed**	
1337	Mean in Original Scale	0.441	Mean in Log Scale	-1.753
1338	SD in Original Scale	0.514	SD in Log Scale	1.891
1339	95% t UCL (Assumes normality)	0.818	95% H-Stat UCL	144.7
1340	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1341				
1342	**Nonparametric Distribution Free UCL Statistics**			
1343	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
1344				
1345	**Suggested UCL to Use**			
1346	95% KM (t) UCL	0.831		
1347				
1348	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
1349	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
1350				
1351	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1352	Recommendations are based upon data size, data distribution, and skewness.			

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Indeno[1,2,3-cd]pyrene

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	6	Number of Non-Detects	1
Number of Distinct Detects	6	Number of Distinct Non-Detects	1
Minimum Detect	0.163	Minimum Non-Detect	0.0126
Maximum Detect	2.86	Maximum Non-Detect	0.0126
Variance Detects	1.034	Percent Non-Detects	14.29%
Mean Detects	0.856	SD Detects	1.017
Median Detects	0.397	CV Detects	1.188
Skewness Detects	2.113	Kurtosis Detects	4.562
Mean of Logged Detects	-0.612	SD of Logged Detects	0.989

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 on Detects Only

Shapiro Wilk Test Statistic	0.701	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.331	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.735	KM Standard Error of Mean	0.376
KM SD	0.909	95% KM (BCA) UCL	1.444
95% KM (t) UCL	1.466	95% KM (Percentile Bootstrap) UCL	1.409
95% KM (z) UCL	1.354	95% KM Bootstrap t UCL	3.547
90% KM Chebyshev UCL	1.864	95% KM Chebyshev UCL	2.375
97.5% KM Chebyshev UCL	3.085	99% KM Chebyshev UCL	4.479

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.543	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.316	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.339	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.235	k star (bias corrected MLE)	0.729
Theta hat (MLE)	0.693	Theta star (bias corrected MLE)	1.174
nu hat (MLE)	14.82	nu star (bias corrected)	8.745
Mean (detects)	0.856		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.735
Maximum	2.86	Median	0.37
SD	0.982	CV	1.336
k hat (MLE)	0.692	k star (bias corrected MLE)	0.491
Theta hat (MLE)	1.062	Theta star (bias corrected MLE)	1.498
nu hat (MLE)	9.688	nu star (bias corrected)	6.87
Adjusted Level of Significance (β)	0.0158		
Approximate Chi Square Value (6.87, α)	2.099	Adjusted Chi Square Value (6.87, β)	1.396
95% Gamma Approximate UCL (use when n>=50)	2.405	95% Gamma Adjusted UCL (use when n<50)	3.616
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.735	SD (KM)	0.909
Variance (KM)	0.826	SE of Mean (KM)	0.376
k hat (KM)	0.655	k star (KM)	0.469
nu hat (KM)	9.166	nu star (KM)	6.571
theta hat (KM)	1.123	theta star (KM)	1.567
80% gamma percentile (KM)	1.203	90% gamma percentile (KM)	2.015
95% gamma percentile (KM)	2.889	99% gamma percentile (KM)	5.05
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (6.57, α)	1.938	Adjusted Chi Square Value (6.57, β)	1.272
95% Gamma Approximate KM-UCL (use when n>=50)	2.493	95% Gamma Adjusted KM-UCL (use when n<50)	3.797
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.265	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.74	Mean in Log Scale	-0.961
SD in Original Scale	0.977	SD in Log Scale	1.291
95% t UCL (assumes normality of ROS data)	1.458	95% Percentile Bootstrap UCL	1.398
95% BCA Bootstrap UCL	1.762	95% Bootstrap t UCL	3.831
95% H-UCL (Log ROS)	9.682		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-1.15	KM Geo Mean	0.317
KM SD (logged)	1.559	95% Critical H Value (KM-Log)	5.367
KM Standard Error of Mean (logged)	0.646	95% H-UCL (KM -Log)	32.55
KM SD (logged)	1.559	95% Critical H Value (KM-Log)	5.367
KM Standard Error of Mean (logged)	0.646		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.734	Mean in Log Scale	-1.249
SD in Original Scale	0.982	SD in Log Scale	1.911

95% t UCL (Assumes normality)	1.456	95% H-Stat UCL	275.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Bootstrap t UCL	3.547	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	3.797

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
Number of Detects	3	Number of Non-Detects	4
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.182	Minimum Non-Detect	0.0126
Maximum Detect	0.402	Maximum Non-Detect	0.309
Variance Detects	0.0121	Percent Non-Detects	57.14%
Mean Detects	0.293	SD Detects	0.11
Median Detects	0.296	CV Detects	0.375
Skewness Detects	-0.109	Kurtosis Detects	N/A
Mean of Logged Detects	-1.277	SD of Logged Detects	0.4

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.146	KM Standard Error of Mean	0.0731
KM SD	0.15	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.288	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.266	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.365	95% KM Chebyshev UCL	0.464
97.5% KM Chebyshev UCL	0.602	99% KM Chebyshev UCL	0.873

	A–E	F	G–K	L
1509	**Gamma GOF Tests on Detected Observations Only**			
1510	Not Enough Data to Perform GOF Test			
1511				
1512	**Gamma Statistics on Detected Data Only**			
1513	k hat (MLE)	9.961	k star (bias corrected MLE)	N/A
1514	Theta hat (MLE)	0.0294	Theta star (bias corrected MLE)	N/A
1515	nu hat (MLE)	59.76	nu star (bias corrected)	N/A
1516	Mean (detects)	0.293		
1517				
1518	**Gamma ROS Statistics using Imputed Non-Detects**			
1519	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1520	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1521	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1522	This is especially true when the sample size is small.			
1523	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1524	Minimum	0.0665	Mean	0.173
1525	Maximum	0.402	Median	0.131
1526	SD	0.131	CV	0.76
1527	k hat (MLE)	2.194	k star (bias corrected MLE)	1.349
1528	Theta hat (MLE)	0.0788	Theta star (bias corrected MLE)	0.128
1529	nu hat (MLE)	30.71	nu star (bias corrected)	18.88
1530	Adjusted Level of Significance (β)	0.0158		
1531	Approximate Chi Square Value (18.88, α)	10.03	Adjusted Chi Square Value (18.88, β)	8.158
1532	95% Gamma Approximate UCL (use when n>=50)	0.325	95% Gamma Adjusted UCL (use when n<50)	N/A
1533				
1534	**Estimates of Gamma Parameters using KM Estimates**			
1535	Mean (KM)	0.146	SD (KM)	0.15
1536	Variance (KM)	0.0226	SE of Mean (KM)	0.0731
1537	k hat (KM)	0.942	k star (KM)	0.633
1538	nu hat (KM)	13.18	nu star (KM)	8.866
1539	theta hat (KM)	0.155	theta star (KM)	0.23
1540	80% gamma percentile (KM)	0.24	90% gamma percentile (KM)	0.375
1541	95% gamma percentile (KM)	0.515	99% gamma percentile (KM)	0.852
1542				
1543	**Gamma Kaplan-Meier (KM) Statistics**			
1544	Approximate Chi Square Value (8.87, α)	3.246	Adjusted Chi Square Value (8.87, β)	2.309
1545	95% Gamma Approximate KM-UCL (use when n>=50)	0.398	95% Gamma Adjusted KM-UCL (use when n<50)	0.56
1546				
1547	**Lognormal GOF Test on Detected Observations Only**			
1548	Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**	
1549	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
1550	Lilliefors Test Statistic	0.226	**Lilliefors GOF Test**	
1551	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
1552	**Detected Data appear Lognormal at 5% Significance Level**			
1553				
1554	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1555	Mean in Original Scale	0.194	Mean in Log Scale	-1.767
1556	SD in Original Scale	0.113	SD in Log Scale	0.524
1557	95% t UCL (assumes normality of ROS data)	0.277	95% Percentile Bootstrap UCL	0.262
1558	95% BCA Bootstrap UCL	0.279	95% Bootstrap t UCL	0.428
1559	95% H-UCL (Log ROS)	0.335		
1560				

	A–E	F	G–K	L
1561	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1562	KM Mean (logged)	-2.88	KM Geo Mean	0.0561
1563	KM SD (logged)	1.553	95% Critical H Value (KM-Log)	5.348
1564	KM Standard Error of Mean (logged)	0.77	95% H-UCL (KM -Log)	5.569
1565	KM SD (logged)	1.553	95% Critical H Value (KM-Log)	5.348
1566	KM Standard Error of Mean (logged)	0.77		
1567				
1568	**DL/2 Statistics**			
1569	**DL/2 Normal**		**DL/2 Log-Transformed**	
1570	Mean in Original Scale	0.158	Mean in Log Scale	-2.515
1571	SD in Original Scale	0.149	SD in Log Scale	1.499
1572	95% t UCL (Assumes normality)	0.268	95% H-Stat UCL	5.933
1573	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1574				
1575	**Nonparametric Distribution Free UCL Statistics**			
1576	**Detected Data appear Normal Distributed at 5% Significance Level**			
1577				
1578	**Suggested UCL to Use**			
1579	95% KM (t) UCL	0.288		
1580				
1581	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1582	Recommendations are based upon data size, data distribution, and skewness.			
1583	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1584	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1585				
1586	Pyrene			
1587				
1588	**General Statistics**			
1589	Total Number of Observations	7	Number of Distinct Observations	7
1590	Number of Detects	5	Number of Non-Detects	2
1591	Number of Distinct Detects	5	Number of Distinct Non-Detects	2
1592	Minimum Detect	0.316	Minimum Non-Detect	0.0126
1593	Maximum Detect	2.86	Maximum Non-Detect	0.0623
1594	Variance Detects	1.052	Percent Non-Detects	28.57%
1595	Mean Detects	1.079	SD Detects	1.026
1596	Median Detects	0.617	CV Detects	0.95
1597	Skewness Detects	1.926	Kurtosis Detects	3.854
1598	Mean of Logged Detects	-0.219	SD of Logged Detects	0.821
1599				
1600	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1601	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1602	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1603	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1604				
1605	**Normal GOF Test on Detects Only**			
1606	Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk GOF Test**	
1607	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
1608	Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**	
1609	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
1610	**Detected Data appear Normal at 5% Significance Level**			
1611				
1612	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			

	A	B	C	D	E	F	G	H	I	J	K	L
1613					KM Mean	0.775					KM Standard Error of Mean	0.386
1614					KM SD	0.913					95% KM (BCA) UCL	1.458
1615					95% KM (t) UCL	1.524					95% KM (Percentile Bootstrap) UCL	1.419
1616					95% KM (z) UCL	1.409					95% KM Bootstrap t UCL	2.202
1617					90% KM Chebyshev UCL	1.932					95% KM Chebyshev UCL	2.456
1618					97.5% KM Chebyshev UCL	3.184					99% KM Chebyshev UCL	4.613
1619												
1620	**Gamma GOF Tests on Detected Observations Only**											
1621					A-D Test Statistic	0.422	**Anderson-Darling GOF Test**					
1622					5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level					
1623					K-S Test Statistic	0.269	**Kolmogorov-Smirnov GOF**					
1624					5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level					
1625	**Detected data appear Gamma Distributed at 5% Significance Level**											
1626												
1627	**Gamma Statistics on Detected Data Only**											
1628					k hat (MLE)	1.842					k star (bias corrected MLE)	0.87
1629					Theta hat (MLE)	0.586					Theta star (bias corrected MLE)	1.241
1630					nu hat (MLE)	18.42					nu star (bias corrected)	8.7
1631					Mean (detects)	1.079						
1632												
1633	**Gamma ROS Statistics using Imputed Non-Detects**											
1634	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1635	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1636	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1637	This is especially true when the sample size is small.											
1638	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1639					Minimum	0.01					Mean	0.774
1640					Maximum	2.86					Median	0.594
1641					SD	0.987					CV	1.275
1642					k hat (MLE)	0.519					k star (bias corrected MLE)	0.392
1643					Theta hat (MLE)	1.49					Theta star (bias corrected MLE)	1.974
1644					nu hat (MLE)	7.271					nu star (bias corrected)	5.488
1645					Adjusted Level of Significance (β)	0.0158						
1646					Approximate Chi Square Value (5.49, α)	1.384					Adjusted Chi Square Value (5.49, β)	0.858
1647					95% Gamma Approximate UCL (use when n>=50)	3.068					95% Gamma Adjusted UCL (use when n<50)	4.952
1648												
1649	**Estimates of Gamma Parameters using KM Estimates**											
1650					Mean (KM)	0.775					SD (KM)	0.913
1651					Variance (KM)	0.833					SE of Mean (KM)	0.386
1652					k hat (KM)	0.72					k star (KM)	0.507
1653					nu hat (KM)	10.08					nu star (KM)	7.093
1654					theta hat (KM)	1.076					theta star (KM)	1.529
1655					80% gamma percentile (KM)	1.273					90% gamma percentile (KM)	2.09
1656					95% gamma percentile (KM)	2.962					99% gamma percentile (KM)	5.102
1657												
1658	**Gamma Kaplan-Meier (KM) Statistics**											
1659					Approximate Chi Square Value (7.09, α)	2.222					Adjusted Chi Square Value (7.09, β)	1.491
1660					95% Gamma Approximate KM-UCL (use when n>=50)	2.473					95% Gamma Adjusted KM-UCL (use when n<50)	3.684
1661												
1662	**Lognormal GOF Test on Detected Observations Only**											
1663					Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**					
1664					5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level					

	A	B	C	D	E	F	G	H	I	J	K	L
1665					Lilliefors Test Statistic	0.226	Lilliefors GOF Test					
1666					5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level					
1667	Detected Data appear Lognormal at 5% Significance Level											
1668												
1669	Lognormal ROS Statistics Using Imputed Non-Detects											
1670					Mean in Original Scale	0.798					Mean in Log Scale	-0.828
1671					SD in Original Scale	0.965					SD in Log Scale	1.237
1672					95% t UCL (assumes normality of ROS data)	1.507					95% Percentile Bootstrap UCL	1.429
1673					95% BCA Bootstrap UCL	1.675					95% Bootstrap t UCL	2.702
1674					95% H-UCL (Log ROS)	8.624						
1675												
1676	Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution											
1677					KM Mean (logged)	-1.406					KM Geo Mean	0.245
1678					KM SD (logged)	1.977					95% Critical H Value (KM-Log)	6.674
1679					KM Standard Error of Mean (logged)	0.835					95% H-UCL (KM -Log)	378
1680					KM SD (logged)	1.977					95% Critical H Value (KM-Log)	6.674
1681					KM Standard Error of Mean (logged)	0.835						
1682												
1683	DL/2 Statistics											
1684	DL/2 Normal						DL/2 Log-Transformed					
1685					Mean in Original Scale	0.776					Mean in Log Scale	-1.376
1686					SD in Original Scale	0.984					SD in Log Scale	2.137
1687					95% t UCL (Assumes normality)	1.499					95% H-Stat UCL	1300
1688	DL/2 is not a recommended method, provided for comparisons and historical reasons											
1689												
1690	Nonparametric Distribution Free UCL Statistics											
1691	Detected Data appear Normal Distributed at 5% Significance Level											
1692												
1693	Suggested UCL to Use											
1694					95% KM (t) UCL	1.524						
1695												
1696	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1697	Recommendations are based upon data size, data distribution, and skewness.											
1698	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1699	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1700												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 10:58:30 AM
From File	IaDOT 0-2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	4	Number of Distinct Observations	3
Number of Detects	3	Number of Non-Detects	1
Number of Distinct Detects	3	Number of Distinct Non-Detects	1
Minimum Detect	6.67	Minimum Non-Detect	6.67
Maximum Detect	12.6	Maximum Non-Detect	6.67
Variance Detects	8.846	Percent Non-Detects	25%
Mean Detects	9.5	SD Detects	2.974
Median Detects	9.23	CV Detects	0.313
Skewness Detects	0.405	Kurtosis Detects	N/A
Mean of Logged Detects	2.218	SD of Logged Detects	0.318

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	0.994	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	8.793	KM Standard Error of Mean	1.491
KM SD	2.434	95% KM (BCA) UCL	N/A
95% KM (t) UCL	12.3	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	11.24	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	13.26	95% KM Chebyshev UCL	15.29
97.5% KM Chebyshev UCL	18.1	99% KM Chebyshev UCL	23.62

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	15.15	k star (bias corrected MLE)	N/A

53	Theta hat (MLE)	0.627	Theta star (bias corrected MLE)	N/A
54	nu hat (MLE)	90.9	nu star (bias corrected)	N/A
55	Mean (detects)	9.5		
56				
57	**Gamma ROS Statistics using Imputed Non-Detects**			
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
59	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
60	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
61	This is especially true when the sample size is small.			
62	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
63	Minimum	1.951	Mean	7.613
64	Maximum	12.6	Median	7.95
65	SD	4.488	CV	0.59
66	k hat (MLE)	2.663	k star (bias corrected MLE)	0.833
67	Theta hat (MLE)	2.858	Theta star (bias corrected MLE)	9.144
68	nu hat (MLE)	21.31	nu star (bias corrected)	6.66
69	Adjusted Level of Significance (β)	0.00498		
70	Approximate Chi Square Value (6.66, α)	1.986	Adjusted Chi Square Value (6.66, β)	N/A
71	95% Gamma Approximate UCL (use when n>=50)	25.53	95% Gamma Adjusted UCL (use when n<50)	N/A
72				
73	**Estimates of Gamma Parameters using KM Estimates**			
74	Mean (KM)	8.793	SD (KM)	2.434
75	Variance (KM)	5.925	SE of Mean (KM)	1.491
76	k hat (KM)	13.05	k star (KM)	3.429
77	nu hat (KM)	104.4	nu star (KM)	27.43
78	theta hat (KM)	0.674	theta star (KM)	2.564
79	80% gamma percentile (KM)	12.34	90% gamma percentile (KM)	15.16
80	95% gamma percentile (KM)	17.77	99% gamma percentile (KM)	23.39
81				
82	**Gamma Kaplan-Meier (KM) Statistics**			
83	Approximate Chi Square Value (27.43, α)	16.49	Adjusted Chi Square Value (27.43, β)	12.08
84	95% Gamma Approximate KM-UCL (use when n>=50)	14.63	95% Gamma Adjusted KM-UCL (use when n<50)	19.96
85				
86	**Lognormal GOF Test on Detected Observations Only**			
87	Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**	
88	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
89	Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
90	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
91	**Detected Data appear Lognormal at 5% Significance Level**			
92				
93	**Lognormal ROS Statistics Using Imputed Non-Detects**			
94	Mean in Original Scale	8.049	Mean in Log Scale	1.99
95	SD in Original Scale	3.784	SD in Log Scale	0.524
96	95% t UCL (assumes normality of ROS data)	12.5	95% Percentile Bootstrap UCL	N/A
97	95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
98	95% H-UCL (Log ROS)	26.38		
99				
100	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
101	KM Mean (logged)	2.138	KM Geo Mean	8.481
102	KM SD (logged)	0.264	95% Critical H Value (KM-Log)	2.656
103	KM Standard Error of Mean (logged)	0.162	95% H-UCL (KM -Log)	13.17
104	KM SD (logged)	0.264	95% Critical H Value (KM-Log)	2.656

KM Standard Error of Mean (logged)	0.162		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	7.959	Mean in Log Scale	1.965
SD in Original Scale	3.924	SD in Log Scale	0.569
95% t UCL (Assumes normality)	12.58	95% H-Stat UCL	31.58
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	12.3		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Lead			
General Statistics			
Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	26.3	Mean	69.65
Maximum	124	Median	64.15
SD	44.15	Std. Error of Mean	22.08
Coefficient of Variation	0.634	Skewness	0.488
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	0.948	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.232	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	121.6	95% Adjusted-CLT UCL (Chen-1995)	111.7
		95% Modified-t UCL (Johnson-1978)	122.5
Gamma GOF Test			
A-D Test Statistic	0.257	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.229	**Kolmogorov-Smirnov Gamma GOF Test**	

	A–E	F	G–K	L
157	5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level	
158	**Detected data appear Gamma Distributed at 5% Significance Level**			
159				
160	**Gamma Statistics**			
161	k hat (MLE)	3.077	k star (bias corrected MLE)	0.936
162	Theta hat (MLE)	22.64	Theta star (bias corrected MLE)	74.43
163	nu hat (MLE)	24.61	nu star (bias corrected)	7.486
164	MLE Mean (bias corrected)	69.65	MLE Sd (bias corrected)	72
165			Approximate Chi Square Value (0.05)	2.441
166	Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A
167				
168	**Assuming Gamma Distribution**			
169	95% Approximate Gamma UCL (use when n>=50))	213.6	95% Adjusted Gamma UCL (use when n<50)	N/A
170				
171	**Lognormal GOF Test**			
172	Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**	
173	5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level	
174	Lilliefors Test Statistic	0.208	**Lilliefors Lognormal GOF Test**	
175	5% Lilliefors Critical Value	0.375	Data appear Lognormal at 5% Significance Level	
176	**Data appear Lognormal at 5% Significance Level**			
177				
178	**Lognormal Statistics**			
179	Minimum of Logged Data	3.27	Mean of logged Data	4.072
180	Maximum of Logged Data	4.82	SD of logged Data	0.697
181				
182	**Assuming Lognormal Distribution**			
183	95% H-UCL	512.5	90% Chebyshev (MVUE) UCL	140.5
184	95% Chebyshev (MVUE) UCL	172.5	97.5% Chebyshev (MVUE) UCL	216.8
185	99% Chebyshev (MVUE) UCL	303.9		
186				
187	**Nonparametric Distribution Free UCL Statistics**			
188	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
189				
190	**Nonparametric Distribution Free UCLs**			
191	95% CLT UCL	106	95% Jackknife UCL	121.6
192	95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
193	95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
194	95% BCA Bootstrap UCL	N/A		
195	90% Chebyshev(Mean, Sd) UCL	135.9	95% Chebyshev(Mean, Sd) UCL	165.9
196	97.5% Chebyshev(Mean, Sd) UCL	207.5	99% Chebyshev(Mean, Sd) UCL	289.3
197				
198	**Suggested UCL to Use**			
199	95% Student's-t UCL	121.6		
200				
201	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
202	Recommendations are based upon data size, data distribution, and skewness.			
203	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
204	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
205				
206	**2-Methylnaphthalene**			
207				
208	**General Statistics**			

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	3	Number of Non-Detects	5
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.138	Minimum Non-Detect	0.0505
Maximum Detect	0.441	Maximum Non-Detect	0.114
Variance Detects	0.0231	Percent Non-Detects	62.5%
Mean Detects	0.284	SD Detects	0.152
Median Detects	0.272	CV Detects	0.535
Skewness Detects	0.344	Kurtosis Detects	N/A
Mean of Logged Detects	-1.367	SD of Logged Detects	0.584

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	0.996	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.138	KM Standard Error of Mean	0.0589
KM SD	0.136	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.25	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.235	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.315	95% KM Chebyshev UCL	0.395
97.5% KM Chebyshev UCL	0.506	99% KM Chebyshev UCL	0.724

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	4.829	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0587	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	28.97	nu star (bias corrected)	N/A
Mean (detects)	0.284		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.113
Maximum	0.441	Median	0.01

	A–E	F	G–K	L
261	SD	0.163	CV	1.449
262	k hat (MLE)	0.523	k star (bias corrected MLE)	0.41
263	Theta hat (MLE)	0.216	Theta star (bias corrected MLE)	0.275
264	nu hat (MLE)	8.361	nu star (bias corrected)	6.559
265	Adjusted Level of Significance (β)	0.0195		
266	Approximate Chi Square Value (6.56, α)	1.932	Adjusted Chi Square Value (6.56, β)	1.363
267	95% Gamma Approximate UCL (use when n>=50)	0.382	95% Gamma Adjusted UCL (use when n<50)	N/A
268				
269	**Estimates of Gamma Parameters using KM Estimates**			
270	Mean (KM)	0.138	SD (KM)	0.136
271	Variance (KM)	0.0185	SE of Mean (KM)	0.0589
272	k hat (KM)	1.028	k star (KM)	0.726
273	nu hat (KM)	16.45	nu star (KM)	11.61
274	theta hat (KM)	0.134	theta star (KM)	0.19
275	80% gamma percentile (KM)	0.226	90% gamma percentile (KM)	0.343
276	95% gamma percentile (KM)	0.463	99% gamma percentile (KM)	0.749
277				
278	**Gamma Kaplan-Meier (KM) Statistics**			
279	Approximate Chi Square Value (11.61, α)	4.974	Adjusted Chi Square Value (11.61, β)	3.933
280	95% Gamma Approximate KM-UCL (use when n>=50)	0.322	95% Gamma Adjusted KM-UCL (use when n<50)	0.407
281				
282	**Lognormal GOF Test on Detected Observations Only**			
283	Shapiro Wilk Test Statistic	0.991	**Shapiro Wilk GOF Test**	
284	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
285	Lilliefors Test Statistic	0.211	**Lilliefors GOF Test**	
286	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
287	**Detected Data appear Lognormal at 5% Significance Level**			
288				
289	**Lognormal ROS Statistics Using Imputed Non-Detects**			
290	Mean in Original Scale	0.124	Mean in Log Scale	-2.734
291	SD in Original Scale	0.155	SD in Log Scale	1.174
292	95% t UCL (assumes normality of ROS data)	0.228	95% Percentile Bootstrap UCL	N/A
293	95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
294	95% H-UCL (Log ROS)	0.72		
295				
296	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
297	KM Mean (logged)	-2.379	KM Geo Mean	0.0927
298	KM SD (logged)	0.836	95% Critical H Value (KM-Log)	3.034
299	KM Standard Error of Mean (logged)	0.362	95% H-UCL (KM -Log)	0.343
300	KM SD (logged)	0.836	95% Critical H Value (KM-Log)	3.034
301	KM Standard Error of Mean (logged)	0.362		
302				
303	**DL/2 Statistics**			
304	**DL/2 Normal**		**DL/2 Log-Transformed**	
305	Mean in Original Scale	0.131	Mean in Log Scale	-2.565
306	SD in Original Scale	0.151	SD in Log Scale	1.08
307	95% t UCL (Assumes normality)	0.232	95% H-Stat UCL	0.605
308	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
309				
310	**Nonparametric Distribution Free UCL Statistics**			
311	**Detected Data appear Normal Distributed at 5% Significance Level**			
312				

