FINAL RECLAMATION PLAN

SECTION 12 MINE
MCKINLEY COUNTY, NEW MEXICO
Rev. 0

SOUTHWEST RESOURCES INC.

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1 INTRODUCTION

The Section 12 Mine is located at 35° 27’ 17”N, 107° 51’ 01”W in T14N, Rl0W, SW 1/4 of Section 12, McKinley County, New Mexico (Figure 1). This underground uranium mine was developed by Cobb Resources, and it operated intermittently in 1959 and 1962 then from approximately 1974 to the early 1982; the mine is currently inactive and owned by Southwest Resources Inc. (SRI). The financial interests of SRI, including reclamation of the Section 12 Mine, are being managed by Empire Trust, Inc.

Although it is adjacent to ephemeral Ambrosia Lake, the mine was operated as a dry mine, encountered no ground water during operations, and did not discharge radiological effluent from the mine workings.

The years of mine operation pre-dated the New Mexico Mining Act (Title 19, Chapter 10 NMAC), so the mine did not have a permit. However, SRI submitted an application for a minimal-impact mine permit to New Mexico Energy, Minerals, and Natural Resources Department’s Mining and Minerals Division (MMD) on January 14, 2014. That application was denied, and under the New Mexico Mining Act the mine has been classified as a regular existing mine subject to the requirements in Part 5 of the Act. Subsequently, SRI performed an economic analysis of the mine and determined that, considering the current uranium market and the limited remaining uranium resources, the mine will not be operating in the future, and SRI will not seek a mine permit will undertake reclamation of the Section 12 Mine.

Upon SRI’s decision not to seek a mine permit under 19.10.5 NMAC, the Director of MMD issued a draft Order of Abatement on Consent that SRI to prepare a Conceptual Reclamation Plan (CRP). The CRP, dated 6/28/2019, was submitted in July 2019, and MMD provided comments on the CRP to SRI on 8/28/2019 and required SRI to prepare a Final Reclamation Plan (RP). The Final RP is submitted in compliance with the New Mexico Mining and Minerals Division (MMD) Director’s Order of Abatement on Consent (Order, MMD 2019) issued on December 16, 2019 by MMD and signed by Empire Trust Inc. on January 14, 2020. The Order requires the Reclamation Plan to satisfy requirements for a closeout plan under NMAC 19.10.5.506 and responds to the environmental standards of the MMD/ NMED *Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico*.

The initial effort on the RP was identification of reclamation objectives, which are described in Section 2. With these objectives delineated, a work plan was prepared that describes the tasks leading up to the RP. Although some of the tasks were initiated before that date, the work plan was completed on 10/4/2019. The remaining work plan tasks were initiated immediately after that, starting with preparation of a Health and Safety Plan (HASP), soil sampling and testing, and a video survey of the shaft on 10/17/2019.

This RP describes the reclamation objectives, the existing conditions, and the reclamation activities, both those already performed and those planned, to satisfy the requirements of the MMD Order and the reclamation objectives.

2 RECLAMATION OBJECTIVES

The Section 12 Mine reclamation objectives are:

- Satisfaction of the *State of New Mexico Radiation Cleanup Criteria* in Section 2 of the *Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico* (MMD/NMED, 2016), namely:

  1) The concentration of Ra-226 in land averaged over any area of 100 square meters ("m^2") shall not exceed the background level by more than 5 pCi/g, averaged over the first 15 cm of soil below the surface, and 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface.

  2) Site post-reclamation radiation level ("PRRL") for gamma radiation should not exceed the site-specific value of gamma radiation that correlates to 5 pCi/g Ra-226 above background at the 95^{th} percentile value.

  3) Cover material for the repository must limit radon flux to not more than 20 $pCi/m^2/s$.

- Satisfaction of the requirements under NMAC 19.10.5.506A & B, 507A.
- Satisfaction of the requirements under ¶ 32 of the Order.