Suggested UCL to Use

95% KM (t) UCL	0.25

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthylene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	3	Number of Non-Detects	5
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.0988	Minimum Non-Detect	0.0505
Maximum Detect	0.889	Maximum Non-Detect	0.114
Variance Detects	0.156	Percent Non-Detects	62.5%
Mean Detects	0.5	SD Detects	0.395
Median Detects	0.512	CV Detects	0.791
Skewness Detects	-0.137	Kurtosis Detects	N/A
Mean of Logged Detects	-1.034	SD of Logged Detects	1.143

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.179	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.225	KM Standard Error of Mean	0.126
KM SD	0.291	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.464	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.433	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.604	95% KM Chebyshev UCL	0.775
97.5% KM Chebyshev UCL	1.013	99% KM Chebyshev UCL	1.481

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.614	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.31	Theta star (bias corrected MLE)	N/A

	A–E	F	G–K	L
365	nu hat (MLE)	9.686	nu star (bias corrected)	N/A
366	Mean (detects)	0.5		
367				
368	**Gamma ROS Statistics using Imputed Non-Detects**			
369	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
370	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
371	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
372	This is especially true when the sample size is small.			
373	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
374	Minimum	0.01	Mean	0.194
375	Maximum	0.889	Median	0.01
376	SD	0.33	CV	1.704
377	k hat (MLE)	0.404	k star (bias corrected MLE)	0.336
378	Theta hat (MLE)	0.479	Theta star (bias corrected MLE)	0.576
379	nu hat (MLE)	6.469	nu star (bias corrected)	5.377
380	Adjusted Level of Significance (β)	0.0195		
381	Approximate Chi Square Value (5.38, α)	1.33	Adjusted Chi Square Value (5.38, β)	0.89
382	95% Gamma Approximate UCL (use when n>=50)	0.783	95% Gamma Adjusted UCL (use when n<50)	N/A
383				
384	**Estimates of Gamma Parameters using KM Estimates**			
385	Mean (KM)	0.225	SD (KM)	0.291
386	Variance (KM)	0.0846	SE of Mean (KM)	0.126
387	k hat (KM)	0.599	k star (KM)	0.458
388	nu hat (KM)	9.579	nu star (KM)	7.32
389	theta hat (KM)	0.376	theta star (KM)	0.492
390	80% gamma percentile (KM)	0.368	90% gamma percentile (KM)	0.62
391	95% gamma percentile (KM)	0.892	99% gamma percentile (KM)	1.568
392				
393	**Gamma Kaplan-Meier (KM) Statistics**			
394	Approximate Chi Square Value (7.32, α)	2.348	Adjusted Chi Square Value (7.32, β)	1.701
395	95% Gamma Approximate KM-UCL (use when n>=50)	0.702	95% Gamma Adjusted KM-UCL (use when n<50)	0.969
396				
397	**Lognormal GOF Test on Detected Observations Only**			
398	Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**	
399	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
400	Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**	
401	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
402	**Detected Data appear Lognormal at 5% Significance Level**			
403				
404	**Lognormal ROS Statistics Using Imputed Non-Detects**			
405	Mean in Original Scale	0.201	Mean in Log Scale	-2.811
406	SD in Original Scale	0.325	SD in Log Scale	1.623
407	95% t UCL (assumes normality of ROS data)	0.419	95% Percentile Bootstrap UCL	0.385
408	95% BCA Bootstrap UCL	0.429	95% Bootstrap t UCL	2.159
409	95% H-UCL (Log ROS)	5.072		
410				
411	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
412	KM Mean (logged)	-2.17	KM Geo Mean	0.114
413	KM SD (logged)	1.07	95% Critical H Value (KM-Log)	3.602
414	KM Standard Error of Mean (logged)	0.478	95% H-UCL (KM -Log)	0.87
415	KM SD (logged)	1.07	95% Critical H Value (KM-Log)	3.602
416	KM Standard Error of Mean (logged)	0.478		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.216	Mean in Log Scale	-2.361
SD in Original Scale	0.317	SD in Log Scale	1.292
95% t UCL (Assumes normality)	0.428	95% H-Stat UCL	1.673

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.464

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	3	Number of Non-Detects	5
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.101	Minimum Non-Detect	0.0505
Maximum Detect	0.897	Maximum Non-Detect	0.114
Variance Detects	0.158	Percent Non-Detects	62.5%
Mean Detects	0.494	SD Detects	0.398
Median Detects	0.483	CV Detects	0.806
Skewness Detects	0.12	Kurtosis Detects	N/A
Mean of Logged Detects	-1.043	SD of Logged Detects	1.126

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.223	KM Standard Error of Mean	0.126
KM SD	0.29	95% KM (BCA) UCL	N/A

469	95% KM (t) UCL	0.461	95% KM (Percentile Bootstrap) UCL	N/A
470	95% KM (z) UCL	0.43	95% KM Bootstrap t UCL	N/A
471	90% KM Chebyshev UCL	0.6	95% KM Chebyshev UCL	0.771
472	97.5% KM Chebyshev UCL	1.008	99% KM Chebyshev UCL	1.474
473				
474	**Gamma GOF Tests on Detected Observations Only**			
475	**Not Enough Data to Perform GOF Test**			
476				
477	**Gamma Statistics on Detected Data Only**			
478	k hat (MLE)	1.63	k star (bias corrected MLE)	N/A
479	Theta hat (MLE)	0.303	Theta star (bias corrected MLE)	N/A
480	nu hat (MLE)	9.779	nu star (bias corrected)	N/A
481	Mean (detects)	0.494		
482				
483	**Gamma ROS Statistics using Imputed Non-Detects**			
484	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
485	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
486	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
487	This is especially true when the sample size is small.			
488	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
489	Minimum	0.01	Mean	0.191
490	Maximum	0.897	Median	0.01
491	SD	0.329	CV	1.717
492	k hat (MLE)	0.406	k star (bias corrected MLE)	0.337
493	Theta hat (MLE)	0.471	Theta star (bias corrected MLE)	0.567
494	nu hat (MLE)	6.5	nu star (bias corrected)	5.396
495	Adjusted Level of Significance (β)	0.0195		
496	Approximate Chi Square Value (5.40, α)	1.339	Adjusted Chi Square Value (5.40, β)	0.897
497	95% Gamma Approximate UCL (use when n>=50)	0.771	95% Gamma Adjusted UCL (use when n<50)	N/A
498				
499	**Estimates of Gamma Parameters using KM Estimates**			
500	Mean (KM)	0.223	SD (KM)	0.29
501	Variance (KM)	0.0838	SE of Mean (KM)	0.126
502	k hat (KM)	0.593	k star (KM)	0.454
503	nu hat (KM)	9.491	nu star (KM)	7.265
504	theta hat (KM)	0.376	theta star (KM)	0.491
505	80% gamma percentile (KM)	0.364	90% gamma percentile (KM)	0.615
506	95% gamma percentile (KM)	0.886	99% gamma percentile (KM)	1.56
507				
508	**Gamma Kaplan-Meier (KM) Statistics**			
509	Approximate Chi Square Value (7.27, α)	2.317	Adjusted Chi Square Value (7.27, β)	1.675
510	95% Gamma Approximate KM-UCL (use when n>=50)	0.699	95% Gamma Adjusted KM-UCL (use when n<50)	0.967
511				
512	**Lognormal GOF Test on Detected Observations Only**			
513	Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**	
514	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
515	Lilliefors Test Statistic	0.277	**Lilliefors GOF Test**	
516	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
517	**Detected Data appear Lognormal at 5% Significance Level**			
518				
519	**Lognormal ROS Statistics Using Imputed Non-Detects**			
520	Mean in Original Scale	0.199	Mean in Log Scale	-2.802

	A	B	C	D	E	F	G	H	I	J	K	L
521					SD in Original Scale	0.324					SD in Log Scale	1.605
522					95% t UCL (assumes normality of ROS data)	0.416					95% Percentile Bootstrap UCL	0.405
523					95% BCA Bootstrap UCL	0.427					95% Bootstrap t UCL	2.075
524					95% H-UCL (Log ROS)	4.66						
525												
526	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
527					KM Mean (logged)	-2.171					KM Geo Mean	0.114
528					KM SD (logged)	1.062					95% Critical H Value (KM-Log)	3.58
529					KM Standard Error of Mean (logged)	0.476					95% H-UCL (KM -Log)	0.844
530					KM SD (logged)	1.062					95% Critical H Value (KM-Log)	3.58
531					KM Standard Error of Mean (logged)	0.476						
532												
533	**DL/2 Statistics**											
534	**DL/2 Normal**						**DL/2 Log-Transformed**					
535					Mean in Original Scale	0.213					Mean in Log Scale	-2.364
536					SD in Original Scale	0.315					SD in Log Scale	1.284
537					95% t UCL (Assumes normality)	0.424					95% H-Stat UCL	1.61
538	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
539												
540	**Nonparametric Distribution Free UCL Statistics**											
541	**Detected Data appear Normal Distributed at 5% Significance Level**											
542												
543	**Suggested UCL to Use**											
544					95% KM (t) UCL	0.461						
545												
546	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
547	Recommendations are based upon data size, data distribution, and skewness.											
548	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
549	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
550												
551												
552	**Benzo[a]anthracene**											
553												
554	**General Statistics**											
555					Total Number of Observations	8					Number of Distinct Observations	8
556											Number of Missing Observations	0
557					Minimum	0.0924					Mean	0.701
558					Maximum	2.79					Median	0.331
559					SD	0.929					Std. Error of Mean	0.328
560					Coefficient of Variation	1.325					Skewness	2.032
561												
562	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**											
563	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**											
564	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**											
565	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**											
566												
567	**Normal GOF Test**											
568					Shapiro Wilk Test Statistic	0.721	**Shapiro Wilk GOF Test**					
569					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
570					Lilliefors Test Statistic	0.306	**Lilliefors GOF Test**					
571					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					
572	**Data Not Normal at 5% Significance Level**											

573				
574	**Assuming Normal Distribution**			
575	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
576	95% Student's-t UCL	1.323	95% Adjusted-CLT UCL (Chen-1995)	1.493
577			95% Modified-t UCL (Johnson-1978)	1.362
578				
579	**Gamma GOF Test**			
580	A-D Test Statistic	0.417	**Anderson-Darling Gamma GOF Test**	
581	5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
582	K-S Test Statistic	0.177	**Kolmogorov-Smirnov Gamma GOF Test**	
583	5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	
584	**Detected data appear Gamma Distributed at 5% Significance Level**			
585				
586	**Gamma Statistics**			
587	k hat (MLE)	0.86	k star (bias corrected MLE)	0.621
588	Theta hat (MLE)	0.815	Theta star (bias corrected MLE)	1.129
589	nu hat (MLE)	13.76	nu star (bias corrected)	9.936
590	MLE Mean (bias corrected)	0.701	MLE Sd (bias corrected)	0.889
591			Approximate Chi Square Value (0.05)	3.901
592	Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	3.005
593				
594	**Assuming Gamma Distribution**			
595	95% Approximate Gamma UCL (use when n>=50)	1.785	95% Adjusted Gamma UCL (use when n<50)	2.317
596				
597	**Lognormal GOF Test**			
598	Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**	
599	5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
600	Lilliefors Test Statistic	0.146	**Lilliefors Lognormal GOF Test**	
601	5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
602	**Data appear Lognormal at 5% Significance Level**			
603				
604	**Lognormal Statistics**			
605	Minimum of Logged Data	-2.382	Mean of logged Data	-1.039
606	Maximum of Logged Data	1.026	SD of logged Data	1.237
607				
608	**Assuming Lognormal Distribution**			
609	95% H-UCL	5.021	90% Chebyshev (MVUE) UCL	1.547
610	95% Chebyshev (MVUE) UCL	1.948	97.5% Chebyshev (MVUE) UCL	2.505
611	99% Chebyshev (MVUE) UCL	3.598		
612				
613	**Nonparametric Distribution Free UCL Statistics**			
614	**Data appear to follow a Discernible Distribution at 5% Significance Level**			
615				
616	**Nonparametric Distribution Free UCLs**			
617	95% CLT UCL	1.241	95% Jackknife UCL	1.323
618	95% Standard Bootstrap UCL	1.22	95% Bootstrap-t UCL	3.128
619	95% Hall's Bootstrap UCL	3.811	95% Percentile Bootstrap UCL	1.256
620	95% BCA Bootstrap UCL	1.462		
621	90% Chebyshev(Mean, Sd) UCL	1.686	95% Chebyshev(Mean, Sd) UCL	2.132
622	97.5% Chebyshev(Mean, Sd) UCL	2.751	99% Chebyshev(Mean, Sd) UCL	3.968
623				
624	**Suggested UCL to Use**			

95% Adjusted Gamma UCL	2.317		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[a]pyrene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.108	Mean	0.95
Maximum	3.47	Median	0.514
SD	1.15	Std. Error of Mean	0.407
Coefficient of Variation	1.211	Skewness	1.873

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	0.756	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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 UCL	1.72	95% Adjusted-CLT UCL (Chen-1995)	1.906
		95% Modified-t UCL (Johnson-1978)	1.765

Gamma GOF Test

A-D Test Statistic	0.328	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.19	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.302	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.979	k star (bias corrected MLE)	0.695
Theta hat (MLE)	0.97	Theta star (bias corrected MLE)	1.366
nu hat (MLE)	15.67	nu star (bias corrected)	11.12
MLE Mean (bias corrected)	0.95	MLE Sd (bias corrected)	1.139
		Approximate Chi Square Value (0.05)	4.656
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	3.656

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.269	95% Adjusted Gamma UCL (use when n<50)	2.889

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.134	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.226	Mean of logged Data	-0.643
Maximum of Logged Data	1.244	SD of logged Data	1.167

Assuming Lognormal Distribution

95% H-UCL	5.669	90% Chebyshev (MVUE) UCL	2.084
95% Chebyshev (MVUE) UCL	2.611	97.5% Chebyshev (MVUE) UCL	3.342
99% Chebyshev (MVUE) UCL	4.779		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	1.618	95% Jackknife UCL	1.72
95% Standard Bootstrap UCL	1.59	95% Bootstrap-t UCL	3.258
95% Hall's Bootstrap UCL	4.984	95% Percentile Bootstrap UCL	1.642
95% BCA Bootstrap UCL	1.942		
90% Chebyshev(Mean, Sd) UCL	2.169	95% Chebyshev(Mean, Sd) UCL	2.722
97.5% Chebyshev(Mean, Sd) UCL	3.489	99% Chebyshev(Mean, Sd) UCL	4.995

Suggested UCL to Use

95% Adjusted Gamma UCL	2.889		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[b]fluoranthene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.136	Mean	1.112
Maximum	4.1	Median	0.612
SD	1.352	Std. Error of Mean	0.478
Coefficient of Variation	1.215	Skewness	1.912

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

	A	B	C	D	E	F	G	H	I	J	K	L
729	**Normal GOF Test**											
730					Shapiro Wilk Test Statistic	0.753	**Shapiro Wilk GOF Test**					
731					5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level					
732					Lilliefors Test Statistic	0.303	**Lilliefors GOF Test**					
733					5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level					
734	**Data Not Normal at 5% Significance Level**											
735												
736	**Assuming Normal Distribution**											
737	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**					
738					95% Student's-t UCL	2.018					95% Adjusted-CLT UCL (Chen-1995)	2.244
739											95% Modified-t UCL (Johnson-1978)	2.072
740												
741	**Gamma GOF Test**											
742					A-D Test Statistic	0.337	**Anderson-Darling Gamma GOF Test**					
743					5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level					
744					K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**					
745					5% K-S Critical Value	0.302	Detected data appear Gamma Distributed at 5% Significance Level					
746	**Detected data appear Gamma Distributed at 5% Significance Level**											
747												
748	**Gamma Statistics**											
749					k hat (MLE)	0.983					k star (bias corrected MLE)	0.697
750					Theta hat (MLE)	1.132					Theta star (bias corrected MLE)	1.595
751					nu hat (MLE)	15.72					nu star (bias corrected)	11.16
752					MLE Mean (bias corrected)	1.112					MLE Sd (bias corrected)	1.332
753											Approximate Chi Square Value (0.05)	4.679
754					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	3.676
755												
756	**Assuming Gamma Distribution**											
757					95% Approximate Gamma UCL (use when n>=50)	2.653					95% Adjusted Gamma UCL (use when n<50)	3.377
758												
759	**Lognormal GOF Test**											
760					Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk Lognormal GOF Test**					
761					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
762					Lilliefors Test Statistic	0.132	**Lilliefors Lognormal GOF Test**					
763					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
764	**Data appear Lognormal at 5% Significance Level**											
765												
766	**Lognormal Statistics**											
767					Minimum of Logged Data	-1.995					Mean of logged Data	-0.482
768					Maximum of Logged Data	1.411					SD of logged Data	1.16
769												
770	**Assuming Lognormal Distribution**											
771					95% H-UCL	6.481					90% Chebyshev (MVUE) UCL	2.424
772					95% Chebyshev (MVUE) UCL	3.035					97.5% Chebyshev (MVUE) UCL	3.882
773					99% Chebyshev (MVUE) UCL	5.548						
774												
775	**Nonparametric Distribution Free UCL Statistics**											
776	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
777												
778	**Nonparametric Distribution Free UCLs**											
779					95% CLT UCL	1.898					95% Jackknife UCL	2.018
780					95% Standard Bootstrap UCL	1.831					95% Bootstrap-t UCL	3.969

95% Hall's Bootstrap UCL	5.749	95% Percentile Bootstrap UCL	1.883
95% BCA Bootstrap UCL	2.174		
90% Chebyshev(Mean, Sd) UCL	2.546	95% Chebyshev(Mean, Sd) UCL	3.196
97.5% Chebyshev(Mean, Sd) UCL	4.097	99% Chebyshev(Mean, Sd) UCL	5.868
Suggested UCL to Use			
95% Adjusted Gamma UCL	3.377		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[g,h,i]perylene			
General Statistics			
Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.0781	Mean	0.967
Maximum	3.39	Median	0.454
SD	1.184	Std. Error of Mean	0.419
Coefficient of Variation	1.224	Skewness	1.626
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	0.755	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.335	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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 UCL	1.761	95% Adjusted-CLT UCL (Chen-1995)	1.913
		95% Modified-t UCL (Johnson-1978)	1.801
Gamma GOF Test			
A-D Test Statistic	0.366	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.214	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	0.89	k star (bias corrected MLE)	0.64
Theta hat (MLE)	1.087	Theta star (bias corrected MLE)	1.512
nu hat (MLE)	14.24	nu star (bias corrected)	10.24

	A	B	C	D	E	F	G	H	I	J	K	L
833					MLE Mean (bias corrected)	0.967					MLE Sd (bias corrected)	1.21
834											Approximate Chi Square Value (0.05)	4.089
835					Adjusted Level of Significance	0.0195					Adjusted Chi Square Value	3.167
836												
837	**Assuming Gamma Distribution**											
838					95% Approximate Gamma UCL (use when n>=50)	2.421					95% Adjusted Gamma UCL (use when n<50)	3.127
839												
840	**Lognormal GOF Test**											
841					Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk Lognormal GOF Test**					
842					5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level					
843					Lilliefors Test Statistic	0.14	**Lilliefors Lognormal GOF Test**					
844					5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level					
845	**Data appear Lognormal at 5% Significance Level**											
846												
847	**Lognormal Statistics**											
848					Minimum of Logged Data	-2.55					Mean of logged Data	-0.691
849					Maximum of Logged Data	1.221					SD of logged Data	1.261
850												
851	**Assuming Lognormal Distribution**											
852					95% H-UCL	7.815					90% Chebyshev (MVUE) UCL	2.265
853					95% Chebyshev (MVUE) UCL	2.856					97.5% Chebyshev (MVUE) UCL	3.677
854					99% Chebyshev (MVUE) UCL	5.289						
855												
856	**Nonparametric Distribution Free UCL Statistics**											
857	**Data appear to follow a Discernible Distribution at 5% Significance Level**											
858												
859	**Nonparametric Distribution Free UCLs**											
860					95% CLT UCL	1.656					95% Jackknife UCL	1.761
861					95% Standard Bootstrap UCL	1.61					95% Bootstrap-t UCL	4.109
862					95% Hall's Bootstrap UCL	6.174					95% Percentile Bootstrap UCL	1.654
863					95% BCA Bootstrap UCL	1.803						
864					90% Chebyshev(Mean, Sd) UCL	2.223					95% Chebyshev(Mean, Sd) UCL	2.792
865					97.5% Chebyshev(Mean, Sd) UCL	3.582					99% Chebyshev(Mean, Sd) UCL	5.133
866												
867	**Suggested UCL to Use**											
868					95% Adjusted Gamma UCL	3.127						
869												
870	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
871	Recommendations are based upon data size, data distribution, and skewness.											
872	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
873	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
874												
875	**Benzo[k]fluoranthene**											
876												
877	**General Statistics**											
878					Total Number of Observations	8					Number of Distinct Observations	8
879					Number of Detects	6					Number of Non-Detects	2
880					Number of Distinct Detects	6					Number of Distinct Non-Detects	2
881					Minimum Detect	0.0579					Minimum Non-Detect	0.0613
882					Maximum Detect	1.7					Maximum Non-Detect	0.113
883					Variance Detects	0.381					Percent Non-Detects	25%
884					Mean Detects	0.511					SD Detects	0.617

885	Median Detects	0.259	CV Detects	1.207
886	Skewness Detects	1.927	Kurtosis Detects	3.746
887	Mean of Logged Detects	-1.236	SD of Logged Detects	1.177
888				
889	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
890	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
891	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
892	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
893				
894	**Normal GOF Test on Detects Only**			
895	Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk GOF Test**	
896	5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
897	Lilliefors Test Statistic	0.322	**Lilliefors GOF Test**	
898	5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
899	**Detected Data appear Approximate Normal at 5% Significance Level**			
900				
901	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
902	KM Mean	0.398	KM Standard Error of Mean	0.204
903	KM SD	0.526	95% KM (BCA) UCL	0.758
904	95% KM (t) UCL	0.783	95% KM (Percentile Bootstrap) UCL	0.735
905	95% KM (z) UCL	0.733	95% KM Bootstrap t UCL	1.888
906	90% KM Chebyshev UCL	1.009	95% KM Chebyshev UCL	1.285
907	97.5% KM Chebyshev UCL	1.669	99% KM Chebyshev UCL	2.423
908				
909	**Gamma GOF Tests on Detected Observations Only**			
910	A-D Test Statistic	0.313	**Anderson-Darling GOF Test**	
911	5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level	
912	K-S Test Statistic	0.266	**Kolmogorov-Smirnov GOF**	
913	5% K-S Critical Value	0.341	Detected data appear Gamma Distributed at 5% Significance Level	
914	**Detected data appear Gamma Distributed at 5% Significance Level**			
915				
916	**Gamma Statistics on Detected Data Only**			
917	k hat (MLE)	1.02	k star (bias corrected MLE)	0.621
918	Theta hat (MLE)	0.501	Theta star (bias corrected MLE)	0.822
919	nu hat (MLE)	12.24	nu star (bias corrected)	7.456
920	Mean (detects)	0.511		
921				
922	**Gamma ROS Statistics using Imputed Non-Detects**			
923	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
924	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
925	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
926	This is especially true when the sample size is small.			
927	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
928	Minimum	0.01	Mean	0.386
929	Maximum	1.7	Median	0.197
930	SD	0.571	CV	1.479
931	k hat (MLE)	0.555	k star (bias corrected MLE)	0.43
932	Theta hat (MLE)	0.695	Theta star (bias corrected MLE)	0.896
933	nu hat (MLE)	8.886	nu star (bias corrected)	6.887
934	Adjusted Level of Significance (β)	0.0195		
935	Approximate Chi Square Value (6.89, α)	2.109	Adjusted Chi Square Value (6.89, β)	1.506
936	95% Gamma Approximate UCL (use when n>=50)	1.26	95% Gamma Adjusted UCL (use when n<50)	1.764

	A	F	G	L
937				
938	**Estimates of Gamma Parameters using KM Estimates**			
939	Mean (KM)	0.398	SD (KM)	0.526
940	Variance (KM)	0.276	SE of Mean (KM)	0.204
941	k hat (KM)	0.572	k star (KM)	0.441
942	nu hat (KM)	9.158	nu star (KM)	7.057
943	theta hat (KM)	0.695	theta star (KM)	0.902
944	80% gamma percentile (KM)	0.648	90% gamma percentile (KM)	1.103
945	95% gamma percentile (KM)	1.597	99% gamma percentile (KM)	2.826
946				
947	**Gamma Kaplan-Meier (KM) Statistics**			
948	Approximate Chi Square Value (7.06, α)	2.202	Adjusted Chi Square Value (7.06, β)	1.581
949	95% Gamma Approximate KM-UCL (use when n>=50)	1.275	95% Gamma Adjusted KM-UCL (use when n<50)	1.775
950				
951	**Lognormal GOF Test on Detected Observations Only**			
952	Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk GOF Test**	
953	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
954	Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**	
955	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
956	**Detected Data appear Lognormal at 5% Significance Level**			
957				
958	**Lognormal ROS Statistics Using Imputed Non-Detects**			
959	Mean in Original Scale	0.395	Mean in Log Scale	-1.697
960	SD in Original Scale	0.564	SD in Log Scale	1.311
961	95% t UCL (assumes normality of ROS data)	0.773	95% Percentile Bootstrap UCL	0.739
962	95% BCA Bootstrap UCL	0.898	95% Bootstrap t UCL	1.911
963	95% H-UCL (Log ROS)	3.521		
964				
965	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
966	KM Mean (logged)	-1.639	KM Geo Mean	0.194
967	KM SD (logged)	1.163	95% Critical H Value (KM-Log)	3.839
968	KM Standard Error of Mean (logged)	0.451	95% H-UCL (KM -Log)	2.066
969	KM SD (logged)	1.163	95% Critical H Value (KM-Log)	3.839
970	KM Standard Error of Mean (logged)	0.451		
971				
972	**DL/2 Statistics**			
973	**DL/2 Normal**		**DL/2 Log-Transformed**	
974	Mean in Original Scale	0.394	Mean in Log Scale	-1.722
975	SD in Original Scale	0.565	SD in Log Scale	1.351
976	95% t UCL (Assumes normality)	0.772	95% H-Stat UCL	4.076
977	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
978				
979	**Nonparametric Distribution Free UCL Statistics**			
980	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
981				
982	**Suggested UCL to Use**			
983	95% KM (t) UCL	0.783		
984				
985	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
986	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
987				
988	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.107	Mean	0.867
Maximum	3.36	Median	0.423
SD	1.134	Std. Error of Mean	0.401
Coefficient of Variation	1.308	Skewness	1.912

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	0.731	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	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 UCL	1.626	95% Adjusted-CLT UCL (Chen-1995)	1.815
		95% Modified-t UCL (Johnson-1978)	1.671

Gamma GOF Test

A-D Test Statistic	0.424	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.848	k star (bias corrected MLE)	0.613
Theta hat (MLE)	1.022	Theta star (bias corrected MLE)	1.412
nu hat (MLE)	13.57	nu star (bias corrected)	9.816
MLE Mean (bias corrected)	0.867	MLE Sd (bias corrected)	1.106
		Approximate Chi Square Value (0.05)	3.827
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	2.942

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	2.223	95% Adjusted Gamma UCL (use when n<50)	2.891

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk Lognormal GOF Test**

5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-2.235	Mean of logged Data	-0.838
Maximum of Logged Data	1.212	SD of logged Data	1.256
Assuming Lognormal Distribution			
95% H-UCL	6.63	90% Chebyshev (MVUE) UCL	1.943
95% Chebyshev (MVUE) UCL	2.45	97.5% Chebyshev (MVUE) UCL	3.153
99% Chebyshev (MVUE) UCL	4.535		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	1.526	95% Jackknife UCL	1.626
95% Standard Bootstrap UCL	1.487	95% Bootstrap-t UCL	3.741
95% Hall's Bootstrap UCL	4.977	95% Percentile Bootstrap UCL	1.558
95% BCA Bootstrap UCL	1.794		
90% Chebyshev(Mean, Sd) UCL	2.069	95% Chebyshev(Mean, Sd) UCL	2.614
97.5% Chebyshev(Mean, Sd) UCL	3.37	99% Chebyshev(Mean, Sd) UCL	4.855
Suggested UCL to Use			
95% Adjusted Gamma UCL	2.891		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Dibenz(a,h)anthracene			
General Statistics			
Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	4	Number of Non-Detects	4
Number of Distinct Detects	4	Number of Distinct Non-Detects	4
Minimum Detect	0.101	Minimum Non-Detect	0.0505
Maximum Detect	0.693	Maximum Non-Detect	0.114
Variance Detects	0.0744	Percent Non-Detects	50%
Mean Detects	0.322	SD Detects	0.273
Median Detects	0.247	CV Detects	0.847
Skewness Detects	1.106	Kurtosis Detects	0.09
Mean of Logged Detects	-1.423	SD of Logged Detects	0.89
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			

1093	**Normal GOF Test on Detects Only**			
1094	Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**	
1095	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
1096	Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**	
1097	5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	
1098	**Detected Data appear Normal at 5% Significance Level**			
1099				
1100	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1101	KM Mean	0.19	KM Standard Error of Mean	0.0872
1102	KM SD	0.213	95% KM (BCA) UCL	N/A
1103	95% KM (t) UCL	0.356	95% KM (Percentile Bootstrap) UCL	N/A
1104	95% KM (z) UCL	0.334	95% KM Bootstrap t UCL	N/A
1105	90% KM Chebyshev UCL	0.452	95% KM Chebyshev UCL	0.571
1106	97.5% KM Chebyshev UCL	0.735	99% KM Chebyshev UCL	1.058
1107				
1108	**Gamma GOF Tests on Detected Observations Only**			
1109	A-D Test Statistic	0.321	**Anderson-Darling GOF Test**	
1110	5% A-D Critical Value	0.661	Detected data appear Gamma Distributed at 5% Significance Level	
1111	K-S Test Statistic	0.285	**Kolmogorov-Smirnov GOF**	
1112	5% K-S Critical Value	0.398	Detected data appear Gamma Distributed at 5% Significance Level	
1113	**Detected data appear Gamma Distributed at 5% Significance Level**			
1114				
1115	**Gamma Statistics on Detected Data Only**			
1116	k hat (MLE)	1.876	k star (bias corrected MLE)	0.636
1117	Theta hat (MLE)	0.172	Theta star (bias corrected MLE)	0.506
1118	nu hat (MLE)	15.01	nu star (bias corrected)	5.086
1119	Mean (detects)	0.322		
1120				
1121	**Gamma ROS Statistics using Imputed Non-Detects**			
1122	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1123	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1124	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1125	This is especially true when the sample size is small.			
1126	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1127	Minimum	0.01	Mean	0.166
1128	Maximum	0.693	Median	0.0555
1129	SD	0.244	CV	1.472
1130	k hat (MLE)	0.518	k star (bias corrected MLE)	0.407
1131	Theta hat (MLE)	0.32	Theta star (bias corrected MLE)	0.407
1132	nu hat (MLE)	8.296	nu star (bias corrected)	6.518
1133	Adjusted Level of Significance (β)	0.0195		
1134	Approximate Chi Square Value (6.52, α)	1.91	Adjusted Chi Square Value (6.52, β)	1.346
1135	95% Gamma Approximate UCL (use when n>=50)	0.566	95% Gamma Adjusted UCL (use when n<50)	N/A
1136				
1137	**Estimates of Gamma Parameters using KM Estimates**			
1138	Mean (KM)	0.19	SD (KM)	0.213
1139	Variance (KM)	0.0454	SE of Mean (KM)	0.0872
1140	k hat (KM)	0.799	k star (KM)	0.583
1141	nu hat (KM)	12.79	nu star (KM)	9.325
1142	theta hat (KM)	0.238	theta star (KM)	0.327
1143	80% gamma percentile (KM)	0.314	90% gamma percentile (KM)	0.499
1144	95% gamma percentile (KM)	0.693	99% gamma percentile (KM)	1.163

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.33, α)	3.525	Adjusted Chi Square Value (9.33, β)	2.684
95% Gamma Approximate KM-UCL (use when n>=50)	0.504	95% Gamma Adjusted KM-UCL (use when n<50)	0.662

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.175	Mean in Log Scale	-2.511
SD in Original Scale	0.238	SD in Log Scale	1.316
95% t UCL (assumes normality of ROS data)	0.334	95% Percentile Bootstrap UCL	0.317
95% BCA Bootstrap UCL	0.374	95% Bootstrap t UCL	0.782
95% H-UCL (Log ROS)	1.592		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.146	KM Geo Mean	0.117
KM SD (logged)	0.924	95% Critical H Value (KM-Log)	3.242
KM Standard Error of Mean (logged)	0.387	95% H-UCL (KM -Log)	0.556
KM SD (logged)	0.924	95% Critical H Value (KM-Log)	3.242
KM Standard Error of Mean (logged)	0.387		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.182	Mean in Log Scale	-2.324
SD in Original Scale	0.233	SD in Log Scale	1.159
95% t UCL (Assumes normality)	0.338	95% H-Stat UCL	1.025

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.356		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fluoranthene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	0.0982	Mean	1.083
Maximum	4.86	Median	0.401

	A–E	F	G–K	L
1197	SD	1.658	Std. Error of Mean	0.586
1198	Coefficient of Variation	1.532	Skewness	2.147
1199				
1200	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1201	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1202	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1203	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1204				
1205	**Normal GOF Test**			
1206	Shapiro Wilk Test Statistic	0.666	**Shapiro Wilk GOF Test**	
1207	5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
1208	Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**	
1209	5% Lilliefors Critical Value	0.283	Data Not Normal at 5% Significance Level	
1210	**Data Not Normal at 5% Significance Level**			
1211				
1212	**Assuming Normal Distribution**			
1213	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
1214	95% Student's-t UCL	2.193	95% Adjusted-CLT UCL (Chen-1995)	2.523
1215			95% Modified-t UCL (Johnson-1978)	2.268
1216				
1217	**Gamma GOF Test**			
1218	A-D Test Statistic	0.575	**Anderson-Darling Gamma GOF Test**	
1219	5% A-D Critical Value	0.75	Detected data appear Gamma Distributed at 5% Significance Level	
1220	K-S Test Statistic	0.279	**Kolmogorov-Smirnov Gamma GOF Test**	
1221	5% K-S Critical Value	0.305	Detected data appear Gamma Distributed at 5% Significance Level	
1222	**Detected data appear Gamma Distributed at 5% Significance Level**			
1223				
1224	**Gamma Statistics**			
1225	k hat (MLE)	0.679	k star (bias corrected MLE)	0.507
1226	Theta hat (MLE)	1.595	Theta star (bias corrected MLE)	2.133
1227	nu hat (MLE)	10.86	nu star (bias corrected)	8.119
1228	MLE Mean (bias corrected)	1.083	MLE Sd (bias corrected)	1.52
1229			Approximate Chi Square Value (0.05)	2.804
1230	Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	2.078
1231				
1232	**Assuming Gamma Distribution**			
1233	95% Approximate Gamma UCL (use when n>=50)	3.134	95% Adjusted Gamma UCL (use when n<50)	4.231
1234				
1235	**Lognormal GOF Test**			
1236	Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**	
1237	5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
1238	Lilliefors Test Statistic	0.186	**Lilliefors Lognormal GOF Test**	
1239	5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	
1240	**Data appear Lognormal at 5% Significance Level**			
1241				
1242	**Lognormal Statistics**			
1243	Minimum of Logged Data	-2.321	Mean of logged Data	-0.815
1244	Maximum of Logged Data	1.581	SD of logged Data	1.393
1245				
1246	**Assuming Lognormal Distribution**			
1247	95% H-UCL	12.15	90% Chebyshev (MVUE) UCL	2.414
1248	95% Chebyshev (MVUE) UCL	3.07	97.5% Chebyshev (MVUE) UCL	3.979

99% Chebyshev (MVUE) UCL	5.766		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	2.047	95% Jackknife UCL	2.193
95% Standard Bootstrap UCL	2.008	95% Bootstrap-t UCL	8.442
95% Hall's Bootstrap UCL	7.867	95% Percentile Bootstrap UCL	2.018
95% BCA Bootstrap UCL	2.41		
90% Chebyshev(Mean, Sd) UCL	2.842	95% Chebyshev(Mean, Sd) UCL	3.638
97.5% Chebyshev(Mean, Sd) UCL	4.744	99% Chebyshev(Mean, Sd) UCL	6.917

Suggested UCL to Use

95% Adjusted Gamma UCL	4.231		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	2	Number of Non-Detects	6
Number of Distinct Detects	2	Number of Distinct Non-Detects	6
Minimum Detect	0.142	Minimum Non-Detect	0.0505
Maximum Detect	0.357	Maximum Non-Detect	0.114
Variance Detects	0.0231	Percent Non-Detects	75%
Mean Detects	0.25	SD Detects	0.152
Median Detects	0.25	CV Detects	0.609
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.491	SD of Logged Detects	0.652

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

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 on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.1	KM Standard Error of Mean	0.0508
KM SD	0.102	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.196	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.184	95% KM Bootstrap t UCL	N/A

	A	B	C	D	E	F	G	H	I	J	K	L
1301					90% KM Chebyshev UCL	0.253					95% KM Chebyshev UCL	0.322
1302					97.5% KM Chebyshev UCL	0.417					99% KM Chebyshev UCL	0.606
1303												
1304	**Gamma GOF Tests on Detected Observations Only**											
1305	**Not Enough Data to Perform GOF Test**											
1306												
1307	**Gamma Statistics on Detected Data Only**											
1308					k hat (MLE)	5.03					k star (bias corrected MLE)	N/A
1309					Theta hat (MLE)	0.0496					Theta star (bias corrected MLE)	N/A
1310					nu hat (MLE)	20.12					nu star (bias corrected)	N/A
1311					Mean (detects)	0.25						
1312												
1313	**Estimates of Gamma Parameters using KM Estimates**											
1314					Mean (KM)	0.1					SD (KM)	0.102
1315					Variance (KM)	0.0103					SE of Mean (KM)	0.0508
1316					k hat (KM)	0.974					k star (KM)	0.692
1317					nu hat (KM)	15.59					nu star (KM)	11.08
1318					theta hat (KM)	0.103					theta star (KM)	0.145
1319					80% gamma percentile (KM)	0.165					90% gamma percentile (KM)	0.252
1320					95% gamma percentile (KM)	0.343					99% gamma percentile (KM)	0.558
1321												
1322	**Gamma Kaplan-Meier (KM) Statistics**											
1323											Adjusted Level of Significance (β)	0.0195
1324					Approximate Chi Square Value (11.08, α)	4.626					Adjusted Chi Square Value (11.08, β)	3.63
1325					95% Gamma Approximate KM-UCL (use when n>=50)	0.24					95% Gamma Adjusted KM-UCL (use when n<50)	0.306
1326												
1327	**Lognormal GOF Test on Detected Observations Only**											
1328	**Not Enough Data to Perform GOF Test**											
1329												
1330	**Lognormal ROS Statistics Using Imputed Non-Detects**											
1331					Mean in Original Scale	0.0685					Mean in Log Scale	-3.976
1332					SD in Original Scale	0.126					SD in Log Scale	1.554
1333					95% t UCL (assumes normality of ROS data)	0.153					95% Percentile Bootstrap UCL	N/A
1334					95% BCA Bootstrap UCL	N/A					95% Bootstrap t UCL	N/A
1335					95% H-UCL (Log ROS)	1.106						
1336												
1337	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**											
1338					KM Mean (logged)	-2.612					KM Geo Mean	0.0734
1339					KM SD (logged)	0.687					95% Critical H Value (KM-Log)	2.708
1340					KM Standard Error of Mean (logged)	0.344					95% H-UCL (KM -Log)	0.188
1341					KM SD (logged)	0.687					95% Critical H Value (KM-Log)	2.708
1342					KM Standard Error of Mean (logged)	0.344						
1343												
1344	**DL/2 Statistics**											
1345	**DL/2 Normal**						**DL/2 Log-Transformed**					
1346					Mean in Original Scale	0.0943					Mean in Log Scale	-2.785
1347					SD in Original Scale	0.112					SD in Log Scale	0.896
1348					95% t UCL (Assumes normality)	0.17					95% H-Stat UCL	0.27
1349	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1350												
1351	**Nonparametric Distribution Free UCL Statistics**											
1352	**Data do not follow a Discernible Distribution at 5% Significance Level**											

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.322	

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	7	Number of Non-Detects	1
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.116	Minimum Non-Detect	0.0613
Maximum Detect	3.08	Maximum Non-Detect	0.0613
Variance Detects	1.188	Percent Non-Detects	12.5%
Mean Detects	0.946	SD Detects	1.09
Median Detects	0.45	CV Detects	1.152
Skewness Detects	1.624	Kurtosis Detects	1.92
Mean of Logged Detects	-0.599	SD of Logged Detects	1.126

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 on Detects Only

Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.336	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.304	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.835	KM Standard Error of Mean	0.377
KM SD	0.988	95% KM (BCA) UCL	1.551
95% KM (t) UCL	1.55	95% KM (Percentile Bootstrap) UCL	1.424
95% KM (z) UCL	1.456	95% KM Bootstrap t UCL	3.715
90% KM Chebyshev UCL	1.967	95% KM Chebyshev UCL	2.48
97.5% KM Chebyshev UCL	3.191	99% KM Chebyshev UCL	4.589

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.398	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.248	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.057	k star (bias corrected MLE)	0.699

1405	Theta hat (MLE)	0.895	Theta star (bias corrected MLE)	1.353
1406	nu hat (MLE)	14.79	nu star (bias corrected)	9.787
1407	Mean (detects)	0.946		
1408				
1409	**Gamma ROS Statistics using Imputed Non-Detects**			
1410	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1411	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1412	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1413	This is especially true when the sample size is small.			
1414	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1415	Minimum	0.01	Mean	0.829
1416	Maximum	3.08	Median	0.39
1417	SD	1.062	CV	1.281
1418	k hat (MLE)	0.667	k star (bias corrected MLE)	0.5
1419	Theta hat (MLE)	1.241	Theta star (bias corrected MLE)	1.656
1420	nu hat (MLE)	10.68	nu star (bias corrected)	8.008
1421	Adjusted Level of Significance (β)	0.0195		
1422	Approximate Chi Square Value (8.01, α)	2.74	Adjusted Chi Square Value (8.01, β)	2.024
1423	95% Gamma Approximate UCL (use when n>=50)	2.422	95% Gamma Adjusted UCL (use when n<50)	3.279
1424				
1425	**Estimates of Gamma Parameters using KM Estimates**			
1426	Mean (KM)	0.835	SD (KM)	0.988
1427	Variance (KM)	0.976	SE of Mean (KM)	0.377
1428	k hat (KM)	0.714	k star (KM)	0.53
1429	nu hat (KM)	11.43	nu star (KM)	8.476
1430	theta hat (KM)	1.169	theta star (KM)	1.576
1431	80% gamma percentile (KM)	1.374	90% gamma percentile (KM)	2.232
1432	95% gamma percentile (KM)	3.142	99% gamma percentile (KM)	5.369
1433				
1434	**Gamma Kaplan-Meier (KM) Statistics**			
1435	Approximate Chi Square Value (8.48, α)	3.014	Adjusted Chi Square Value (8.48, β)	2.253
1436	95% Gamma Approximate KM-UCL (use when n>=50)	2.349	95% Gamma Adjusted KM-UCL (use when n<50)	3.142
1437				
1438	**Lognormal GOF Test on Detected Observations Only**			
1439	Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
1440	5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
1441	Lilliefors Test Statistic	0.178	**Lilliefors GOF Test**	
1442	5% Lilliefors Critical Value	0.304	Detected Data appear Lognormal at 5% Significance Level	
1443	**Detected Data appear Lognormal at 5% Significance Level**			
1444				
1445	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1446	Mean in Original Scale	0.831	Mean in Log Scale	-0.951
1447	SD in Original Scale	1.059	SD in Log Scale	1.442
1448	95% t UCL (assumes normality of ROS data)	1.541	95% Percentile Bootstrap UCL	1.437
1449	95% BCA Bootstrap UCL	1.591	95% Bootstrap t UCL	3.841
1450	95% H-UCL (Log ROS)	13.28		
1451				
1452	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1453	KM Mean (logged)	-0.873	KM Geo Mean	0.418
1454	KM SD (logged)	1.215	95% Critical H Value (KM-Log)	3.975
1455	KM Standard Error of Mean (logged)	0.464	95% H-UCL (KM -Log)	5.423
1456	KM SD (logged)	1.215	95% Critical H Value (KM-Log)	3.975

1457	KM Standard Error of Mean (logged)	0.464		
1458				
1459	**DL/2 Statistics**			
1460	**DL/2 Normal**		**DL/2 Log-Transformed**	
1461	Mean in Original Scale	0.831	Mean in Log Scale	-0.96
1462	SD in Original Scale	1.059	SD in Log Scale	1.459
1463	95% t UCL (Assumes normality)	1.541	95% H-Stat UCL	14.22
1464	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1465				
1466	**Nonparametric Distribution Free UCL Statistics**			
1467	**Detected Data appear Gamma Distributed at 5% Significance Level**			
1468				
1469	**Suggested UCL to Use**			
1470	95% KM Bootstrap t UCL	3.715	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	3.142
1471				
1472	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1473	Recommendations are based upon data size, data distribution, and skewness.			
1474	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1475	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1476				
1477	Naphthalene			
1478				
1479	**General Statistics**			
1480	Total Number of Observations	8	Number of Distinct Observations	8
1481	Number of Detects	5	Number of Non-Detects	3
1482	Number of Distinct Detects	5	Number of Distinct Non-Detects	3
1483	Minimum Detect	0.101	Minimum Non-Detect	0.0505
1484	Maximum Detect	0.524	Maximum Non-Detect	0.112
1485	Variance Detects	0.0276	Percent Non-Detects	37.5%
1486	Mean Detects	0.24	SD Detects	0.166
1487	Median Detects	0.19	CV Detects	0.692
1488	Skewness Detects	1.749	Kurtosis Detects	3.34
1489	Mean of Logged Detects	-1.588	SD of Logged Detects	0.613
1490				
1491	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
1492	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
1493	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
1494	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
1495				
1496	**Normal GOF Test on Detects Only**			
1497	Shapiro Wilk Test Statistic	0.824	**Shapiro Wilk GOF Test**	
1498	5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
1499	Lilliefors Test Statistic	0.31	**Lilliefors GOF Test**	
1500	5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level	
1501	**Detected Data appear Normal at 5% Significance Level**			
1502				
1503	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1504	KM Mean	0.171	KM Standard Error of Mean	0.0586
1505	KM SD	0.148	95% KM (BCA) UCL	0.28
1506	95% KM (t) UCL	0.282	95% KM (Percentile Bootstrap) UCL	0.273
1507	95% KM (z) UCL	0.268	95% KM Bootstrap t UCL	0.332
1508	90% KM Chebyshev UCL	0.347	95% KM Chebyshev UCL	0.426

	A	B	C	D	E	F	G	H	I	J	K	L
1509					97.5% KM Chebyshev UCL	0.537					99% KM Chebyshev UCL	0.754
1510												
1511	**Gamma GOF Tests on Detected Observations Only**											
1512					A-D Test Statistic	0.326	**Anderson-Darling GOF Test**					
1513					5% A-D Critical Value	0.682	Detected data appear Gamma Distributed at 5% Significance Level					
1514					K-S Test Statistic	0.239	**Kolmogorov-Smirnov GOF**					
1515					5% K-S Critical Value	0.359	Detected data appear Gamma Distributed at 5% Significance Level					
1516	**Detected data appear Gamma Distributed at 5% Significance Level**											
1517												
1518	**Gamma Statistics on Detected Data Only**											
1519					k hat (MLE)	3.246					k star (bias corrected MLE)	1.432
1520					Theta hat (MLE)	0.074					Theta star (bias corrected MLE)	0.168
1521					nu hat (MLE)	32.46					nu star (bias corrected)	14.32
1522					Mean (detects)	0.24						
1523												
1524	**Gamma ROS Statistics using Imputed Non-Detects**											
1525	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1526	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1527	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1528	This is especially true when the sample size is small.											
1529	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1530					Minimum	0.01					Mean	0.154
1531					Maximum	0.524					Median	0.126
1532					SD	0.173					CV	1.125
1533					k hat (MLE)	0.711					k star (bias corrected MLE)	0.528
1534					Theta hat (MLE)	0.216					Theta star (bias corrected MLE)	0.292
1535					nu hat (MLE)	11.38					nu star (bias corrected)	8.445
1536					Adjusted Level of Significance (β)	0.0195						
1537					Approximate Chi Square Value (8.45, α)	2.995					Adjusted Chi Square Value (8.45, β)	2.237
1538					95% Gamma Approximate UCL (use when n>=50)	0.434					95% Gamma Adjusted UCL (use when n<50)	0.581
1539												
1540	**Estimates of Gamma Parameters using KM Estimates**											
1541					Mean (KM)	0.171					SD (KM)	0.148
1542					Variance (KM)	0.0219					SE of Mean (KM)	0.0586
1543					k hat (KM)	1.34					k star (KM)	0.921
1544					nu hat (KM)	21.44					nu star (KM)	14.74
1545					theta hat (KM)	0.128					theta star (KM)	0.186
1546					80% gamma percentile (KM)	0.277					90% gamma percentile (KM)	0.402
1547					95% gamma percentile (KM)	0.528					99% gamma percentile (KM)	0.822
1548												
1549	**Gamma Kaplan-Meier (KM) Statistics**											
1550					Approximate Chi Square Value (14.74, α)	7.078					Adjusted Chi Square Value (14.74, β)	5.789
1551					95% Gamma Approximate KM-UCL (use when n>=50)	0.356					95% Gamma Adjusted KM-UCL (use when n<50)	0.436
1552												
1553	**Lognormal GOF Test on Detected Observations Only**											
1554					Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**					
1555					5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level					
1556					Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**					
1557					5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level					
1558	**Detected Data appear Lognormal at 5% Significance Level**											
1559												
1560	**Lognormal ROS Statistics Using Imputed Non-Detects**											