3 EXISTING CONDITIONS

According to the Director's Order Findings of Fact, #13 "The surface disturbance at the Mine Property exceeds 10 acres, excluding permanent roads" and #14 "A mine building, a hoist house, a main shaft, and two subsidiary vent shafts with or without headframes, piles of waste rock that contains low grade uranium mineralization, piles of rock mineralized with uranium that were intended for milling, and soils contaminated by uranium mineralization exist on the Mine Property. The Mine Property also contains roads, drainage ditches, and miscellaneous mining equipment." Additional descriptions of existing site conditions are provided in the following sections, in Table 1, on Figures 2 and 3, and in photos in Appendix A.

3.1 Existing Terrain

The mine site is located at the east side of Ambrosia Lake, an ephemeral lake that occupies a bolson or deflation basin formed primarily by wind erosion of the underlying Mancos Formation. Water-borne and residual clay soil covers the lake bed, and during mining some of the waste rock was placed at the edges of the lake basin. During wet periods, runoff collects in the basin from local sheet flow and, during extreme runoff events, from overflow from Arroyo del Puerto (Martin Draw) west of the mine site. This overflow from the lake leaves through a drainage point on the west edge of the lake basin to Arroyo del Puerto.

Covering most of the SW ¼, SW ¼ of Section 12 is a north-south ridge, the north end of Don Andres Hill. Otherwise, the SW ¼ of Section 12 rises nearly uniformly, except for lake bed and waste rock fills from the mine, from west to east at grades of less than 1%, so the rise in elevation from west to east is less than 10 feet. This terrain will affect location of the waste rock repository as well as borrow locations for cover soil. The existing terrain is illustrated in Figure 2.

3.2 Mine Facilities

The Section 12 mine is inactive, and SRI has no employees at the mine. Almost all equipment and supplies have been removed from the site; remaining structures are listed on Table 1 and shown on Figures 2 and 3 and in photos in Appendix A. Two durable steel-frame and metal-siding buildings, the hoist house and the mine office/ change room building, remain. A small wooden frame pump house remains next to the headframe. The main shaft and its headframe remain intact, but the shaft collar is blocked by a temporary wooden cover. Two small vent shafts remain, both with steel casing extending approximately five feet above ground surface; one of these has been backfilled previously and the other is open. The mine site is accessed by an unpaved two-track road extending northward to the mine approximately one mile from old Route 509.

3.3 Ground Water

There is no ground water in the mine area and within the depth of the mine workings, and there are no wells on the mine site. The closest wells are 2.03 miles west-northwest and 1.15 miles south-southeast of the Section 12 Mine (see Figure A1-14, *EPA Grants Mining District Information Meeting and Negotiations Update, October 2, 2019* and OSE well locations records).

Absence of ground water at the mine site was evident from the lack of wells, water impoundments, or water storage facilities other than a 2000 gallon tank next to the pump shack that was used to hold imported water for use underground for dust suppression and drilling. Absence of ground water has been confirmed by video survey of the shaft in 2019 (see photos in Appendix A)

3.4 Existing Radiological Contamination

Waste rock excavated from the mine and shaft contains Technically Enhanced Naturally Occurring Radiological Material (TENORM) that remains at a number of locations in small piles on the mine surface. Radiological surveys by Environmental Restoration Group (ERG, 2017; Appendix B) indicated that natural soil Ra-226 levels in the Background Reference Area (BRA) north of the mine average 1.41 pCi/g and the Ra-226 levels in waste rock and affected soils average 17.3 pCi/g. According to the MMD/ NMED Joint Guidance (MMD/NMED, 2016), waste rock and soil containing Ra-226 levels above background plus 5 pCi/g exceed the Post-Reclamation Radiation Level (PRRL) and should be removed or otherwise isolated from the accessible environment. The PRRL for the Section 12 Mine is 5 plus 1.41, or 6.41 pCi/g Ra-226. That Ra-226 level corresponds to a gamma radiation rate of approximately 24,520 counts per minutes (cpm) and a predicted exposure rate of 22.1

μR/h. The surface extent of radiological contamination is shown on Figure 3. Permits West made estimates of the depths of contamination from six inches to eight feet based on visual examination of trenches (Appendix C).

3.5 Existing Vegetation

A vegetation survey was performed in the autumn of 2019 by Kevin Branum of Enchanted Agro-management Solutions in a reference area in the SE ¼, NW ¼ of Section12, north of the mine area, overlapping part of the radiological BRA. The survey plan and report are included in Appendix D.