Mean in Original Scale	0.168	Mean in Log Scale	-2.146
SD in Original Scale	0.161	SD in Log Scale	0.904
95% t UCL (assumes normality of ROS data)	0.275	95% Percentile Bootstrap UCL	0.261
95% BCA Bootstrap UCL	0.291	95% Bootstrap t UCL	0.361
95% H-UCL (Log ROS)	0.524		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.083	KM Geo Mean	0.125
KM SD (logged)	0.784	95% Critical H Value (KM-Log)	2.916
KM Standard Error of Mean (logged)	0.314	95% H-UCL (KM -Log)	0.402
KM SD (logged)	0.784	95% Critical H Value (KM-Log)	2.916
KM Standard Error of Mean (logged)	0.314		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.164	Mean in Log Scale	-2.248
SD in Original Scale	0.164	SD in Log Scale	1.046
95% t UCL (Assumes normality)	0.274	95% H-Stat UCL	0.74

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.282		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	8	Number of Distinct Observations	8
Number of Detects	6	Number of Non-Detects	2
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	0.0661	Minimum Non-Detect	0.0505
Maximum Detect	3.56	Maximum Non-Detect	0.113
Variance Detects	1.804	Percent Non-Detects	25%
Mean Detects	1.007	SD Detects	1.343
Median Detects	0.36	CV Detects	1.334
Skewness Detects	1.845	Kurtosis Detects	3.214
Mean of Logged Detects	-0.757	SD of Logged Detects	1.402

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 on Detects Only

Shapiro Wilk Test Statistic	0.745	**Shapiro Wilk GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
1613					5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level					
1614					Lilliefors Test Statistic	0.34	**Lilliefors GOF Test**					
1615					5% Lilliefors Critical Value	0.325	Detected Data Not Normal at 5% Significance Level					
1616	**Detected Data Not Normal at 5% Significance Level**											
1617												
1618	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1619					KM Mean	0.769					KM Standard Error of Mean	0.441
1620					KM SD	1.139					95% KM (BCA) UCL	1.64
1621					95% KM (t) UCL	1.605					95% KM (Percentile Bootstrap) UCL	1.492
1622					95% KM (z) UCL	1.494					95% KM Bootstrap t UCL	5.513
1623					90% KM Chebyshev UCL	2.092					95% KM Chebyshev UCL	2.692
1624					97.5% KM Chebyshev UCL	3.524					99% KM Chebyshev UCL	5.159
1625												
1626	**Gamma GOF Tests on Detected Observations Only**											
1627					A-D Test Statistic	0.362	**Anderson-Darling GOF Test**					
1628					5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level					
1629					K-S Test Statistic	0.285	**Kolmogorov-Smirnov GOF**					
1630					5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level					
1631	**Detected data appear Gamma Distributed at 5% Significance Level**											
1632												
1633	**Gamma Statistics on Detected Data Only**											
1634					k hat (MLE)	0.78					k star (bias corrected MLE)	0.501
1635					Theta hat (MLE)	1.291					Theta star (bias corrected MLE)	2.01
1636					nu hat (MLE)	9.355					nu star (bias corrected)	6.011
1637					Mean (detects)	1.007						
1638												
1639	**Gamma ROS Statistics using Imputed Non-Detects**											
1640	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1641	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1642	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1643	This is especially true when the sample size is small.											
1644	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1645					Minimum	0.01					Mean	0.758
1646					Maximum	3.56					Median	0.28
1647					SD	1.225					CV	1.618
1648					k hat (MLE)	0.448					k star (bias corrected MLE)	0.363
1649					Theta hat (MLE)	1.69					Theta star (bias corrected MLE)	2.084
1650					nu hat (MLE)	7.172					nu star (bias corrected)	5.816
1651					Adjusted Level of Significance (β)	0.0195						
1652					Approximate Chi Square Value (5.82, α)	1.547					Adjusted Chi Square Value (5.82, β)	1.058
1653					95% Gamma Approximate UCL (use when n>=50)	2.849					95% Gamma Adjusted UCL (use when n<50)	4.166
1654												
1655	**Estimates of Gamma Parameters using KM Estimates**											
1656					Mean (KM)	0.769					SD (KM)	1.139
1657					Variance (KM)	1.298					SE of Mean (KM)	0.441
1658					k hat (KM)	0.455					k star (KM)	0.368
1659					nu hat (KM)	7.283					nu star (KM)	5.885
1660					theta hat (KM)	1.689					theta star (KM)	2.09
1661					80% gamma percentile (KM)	1.227					90% gamma percentile (KM)	2.202
1662					95% gamma percentile (KM)	3.287					99% gamma percentile (KM)	6.039
1663												
1664	**Gamma Kaplan-Meier (KM) Statistics**											

1665	Approximate Chi Square Value (5.89, α)	1.581	Adjusted Chi Square Value (5.89, β)	1.085
1666	95% Gamma Approximate KM-UCL (use when n>=50)	2.86	95% Gamma Adjusted KM-UCL (use when n<50)	4.169
1667				
1668	**Lognormal GOF Test on Detected Observations Only**			
1669	Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**	
1670	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
1671	Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**	
1672	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
1673	**Detected Data appear Lognormal at 5% Significance Level**			
1674				
1675	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1676	Mean in Original Scale	0.761	Mean in Log Scale	-1.534
1677	SD in Original Scale	1.223	SD in Log Scale	1.88
1678	95% t UCL (assumes normality of ROS data)	1.58	95% Percentile Bootstrap UCL	1.479
1679	95% BCA Bootstrap UCL	1.758	95% Bootstrap t UCL	5.355
1680	95% H-UCL (Log ROS)	77.62		
1681				
1682	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1683	KM Mean (logged)	-1.298	KM Geo Mean	0.273
1684	KM SD (logged)	1.452	95% Critical H Value (KM-Log)	4.608
1685	KM Standard Error of Mean (logged)	0.563	95% H-UCL (KM -Log)	9.821
1686	KM SD (logged)	1.452	95% Critical H Value (KM-Log)	4.608
1687	KM Standard Error of Mean (logged)	0.563		
1688				
1689	**DL/2 Statistics**			
1690	**DL/2 Normal**		**DL/2 Log-Transformed**	
1691	Mean in Original Scale	0.765	Mean in Log Scale	-1.387
1692	SD in Original Scale	1.22	SD in Log Scale	1.676
1693	95% t UCL (Assumes normality)	1.583	95% H-Stat UCL	27.9
1694	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1695				
1696	**Nonparametric Distribution Free UCL Statistics**			
1697	**Detected Data appear Gamma Distributed at 5% Significance Level**			
1698				
1699	**Suggested UCL to Use**			
1700	95% KM Bootstrap t UCL	5.513	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.169
1701				
1702	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1703	Recommendations are based upon data size, data distribution, and skewness.			
1704	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1705	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1706				
1707				
1708	**Pyrene**			
1709				
1710	**General Statistics**			
1711	Total Number of Observations	8	Number of Distinct Observations	8
1712			Number of Missing Observations	0
1713	Minimum	0.143	Mean	1.394
1714	Maximum	5.27	Median	0.59
1715	SD	1.879	Std. Error of Mean	0.664
1716	Coefficient of Variation	1.348	Skewness	1.689

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	0.714	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.373	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	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 UCL	2.653	95% Adjusted-CLT UCL (Chen-1995)	2.911
		95% Modified-t UCL (Johnson-1978)	2.719

Gamma GOF Test

A-D Test Statistic	0.548	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.27	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.304	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.776	k star (bias corrected MLE)	0.568
Theta hat (MLE)	1.797	Theta star (bias corrected MLE)	2.453
nu hat (MLE)	12.42	nu star (bias corrected)	9.093
MLE Mean (bias corrected)	1.394	MLE Sd (bias corrected)	1.849
		Approximate Chi Square Value (0.05)	3.383
Adjusted Level of Significance	0.0195	Adjusted Chi Square Value	2.564

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	3.747	95% Adjusted Gamma UCL (use when n<50)	4.944

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.185	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.283	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.945	Mean of logged Data	-0.436
Maximum of Logged Data	1.662	SD of logged Data	1.315

Assuming Lognormal Distribution

95% H-UCL	12.62	90% Chebyshev (MVUE) UCL	3.155
95% Chebyshev (MVUE) UCL	3.992	97.5% Chebyshev (MVUE) UCL	5.155
99% Chebyshev (MVUE) UCL	7.438		

	A	B	C	D	E	F	G	H	I	J	K	L
1769	Nonparametric Distribution Free UCL Statistics											
1770	Data appear to follow a Discernible Distribution at 5% Significance Level											
1771												
1772	Nonparametric Distribution Free UCLs											
1773					95% CLT UCL	2.487					95% Jackknife UCL	2.653
1774					95% Standard Bootstrap UCL	2.404					95% Bootstrap-t UCL	8.64
1775					95% Hall's Bootstrap UCL	9.976					95% Percentile Bootstrap UCL	2.467
1776					95% BCA Bootstrap UCL	2.699						
1777					90% Chebyshev(Mean, Sd) UCL	3.387					95% Chebyshev(Mean, Sd) UCL	4.29
1778					97.5% Chebyshev(Mean, Sd) UCL	5.543					99% Chebyshev(Mean, Sd) UCL	8.005
1779												
1780	Suggested UCL to Use											
1781					95% Adjusted Gamma UCL	4.944						
1782												
1783	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1784	Recommendations are based upon data size, data distribution, and skewness.											
1785	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1786	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1787												

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.12/16/2021 11:02:10 AM
From File	IaDOT GT2ft.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Arsenic

General Statistics

Total Number of Observations	6	Number of Distinct Observations	6
Number of Detects	4	Number of Non-Detects	2
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	2.53	Minimum Non-Detect	2.01
Maximum Detect	6.01	Maximum Non-Detect	3.26
Variance Detects	2.037	Percent Non-Detects	33.33%
Mean Detects	4.19	SD Detects	1.427
Median Detects	4.11	CV Detects	0.341
Skewness Detects	0.332	Kurtosis Detects	1.422
Mean of Logged Detects	1.387	SD of Logged Detects	0.355

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 on Detects Only

Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	3.507	KM Standard Error of Mean	0.664
KM SD	1.403	95% KM (BCA) UCL	N/A
95% KM (t) UCL	4.845	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	4.599	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	5.5	95% KM Chebyshev UCL	6.402
97.5% KM Chebyshev UCL	7.655	99% KM Chebyshev UCL	10.12

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.266	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.226	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	11.08	k star (bias corrected MLE)	2.937

53	Theta hat (MLE)	0.378	Theta star (bias corrected MLE)	1.426
54	nu hat (MLE)	88.67	nu star (bias corrected)	23.5
55	Mean (detects)	4.19		
56				
57	**Gamma ROS Statistics using Imputed Non-Detects**			
58	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
59	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
60	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
61	This is especially true when the sample size is small.			
62	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
63	Minimum	1.007	Mean	3.265
64	Maximum	6.01	Median	3.26
65	SD	1.828	CV	0.56
66	k hat (MLE)	3.332	k star (bias corrected MLE)	1.777
67	Theta hat (MLE)	0.98	Theta star (bias corrected MLE)	1.837
68	nu hat (MLE)	39.99	nu star (bias corrected)	21.33
69	Adjusted Level of Significance (β)	0.0122		
70	Approximate Chi Square Value (21.33, α)	11.83	Adjusted Chi Square Value (21.33, β)	9.388
71	95% Gamma Approximate UCL (use when n>=50)	5.883	95% Gamma Adjusted UCL (use when n<50)	N/A
72				
73	**Estimates of Gamma Parameters using KM Estimates**			
74	Mean (KM)	3.507	SD (KM)	1.403
75	Variance (KM)	1.969	SE of Mean (KM)	0.664
76	k hat (KM)	6.245	k star (KM)	3.234
77	nu hat (KM)	74.94	nu star (KM)	38.8
78	theta hat (KM)	0.562	theta star (KM)	1.084
79	80% gamma percentile (KM)	4.957	90% gamma percentile (KM)	6.122
80	95% gamma percentile (KM)	7.204	99% gamma percentile (KM)	9.541
81				
82	**Gamma Kaplan-Meier (KM) Statistics**			
83	Approximate Chi Square Value (38.80, α)	25.54	Adjusted Chi Square Value (38.80, β)	21.73
84	95% Gamma Approximate KM-UCL (use when n>=50)	5.329	95% Gamma Adjusted KM-UCL (use when n<50)	6.262
85				
86	**Lognormal GOF Test on Detected Observations Only**			
87	Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**	
88	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
89	Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**	
90	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
91	**Detected Data appear Lognormal at 5% Significance Level**			
92				
93	**Lognormal ROS Statistics Using Imputed Non-Detects**			
94	Mean in Original Scale	3.414	Mean in Log Scale	1.129
95	SD in Original Scale	1.641	SD in Log Scale	0.493
96	95% t UCL (assumes normality of ROS data)	4.764	95% Percentile Bootstrap UCL	4.46
97	95% BCA Bootstrap UCL	4.5	95% Bootstrap t UCL	5.225
98	95% H-UCL (Log ROS)	6.221		
99				
100	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
101	KM Mean (logged)	1.176	KM Geo Mean	3.243
102	KM SD (logged)	0.394	95% Critical H Value (KM-Log)	2.402
103	KM Standard Error of Mean (logged)	0.188	95% H-UCL (KM -Log)	5.349
104	KM SD (logged)	0.394	95% Critical H Value (KM-Log)	2.402

	A–E	F	G–K	L
105	KM Standard Error of Mean (logged)	0.188		
106				
107	**DL/2 Statistics**			
108	**DL/2 Normal**		**DL/2 Log-Transformed**	
109	Mean in Original Scale	3.233	Mean in Log Scale	1.007
110	SD in Original Scale	1.86	SD in Log Scale	0.668
111	95% t UCL (Assumes normality)	4.763	95% H-Stat UCL	8.576
112	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
113				
114	**Nonparametric Distribution Free UCL Statistics**			
115	**Detected Data appear Normal Distributed at 5% Significance Level**			
116				
117	**Suggested UCL to Use**			
118	95% KM (t) UCL	4.845		
119				
120	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
121	Recommendations are based upon data size, data distribution, and skewness.			
122	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
123	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
124				
125				
126	**Lead**			
127				
128	**General Statistics**			
129	Total Number of Observations	6	Number of Distinct Observations	6
130			Number of Missing Observations	0
131	Minimum	18.5	Mean	49.22
132	Maximum	113	Median	24.15
133	SD	42.36	Std. Error of Mean	17.29
134	Coefficient of Variation	0.861	Skewness	1.049
135				
136	**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use**			
137	**guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.**			
138	**For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).**			
139	**Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1**			
140				
141	**Normal GOF Test**			
142	Shapiro Wilk Test Statistic	0.729	**Shapiro Wilk GOF Test**	
143	5% Shapiro Wilk Critical Value	0.788	Data Not Normal at 5% Significance Level	
144	Lilliefors Test Statistic	0.388	**Lilliefors GOF Test**	
145	5% Lilliefors Critical Value	0.325	Data Not Normal at 5% Significance Level	
146	**Data Not Normal at 5% Significance Level**			
147				
148	**Assuming Normal Distribution**			
149	**95% Normal UCL**		**95% UCLs (Adjusted for Skewness)**	
150	95% Student's-t UCL	84.06	95% Adjusted-CLT UCL (Chen-1995)	85.57
151			95% Modified-t UCL (Johnson-1978)	85.29
152				
153	**Gamma GOF Test**			
154	A-D Test Statistic	0.884	**Anderson-Darling Gamma GOF Test**	
155	5% A-D Critical Value	0.705	Data Not Gamma Distributed at 5% Significance Level	
156	K-S Test Statistic	0.394	**Kolmogorov-Smirnov Gamma GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
157	5% K-S Critical Value					0.336	Data Not Gamma Distributed at 5% Significance Level					
158	**Data Not Gamma Distributed at 5% Significance Level**											
159												
160	**Gamma Statistics**											
161	k hat (MLE)					1.879	k star (bias corrected MLE)					1.051
162	Theta hat (MLE)					26.19	Theta star (bias corrected MLE)					46.85
163	nu hat (MLE)					22.55	nu star (bias corrected)					12.61
164	MLE Mean (bias corrected)					49.22	MLE Sd (bias corrected)					48.02
165							Approximate Chi Square Value (0.05)					5.629
166	Adjusted Level of Significance					0.0122	Adjusted Chi Square Value					4.067
167												
168	**Assuming Gamma Distribution**											
169	95% Approximate Gamma UCL (use when n>=50))					110.2	95% Adjusted Gamma UCL (use when n<50)					152.5
170												
171	**Lognormal GOF Test**											
172	Shapiro Wilk Test Statistic					0.767	**Shapiro Wilk Lognormal GOF Test**					
173	5% Shapiro Wilk Critical Value					0.788	Data Not Lognormal at 5% Significance Level					
174	Lilliefors Test Statistic					0.363	**Lilliefors Lognormal GOF Test**					
175	5% Lilliefors Critical Value					0.325	Data Not Lognormal at 5% Significance Level					
176	**Data Not Lognormal at 5% Significance Level**											
177												
178	**Lognormal Statistics**											
179	Minimum of Logged Data					2.918	Mean of logged Data					3.607
180	Maximum of Logged Data					4.727	SD of logged Data					0.803
181												
182	**Assuming Lognormal Distribution**											
183	95% H-UCL					177.7	90% Chebyshev (MVUE) UCL					94.32
184	95% Chebyshev (MVUE) UCL					115.4	97.5% Chebyshev (MVUE) UCL					144.7
185	99% Chebyshev (MVUE) UCL					202.2						
186												
187	**Nonparametric Distribution Free UCL Statistics**											
188	**Data do not follow a Discernible Distribution (0.05)**											
189												
190	**Nonparametric Distribution Free UCLs**											
191	95% CLT UCL					77.66	95% Jackknife UCL					84.06
192	95% Standard Bootstrap UCL					75.01	95% Bootstrap-t UCL					530.7
193	95% Hall's Bootstrap UCL					642.5	95% Percentile Bootstrap UCL					78.83
194	95% BCA Bootstrap UCL					78.83						
195	90% Chebyshev(Mean, Sd) UCL					101.1	95% Chebyshev(Mean, Sd) UCL					124.6
196	97.5% Chebyshev(Mean, Sd) UCL					157.2	99% Chebyshev(Mean, Sd) UCL					221.3
197												
198	**Suggested UCL to Use**											
199	95% Chebyshev (Mean, Sd) UCL					124.6						
200												
201	**Recommended UCL exceeds the maximum observation**											
202												
203	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
204	Recommendations are based upon data size, data distribution, and skewness.											
205	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
206	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
207												
208	**2-Methylnaphthalene**											

General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	13
Minimum Detect	0.189	Minimum Non-Detect	0.0113
Maximum Detect	0.452	Maximum Non-Detect	0.133
Variance Detects	0.019	Percent Non-Detects	81.25%
Mean Detects	0.296	SD Detects	0.138
Median Detects	0.248	CV Detects	0.466
Skewness Detects	1.383	Kurtosis Detects	N/A
Mean of Logged Detects	-1.285	SD of Logged Detects	0.446
Warning: Data set has only 3 Detected Values.			
This is not enough to compute meaningful or reliable statistics and estimates.			
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.908	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.304	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0647	KM Standard Error of Mean	0.0372
KM SD	0.121	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.13	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.126	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.176	95% KM Chebyshev UCL	0.227
97.5% KM Chebyshev UCL	0.297	99% KM Chebyshev UCL	0.435
Gamma GOF Tests on Detected Observations Only			
Not Enough Data to Perform GOF Test			
Gamma Statistics on Detected Data Only			
k hat (MLE)	7.459	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0397	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	44.75	nu star (bias corrected)	N/A
Mean (detects)	0.296		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	0.0637
Maximum	0.452	Median	0.01
SD	0.126	CV	1.978
k hat (MLE)	0.515	k star (bias corrected MLE)	0.46
Theta hat (MLE)	0.124	Theta star (bias corrected MLE)	0.139

	A B C D E	F	G H I J K	L
261	nu hat (MLE)	16.47	nu star (bias corrected)	14.71
262	Adjusted Level of Significance (β)	0.0335		
263	Approximate Chi Square Value (14.71, α)	7.062	Adjusted Chi Square Value (14.71, β)	6.467
264	95% Gamma Approximate UCL (use when n>=50)	0.133	95% Gamma Adjusted UCL (use when n<50)	N/A
265				
266	**Estimates of Gamma Parameters using KM Estimates**			
267	Mean (KM)	0.0647	SD (KM)	0.121
268	Variance (KM)	0.0148	SE of Mean (KM)	0.0372
269	k hat (KM)	0.284	k star (KM)	0.272
270	nu hat (KM)	9.089	nu star (KM)	8.718
271	theta hat (KM)	0.228	theta star (KM)	0.238
272	80% gamma percentile (KM)	0.0967	90% gamma percentile (KM)	0.193
273	95% gamma percentile (KM)	0.305	99% gamma percentile (KM)	0.601
274				
275	**Gamma Kaplan-Meier (KM) Statistics**			
276	Approximate Chi Square Value (8.72, α)	3.158	Adjusted Chi Square Value (8.72, β)	2.788
277	95% Gamma Approximate KM-UCL (use when n>=50)	0.179	95% Gamma Adjusted KM-UCL (use when n<50)	0.202
278				
279	**Lognormal GOF Test on Detected Observations Only**			
280	Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**	
281	5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
282	Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**	
283	5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level	
284	**Detected Data appear Lognormal at 5% Significance Level**			
285				
286	**Lognormal ROS Statistics Using Imputed Non-Detects**			
287	Mean in Original Scale	0.077	Mean in Log Scale	-3.194
288	SD in Original Scale	0.12	SD in Log Scale	0.961
289	95% t UCL (assumes normality of ROS data)	0.13	95% Percentile Bootstrap UCL	N/A
290	95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
291	95% H-UCL (Log ROS)	0.125		
292				
293	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
294	KM Mean (logged)	-3.883	KM Geo Mean	0.0206
295	KM SD (logged)	1.258	95% Critical H Value (KM-Log)	3.123
296	KM Standard Error of Mean (logged)	0.385	95% H-UCL (KM -Log)	0.125
297	KM SD (logged)	1.258	95% Critical H Value (KM-Log)	3.123
298	KM Standard Error of Mean (logged)	0.385		
299				
300	**DL/2 Statistics**			
301	**DL/2 Normal**		**DL/2 Log-Transformed**	
302	Mean in Original Scale	0.0774	Mean in Log Scale	-3.618
303	SD in Original Scale	0.122	SD in Log Scale	1.541
304	95% t UCL (Assumes normality)	0.131	95% H-Stat UCL	0.371
305	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
306				
307	**Nonparametric Distribution Free UCL Statistics**			
308	**Detected Data appear Normal Distributed at 5% Significance Level**			
309				
310	**Suggested UCL to Use**			
311	95% KM (t) UCL	0.13		
312				

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	13
Minimum Detect	0.0804	Minimum Non-Detect	0.0113
Maximum Detect	12.5	Maximum Non-Detect	0.123
Variance Detects	49.39	Percent Non-Detects	81.25%
Mean Detects	4.39	SD Detects	7.028
Median Detects	0.591	CV Detects	1.601
Skewness Detects	1.722	Kurtosis Detects	N/A
Mean of Logged Detects	-0.174	SD of Logged Detects	2.542

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.781	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.834	KM Standard Error of Mean	0.923
KM SD	3.015	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.452	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.352	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.603	95% KM Chebyshev UCL	4.858
97.5% KM Chebyshev UCL	6.6	99% KM Chebyshev UCL	10.02

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.398	k star (bias corrected MLE)	N/A
Theta hat (MLE)	11.02	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.39	nu star (bias corrected)	N/A
Mean (detects)	4.39		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.831
Maximum	12.5	Median	0.01
SD	3.115	CV	3.747
k hat (MLE)	0.204	k star (bias corrected MLE)	0.208
Theta hat (MLE)	4.069	Theta star (bias corrected MLE)	4.003
nu hat (MLE)	6.539	nu star (bias corrected)	6.646
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (6.65, α)	1.978	Adjusted Chi Square Value (6.65, β)	1.702
95% Gamma Approximate UCL (use when n>=50)	2.793	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.834	SD (KM)	3.015
Variance (KM)	9.093	SE of Mean (KM)	0.923
k hat (KM)	0.0764	k star (KM)	0.104
nu hat (KM)	2.445	nu star (KM)	3.32
theta hat (KM)	10.91	theta star (KM)	8.034
80% gamma percentile (KM)	0.609	90% gamma percentile (KM)	2.251
95% gamma percentile (KM)	4.827	99% gamma percentile (KM)	13

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.32, α)	0.473	Adjusted Chi Square Value (3.32, β)	0.373
95% Gamma Approximate KM-UCL (use when n>=50)	5.848	95% Gamma Adjusted KM-UCL (use when n<50)	7.413

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.222	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.425	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.823	Mean in Log Scale	-8.773
SD in Original Scale	3.117	SD in Log Scale	4.374
95% t UCL (assumes normality of ROS data)	2.189	95% Percentile Bootstrap UCL	2.354
95% BCA Bootstrap UCL	3.204	95% Bootstrap t UCL	127.8
95% H-UCL (Log ROS)	71055		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.642	KM Geo Mean	0.0262
KM SD (logged)	1.91	95% Critical H Value (KM-Log)	4.299
KM Standard Error of Mean (logged)	0.591	95% H-UCL (KM -Log)	1.352
KM SD (logged)	1.91	95% Critical H Value (KM-Log)	4.299
KM Standard Error of Mean (logged)	0.591		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.843	Mean in Log Scale	-3.461
SD in Original Scale	3.112	SD in Log Scale	2.101
95% t UCL (Assumes normality)	2.207	95% H-Stat UCL	3.572

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	2.452		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Acenaphthylene			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	6	Number of Non-Detects	10
Number of Distinct Detects	6	Number of Distinct Non-Detects	10
Minimum Detect	0.132	Minimum Non-Detect	0.0113
Maximum Detect	7.02	Maximum Non-Detect	0.117
Variance Detects	7.018	Percent Non-Detects	62.5%
Mean Detects	2.032	SD Detects	2.649
Median Detects	0.986	CV Detects	1.304
Skewness Detects	1.756	Kurtosis Detects	2.96
Mean of Logged Detects	-0.169	SD of Logged Detects	1.6
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.306	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Approximate Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.769	KM Standard Error of Mean	0.486
KM SD	1.775	95% KM (BCA) UCL	1.591
95% KM (t) UCL	1.621	95% KM (Percentile Bootstrap) UCL	1.578
95% KM (z) UCL	1.569	95% KM Bootstrap t UCL	3.471
90% KM Chebyshev UCL	2.227	95% KM Chebyshev UCL	2.888
97.5% KM Chebyshev UCL	3.805	99% KM Chebyshev UCL	5.606
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.299	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.202	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.345	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.69	k star (bias corrected MLE)	0.456
Theta hat (MLE)	2.946	Theta star (bias corrected MLE)	4.457
nu hat (MLE)	8.276	nu star (bias corrected)	5.471

	A–E	F	G–K	L
469	Mean (detects)	2.032		
470				
471	**Gamma ROS Statistics using Imputed Non-Detects**			
472	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
473	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
474	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
475	This is especially true when the sample size is small.			
476	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
477	Minimum	0.01	Mean	0.768
478	Maximum	7.02	Median	0.01
479	SD	1.833	CV	2.386
480	k hat (MLE)	0.263	k star (bias corrected MLE)	0.255
481	Theta hat (MLE)	2.921	Theta star (bias corrected MLE)	3.008
482	nu hat (MLE)	8.418	nu star (bias corrected)	8.173
483	Adjusted Level of Significance (β)	0.0335		
484	Approximate Chi Square Value (8.17, α)	2.835	Adjusted Chi Square Value (8.17, β)	2.489
485	95% Gamma Approximate UCL (use when n>=50)	2.215	95% Gamma Adjusted UCL (use when n<50)	2.522
486				
487	**Estimates of Gamma Parameters using KM Estimates**			
488	Mean (KM)	0.769	SD (KM)	1.775
489	Variance (KM)	3.15	SE of Mean (KM)	0.486
490	k hat (KM)	0.188	k star (KM)	0.194
491	nu hat (KM)	6.009	nu star (KM)	6.216
492	theta hat (KM)	4.096	theta star (KM)	3.96
493	80% gamma percentile (KM)	0.998	90% gamma percentile (KM)	2.325
494	95% gamma percentile (KM)	3.993	99% gamma percentile (KM)	8.606
495				
496	**Gamma Kaplan-Meier (KM) Statistics**			
497	Approximate Chi Square Value (6.22, α)	1.751	Adjusted Chi Square Value (6.22, β)	1.496
498	95% Gamma Approximate KM-UCL (use when n>=50)	2.73	95% Gamma Adjusted KM-UCL (use when n<50)	3.196
499				
500	**Lognormal GOF Test on Detected Observations Only**			
501	Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**	
502	5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
503	Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**	
504	5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level	
505	**Detected Data appear Lognormal at 5% Significance Level**			
506				
507	**Lognormal ROS Statistics Using Imputed Non-Detects**			
508	Mean in Original Scale	0.765	Mean in Log Scale	-3.458
509	SD in Original Scale	1.835	SD in Log Scale	2.789
510	95% t UCL (assumes normality of ROS data)	1.569	95% Percentile Bootstrap UCL	1.579
511	95% BCA Bootstrap UCL	1.939	95% Bootstrap t UCL	4.155
512	95% H-UCL (Log ROS)	115.9		
513				
514	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
515	KM Mean (logged)	-2.865	KM Geo Mean	0.057
516	KM SD (logged)	2.272	95% Critical H Value (KM-Log)	4.991
517	KM Standard Error of Mean (logged)	0.622	95% H-UCL (KM -Log)	14.06
518	KM SD (logged)	2.272	95% Critical H Value (KM-Log)	4.991
519	KM Standard Error of Mean (logged)	0.622		
520				

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.774	Mean in Log Scale	-2.88
SD in Original Scale	1.831	SD in Log Scale	2.488
95% t UCL (Assumes normality)	1.576	95% H-Stat UCL	39.99

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.621		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	11
Minimum Detect	0.0774	Minimum Non-Detect	0.0113
Maximum Detect	7.35	Maximum Non-Detect	0.123
Variance Detects	9.154	Percent Non-Detects	68.75%
Mean Detects	2.05	SD Detects	3.026
Median Detects	0.604	CV Detects	1.476
Skewness Detects	2.021	Kurtosis Detects	4.152
Mean of Logged Detects	-0.248	SD of Logged Detects	1.68

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.72	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.342	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.343	Detected Data appear Normal at 5% Significance Level

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.65	KM Standard Error of Mean	0.498
KM SD	1.783	95% KM (BCA) UCL	1.529
95% KM (t) UCL	1.523	95% KM (Percentile Bootstrap) UCL	1.554
95% KM (z) UCL	1.469	95% KM Bootstrap t UCL	4.585
90% KM Chebyshev UCL	2.145	95% KM Chebyshev UCL	2.822
97.5% KM Chebyshev UCL	3.762	99% KM Chebyshev UCL	5.609

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.292	**Anderson-Darling GOF Test**

	A	B	C	D	E	F	G	H	I	J	K	L
573					5% A-D Critical Value	0.704	Detected data appear Gamma Distributed at 5% Significance Level					
574					K-S Test Statistic	0.242	**Kolmogorov-Smirnov GOF**					
575					5% K-S Critical Value	0.369	Detected data appear Gamma Distributed at 5% Significance Level					
576	**Detected data appear Gamma Distributed at 5% Significance Level**											
577												
578	**Gamma Statistics on Detected Data Only**											
579					k hat (MLE)	0.635					k star (bias corrected MLE)	0.387
580					Theta hat (MLE)	3.23					Theta star (bias corrected MLE)	5.294
581					nu hat (MLE)	6.347					nu star (bias corrected)	3.872
582					Mean (detects)	2.05						
583												
584	**Gamma ROS Statistics using Imputed Non-Detects**											
585	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
586	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
587	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
588	This is especially true when the sample size is small.											
589	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
590					Minimum	0.01					Mean	0.647
591					Maximum	7.35					Median	0.01
592					SD	1.842					CV	2.846
593					k hat (MLE)	0.252					k star (bias corrected MLE)	0.247
594					Theta hat (MLE)	2.564					Theta star (bias corrected MLE)	2.623
595					nu hat (MLE)	8.079					nu star (bias corrected)	7.898
596					Adjusted Level of Significance (β)	0.0335						
597					Approximate Chi Square Value (7.90, α)	2.676					Adjusted Chi Square Value (7.90, β)	2.342
598					95% Gamma Approximate UCL (use when n>=50)	1.911					95% Gamma Adjusted UCL (use when n<50)	2.183
599												
600	**Estimates of Gamma Parameters using KM Estimates**											
601					Mean (KM)	0.65					SD (KM)	1.783
602					Variance (KM)	3.18					SE of Mean (KM)	0.498
603					k hat (KM)	0.133					k star (KM)	0.15
604					nu hat (KM)	4.248					nu star (KM)	4.785
605					theta hat (KM)	4.894					theta star (KM)	4.345
606					80% gamma percentile (KM)	0.705					90% gamma percentile (KM)	1.926
607					95% gamma percentile (KM)	3.578					99% gamma percentile (KM)	8.376
608												
609	**Gamma Kaplan-Meier (KM) Statistics**											
610					Approximate Chi Square Value (4.78, α)	1.054					Adjusted Chi Square Value (4.78, β)	0.872
611					95% Gamma Approximate KM-UCL (use when n>=50)	2.949					95% Gamma Adjusted KM-UCL (use when n<50)	3.564
612												
613	**Lognormal GOF Test on Detected Observations Only**											
614					Shapiro Wilk Test Statistic	0.983	**Shapiro Wilk GOF Test**					
615					5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level					
616					Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**					
617					5% Lilliefors Critical Value	0.343	Detected Data appear Lognormal at 5% Significance Level					
618	**Detected Data appear Lognormal at 5% Significance Level**											
619												
620	**Lognormal ROS Statistics Using Imputed Non-Detects**											
621					Mean in Original Scale	0.642					Mean in Log Scale	-4.26
622					SD in Original Scale	1.844					SD in Log Scale	2.93
623					95% t UCL (assumes normality of ROS data)	1.45					95% Percentile Bootstrap UCL	1.497
624					95% BCA Bootstrap UCL	1.947					95% Bootstrap t UCL	6.271

95% H-UCL (Log ROS)	119.7		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.119	KM Geo Mean	0.0442
KM SD (logged)	2.128	95% Critical H Value (KM-Log)	4.714
KM Standard Error of Mean (logged)	0.601	95% H-UCL (KM -Log)	5.668
KM SD (logged)	2.128	95% Critical H Value (KM-Log)	4.714
KM Standard Error of Mean (logged)	0.601		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.656	Mean in Log Scale	-3.069
SD in Original Scale	1.839	SD in Log Scale	2.328
95% t UCL (Assumes normality)	1.462	95% H-Stat UCL	14.97

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.523		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[a]anthracene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	8	Number of Non-Detects	8
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.105	Minimum Non-Detect	0.0113
Maximum Detect	4.41	Maximum Non-Detect	0.117
Variance Detects	2.451	Percent Non-Detects	50%
Mean Detects	1.568	SD Detects	1.566
Median Detects	1.142	CV Detects	0.999
Skewness Detects	0.839	Kurtosis Detects	-0.283
Mean of Logged Detects	-0.247	SD of Logged Detects	1.449

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.256	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

	A B C D E	F	G H I J K	L
677	KM Mean	0.79	KM Standard Error of Mean	0.346
678	KM SD	1.295	95% KM (BCA) UCL	1.432
679	95% KM (t) UCL	1.397	95% KM (Percentile Bootstrap) UCL	1.329
680	95% KM (z) UCL	1.359	95% KM Bootstrap t UCL	1.693
681	90% KM Chebyshev UCL	1.828	95% KM Chebyshev UCL	2.299
682	97.5% KM Chebyshev UCL	2.951	99% KM Chebyshev UCL	4.233
683				
684	**Gamma GOF Tests on Detected Observations Only**			
685	A-D Test Statistic	0.362	**Anderson-Darling GOF Test**	
686	5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level	
687	K-S Test Statistic	0.198	**Kolmogorov-Smirnov GOF**	
688	5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	
689	**Detected data appear Gamma Distributed at 5% Significance Level**			
690				
691	**Gamma Statistics on Detected Data Only**			
692	k hat (MLE)	0.846	k star (bias corrected MLE)	0.612
693	Theta hat (MLE)	1.854	Theta star (bias corrected MLE)	2.562
694	nu hat (MLE)	13.53	nu star (bias corrected)	9.79
695	Mean (detects)	1.568		
696				
697	**Gamma ROS Statistics using Imputed Non-Detects**			
698	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
699	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
700	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
701	This is especially true when the sample size is small.			
702	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
703	Minimum	0.01	Mean	0.789
704	Maximum	4.41	Median	0.0575
705	SD	1.338	CV	1.697
706	k hat (MLE)	0.313	k star (bias corrected MLE)	0.296
707	Theta hat (MLE)	2.521	Theta star (bias corrected MLE)	2.666
708	nu hat (MLE)	10.01	nu star (bias corrected)	9.468
709	Adjusted Level of Significance (β)	0.0335		
710	Approximate Chi Square Value (9.47, α)	3.612	Adjusted Chi Square Value (9.47, β)	3.211
711	95% Gamma Approximate UCL (use when n>=50)	2.067	95% Gamma Adjusted UCL (use when n<50)	2.326
712				
713	**Estimates of Gamma Parameters using KM Estimates**			
714	Mean (KM)	0.79	SD (KM)	1.295
715	Variance (KM)	1.677	SE of Mean (KM)	0.346
716	k hat (KM)	0.372	k star (KM)	0.344
717	nu hat (KM)	11.92	nu star (KM)	11.01
718	theta hat (KM)	2.122	theta star (KM)	2.296
719	80% gamma percentile (KM)	1.247	90% gamma percentile (KM)	2.287
720	95% gamma percentile (KM)	3.455	99% gamma percentile (KM)	6.44
721				
722	**Gamma Kaplan-Meier (KM) Statistics**			
723	Approximate Chi Square Value (11.01, α)	4.585	Adjusted Chi Square Value (11.01, β)	4.123
724	95% Gamma Approximate KM-UCL (use when n>=50)	1.898	95% Gamma Adjusted KM-UCL (use when n<50)	2.111
725				
726	**Lognormal GOF Test on Detected Observations Only**			
727	Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**	
728	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	

Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.792	Mean in Log Scale	-2.17
SD in Original Scale	1.336	SD in Log Scale	2.219
95% t UCL (assumes normality of ROS data)	1.378	95% Percentile Bootstrap UCL	1.342
95% BCA Bootstrap UCL	1.541	95% Bootstrap t UCL	1.742
95% H-UCL (Log ROS)	22.1		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.348	KM Geo Mean	0.0956
KM SD (logged)	2.317	95% Critical H Value (KM-Log)	5.078
KM Standard Error of Mean (logged)	0.621	95% H-UCL (KM -Log)	29.19
KM SD (logged)	2.317	95% Critical H Value (KM-Log)	5.078
KM Standard Error of Mean (logged)	0.621		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.79	Mean in Log Scale	-2.548
SD in Original Scale	1.337	SD in Log Scale	2.633
95% t UCL (Assumes normality)	1.376	95% H-Stat UCL	120.2
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.397		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[a]pyrene			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	7
Minimum Detect	0.0127	Minimum Non-Detect	0.0113
Maximum Detect	6.34	Maximum Non-Detect	0.117
Variance Detects	4.617	Percent Non-Detects	43.75%
Mean Detects	1.898	SD Detects	2.149
Median Detects	0.868	CV Detects	1.132
Skewness Detects	1.203	Kurtosis Detects	0.942
Mean of Logged Detects	-0.426	SD of Logged Detects	2.005
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**	

	A	B	C	D	E	F	G	H	I	J	K	L
781					5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level					
782					Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**					
783					5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level					
784	**Detected Data appear Normal at 5% Significance Level**											
785												
786	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
787					KM Mean	1.072					KM Standard Error of Mean	0.473
788					KM SD	1.784					95% KM (BCA) UCL	1.844
789					95% KM (t) UCL	1.902					95% KM (Percentile Bootstrap) UCL	1.869
790					95% KM (z) UCL	1.851					95% KM Bootstrap t UCL	2.422
791					90% KM Chebyshev UCL	2.492					95% KM Chebyshev UCL	3.135
792					97.5% KM Chebyshev UCL	4.027					99% KM Chebyshev UCL	5.78
793												
794	**Gamma GOF Tests on Detected Observations Only**											
795					A-D Test Statistic	0.219	**Anderson-Darling GOF Test**					
796					5% A-D Critical Value	0.764	Detected data appear Gamma Distributed at 5% Significance Level					
797					K-S Test Statistic	0.19	**Kolmogorov-Smirnov GOF**					
798					5% K-S Critical Value	0.293	Detected data appear Gamma Distributed at 5% Significance Level					
799	**Detected data appear Gamma Distributed at 5% Significance Level**											
800												
801	**Gamma Statistics on Detected Data Only**											
802					k hat (MLE)	0.582					k star (bias corrected MLE)	0.462
803					Theta hat (MLE)	3.261					Theta star (bias corrected MLE)	4.107
804					nu hat (MLE)	10.47					nu star (bias corrected)	8.316
805					Mean (detects)	1.898						
806												
807	**Gamma ROS Statistics using Imputed Non-Detects**											
808	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
809	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
810	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
811	This is especially true when the sample size is small.											
812	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
813					Minimum	0.01					Mean	1.072
814					Maximum	6.34					Median	0.0684
815					SD	1.843					CV	1.72
816					k hat (MLE)	0.297					k star (bias corrected MLE)	0.283
817					Theta hat (MLE)	3.606					Theta star (bias corrected MLE)	3.785
818					nu hat (MLE)	9.51					nu star (bias corrected)	9.061
819					Adjusted Level of Significance (β)	0.0335						
820					Approximate Chi Square Value (9.06, α)	3.364					Adjusted Chi Square Value (9.06, β)	2.979
821					95% Gamma Approximate UCL (use when n>=50)	2.887					95% Gamma Adjusted UCL (use when n<50)	3.259
822												
823	**Estimates of Gamma Parameters using KM Estimates**											
824					Mean (KM)	1.072					SD (KM)	1.784
825					Variance (KM)	3.184					SE of Mean (KM)	0.473
826					k hat (KM)	0.361					k star (KM)	0.335
827					nu hat (KM)	11.56					nu star (KM)	10.72
828					theta hat (KM)	2.969					theta star (KM)	3.2
829					80% gamma percentile (KM)	1.685					90% gamma percentile (KM)	3.117
830					95% gamma percentile (KM)	4.731					99% gamma percentile (KM)	8.872
831												
832	**Gamma Kaplan-Meier (KM) Statistics**											

Approximate Chi Square Value (10.72, α)	4.399	Adjusted Chi Square Value (10.72, β)	3.947
95% Gamma Approximate KM-UCL (use when n>=50)	2.614	95% Gamma Adjusted KM-UCL (use when n<50)	2.913
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.923	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.069	Mean in Log Scale	-2.585
SD in Original Scale	1.845	SD in Log Scale	2.923
95% t UCL (assumes normality of ROS data)	1.878	95% Percentile Bootstrap UCL	1.873
95% BCA Bootstrap UCL	2.094	95% Bootstrap t UCL	2.461
95% H-UCL (Log ROS)	613.3		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.2	KM Geo Mean	0.111
KM SD (logged)	2.461	95% Critical H Value (KM-Log)	5.358
KM Standard Error of Mean (logged)	0.653	95% H-UCL (KM -Log)	68.88
KM SD (logged)	2.461	95% Critical H Value (KM-Log)	5.358
KM Standard Error of Mean (logged)	0.653		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.073	Mean in Log Scale	-2.347
SD in Original Scale	1.842	SD in Log Scale	2.741
95% t UCL (Assumes normality)	1.881	95% H-Stat UCL	267.3
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.902		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[b]fluoranthene			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	7
Minimum Detect	0.0184	Minimum Non-Detect	0.0113
Maximum Detect	5.68	Maximum Non-Detect	0.117
Variance Detects	3.94	Percent Non-Detects	43.75%
Mean Detects	1.879	SD Detects	1.985

	A–E	F	G–K	L
885	Median Detects	0.949	CV Detects	1.056
886	Skewness Detects	0.947	Kurtosis Detects	-0.139
887	Mean of Logged Detects	-0.304	SD of Logged Detects	1.859
888				
889	**Normal GOF Test on Detects Only**			
890	Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**	
891	5% Shapiro Wilk Critical Value	0.829	Detected Data appear Normal at 5% Significance Level	
892	Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**	
893	5% Lilliefors Critical Value	0.274	Detected Data appear Normal at 5% Significance Level	
894	**Detected Data appear Normal at 5% Significance Level**			
895				
896	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
897	KM Mean	1.062	KM Standard Error of Mean	0.446
898	KM SD	1.682	95% KM (BCA) UCL	1.758
899	95% KM (t) UCL	1.844	95% KM (Percentile Bootstrap) UCL	1.797
900	95% KM (z) UCL	1.795	95% KM Bootstrap t UCL	2.3
901	90% KM Chebyshev UCL	2.4	95% KM Chebyshev UCL	3.006
902	97.5% KM Chebyshev UCL	3.847	99% KM Chebyshev UCL	5.499
903				
904	**Gamma GOF Tests on Detected Observations Only**			
905	A-D Test Statistic	0.208	**Anderson-Darling GOF Test**	
906	5% A-D Critical Value	0.759	Detected data appear Gamma Distributed at 5% Significance Level	
907	K-S Test Statistic	0.146	**Kolmogorov-Smirnov GOF**	
908	5% K-S Critical Value	0.291	Detected data appear Gamma Distributed at 5% Significance Level	
909	**Detected data appear Gamma Distributed at 5% Significance Level**			
910				
911	**Gamma Statistics on Detected Data Only**			
912	k hat (MLE)	0.653	k star (bias corrected MLE)	0.509
913	Theta hat (MLE)	2.878	Theta star (bias corrected MLE)	3.689
914	nu hat (MLE)	11.75	nu star (bias corrected)	9.169
915	Mean (detects)	1.879		
916				
917	**Gamma ROS Statistics using Imputed Non-Detects**			
918	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
919	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
920	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
921	This is especially true when the sample size is small.			
922	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
923	Minimum	0.01	Mean	1.061
924	Maximum	5.68	Median	0.0872
925	SD	1.737	CV	1.637
926	k hat (MLE)	0.306	k star (bias corrected MLE)	0.29
927	Theta hat (MLE)	3.467	Theta star (bias corrected MLE)	3.655
928	nu hat (MLE)	9.796	nu star (bias corrected)	9.292
929	Adjusted Level of Significance (β)	0.0335		
930	Approximate Chi Square Value (9.29, α)	3.504	Adjusted Chi Square Value (9.29, β)	3.111
931	95% Gamma Approximate UCL (use when n>=50)	2.814	95% Gamma Adjusted UCL (use when n<50)	3.17
932				
933	**Estimates of Gamma Parameters using KM Estimates**			
934	Mean (KM)	1.062	SD (KM)	1.682
935	Variance (KM)	2.828	SE of Mean (KM)	0.446
936	k hat (KM)	0.399	k star (KM)	0.366

nu hat (KM)	12.76	nu star (KM)	11.7
theta hat (KM)	2.663	theta star (KM)	2.904
80% gamma percentile (KM)	1.693	90% gamma percentile (KM)	3.046
95% gamma percentile (KM)	4.55	99% gamma percentile (KM)	8.371
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (11.70, α)	5.031	Adjusted Chi Square Value (11.70, β)	4.542
95% Gamma Approximate KM-UCL (use when n>=50)	2.47	95% Gamma Adjusted KM-UCL (use when n<50)	2.736
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.06	Mean in Log Scale	-2.298
SD in Original Scale	1.738	SD in Log Scale	2.703
95% t UCL (assumes normality of ROS data)	1.822	95% Percentile Bootstrap UCL	1.845
95% BCA Bootstrap UCL	1.915	95% Bootstrap t UCL	2.345
95% H-UCL (Log ROS)	226.7		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.128	KM Geo Mean	0.119
KM SD (logged)	2.451	95% Critical H Value (KM-Log)	5.339
KM Standard Error of Mean (logged)	0.65	95% H-UCL (KM -Log)	70.41
KM SD (logged)	2.451	95% Critical H Value (KM-Log)	5.339
KM Standard Error of Mean (logged)	0.65		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.063	Mean in Log Scale	-2.279
SD in Original Scale	1.736	SD in Log Scale	2.738
95% t UCL (Assumes normality)	1.824	95% H-Stat UCL	281.8
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.844		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Benzo[g,h,i]perylene			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16