In the reference area, the average bare ground per transect was 46.25%, average litter per transect was 17.75%, and average gravel was 2%.

Average vegetative cover was 34%. The dominant species were Blue Grama and Sideoats Grama.

4 RECLAMATION ACTIVITIES

Reclamation activities already completed (Site Investigations) are described in Section 4.1, and the planned reclamation activities remaining to be performed are illustrated on Figures 4 and 5 and described in the remainder of Section 4. The relevant paragraphs in the Order are referenced in parentheses for each activity.

4.1 Site Investigations (Order ¶32a, 32b, 32j)

Because of the age of the mine and absence of records of mine construction and operations, the following site investigations have been performed. The initial action was to plan and perform site investigations to augment studies performed by ERG (2017) and Permits West Inc. (Tierney, 2018) and to collect additional information needed for final reclamation planning. Site investigations needed for reclamation planning were initiated in 2017 and completed in November 2019.

4.1.1 Baseline Radiological Characterization (*Joint Guidance* Section 5.2)

Prior to the initiation of RP activities, in 2017 Environmental Restoration Group (ERG) conducted surveys and soil sampling and testing for both background radiation and mine site radiation levels in accordance with *Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico* (MMD/NMED, 2016). The radiological surveys extended in all directions from the mine as far as the gamma levels indicated contamination. The berm and ditch on the north and west sides of Ambrosia Lake were not specifically targeted but were included in the extent of coverage of the survey as far as elevated gamma levels were detected; only the eastern-most part of the berm had gamma levels indicating radium above the clean-up standard. ERG's report (*Baseline Radiological Characterization of the Section 11/12 Mine – Phase 1*, 2017) documents the background radiation levels and mine-site radiation levels associated with radium content of soil and waste rock as well as the lateral (X and Y) distributions of radium. The ERG report is included in Appendix B and the results are shown on Figure 3.

The waste rock is the source of radiological contamination at ground surface and is classified as Technically Enhanced Naturally Occurring Radiological Material (TENORM), according to the EPA (see https://www.epa.gov/radiation/technologically-enhanced-naturally-occurring-radioactive-materials-tenorm). The TENORM, referred to in this RP as *radwaste*, includes soils with radiological contamination above 6.41 pCi/g Ra-226 and remains at a number of locations on the mine surface. The ERG survey indicates that:

- natural soil Ra-226 levels in the Background Reference Area (BRA) north of the mine average 1.41 pCi/g,
- Ra-226 levels in waste rock and affected soils (collectively radwaste) average 17.3 pCi/g,
- the Post-Reclamation Radiation Level (PRRL) for the Section 12 Mine is 5 plus 1.41, or 6.41 pCi/g Ra-226 with a gamma radiation rate of approximately 24,520 counts per minutes (cpm) and a predicted exposure rate of 22.1 μR/h.

No additional radiological characterization is necessary, but gamma scanning and soil testing will be conducted during construction to confirm achievement of clean-up.

4.1.2 Waste Characterization (Order ¶32a, 32f, 32j; *Joint Guidance*, Section 3.2)

Permits West performed initial visual waste characterization field studies in trenches across the mine areas that had been previously identified by ERG as containing radiological contamination. The Permits West report, *Waste Characterization Study – Phase 2, October 2018*, included in Appendix C, has been submitted previously to MMD and NMED.

Permits West Inc. (Tierney, 2018) performed waste characterization to determine the physical properties and depth of waste rock and contaminated soil (radwaste) in the mine site. Their report has been submitted previously to MMD and NMED. With MMD participation, Permits West excavated 13 trenches within the mine area to determine depth of radwaste and physical descriptions of both radwaste and the underlying clean soil. Permits West found that waste rock and related contaminated soils were distributed across the area of contamination identified by ERG to depths of up to eight feet in mounds of waste rock but typically 0.5 feet to 1.5 feet in other locations. Waste rock and soil in the trenches were visually classified in the field for color, texture, soil structure, and by hand-held gamma detector for gamma emission. Once the characterizations in each trench were completed, the trench was backfill to original grade. Additional details of the Permits West waste characterization are contained in their report (Tierney, 2018).