	A B C D E	F	G H I J K	L
989	Number of Detects	8	Number of Non-Detects	8
990	Number of Distinct Detects	8	Number of Distinct Non-Detects	8
991	Minimum Detect	0.0886	Minimum Non-Detect	0.0113
992	Maximum Detect	6.13	Maximum Non-Detect	0.117
993	Variance Detects	3.839	Percent Non-Detects	50%
994	Mean Detects	1.667	SD Detects	1.959
995	Median Detects	1.245	CV Detects	1.175
996	Skewness Detects	2.033	Kurtosis Detects	4.631
997	Mean of Logged Detects	-0.145	SD of Logged Detects	1.361
998				
999	**Normal GOF Test on Detects Only**			
1000	Shapiro Wilk Test Statistic	0.77	**Shapiro Wilk GOF Test**	
1001	5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
1002	Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**	
1003	5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	
1004	**Detected Data appear Approximate Normal at 5% Significance Level**			
1005				
1006	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1007	KM Mean	0.84	KM Standard Error of Mean	0.411
1008	KM SD	1.538	95% KM (BCA) UCL	1.623
1009	95% KM (t) UCL	1.56	95% KM (Percentile Bootstrap) UCL	1.518
1010	95% KM (z) UCL	1.516	95% KM Bootstrap t UCL	2.391
1011	90% KM Chebyshev UCL	2.073	95% KM Chebyshev UCL	2.631
1012	97.5% KM Chebyshev UCL	3.406	99% KM Chebyshev UCL	4.929
1013				
1014	**Gamma GOF Tests on Detected Observations Only**			
1015	A-D Test Statistic	0.193	**Anderson-Darling GOF Test**	
1016	5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
1017	K-S Test Statistic	0.129	**Kolmogorov-Smirnov GOF**	
1018	5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	
1019	**Detected data appear Gamma Distributed at 5% Significance Level**			
1020				
1021	**Gamma Statistics on Detected Data Only**			
1022	k hat (MLE)	0.892	k star (bias corrected MLE)	0.641
1023	Theta hat (MLE)	1.87	Theta star (bias corrected MLE)	2.603
1024	nu hat (MLE)	14.27	nu star (bias corrected)	10.25
1025	Mean (detects)	1.667		
1026				
1027	**Gamma ROS Statistics using Imputed Non-Detects**			
1028	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1029	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1030	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1031	This is especially true when the sample size is small.			
1032	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1033	Minimum	0.01	Mean	0.839
1034	Maximum	6.13	Median	0.0493
1035	SD	1.589	CV	1.894
1036	k hat (MLE)	0.312	k star (bias corrected MLE)	0.295
1037	Theta hat (MLE)	2.691	Theta star (bias corrected MLE)	2.844
1038	nu hat (MLE)	9.972	nu star (bias corrected)	9.435
1039	Adjusted Level of Significance (β)	0.0335		
1040	Approximate Chi Square Value (9.44, α)	3.592	Adjusted Chi Square Value (9.44, β)	3.192

	A B C D E	F	G H I J K	L
1041	95% Gamma Approximate UCL (use when n>=50)	2.203	95% Gamma Adjusted UCL (use when n<50)	2.479
1042				
1043	**Estimates of Gamma Parameters using KM Estimates**			
1044	Mean (KM)	0.84	SD (KM)	1.538
1045	Variance (KM)	2.364	SE of Mean (KM)	0.411
1046	k hat (KM)	0.298	k star (KM)	0.284
1047	nu hat (KM)	9.547	nu star (KM)	9.09
1048	theta hat (KM)	2.815	theta star (KM)	2.957
1049	80% gamma percentile (KM)	1.27	90% gamma percentile (KM)	2.492
1050	95% gamma percentile (KM)	3.909	99% gamma percentile (KM)	7.617
1051				
1052	**Gamma Kaplan-Meier (KM) Statistics**			
1053	Approximate Chi Square Value (9.09, α)	3.382	Adjusted Chi Square Value (9.09, β)	2.996
1054	95% Gamma Approximate KM-UCL (use when n>=50)	2.258	95% Gamma Adjusted KM-UCL (use when n<50)	2.548
1055				
1056	**Lognormal GOF Test on Detected Observations Only**			
1057	Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**	
1058	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
1059	Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**	
1060	5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
1061	**Detected Data appear Lognormal at 5% Significance Level**			
1062				
1063	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1064	Mean in Original Scale	0.845	Mean in Log Scale	-1.987
1065	SD in Original Scale	1.585	SD in Log Scale	2.118
1066	95% t UCL (assumes normality of ROS data)	1.539	95% Percentile Bootstrap UCL	1.561
1067	95% BCA Bootstrap UCL	1.866	95% Bootstrap t UCL	2.331
1068	95% H-UCL (Log ROS)	16.83		
1069				
1070	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1071	KM Mean (logged)	-2.298	KM Geo Mean	0.1
1072	KM SD (logged)	2.34	95% Critical H Value (KM-Log)	5.123
1073	KM Standard Error of Mean (logged)	0.627	95% H-UCL (KM -Log)	34.35
1074	KM SD (logged)	2.34	95% Critical H Value (KM-Log)	5.123
1075	KM Standard Error of Mean (logged)	0.627		
1076				
1077	**DL/2 Statistics**			
1078	**DL/2 Normal**		**DL/2 Log-Transformed**	
1079	Mean in Original Scale	0.84	Mean in Log Scale	-2.497
1080	SD in Original Scale	1.588	SD in Log Scale	2.659
1081	95% t UCL (Assumes normality)	1.536	95% H-Stat UCL	146
1082	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1083				
1084	**Nonparametric Distribution Free UCL Statistics**			
1085	**Detected Data appear Approximate Normal Distributed at 5% Significance Level**			
1086				
1087	**Suggested UCL to Use**			
1088	95% KM (t) UCL	1.56		
1089				
1090	When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
1091	When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
1092				

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo[k]fluoranthene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	6	Number of Non-Detects	10
Number of Distinct Detects	6	Number of Distinct Non-Detects	10
Minimum Detect	0.201	Minimum Non-Detect	0.0113
Maximum Detect	1.83	Maximum Non-Detect	0.117
Variance Detects	0.389	Percent Non-Detects	62.5%
Mean Detects	0.902	SD Detects	0.624
Median Detects	0.858	CV Detects	0.692
Skewness Detects	0.413	Kurtosis Detects	-0.927
Mean of Logged Detects	-0.366	SD of Logged Detects	0.862

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.163	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.345	KM Standard Error of Mean	0.152
KM SD	0.555	95% KM (BCA) UCL	0.589
95% KM (t) UCL	0.612	95% KM (Percentile Bootstrap) UCL	0.603
95% KM (z) UCL	0.595	95% KM Bootstrap t UCL	0.617
90% KM Chebyshev UCL	0.801	95% KM Chebyshev UCL	1.008
97.5% KM Chebyshev UCL	1.294	99% KM Chebyshev UCL	1.857

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.241	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.704	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.336	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.048	k star (bias corrected MLE)	1.135
Theta hat (MLE)	0.441	Theta star (bias corrected MLE)	0.795
nu hat (MLE)	24.58	nu star (bias corrected)	13.62
Mean (detects)	0.902		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.345
Maximum	1.83	Median	0.01
SD	0.573	CV	1.664
k hat (MLE)	0.346	k star (bias corrected MLE)	0.322
Theta hat (MLE)	0.997	Theta star (bias corrected MLE)	1.069
nu hat (MLE)	11.06	nu star (bias corrected)	10.32
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (10.32, α)	4.141	Adjusted Chi Square Value (10.32, β)	3.705
95% Gamma Approximate UCL (use when n>=50)	0.859	95% Gamma Adjusted UCL (use when n<50)	0.96

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.345	SD (KM)	0.555
Variance (KM)	0.308	SE of Mean (KM)	0.152
k hat (KM)	0.388	k star (KM)	0.357
nu hat (KM)	12.41	nu star (KM)	11.41
theta hat (KM)	0.891	theta star (KM)	0.968
80% gamma percentile (KM)	0.549	90% gamma percentile (KM)	0.995
95% gamma percentile (KM)	1.493	99% gamma percentile (KM)	2.761

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (11.41, α)	4.844	Adjusted Chi Square Value (11.41, β)	4.366
95% Gamma Approximate KM-UCL (use when n>=50)	0.814	95% Gamma Adjusted KM-UCL (use when n<50)	0.903

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.366	Mean in Log Scale	-2.091
SD in Original Scale	0.56	SD in Log Scale	1.467
95% t UCL (assumes normality of ROS data)	0.611	95% Percentile Bootstrap UCL	0.601
95% BCA Bootstrap UCL	0.659	95% Bootstrap t UCL	0.786
95% H-UCL (Log ROS)	1.356		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.939	KM Geo Mean	0.0529
KM SD (logged)	2.05	95% Critical H Value (KM-Log)	4.566
KM Standard Error of Mean (logged)	0.562	95% H-UCL (KM -Log)	4.854
KM SD (logged)	2.05	95% Critical H Value (KM-Log)	4.566
KM Standard Error of Mean (logged)	0.562		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.35	Mean in Log Scale	-2.954
SD in Original Scale	0.57	SD in Log Scale	2.272
95% t UCL (Assumes normality)	0.6	95% H-Stat UCL	12.89

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.612

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	8	Number of Non-Detects	8
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.134	Minimum Non-Detect	0.0113
Maximum Detect	5.24	Maximum Non-Detect	0.117
Variance Detects	3.169	Percent Non-Detects	50%
Mean Detects	1.78	SD Detects	1.78
Median Detects	1.327	CV Detects	1
Skewness Detects	1.067	Kurtosis Detects	0.699
Mean of Logged Detects	-0.0617	SD of Logged Detects	1.367

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.876	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.895	KM Standard Error of Mean	0.394
KM SD	1.472	95% KM (BCA) UCL	1.617
95% KM (t) UCL	1.585	95% KM (Percentile Bootstrap) UCL	1.56
95% KM (z) UCL	1.543	95% KM Bootstrap t UCL	1.986
90% KM Chebyshev UCL	2.076	95% KM Chebyshev UCL	2.611
97.5% KM Chebyshev UCL	3.353	99% KM Chebyshev UCL	4.811

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.3	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.177	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.302	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.915	k star (bias corrected MLE)	0.655
Theta hat (MLE)	1.946	Theta star (bias corrected MLE)	2.717
nu hat (MLE)	14.63	nu star (bias corrected)	10.48
Mean (detects)	1.78		

	A–E	F	G–K	L
1249				
1250	**Gamma ROS Statistics using Imputed Non-Detects**			
1251	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1252	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1253	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1254	This is especially true when the sample size is small.			
1255	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1256	Minimum	0.01	Mean	0.895
1257	Maximum	5.24	Median	0.072
1258	SD	1.521	CV	1.7
1259	k hat (MLE)	0.309	k star (bias corrected MLE)	0.293
1260	Theta hat (MLE)	2.897	Theta star (bias corrected MLE)	3.058
1261	nu hat (MLE)	9.883	nu star (bias corrected)	9.363
1262	Adjusted Level of Significance (β)	0.0335		
1263	Approximate Chi Square Value (9.36, α)	3.548	Adjusted Chi Square Value (9.36, β)	3.151
1264	95% Gamma Approximate UCL (use when n>=50)	2.361	95% Gamma Adjusted UCL (use when n<50)	2.659
1265				
1266	**Estimates of Gamma Parameters using KM Estimates**			
1267	Mean (KM)	0.895	SD (KM)	1.472
1268	Variance (KM)	2.168	SE of Mean (KM)	0.394
1269	k hat (KM)	0.37	k star (KM)	0.342
1270	nu hat (KM)	11.83	nu star (KM)	10.95
1271	theta hat (KM)	2.421	theta star (KM)	2.617
1272	80% gamma percentile (KM)	1.412	90% gamma percentile (KM)	2.595
1273	95% gamma percentile (KM)	3.923	99% gamma percentile (KM)	7.323
1274				
1275	**Gamma Kaplan-Meier (KM) Statistics**			
1276	Approximate Chi Square Value (10.95, α)	4.542	Adjusted Chi Square Value (10.95, β)	4.082
1277	95% Gamma Approximate KM-UCL (use when n>=50)	2.158	95% Gamma Adjusted KM-UCL (use when n<50)	2.401
1278				
1279	**Lognormal GOF Test on Detected Observations Only**			
1280	Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**	
1281	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
1282	Lilliefors Test Statistic	0.208	**Lilliefors GOF Test**	
1283	5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
1284	**Detected Data appear Lognormal at 5% Significance Level**			
1285				
1286	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1287	Mean in Original Scale	0.901	Mean in Log Scale	-1.93
1288	SD in Original Scale	1.517	SD in Log Scale	2.144
1289	95% t UCL (assumes normality of ROS data)	1.566	95% Percentile Bootstrap UCL	1.547
1290	95% BCA Bootstrap UCL	1.792	95% Bootstrap t UCL	2.059
1291	95% H-UCL (Log ROS)	19.95		
1292				
1293	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1294	KM Mean (logged)	-2.272	KM Geo Mean	0.103
1295	KM SD (logged)	2.388	95% Critical H Value (KM-Log)	5.217
1296	KM Standard Error of Mean (logged)	0.638	95% H-UCL (KM -Log)	44.58
1297	KM SD (logged)	2.388	95% Critical H Value (KM-Log)	5.217
1298	KM Standard Error of Mean (logged)	0.638		
1299				
1300	**DL/2 Statistics**			

	A	B	C	D	E	F	G	H	I	J	K	L
1301	DL/2 Normal						DL/2 Log-Transformed					
1302	Mean in Original Scale					0.896	Mean in Log Scale					-2.455
1303	SD in Original Scale					1.52	SD in Log Scale					2.7
1304	95% t UCL (Assumes normality)					1.562	95% H-Stat UCL					190.9
1305	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
1306												
1307	**Nonparametric Distribution Free UCL Statistics**											
1308	**Detected Data appear Normal Distributed at 5% Significance Level**											
1309												
1310	**Suggested UCL to Use**											
1311	95% KM (t) UCL					1.585						
1312												
1313	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1314	Recommendations are based upon data size, data distribution, and skewness.											
1315	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1316	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1317												
1318	**Dibenz(a,h)anthracene**											
1319												
1320	**General Statistics**											
1321	Total Number of Observations					16	Number of Distinct Observations					16
1322	Number of Detects					6	Number of Non-Detects					10
1323	Number of Distinct Detects					6	Number of Distinct Non-Detects					10
1324	Minimum Detect					0.0849	Minimum Non-Detect					0.0113
1325	Maximum Detect					1.05	Maximum Non-Detect					0.117
1326	Variance Detects					0.121	Percent Non-Detects					62.5%
1327	Mean Detects					0.378	SD Detects					0.347
1328	Median Detects					0.3	CV Detects					0.919
1329	Skewness Detects					1.899	Kurtosis Detects					4.058
1330	Mean of Logged Detects					-1.282	SD of Logged Detects					0.859
1331												
1332	**Normal GOF Test on Detects Only**											
1333	Shapiro Wilk Test Statistic					0.79	**Shapiro Wilk GOF Test**					
1334	5% Shapiro Wilk Critical Value					0.788	Detected Data appear Normal at 5% Significance Level					
1335	Lilliefors Test Statistic					0.326	**Lilliefors GOF Test**					
1336	5% Lilliefors Critical Value					0.325	Detected Data Not Normal at 5% Significance Level					
1337	**Detected Data appear Approximate Normal at 5% Significance Level**											
1338												
1339	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
1340	KM Mean					0.15	KM Standard Error of Mean					0.072
1341	KM SD					0.263	95% KM (BCA) UCL					0.284
1342	95% KM (t) UCL					0.276	95% KM (Percentile Bootstrap) UCL					0.274
1343	95% KM (z) UCL					0.268	95% KM Bootstrap t UCL					0.344
1344	90% KM Chebyshev UCL					0.366	95% KM Chebyshev UCL					0.464
1345	97.5% KM Chebyshev UCL					0.599	99% KM Chebyshev UCL					0.866
1346												
1347	**Gamma GOF Tests on Detected Observations Only**											
1348	A-D Test Statistic					0.298	**Anderson-Darling GOF Test**					
1349	5% A-D Critical Value					0.706	Detected data appear Gamma Distributed at 5% Significance Level					
1350	K-S Test Statistic					0.225	**Kolmogorov-Smirnov GOF**					
1351	5% K-S Critical Value					0.337	Detected data appear Gamma Distributed at 5% Significance Level					
1352	**Detected data appear Gamma Distributed at 5% Significance Level**											

Gamma Statistics on Detected Data Only

k hat (MLE)	1.767	k star (bias corrected MLE)	0.994
Theta hat (MLE)	0.214	Theta star (bias corrected MLE)	0.38
nu hat (MLE)	21.2	nu star (bias corrected)	11.93
Mean (detects)	0.378		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.148
Maximum	1.05	Median	0.01
SD	0.272	CV	1.839
k hat (MLE)	0.446	k star (bias corrected MLE)	0.404
Theta hat (MLE)	0.332	Theta star (bias corrected MLE)	0.366
nu hat (MLE)	14.29	nu star (bias corrected)	12.94
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (12.94, α)	5.853	Adjusted Chi Square Value (12.94, β)	5.318
95% Gamma Approximate UCL (use when n>=50)	0.327	95% Gamma Adjusted UCL (use when n<50)	0.36

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.15	SD (KM)	0.263
Variance (KM)	0.069	SE of Mean (KM)	0.072
k hat (KM)	0.325	k star (KM)	0.306
nu hat (KM)	10.41	nu star (KM)	9.793
theta hat (KM)	0.46	theta star (KM)	0.49
80% gamma percentile (KM)	0.231	90% gamma percentile (KM)	0.441
95% gamma percentile (KM)	0.681	99% gamma percentile (KM)	1.304

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.79, α)	3.813	Adjusted Chi Square Value (9.79, β)	3.398
95% Gamma Approximate KM-UCL (use when n>=50)	0.385	95% Gamma Adjusted KM-UCL (use when n<50)	0.432

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.325	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.153	Mean in Log Scale	-2.986
SD in Original Scale	0.269	SD in Log Scale	1.452
95% t UCL (assumes normality of ROS data)	0.271	95% Percentile Bootstrap UCL	0.271
95% BCA Bootstrap UCL	0.318	95% Bootstrap t UCL	0.416
95% H-UCL (Log ROS)	0.53		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.255	KM Geo Mean	0.0386

KM SD (logged)	1.619	95% Critical H Value (KM-Log)	3.758
KM Standard Error of Mean (logged)	0.448	95% H-UCL (KM -Log)	0.688
KM SD (logged)	1.619	95% Critical H Value (KM-Log)	3.758
KM Standard Error of Mean (logged)	0.448		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.154	Mean in Log Scale	-3.298
SD in Original Scale	0.27	SD in Log Scale	1.864
95% t UCL (Assumes normality)	0.272	95% H-Stat UCL	1.598

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.276		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test

When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fluoranthene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	9	Number of Distinct Non-Detects	7
Minimum Detect	0.0131	Minimum Non-Detect	0.0113
Maximum Detect	9.69	Maximum Non-Detect	0.117
Variance Detects	13.48	Percent Non-Detects	43.75%
Mean Detects	2.759	SD Detects	3.671
Median Detects	0.594	CV Detects	1.331
Skewness Detects	1.331	Kurtosis Detects	0.339
Mean of Logged Detects	-0.337	SD of Logged Detects	2.183

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.762	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.274	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.558	KM Standard Error of Mean	0.777
KM SD	2.932	95% KM (BCA) UCL	2.797
95% KM (t) UCL	2.92	95% KM (Percentile Bootstrap) UCL	2.783
95% KM (z) UCL	2.836	95% KM Bootstrap t UCL	5.018

	A	B	C	D	E	F	G	H	I	J	K	L
1457					90% KM Chebyshev UCL	3.89					95% KM Chebyshev UCL	4.946
1458					97.5% KM Chebyshev UCL	6.412					99% KM Chebyshev UCL	9.292
1459												
1460	**Gamma GOF Tests on Detected Observations Only**											
1461					A-D Test Statistic	0.26	**Anderson-Darling GOF Test**					
1462					5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level					
1463					K-S Test Statistic	0.185	**Kolmogorov-Smirnov GOF**					
1464					5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level					
1465	**Detected data appear Gamma Distributed at 5% Significance Level**											
1466												
1467	**Gamma Statistics on Detected Data Only**											
1468					k hat (MLE)	0.474					k star (bias corrected MLE)	0.39
1469					Theta hat (MLE)	5.822					Theta star (bias corrected MLE)	7.074
1470					nu hat (MLE)	8.529					nu star (bias corrected)	7.019
1471					Mean (detects)	2.759						
1472												
1473	**Gamma ROS Statistics using Imputed Non-Detects**											
1474	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											
1475	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)											
1476	For such situations, GROS method may yield incorrect values of UCLs and BTVs											
1477	This is especially true when the sample size is small.											
1478	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
1479					Minimum	0.01					Mean	1.556
1480					Maximum	9.69					Median	0.0636
1481					SD	3.028					CV	1.946
1482					k hat (MLE)	0.266					k star (bias corrected MLE)	0.258
1483					Theta hat (MLE)	5.856					Theta star (bias corrected MLE)	6.041
1484					nu hat (MLE)	8.504					nu star (bias corrected)	8.243
1485					Adjusted Level of Significance (β)	0.0335						
1486					Approximate Chi Square Value (8.24, α)	2.876					Adjusted Chi Square Value (8.24, β)	2.527
1487					95% Gamma Approximate UCL (use when n>=50)	4.459					95% Gamma Adjusted UCL (use when n<50)	5.075
1488												
1489	**Estimates of Gamma Parameters using KM Estimates**											
1490					Mean (KM)	1.558					SD (KM)	2.932
1491					Variance (KM)	8.594					SE of Mean (KM)	0.777
1492					k hat (KM)	0.282					k star (KM)	0.271
1493					nu hat (KM)	9.033					nu star (KM)	8.672
1494					theta hat (KM)	5.518					theta star (KM)	5.747
1495					80% gamma percentile (KM)	2.323					90% gamma percentile (KM)	4.644
1496					95% gamma percentile (KM)	7.357					99% gamma percentile (KM)	14.5
1497												
1498	**Gamma Kaplan-Meier (KM) Statistics**											
1499					Approximate Chi Square Value (8.67, α)	3.13					Adjusted Chi Square Value (8.67, β)	2.763
1500					95% Gamma Approximate KM-UCL (use when n>=50)	4.315					95% Gamma Adjusted KM-UCL (use when n<50)	4.889
1501												
1502	**Lognormal GOF Test on Detected Observations Only**											
1503					Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**					
1504					5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level					
1505					Lilliefors Test Statistic	0.155	**Lilliefors GOF Test**					
1506					5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level					
1507	**Detected Data appear Lognormal at 5% Significance Level**											
1508												

	A–E	F	G–K	L
1509	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1510	Mean in Original Scale	1.553	Mean in Log Scale	-2.68
1511	SD in Original Scale	3.03	SD in Log Scale	3.18
1512	95% t UCL (assumes normality of ROS data)	2.881	95% Percentile Bootstrap UCL	2.807
1513	95% BCA Bootstrap UCL	3.234	95% Bootstrap t UCL	5.025
1514	95% H-UCL (Log ROS)	2811		
1515				
1516	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1517	KM Mean (logged)	-2.132	KM Geo Mean	0.119
1518	KM SD (logged)	2.562	95% Critical H Value (KM-Log)	5.556
1519	KM Standard Error of Mean (logged)	0.681	95% H-UCL (KM -Log)	124.7
1520	KM SD (logged)	2.562	95% Critical H Value (KM-Log)	5.556
1521	KM Standard Error of Mean (logged)	0.681		
1522				
1523	**DL/2 Statistics**			
1524	**DL/2 Normal**		**DL/2 Log-Transformed**	
1525	Mean in Original Scale	1.558	Mean in Log Scale	-2.297
1526	SD in Original Scale	3.028	SD in Log Scale	2.849
1527	95% t UCL (Assumes normality)	2.885	95% H-Stat UCL	524.9
1528	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1529				
1530	**Nonparametric Distribution Free UCL Statistics**			
1531	**Detected Data appear Gamma Distributed at 5% Significance Level**			
1532				
1533	**Suggested UCL to Use**			
1534	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.889		
1535				
1536	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1537	Recommendations are based upon data size, data distribution, and skewness.			
1538	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1539	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1540				
1541	**Fluorene**			
1542				
1543	**General Statistics**			
1544	Total Number of Observations	16	Number of Distinct Observations	16
1545	Number of Detects	4	Number of Non-Detects	12
1546	Number of Distinct Detects	4	Number of Distinct Non-Detects	12
1547	Minimum Detect	0.14	Minimum Non-Detect	0.0113
1548	Maximum Detect	8.28	Maximum Non-Detect	0.123
1549	Variance Detects	15.99	Percent Non-Detects	75%
1550	Mean Detects	2.29	SD Detects	3.999
1551	Median Detects	0.369	CV Detects	1.747
1552	Skewness Detects	1.985	Kurtosis Detects	3.949
1553	Mean of Logged Detects	-0.554	SD of Logged Detects	1.887
1554				
1555	**Normal GOF Test on Detects Only**			
1556	Shapiro Wilk Test Statistic	0.668	**Shapiro Wilk GOF Test**	
1557	5% Shapiro Wilk Critical Value	0.748	Detected Data Not Normal at 5% Significance Level	
1558	Lilliefors Test Statistic	0.416	**Lilliefors GOF Test**	
1559	5% Lilliefors Critical Value	0.375	Detected Data Not Normal at 5% Significance Level	
1560	**Detected Data Not Normal at 5% Significance Level**			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.581	KM Standard Error of Mean	0.575
KM SD	1.993	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.589	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.527	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.307	95% KM Chebyshev UCL	3.088
97.5% KM Chebyshev UCL	4.173	99% KM Chebyshev UCL	6.305

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.574	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.685	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.349	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.412	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.465	k star (bias corrected MLE)	0.283
Theta hat (MLE)	4.925	Theta star (bias corrected MLE)	8.094
nu hat (MLE)	3.719	nu star (bias corrected)	2.263
Mean (detects)	2.29		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.58
Maximum	8.28	Median	0.01
SD	2.058	CV	3.55
k hat (MLE)	0.235	k star (bias corrected MLE)	0.233
Theta hat (MLE)	2.464	Theta star (bias corrected MLE)	2.49
nu hat (MLE)	7.531	nu star (bias corrected)	7.453
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (7.45, α)	2.422	Adjusted Chi Square Value (7.45, β)	2.108
95% Gamma Approximate UCL (use when n>=50)	1.784	95% Gamma Adjusted UCL (use when n<50)	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.581	SD (KM)	1.993
Variance (KM)	3.971	SE of Mean (KM)	0.575
k hat (KM)	0.085	k star (KM)	0.111
nu hat (KM)	2.719	nu star (KM)	3.542
theta hat (KM)	6.837	theta star (KM)	5.247
80% gamma percentile (KM)	0.463	90% gamma percentile (KM)	1.606
95% gamma percentile (KM)	3.345	99% gamma percentile (KM)	8.765

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.54, α)	0.55	Adjusted Chi Square Value (3.54, β)	0.437
95% Gamma Approximate KM-UCL (use when n>=50)	3.743	95% Gamma Adjusted KM-UCL (use when n<50)	4.709

95% Gamma Adjusted KM-UCL (use when k<=1 and 15 < n < 50)

	A–E	F	G–K	L
1613	**Lognormal GOF Test on Detected Observations Only**			
1614	Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**	
1615	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
1616	Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**	
1617	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
1618	**Detected Data appear Lognormal at 5% Significance Level**			
1619				
1620	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1621	Mean in Original Scale	0.573	Mean in Log Scale	-6.567
1622	SD in Original Scale	2.061	SD in Log Scale	3.684
1623	95% t UCL (assumes normality of ROS data)	1.476	95% Percentile Bootstrap UCL	1.563
1624	95% BCA Bootstrap UCL	2.118	95% Bootstrap t UCL	22.48
1625	95% H-UCL (Log ROS)	2055		
1626				
1627	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1628	KM Mean (logged)	-3.501	KM Geo Mean	0.0302
1629	KM SD (logged)	1.887	95% Critical H Value (KM-Log)	4.257
1630	KM Standard Error of Mean (logged)	0.545	95% H-UCL (KM -Log)	1.426
1631	KM SD (logged)	1.887	95% Critical H Value (KM-Log)	4.257
1632	KM Standard Error of Mean (logged)	0.545		
1633				
1634	**DL/2 Statistics**			
1635	**DL/2 Normal**		**DL/2 Log-Transformed**	
1636	Mean in Original Scale	0.59	Mean in Log Scale	-3.346
1637	SD in Original Scale	2.056	SD in Log Scale	2.084
1638	95% t UCL (Assumes normality)	1.491	95% H-Stat UCL	3.724
1639	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1640				
1641	**Nonparametric Distribution Free UCL Statistics**			
1642	**Detected Data appear Gamma Distributed at 5% Significance Level**			
1643				
1644	**Suggested UCL to Use**			
1645	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)	4.709		
1646				
1647	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1648	Recommendations are based upon data size, data distribution, and skewness.			
1649	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
1650	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1651				
1652	**Indeno[1,2,3-cd]pyrene**			
1653				
1654	**General Statistics**			
1655	Total Number of Observations	16	Number of Distinct Observations	16
1656	Number of Detects	8	Number of Non-Detects	8
1657	Number of Distinct Detects	8	Number of Distinct Non-Detects	8
1658	Minimum Detect	0.0764	Minimum Non-Detect	0.0113
1659	Maximum Detect	5.17	Maximum Non-Detect	0.117
1660	Variance Detects	2.74	Percent Non-Detects	50%
1661	Mean Detects	1.44	SD Detects	1.655
1662	Median Detects	1.108	CV Detects	1.149
1663	Skewness Detects	1.941	Kurtosis Detects	4.278
1664	Mean of Logged Detects	-0.291	SD of Logged Detects	1.369

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.787	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.726	KM Standard Error of Mean	0.349
KM SD	1.307	95% KM (BCA) UCL	1.363
95% KM (t) UCL	1.339	95% KM (Percentile Bootstrap) UCL	1.365
95% KM (z) UCL	1.301	95% KM Bootstrap t UCL	1.899
90% KM Chebyshev UCL	1.774	95% KM Chebyshev UCL	2.249
97.5% KM Chebyshev UCL	2.908	99% KM Chebyshev UCL	4.202

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.188	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.892	k star (bias corrected MLE)	0.641
Theta hat (MLE)	1.614	Theta star (bias corrected MLE)	2.247
nu hat (MLE)	14.27	nu star (bias corrected)	10.25
Mean (detects)	1.44		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.725
Maximum	5.17	Median	0.0432
SD	1.351	CV	1.863
k hat (MLE)	0.321	k star (bias corrected MLE)	0.302
Theta hat (MLE)	2.261	Theta star (bias corrected MLE)	2.399
nu hat (MLE)	10.26	nu star (bias corrected)	9.672
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (9.67, α)	3.738	Adjusted Chi Square Value (9.67, β)	3.328
95% Gamma Approximate UCL (use when n>=50)	1.876	95% Gamma Adjusted UCL (use when n<50)	2.107

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.726	SD (KM)	1.307
Variance (KM)	1.709	SE of Mean (KM)	0.349
k hat (KM)	0.309	k star (KM)	0.292
nu hat (KM)	9.879	nu star (KM)	9.36
theta hat (KM)	2.353	theta star (KM)	2.483
80% gamma percentile (KM)	1.107	90% gamma percentile (KM)	2.148

95% gamma percentile (KM)	3.349	99% gamma percentile (KM)	6.48
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (9.36, α)	3.546	Adjusted Chi Square Value (9.36, β)	3.149
95% Gamma Approximate KM-UCL (use when n>=50)	1.917	95% Gamma Adjusted KM-UCL (use when n<50)	2.159
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.968	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.729	Mean in Log Scale	-2.143
SD in Original Scale	1.348	SD in Log Scale	2.129
95% t UCL (assumes normality of ROS data)	1.32	95% Percentile Bootstrap UCL	1.294
95% BCA Bootstrap UCL	1.543	95% Bootstrap t UCL	2.059
95% H-UCL (Log ROS)	15.15		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-2.372	KM Geo Mean	0.0933
KM SD (logged)	2.275	95% Critical H Value (KM-Log)	4.998
KM Standard Error of Mean (logged)	0.61	95% H-UCL (KM -Log)	23.41
KM SD (logged)	2.275	95% Critical H Value (KM-Log)	4.998
KM Standard Error of Mean (logged)	0.61		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.726	Mean in Log Scale	-2.57
SD in Original Scale	1.35	SD in Log Scale	2.592
95% t UCL (Assumes normality)	1.318	95% H-Stat UCL	94.45
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Approximate Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	1.339		
When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test			
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness.			
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Naphthalene			
General Statistics			
Total Number of Observations	16	Number of Distinct Observations	16

Number of Detects	4	Number of Non-Detects	12
Number of Distinct Detects	4	Number of Distinct Non-Detects	12
Minimum Detect	0.213	Minimum Non-Detect	0.0113
Maximum Detect	0.983	Maximum Non-Detect	0.123
Variance Detects	0.122	Percent Non-Detects	75%
Mean Detects	0.478	SD Detects	0.35
Median Detects	0.359	CV Detects	0.731
Skewness Detects	1.592	Kurtosis Detects	2.46
Mean of Logged Detects	-0.916	SD of Logged Detects	0.669

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.296	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.375	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.128	KM Standard Error of Mean	0.0729
KM SD	0.253	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.256	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.248	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.347	95% KM Chebyshev UCL	0.446
97.5% KM Chebyshev UCL	0.583	99% KM Chebyshev UCL	0.853

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.339	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.241	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.953	k star (bias corrected MLE)	0.905
Theta hat (MLE)	0.162	Theta star (bias corrected MLE)	0.529
nu hat (MLE)	23.62	nu star (bias corrected)	7.238
Mean (detects)	0.478		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.127
Maximum	0.983	Median	0.01
SD	0.261	CV	2.057
k hat (MLE)	0.405	k star (bias corrected MLE)	0.371
Theta hat (MLE)	0.313	Theta star (bias corrected MLE)	0.342
nu hat (MLE)	12.97	nu star (bias corrected)	11.87
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (11.87, α)	5.143	Adjusted Chi Square Value (11.87, β)	4.648

	A–E	F	G–K	L
1821	95% Gamma Approximate UCL (use when n>=50)	0.293	95% Gamma Adjusted UCL (use when n<50)	N/A
1822				
1823	**Estimates of Gamma Parameters using KM Estimates**			
1824	Mean (KM)	0.128	SD (KM)	0.253
1825	Variance (KM)	0.0638	SE of Mean (KM)	0.0729
1826	k hat (KM)	0.257	k star (KM)	0.25
1827	nu hat (KM)	8.224	nu star (KM)	8.016
1828	theta hat (KM)	0.498	theta star (KM)	0.511
1829	80% gamma percentile (KM)	0.186	90% gamma percentile (KM)	0.384
1830	95% gamma percentile (KM)	0.619	99% gamma percentile (KM)	1.245
1831				
1832	**Gamma Kaplan-Meier (KM) Statistics**			
1833	Approximate Chi Square Value (8.02, α)	2.744	Adjusted Chi Square Value (8.02, β)	2.405
1834	95% Gamma Approximate KM-UCL (use when n>=50)	0.374	95% Gamma Adjusted KM-UCL (use when n<50)	0.427
1835				
1836	**Lognormal GOF Test on Detected Observations Only**			
1837	Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**	
1838	5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
1839	Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**	
1840	5% Lilliefors Critical Value	0.375	Detected Data appear Lognormal at 5% Significance Level	
1841	**Detected Data appear Lognormal at 5% Significance Level**			
1842				
1843	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1844	Mean in Original Scale	0.136	Mean in Log Scale	-3.11
1845	SD in Original Scale	0.257	SD in Log Scale	1.342
1846	95% t UCL (assumes normality of ROS data)	0.248	95% Percentile Bootstrap UCL	0.252
1847	95% BCA Bootstrap UCL	0.292	95% Bootstrap t UCL	0.375
1848	95% H-UCL (Log ROS)	0.34		
1849				
1850	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1851	KM Mean (logged)	-3.591	KM Geo Mean	0.0276
1852	KM SD (logged)	1.571	95% Critical H Value (KM-Log)	3.672
1853	KM Standard Error of Mean (logged)	0.454	95% H-UCL (KM -Log)	0.42
1854	KM SD (logged)	1.571	95% Critical H Value (KM-Log)	3.672
1855	KM Standard Error of Mean (logged)	0.454		
1856				
1857	**DL/2 Statistics**			
1858	**DL/2 Normal**		**DL/2 Log-Transformed**	
1859	Mean in Original Scale	0.137	Mean in Log Scale	-3.437
1860	SD in Original Scale	0.257	SD in Log Scale	1.79
1861	95% t UCL (Assumes normality)	0.25	95% H-Stat UCL	1.05
1862	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1863				
1864	**Nonparametric Distribution Free UCL Statistics**			
1865	**Detected Data appear Normal Distributed at 5% Significance Level**			
1866				
1867	**Suggested UCL to Use**			
1868	95% KM (t) UCL	0.256		
1869				
1870	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1871	Recommendations are based upon data size, data distribution, and skewness.			
1872	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).			

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	8	Number of Non-Detects	8
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.0155	Minimum Non-Detect	0.0113
Maximum Detect	26.7	Maximum Non-Detect	0.117
Variance Detects	82.76	Percent Non-Detects	50%
Mean Detects	4.422	SD Detects	9.097
Median Detects	1.184	CV Detects	2.057
Skewness Detects	2.714	Kurtosis Detects	7.498
Mean of Logged Detects	-0.326	SD of Logged Detects	2.335

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.542	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.403	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.283	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.218	KM Standard Error of Mean	1.713
KM SD	6.408	95% KM (BCA) UCL	5.464
95% KM (t) UCL	5.22	95% KM (Percentile Bootstrap) UCL	5.395
95% KM (z) UCL	5.035	95% KM Bootstrap t UCL	20.49
90% KM Chebyshev UCL	7.356	95% KM Chebyshev UCL	9.683
97.5% KM Chebyshev UCL	12.91	99% KM Chebyshev UCL	19.26

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.376	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.197	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.368	k star (bias corrected MLE)	0.313
Theta hat (MLE)	12.02	Theta star (bias corrected MLE)	14.11
nu hat (MLE)	5.887	nu star (bias corrected)	5.013
Mean (detects)	4.422		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.216
Maximum	26.7	Median	0.0128

	A–E	F	G–K	L
1925	SD	6.619	CV	2.987
1926	k hat (MLE)	0.222	k star (bias corrected MLE)	0.222
1927	Theta hat (MLE)	9.983	Theta star (bias corrected MLE)	9.981
1928	nu hat (MLE)	7.103	nu star (bias corrected)	7.105
1929	Adjusted Level of Significance (β)	0.0335		
1930	Approximate Chi Square Value (7.10, α)	2.228	Adjusted Chi Square Value (7.10, β)	1.93
1931	95% Gamma Approximate UCL (use when n>=50)	7.066	95% Gamma Adjusted UCL (use when n<50)	8.156
1932				
1933	**Estimates of Gamma Parameters using KM Estimates**			
1934	Mean (KM)	2.218	SD (KM)	6.408
1935	Variance (KM)	41.07	SE of Mean (KM)	1.713
1936	k hat (KM)	0.12	k star (KM)	0.139
1937	nu hat (KM)	3.833	nu star (KM)	4.448
1938	theta hat (KM)	18.52	theta star (KM)	15.96
1939	80% gamma percentile (KM)	2.26	90% gamma percentile (KM)	6.497
1940	95% gamma percentile (KM)	12.38	99% gamma percentile (KM)	29.73
1941				
1942	**Gamma Kaplan-Meier (KM) Statistics**			
1943	Approximate Chi Square Value (4.45, α)	0.906	Adjusted Chi Square Value (4.45, β)	0.742
1944	95% Gamma Approximate KM-UCL (use when n>=50)	10.89	95% Gamma Adjusted KM-UCL (use when n<50)	13.29
1945				
1946	**Lognormal GOF Test on Detected Observations Only**			
1947	Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**	
1948	5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
1949	Lilliefors Test Statistic	0.166	**Lilliefors GOF Test**	
1950	5% Lilliefors Critical Value	0.283	Detected Data appear Lognormal at 5% Significance Level	
1951	**Detected Data appear Lognormal at 5% Significance Level**			
1952				
1953	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1954	Mean in Original Scale	2.212	Mean in Log Scale	-3.366
1955	SD in Original Scale	6.62	SD in Log Scale	3.536
1956	95% t UCL (assumes normality of ROS data)	5.113	95% Percentile Bootstrap UCL	5.424
1957	95% BCA Bootstrap UCL	7.315	95% Bootstrap t UCL	21.29
1958	95% H-UCL (Log ROS)	16768		
1959				
1960	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1961	KM Mean (logged)	-2.368	KM Geo Mean	0.0937
1962	KM SD (logged)	2.572	95% Critical H Value (KM-Log)	5.576
1963	KM Standard Error of Mean (logged)	0.691	95% H-UCL (KM -Log)	104
1964	KM SD (logged)	2.572	95% Critical H Value (KM-Log)	5.576
1965	KM Standard Error of Mean (logged)	0.691		
1966				
1967	**DL/2 Statistics**			
1968	**DL/2 Normal**		**DL/2 Log-Transformed**	
1969	Mean in Original Scale	2.22	Mean in Log Scale	-2.449
1970	SD in Original Scale	6.617	SD in Log Scale	2.807
1971	95% t UCL (Assumes normality)	5.121	95% H-Stat UCL	353.9
1972	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1973				
1974	**Nonparametric Distribution Free UCL Statistics**			
1975	**Detected Data appear Gamma Distributed at 5% Significance Level**			
1976				

	A	B	C	D	E	F	G	H	I	J	K	L
1977	Suggested UCL to Use											
1978	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					13.29						
1979												
1980	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
1981	Recommendations are based upon data size, data distribution, and skewness.											
1982	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
1983	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
1984												
1985	**Pyrene**											
1986												
1987	**General Statistics**											
1988	Total Number of Observations					16	Number of Distinct Observations					16
1989	Number of Detects					9	Number of Non-Detects					7
1990	Number of Distinct Detects					9	Number of Distinct Non-Detects					7
1991	Minimum Detect					0.0159	Minimum Non-Detect					0.0113
1992	Maximum Detect					13.5	Maximum Non-Detect					0.117
1993	Variance Detects					29.12	Percent Non-Detects					43.75%
1994	Mean Detects					4.159	SD Detects					5.396
1995	Median Detects					0.908	CV Detects					1.297
1996	Skewness Detects					1.198	Kurtosis Detects					-0.159
1997	Mean of Logged Detects					0.0395	SD of Logged Detects					2.251
1998												
1999	**Normal GOF Test on Detects Only**											
2000	Shapiro Wilk Test Statistic					0.762	**Shapiro Wilk GOF Test**					
2001	5% Shapiro Wilk Critical Value					0.829	Detected Data Not Normal at 5% Significance Level					
2002	Lilliefors Test Statistic					0.282	**Lilliefors GOF Test**					
2003	5% Lilliefors Critical Value					0.274	Detected Data Not Normal at 5% Significance Level					
2004	**Detected Data Not Normal at 5% Significance Level**											
2005												
2006	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**											
2007	KM Mean					2.345	KM Standard Error of Mean					1.15
2008	KM SD					4.335	95% KM (BCA) UCL					4.326
2009	95% KM (t) UCL					4.36	95% KM (Percentile Bootstrap) UCL					4.194
2010	95% KM (z) UCL					4.235	95% KM Bootstrap t UCL					6.955
2011	90% KM Chebyshev UCL					5.793	95% KM Chebyshev UCL					7.355
2012	97.5% KM Chebyshev UCL					9.523	99% KM Chebyshev UCL					13.78
2013												
2014	**Gamma GOF Tests on Detected Observations Only**											
2015	A-D Test Statistic					0.266	**Anderson-Darling GOF Test**					
2016	5% A-D Critical Value					0.777	Detected data appear Gamma Distributed at 5% Significance Level					
2017	K-S Test Statistic					0.177	**Kolmogorov-Smirnov GOF**					
2018	5% K-S Critical Value					0.295	Detected data appear Gamma Distributed at 5% Significance Level					
2019	**Detected data appear Gamma Distributed at 5% Significance Level**											
2020												
2021	**Gamma Statistics on Detected Data Only**											
2022	k hat (MLE)					0.464	k star (bias corrected MLE)					0.383
2023	Theta hat (MLE)					8.969	Theta star (bias corrected MLE)					10.85
2024	nu hat (MLE)					8.348	nu star (bias corrected)					6.898
2025	Mean (detects)					4.159						
2026												
2027	**Gamma ROS Statistics using Imputed Non-Detects**											
2028	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

	A–E	F	G–K	L
2029	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
2030	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
2031	This is especially true when the sample size is small.			
2032	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
2033	Minimum	0.01	Mean	2.344
2034	Maximum	13.5	Median	0.083
2035	SD	4.478	CV	1.91
2036	k hat (MLE)	0.25	k star (bias corrected MLE)	0.245
2037	Theta hat (MLE)	9.385	Theta star (bias corrected MLE)	9.583
2038	nu hat (MLE)	7.992	nu star (bias corrected)	7.827
2039	Adjusted Level of Significance (β)	0.0335		
2040	Approximate Chi Square Value (7.83, α)	2.635	Adjusted Chi Square Value (7.83, β)	2.305
2041	95% Gamma Approximate UCL (use when n>=50)	6.962	95% Gamma Adjusted UCL (use when n<50)	7.961
2042				
2043	**Estimates of Gamma Parameters using KM Estimates**			
2044	Mean (KM)	2.345	SD (KM)	4.335
2045	Variance (KM)	18.79	SE of Mean (KM)	1.15
2046	k hat (KM)	0.292	k star (KM)	0.279
2047	nu hat (KM)	9.36	nu star (KM)	8.938
2048	theta hat (KM)	8.016	theta star (KM)	8.394
2049	80% gamma percentile (KM)	3.528	90% gamma percentile (KM)	6.97
2050	95% gamma percentile (KM)	10.97	99% gamma percentile (KM)	21.46
2051				
2052	**Gamma Kaplan-Meier (KM) Statistics**			
2053	Approximate Chi Square Value (8.94, α)	3.29	Adjusted Chi Square Value (8.94, β)	2.911
2054	95% Gamma Approximate KM-UCL (use when n>=50)	6.37	95% Gamma Adjusted KM-UCL (use when n<50)	7.2
2055				
2056	**Lognormal GOF Test on Detected Observations Only**			
2057	Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**	
2058	5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
2059	Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**	
2060	5% Lilliefors Critical Value	0.274	Detected Data appear Lognormal at 5% Significance Level	
2061	**Detected Data appear Lognormal at 5% Significance Level**			
2062				
2063	**Lognormal ROS Statistics Using Imputed Non-Detects**			
2064	Mean in Original Scale	2.341	Mean in Log Scale	-2.438
2065	SD in Original Scale	4.479	SD in Log Scale	3.336
2066	95% t UCL (assumes normality of ROS data)	4.304	95% Percentile Bootstrap UCL	4.489
2067	95% BCA Bootstrap UCL	4.978	95% Bootstrap t UCL	7.106
2068	95% H-UCL (Log ROS)	10278		
2069				
2070	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
2071	KM Mean (logged)	-1.936	KM Geo Mean	0.144
2072	KM SD (logged)	2.748	95% Critical H Value (KM-Log)	5.922
2073	KM Standard Error of Mean (logged)	0.729	95% H-UCL (KM -Log)	421
2074	KM SD (logged)	2.748	95% Critical H Value (KM-Log)	5.922
2075	KM Standard Error of Mean (logged)	0.729		
2076				
2077	**DL/2 Statistics**			
2078	**DL/2 Normal**		**DL/2 Log-Transformed**	
2079	Mean in Original Scale	2.345	Mean in Log Scale	-2.085
2080	SD in Original Scale	4.477	SD in Log Scale	3.033

	A	B	C	D	E	F	G	H	I	J	K	L
2081	95% t UCL (Assumes normality)					4.308	95% H-Stat UCL					1990
2082	**DL/2 is not a recommended method, provided for comparisons and historical reasons**											
2083												
2084	**Nonparametric Distribution Free UCL Statistics**											
2085	**Detected Data appear Gamma Distributed at 5% Significance Level**											
2086												
2087	**Suggested UCL to Use**											
2088	Adjusted KM-UCL (use when k<=1 and 15 < n < 50 but k<=1)					7.2						
2089												
2090	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
2091	Recommendations are based upon data size, data distribution, and skewness.											
2092	These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).											
2093	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2094												

Appendix D

Cumulative Risk Calculations for Soil

PREPARER

Preparer Name	Site Name	Address	City State	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	Albia 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.104	
Anthracene	000120-12-7	0.0955	
Arsenic, Inorganic	007440-38-2	6.222	
Benzo[a]anthracene	000056-55-3	0.37	
Benzo[a]pyrene	000050-32-8	0.485	
Benzo[b]fluoranthene	000205-99-2	1.392	
Benzo[g,h,i]perylene	000191-24-2	0.424	
Benzo[k]fluoranthene	000207-08-9	0.204	
Chrysene	000218-01-9	0.479	
Dibenz[a,h]anthracene	000053-70-3	0.0952	
Fluoranthene	000206-44-0	0.466	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.406	
Lead and Compounds	007439-92-1	136.6	
Methylnaphthalene, 2	000091-57-6	0.0825	
Naphthalene	000091-20-3	0.136	
Phenanthrene	000085-01-8	0.323	
Pyrene	000129-00-0	0.518	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0