During 2019, Alan Kuhn Associates LLC visually examined the radwaste at the site to evaluate the geotechnical properties that would affect excavation and placement of radwaste in one or more repository locations (Appendix E). Although somewhat variable in sand, silt and clay content with some gravel to cobble size sandstone fragments, the waste rock is primarily a sand-clay mixture with USCS classification of SC, SM, SP-SM, and CL in diminishing order. This information was used to plan and conduct geotechnical sampling and testing of potential cover sources available on site (Figure 6).

4.1.3 Mine Facilities Inventory (Order ¶32c, 32d, 32e)

SRI contractors performed an inventory to identify types and quantities of building, shaft, and headframe materials that will be either sold for salvage or demolished and removed from the site or buried on the site. The inventory also included materials remaining on site that could result in contamination if left on site or that, by law, must be removed to a licensed facility.

Table 1 lists the structures and materials identified by the inventory. Third parties have expressed interest in removing the hoists, the headframe and the two steel-frame buildings; negotiations are under way with these parties. Non-compressible mine debris including steel, concrete, wire, and hoses will be placed in a cell within the repository then backfilled with radwaste or flooded with flowable cementitious fill. Combustible materials including paper and plastic will be incinerated.

The hoist house contains sixteen 55-gallon steel drums. Four of these contain charcoal and the other 12 contain resin loaded with 12000 mg/kg uranium. The drums came from an unidentified off-site source and had not been discovered until the recent inventory. SRI is making arrangements with a licensed facility to take the drums containing the uranium-loaded resin. Copies of manifests and chain of custody records for the resin shipments will be included in the reclamation completion report.

4.1.4 GPS Mapping (Order ¶32f, 32g, 32h, 32i, 32j)

Global Positioning (GPS) methods were used to establish coordinates and elevations for ground control and create terrain models of ground that will be excavated or filled during reclamation. The GPS topographic data collected by Edward Loescher, PE, included 1200 data points collected on 9/17-9/18/2019 with Trimble RTK Survey equipment. Using existing historical maps and the results of the GPS mapping, a base map of the mine area was prepared and used in planning earthwork, grading, and vegetation and in later documentation of site reclamation records.

Terrain models of existing terrain before excavation and the subsequent terrain model after excavation provided the basis for calculating earthwork volumes for final waste pile and cover design and for payment quantities. These models are illustrated in Figures 2 and 7. Due to the uncertainty of estimating volumes inherent in any earthwork for removal of contaminated soil and placement in a single waste rock pile, the model of the site terrain at completion of reclamation is the best estimate based on information available before reclamation. After the earthwork is finished, an as-built terrain drawing will be prepared based on a final GPS survey of impacted land surfaces.

4.1.5 Shaft Video Survey

On 10/17/2019, a video survey was performed by Jet West Geophysical Services with hoisting assistance by Stewart Brothers Drilling Company on the mine shaft from the collar to the bottom of the shaft. Both a continuous video recording of the entire shaft and a number of photographs documented the condition of the shaft. Representatives of MMD and NMED MECS were on site to observe the survey. All in attendance observed that no water was present at any depth in the shaft, confirming other observations that the shaft is dry. Selected photos from the video survey are included in Appendix A; however, due to the extremely large file size, the video and all photographic images of the shaft were previously submitted separately to MMD.

4.1.6 Cover Soil Characterization

Characterization of soil for the geotechnical and agronomic properties related to cover performance was performed by Alan Kuhn Associates in February, September and October 2019. A total of 28 grab samples of soil were collected from potential locations of borrow soil (Figure 6) to be used in construction of both the radon barrier (clay) cover and the vegetative medium (loam). Soil testing was performed by Daniel B. Stephens and Associates Inc. and NV5 Inc. The results of the soils investigations are compiled in Appendix E and, together with the findings of the radiological survey (Appendix B), provide the input necessary for the RADON model (Appendix F) used in design of the radwaste repository and cover.