Cumulative Cancer Risk Construction Worker: 0
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.06				0.06									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2															

		Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.07			0.07									0.07	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.13	0	0	0.07	0.06	0	0	0	0	0	0	0	0.08	0.01

PREPARER

Preparer Name	Site Name	Address	City State	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	Albia 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.104	
Anthracene	000120-12-7	0.0955	
Arsenic, Inorganic	007440-38-2	6.222	
Benzo[a]anthracene	000056-55-3	0.37	
Benzo[a]pyrene	000050-32-8	0.485	
Benzo[b]fluoranthene	000205-99-2	1.392	
Benzo[g,h,i]perylene	000191-24-2	0.424	
Benzo[k]fluoranthene	000207-08-9	0.204	
Chrysene	000218-01-9	0.479	
Dibenz[a,h]anthracene	000053-70-3	0.0952	
Fluoranthene	000206-44-0	0.466	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.406	
Lead and Compounds	007439-92-1	136.6	
Methylnaphthalene, 2	000091-57-6	0.0825	
Naphthalene	000091-20-3	0.136	
Phenanthrene	000085-01-8	0.323	
Pyrene	000129-00-0	0.518	

CANCER OUTPUT

Chemical	CASRN	Resident Soil	Site Worker Soil
Arsenic, Inorganic	007440-38-2	0.16	0.04
Benzo[a]anthracene	000056-55-3	0.01	0
Benzo[a]pyrene	000050-32-8	0.01	0
Benzo[b]fluoranthene	000205-99-2	0.02	0.01
Benzo[k]fluoranthene	000207-08-9	0	0
Chrysene	000218-01-9	0	0
Dibenz[a,h]anthracene	000053-70-3	0.02	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0.01	0
Lead and Compounds	007439-92-1	NQ	NQ
Naphthalene	000091-20-3	NQ	NQ
TOTALS:	Â	0.23	0.05

Cumulative Cancer Risk Site Resident: 0.23
Cumulative Cancer Risk Site Worker: 0.05
All cancer risk values are x 10^-4

SITE RESIDENT - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.29				0.29									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.03	0.03

Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.34			0.34									0.34	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.63	0	0	0.34	0.29	0	0	0	0	0	0	0	0.37	0.03

SITE WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8	Soil				0										
Anthracene	000120-12-7	Soil		0										0		
Arsenic, Inorganic	007440-38-2	Soil	0.06				0.06									
Benzo[a]anthracene	000056-55-3	Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.126			0.126									0.126	

Methylnaphthalene, 2	000091-57-6															
		Soil											0			
Naphthalene	000091-20-3															
		Soil									0			0		
Phenanthrene	000085-01-8															
		Soil				0										
Pyrene	000129-00-0															
		Soil				0										
		Sum:	0.186	0	0	0.126	0.06	0	0	0	0	0	0	0	0.136	0.01

PREPARER

Preparer Name	Site Name	Address	City State :	Comment
Tim Wineland	IPL Albia MGP	501 N Mai	Albia, IA	Albia GT2ft

PREPARER INPUT

Chemical	CASRN	Exposure I	Site-Specific Background Soil Level* (mg/kg)
Acenaphthene	000083-32-9	0.722	
Acenaphthylene	000208-96-8	3.86	
Anthracene	000120-12-7	3.41	
Arsenic, Inorganic	007440-38-2	7.497	
Benzo[a]anthracene	000056-55-3	2.28	
Benzo[a]pyrene	000050-32-8	1.912	
Benzo[b]fluoranthene	000205-99-2	1.612	
Benzo[g,h,i]perylene	000191-24-2	1.139	
Benzo[k]fluoranthene	000207-08-9	0.719	
Butylbenzene, n-	000104-51-8	0.201	
Chrysene	000218-01-9	1.88	
Dibenz[a,h]anthracene	000053-70-3	0.174	
Fluoranthene	000206-44-0	8.77	
Fluorene	000086-73-7	4.89	
Indeno[1,2,3-cd]pyrene	000193-39-5	1.161	
Lead and Compounds	007439-92-1	15.23	
Methylnaphthalene, 2	000091-57-6	1.584	
Naphthalene	000091-20-3	28.5	
Phenanthrene	000085-01-8	21.1	
Propylbenzene, N-	000103-65-1	0.173	
Pyrene	000129-00-0	11.1	
Toluene	000108-88-3	0.212	
Trimethylbenzene, 1,2,4-	000095-63-6	2.22	
Trimethylbenzene, 1,3,5-	000108-67-8	0.677	
Xylene, Mixture	001330-20-7	1.2	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0

Cumulative Cancer Risk Construction Worker: 0
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthene	000083-32-9															
		Soil														

Acenaphthylene	000208-96-8	Soil				0										
Anthracene	000120-12-7	Soil		0										0		
Arsenic, Inorganic	007440-38-2	Soil	0.07				0.07									
Benzo[a]anthracene	000056-55-3	Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.02	0.02
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Butylbenzene, n-	000104-51-8	Soil		0										0		
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Fluorene	000086-73-7	Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.01			0.01									0.01	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0.01			0.01		
Phenanthrene	000085-01-8	Soil				0										
Propylbenzene, N-	000103-65-1	Soil									0					
Pyrene	000129-00-0	Soil				0										
Toluene	000108-88-3	Soil		0		0					0					
Trimethylbenzene, 1,2,4-	000095-63-6	Soil												0		
Trimethylbenzene, 1,3,5-	000108-67-8	Soil												0		
Xylene, Mixture	001330-20-7	Soil									0			0		
		Sum:	0.08	0	0	0.01	0.07	0	0	0	0.01	0	0	0.01	0.03	0.02

PREPARER

Preparer Name	Site Name	Address	City State Zip	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	CVEC 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.305	
Anthracene	000120-12-7	0.106	
Arsenic, Inorganic	007440-38-2	21.49	
Benzo[a]anthracene	000056-55-3	0.562	
Benzo[a]pyrene	000050-32-8	0.906	
Benzo[b]fluoranthene	000205-99-2	1.121	
Benzo[g,h,i]perylene	000191-24-2	0.866	
Benzo[k]fluoranthene	000207-08-9	0.366	
Chrysene	000218-01-9	0.74	
Dibenz[a,h]anthracene	000053-70-3	0.132	
Fluoranthene	000206-44-0	0.835	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.71	
Lead and Compounds	007439-92-1	64.94	
Methylnaphthalene, 2	000091-57-6	0.0799	
Naphthalene	000091-20-3	0.149	
Phenanthrene	000085-01-8	0.364	
Pyrene	000129-00-0	1.34	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0.01
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0.01

Cumulative Cancer Risk Construction Worker: 0.01
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.2				0.2									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2															

		Soil														
Benzo[g,h,i]perylene	000191-24-2															
		Soil				0										
Benzo[k]fluoranthene	000207-08-9															
		Soil														
Chrysene	000218-01-9															
		Soil														
Dibenz[a,h]anthracene	000053-70-3															
		Soil														
Fluoranthene	000206-44-0															
		Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5															
		Soil														
Lead and Compounds	007439-92-1															
		Soil	0.03			0.03									0.03	
Methylnaphthalene, 2	000091-57-6															
		Soil											0			
Naphthalene	000091-20-3															
		Soil									0			0		
Phenanthrene	000085-01-8															
		Soil				0										
Pyrene	000129-00-0															
		Soil				0										
		Sum:	0.23	0	0	0.03	0.2	0	0	0	0	0	0	0	0.04	0.01

PREPARER

Preparer Name	Site Name	Address	City State	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	CVEC 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.305	
Anthracene	000120-12-7	0.106	
Arsenic, Inorganic	007440-38-2	21.49	
Benzo[a]anthracene	000056-55-3	0.562	
Benzo[a]pyrene	000050-32-8	0.906	
Benzo[b]fluoranthene	000205-99-2	1.121	
Benzo[g,h,i]perylene	000191-24-2	0.866	
Benzo[k]fluoranthene	000207-08-9	0.366	
Chrysene	000218-01-9	0.74	
Dibenz[a,h]anthracene	000053-70-3	0.132	
Fluoranthene	000206-44-0	0.835	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.71	
Lead and Compounds	007439-92-1	64.94	
Methylnaphthalene, 2	000091-57-6	0.0799	
Naphthalene	000091-20-3	0.149	
Phenanthrene	000085-01-8	0.364	
Pyrene	000129-00-0	1.34	

CANCER OUTPUT

Chemical	CASRN	Resident Soil	Site Worker Soil
Arsenic, Inorganic	007440-38-2	0.55	0.12
Benzo[a]anthracene	000056-55-3	0.01	0
Benzo[a]pyrene	000050-32-8	0.02	0.01
Benzo[b]fluoranthene	000205-99-2	0.02	0
Benzo[k]fluoranthene	000207-08-9	0	0
Chrysene	000218-01-9	0	0
Dibenz[a,h]anthracene	000053-70-3	0.02	0.01
Indeno[1,2,3-cd]pyrene	000193-39-5	0.01	0
Lead and Compounds	007439-92-1	NQ	NQ
Naphthalene	000091-20-3	NQ	NQ
TOTALS:	Â	0.63	0.14

Cumulative Cancer Risk Site Resident: 0.63
Cumulative Cancer Risk Site Worker: 0.14
All cancer risk values are x 10^-4

SITE RESIDENT - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.99				0.99									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.05	0.05

Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0.01										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.16			0.16									0.16	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	1.15	0	0	0.17	0.99	0	0	0	0	0	0	0	0.21	0.05

SITE WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8	Soil				0										
Anthracene	000120-12-7	Soil		0										0		
Arsenic, Inorganic	007440-38-2	Soil	0.2				0.2									
Benzo[a]anthracene	000056-55-3	Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.054			0.054									0.054	

Methylnaphthalene, 2	000091-57-6															
		Soil											0			
Naphthalene	000091-20-3															
		Soil									0			0		
Phenanthrene	000085-01-8															
		Soil				0										
Pyrene	000129-00-0															
		Soil				0										
		Sum:	0.254	0	0	0.054	0.2	0	0	0	0	0	0	0	0.064	0.01

PREPARER

Preparer Name	Site Name	Address	City State Zip	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	CVEC >2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthene	000083-32-9	0.0354	
Acenaphthylene	000208-96-8	0.227	
Anthracene	000120-12-7	0.0917	
Arsenic, Inorganic	007440-38-2	6.02	
Benzene	000071-43-2	0.0194	
Benzo[a]anthracene	000056-55-3	0.313	
Benzo[a]pyrene	000050-32-8	0.2	
Benzo[b]fluoranthene	000205-99-2	0.325	
Benzo[g,h,i]perylene	000191-24-2	0.291	
Benzo[k]fluoranthene	000207-08-9	0.057	
Chrysene	000218-01-9	0.163	
Dibenz[a,h]anthracene	000053-70-3	0.0589	
Ethylbenzene	000100-41-4	2	
Fluoranthene	000206-44-0	1.221	
Fluorene	000086-73-7	0.103	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.421	
Lead and Compounds	007439-92-1	21.49	
Methylnaphthalene, 2	000091-57-6	0.0598	
Naphthalene	000091-20-3	4.067	
Phenanthrene	000085-01-8	3.076	
Pyrene	000129-00-0	1.711	
Trimethylbenzene, 1,2,4-	000095-63-6	0.809	
Trimethylbenzene, 1,3,5-	000108-67-8	0.274	
Xylene, Mixture	001330-20-7	1.07	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil	
Arsenic, Inorganic	007440-38-2		0
Benzene	000071-43-2		0
Benzo[a]anthracene	000056-55-3		0
Benzo[a]pyrene	000050-32-8		0
Benzo[b]fluoranthene	000205-99-2		0
Benzo[k]fluoranthene	000207-08-9		0
Chrysene	000218-01-9		0
Dibenz[a,h]anthracene	000053-70-3		0
Indeno[1,2,3-cd]pyrene	000193-39-5		0
Lead and Compounds	007439-92-1	NQ	
Naphthalene	000091-20-3	NQ	
TOTALS:	Â		0

Cumulative Cancer Risk Construction Worker: 0
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthene	000083-32-9															
		Soil														
Acenaphthylene	000208-96-8															

		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.06				0.06									
Benzene	000071-43-2															
		Soil			0					0						
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0	0
Benzo[b]fluoranthene	000205-99-2															
		Soil														
Benzo[g,h,i]perylene	000191-24-2															
		Soil				0										
Benzo[k]fluoranthene	000207-08-9															
		Soil														
Chrysene	000218-01-9															
		Soil														
Dibenz[a,h]anthracene	000053-70-3															
		Soil														
Ethylbenzene	000100-41-4															
		Soil		0		0										
Fluoranthene	000206-44-0															
		Soil		0	0	0										
Fluorene	000086-73-7															
		Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5															
		Soil														
Lead and Compounds	007439-92-1															
		Soil	0.01			0.01									0.01	
Methylnaphthalene, 2	000091-57-6															
		Soil											0			
Naphthalene	000091-20-3															
		Soil									0			0		
Phenanthrene	000085-01-8															
		Soil				0										
Pyrene	000129-00-0															
		Soil				0										
Trimethylbenzene, 1,2,4-	000095-63-6															
		Soil												0		
Trimethylbenzene, 1,3,5-	000108-67-8															
		Soil												0		
Xylene, Mixture	001330-20-7															
		Soil									0			0		
		Sum:	0.07	0	0	0.01	0.06	0	0	0	0	0	0	0	0.01	0

PREPARER

Preparer Name	Site Name	Address	City State	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	Hendersen 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.514	
Anthracene	000120-12-7	0.114	
Arsenic, Inorganic	007440-38-2	5.31	
Benzo[a]anthracene	000056-55-3	0.563	
Benzo[a]pyrene	000050-32-8	0.798	
Benzo[b]fluoranthene	000205-99-2	1.002	
Benzo[g,h,i]perylene	000191-24-2	0.869	
Benzo[k]fluoranthene	000207-08-9	0.615	
Chrysene	000218-01-9	0.526	
Dibenz[a,h]anthracene	000053-70-3	0.139	
Fluoranthene	000206-44-0	0.452	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.688	
Lead and Compounds	007439-92-1	67.6	
Methylnaphthalene, 2	000091-57-6	0.084	
Naphthalene	000091-20-3	0.0728	
Phenanthrene	000085-01-8	0.244	
Pyrene	000129-00-0	0.741	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0

Cumulative Cancer Risk Construction Worker: 0
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.05				0.05									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2															

		Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.03			0.03									0.03	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.08	0	0	0.03	0.05	0	0	0	0	0	0	0	0.04	0.01

PREPARER

Preparer Name	Site Name	Address	City State :	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	Hendersen 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.514	
Anthracene	000120-12-7	0.114	
Arsenic, Inorganic	007440-38-2	5.31	
Benzo[a]anthracene	000056-55-3	0.563	
Benzo[a]pyrene	000050-32-8	0.798	
Benzo[b]fluoranthene	000205-99-2	1.002	
Benzo[g,h,i]perylene	000191-24-2	0.869	
Benzo[k]fluoranthene	000207-08-9	0.615	
Chrysene	000218-01-9	0.526	
Dibenz[a,h]anthracene	000053-70-3	0.139	
Fluoranthene	000206-44-0	0.452	
Indeno[1,2,3-cd]pyrene	000193-39-5	0.688	
Lead and Compounds	007439-92-1	67.6	
Methylnaphthalene, 2	000091-57-6	0.084	
Naphthalene	000091-20-3	0.0728	
Phenanthrene	000085-01-8	0.244	
Pyrene	000129-00-0	0.741	

CANCER OUTPUT

Chemical	CASRN	Resident Soil	Site Worker Soil
Arsenic, Inorganic	007440-38-2	0.14	0.03
Benzo[a]anthracene	000056-55-3	0.01	0
Benzo[a]pyrene	000050-32-8	0.02	0
Benzo[b]fluoranthene	000205-99-2	0.02	0
Benzo[k]fluoranthene	000207-08-9	0	0
Chrysene	000218-01-9	0	0
Dibenz[a,h]anthracene	000053-70-3	0.02	0.01
Indeno[1,2,3-cd]pyrene	000193-39-5	0.01	0
Lead and Compounds	007439-92-1	NQ	NQ
Naphthalene	000091-20-3	NQ	NQ
TOTALS:	Â	0.22	0.04

Cumulative Cancer Risk Site Resident: 0.22
Cumulative Cancer Risk Site Worker: 0.04
All cancer risk values are x 10^-4

SITE RESIDENT - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.25				0.25									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.05	0.05

Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0.01										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.17			0.17									0.17	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.42	0	0	0.18	0.25	0	0	0	0	0	0	0	0.22	0.05

SITE WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8	Soil				0										
Anthracene	000120-12-7	Soil		0										0		
Arsenic, Inorganic	007440-38-2	Soil	0.05				0.05									
Benzo[a]anthracene	000056-55-3	Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.01	0.01
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.054			0.054									0.054	

Methylnaphthalene, 2	000091-57-6																
		Soil											0				
Naphthalene	000091-20-3																
		Soil									0			0			
Phenanthrene	000085-01-8																
		Soil				0											
Pyrene	000129-00-0																
		Soil				0											
		Sum:	0.104	0	0	0.054	0.05	0	0	0	0	0	0	0	0.064	0.01	

PREPARER

Preparer Name	Site Name	Address	City State .	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	IaDOT 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.464	
Anthracene	000120-12-7	0.461	
Arsenic, Inorganic	007440-38-2	12.3	
Benzo[a]anthracene	000056-55-3	2.317	
Benzo[a]pyrene	000050-32-8	2.889	
Benzo[b]fluoranthene	000205-99-2	3.377	
Benzo[g,h,i]perylene	000191-24-2	3.127	
Benzo[k]fluoranthene	000207-08-9	0.783	
Chrysene	000218-01-9	2.891	
Dibenz[a,h]anthracene	000053-70-3	0.356	
Fluoranthene	000206-44-0	4.231	
Fluorene	000086-73-7	0.322	
Indeno[1,2,3-cd]pyrene	000193-39-5	3.142	
Lead and Compounds	007439-92-1	121.6	
Methylnaphthalene, 2	000091-57-6	0.25	
Naphthalene	000091-20-3	0.282	
Phenanthrene	000085-01-8	5.513	
Pyrene	000129-00-0	4.944	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0.01
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0.01

Cumulative Cancer Risk Construction Worker: 0.01
All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.12				0.12									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															
		Soil													0.03	0.03

Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Fluorene	000086-73-7	Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.06			0.06									0.06	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.18	0	0	0.06	0.12	0	0	0	0	0	0	0	0.09	0.03

PREPARER

Preparer Name	Site Name	Address	City State :	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	IaDOT 0-2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthylene	000208-96-8	0.464	
Anthracene	000120-12-7	0.461	
Arsenic, Inorganic	007440-38-2	12.3	
Benzo[a]anthracene	000056-55-3	2.317	
Benzo[a]pyrene	000050-32-8	2.889	
Benzo[b]fluoranthene	000205-99-2	3.377	
Benzo[g,h,i]perylene	000191-24-2	3.127	
Benzo[k]fluoranthene	000207-08-9	0.783	
Chrysene	000218-01-9	2.891	
Dibenz[a,h]anthracene	000053-70-3	0.356	
Fluoranthene	000206-44-0	4.231	
Fluorene	000086-73-7	0.322	
Indeno[1,2,3-cd]pyrene	000193-39-5	3.142	
Lead and Compounds	007439-92-1	121.6	
Methylnaphthalene, 2	000091-57-6	0.25	
Naphthalene	000091-20-3	0.282	
Phenanthrene	000085-01-8	5.513	
Pyrene	000129-00-0	4.944	

CANCER OUTPUT

Chemical	CASRN	Resident Soil	Site Worker Soil
Arsenic, Inorganic	007440-38-2	0.32	0.07
Benzo[a]anthracene	000056-55-3	0.04	0.01
Benzo[a]pyrene	000050-32-8	0.06	0.02
Benzo[b]fluoranthene	000205-99-2	0.05	0.01
Benzo[k]fluoranthene	000207-08-9	0	0
Chrysene	000218-01-9	0	0
Dibenz[a,h]anthracene	000053-70-3	0.06	0.02
Indeno[1,2,3-cd]pyrene	000193-39-5	0.05	0.01
Lead and Compounds	007439-92-1	NQ	NQ
Naphthalene	000091-20-3	NQ	NQ
TOTALS:	Â	0.58	0.14

Cumulative Cancer Risk Site Resident: 0.58
Cumulative Cancer Risk Site Worker: 0.14
All cancer risk values are x 10^-4

SITE RESIDENT - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.57				0.57									
Benzo[a]anthracene	000056-55-3															
		Soil														
Benzo[a]pyrene	000050-32-8															

		Soil													0.17	0.17
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0.02										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Fluorene	000086-73-7	Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.3			0.3									0.3	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.87	0	0	0.32	0.57	0	0	0	0	0	0	0	0.47	0.17

SITE WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthylene	000208-96-8	Soil				0										
Anthracene	000120-12-7	Soil		0										0		
Arsenic, Inorganic	007440-38-2	Soil	0.11				0.11									
Benzo[a]anthracene	000056-55-3	Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.03	0.03
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Fluorene	000086-73-7															

		Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.108			0.108									0.108	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.218	0	0	0.108	0.11	0	0	0	0	0	0	0	0.138	0.03

PREPARER

Preparer Name	Site Name	Address	City State	Comment
Tim Wineland	IPL Albia MGP	501 N Main St	Albia, IA	IaDOT GT2ft

PREPARER INPUT

Chemical	CASRN	Exposure Point Concentration for Soil(mg/kg)	Site-Specific Background Soil Level* (mg/kg)
Acenaphthene	000083-32-9	2.452	
Acenaphthylene	000208-96-8	1.621	
Anthracene	000120-12-7	1.523	
Arsenic, Inorganic	007440-38-2	4.845	
Benzo[a]anthracene	000056-55-3	1.397	
Benzo[a]pyrene	000050-32-8	1.902	
Benzo[b]fluoranthene	000205-99-2	1.844	
Benzo[g,h,i]perylene	000191-24-2	1.56	
Benzo[k]fluoranthene	000207-08-9	0.612	
Chrysene	000218-01-9	1.585	
Dibenz[a,h]anthracene	000053-70-3	0.276	
Fluoranthene	000206-44-0	4.889	
Fluorene	000086-73-7	4.709	
Indeno[1,2,3-cd]pyrene	000193-39-5	1.339	
Lead and Compounds	007439-92-1	124.6	
Methylnaphthalene, 2	000091-57-6	0.13	
Naphthalene	000091-20-3	0.256	
Phenanthrene	000085-01-8	13.29	
Pyrene	000129-00-0	7.2	

CANCER OUTPUT

Chemical	CASRN	Construction Worker Soil
Arsenic, Inorganic	007440-38-2	0
Benzo[a]anthracene	000056-55-3	0
Benzo[a]pyrene	000050-32-8	0
Benzo[b]fluoranthene	000205-99-2	0
Benzo[k]fluoranthene	000207-08-9	0
Chrysene	000218-01-9	0
Dibenz[a,h]anthracene	000053-70-3	0
Indeno[1,2,3-cd]pyrene	000193-39-5	0
Lead and Compounds	007439-92-1	NQ
Naphthalene	000091-20-3	NQ
TOTALS:	Â	0

Cumulative Cancer Risk Construction Worker: 0

All cancer risk values are x 10^-4

CONSTRUCTION WORKER - NON CANCER OUTPUT BY TARGET ORGAN

Chemical Name	CASRN	Media	Heart	Liver	Blood	Kidney	Skin	Endoc	Eye	Immu	Nerve	GenUr	Respi	Other	Devel	Gastro
Acenaphthene	000083-32-9															
		Soil														
Acenaphthylene	000208-96-8															
		Soil				0										
Anthracene	000120-12-7															
		Soil		0										0		
Arsenic, Inorganic	007440-38-2															
		Soil	0.05				0.05									
Benzo[a]anthracene	000056-55-3															

		Soil														
Benzo[a]pyrene	000050-32-8	Soil													0.02	0.02
Benzo[b]fluoranthene	000205-99-2	Soil														
Benzo[g,h,i]perylene	000191-24-2	Soil				0										
Benzo[k]fluoranthene	000207-08-9	Soil														
Chrysene	000218-01-9	Soil														
Dibenz[a,h]anthracene	000053-70-3	Soil														
Fluoranthene	000206-44-0	Soil		0	0	0										
Fluorene	000086-73-7	Soil		0	0											
Indeno[1,2,3-cd]pyrene	000193-39-5	Soil														
Lead and Compounds	007439-92-1	Soil	0.06			0.06									0.06	
Methylnaphthalene, 2	000091-57-6	Soil											0			
Naphthalene	000091-20-3	Soil									0			0		
Phenanthrene	000085-01-8	Soil				0										
Pyrene	000129-00-0	Soil				0										
		Sum:	0.11	0	0	0.06	0.05	0	0	0	0	0	0	0	0.08	0.02