As described below in Sections 4.2.5 and 4.2.6, the proposed method of radwaste disposal, stabilization and long-term management is consolidation of radwaste in an on-site, above-grade repository with a two-component soil cover. Figure 6 shows the soil sampling locations and the estimated borrow sources for the two types of soil that may be used in reclamation construction. The borrow soil investigations indicate that high-plasticity clay (CH) exists at shallow depths (0 to 2.0 feet) over most of the mine footprint, including Ambrosia Lake basin and most of the area between the lake basin and the east fence. Loam soil (clay loam, sandy clay loam) exists in the southeast corner of the mine property (SW1/4 of Section 12) as well as the lower part of the northeast slope of Don Andres Hill. The estimated volumes of these soils available on the mine property should be sufficient for cover construction.

4.1.7 Reference Vegetation Survey (Order ¶32j, 32k, 32o)

A qualified vegetation specialist, Kevin Branum, performed a reference area vegetation survey in the area shown on Figure 2 and Appendix D to identify local natural vegetation species and natural diversity, ground cover, and vegetation density for setting success criteria for the revegetation plan. The results of the reference survey are recorded in Appendix D.

In the primary reference area, A, the predominant vegetation species are blue grama and sideoats grama.

4.2 Reclamation (Order ¶33, 34, 35, 36)

SRI used the information and data collected in site investigations to refine and add detail to the Conceptual Reclamation Plan and the Draft Final Reclamation Plan submitted previously to finalize the designs contained in this Reclamation Plan (RP). The implementation of this design will be directed by drawings and a specification signed and sealed by a licensed Professional Engineer. The vegetation consultant will advise on the selection and placement of the seeding medium included in the repository cover design. The RP will include tasks to be performed in approximately the following sequence.

4.2.1 Materials Decontamination

The initial on-the-ground task of reclamation will be determination of the extent of radiological contamination of existing structures and materials at the mine. The drums of uranium-loaded resin (Section 4.1.3), the primary potential source of radiological exposure on the site, will be removed first. Once the resin is gone, the hoist, buildings and headframe will be swiped and the swipes tested for removable contaminant levels. If the hoist, building and headframes materials are to be re-cycled for use elsewhere, they will be decontaminated as necessary at a cleaning pad within the repository footprint and swiped again prior to removal from the site. Demolition debris and other non-recyclable materials will not be decontaminated and will be disposed in the shaft or within the repository footprint (Section 4.1.3).

4.2.2 Building Demolition

The two remaining salvageable buildings on site, the hoist house and the office/ change house, are sheet metal buildings. SRI has received statements of interest for removal and offsite re-use of both buildings, and agreements with the interested parties for removal of these buildings without cost to SRI are pending. If any building components have radiological contamination that exceeds release standards, they will be either cleaned before release or buried on site within the repository footprint. The hoist house will be removed before the hoisting equipment can be removed, but the office/change house will be removed any time prior to contaminated material (radwaste) excavation. The small wood-frame pump house next to the shaft will be demolished.

After removal of the building superstructures, the concrete foundations will be demolished to post-excavation surface grade (i.e.; ground surface remaining after removal of radwaste). Foundation concrete remaining below post-excavation surface grade will be broken and left in place and covered with not less than two feet of clean loam soil.

4.2.3 Hoisting Equipment Removal

Since mining operations ceased, all hoisting equipment has remained in place. Two skips, one at the bottom of the shaft and the other near the top, remain attached to the hoisting ropes. The upper skip will be removed from the shaft and scrapped. The lower skip will be left in the shaft. The main hoist and related motors and control equipment remain in the hoist house. After the hoist house superstructure is removed, this equipment will be removed and either sold for use elsewhere or stored off site until their disposition can be determined. Negotiations are ongoing with a mine equipment broker for removal of the hoist equipment without cost to SRI.

4.2.4 Shaft Headframe Removal

The main shaft headframe will be taken apart and removed. Negotiations are ongoing with a mine equipment broker for removal of the headframe without cost to SRI. Should no agreement for removal for re-use of the headframe be reached, the headframe will be demolished and the steel will be salvaged, sold for scrap, or buried on site.

4.2.5 Shaft and Vent Closure

The video survey of the mine shaft performed on 10/17/2019 confirmed what previous information had indicated – the shaft is dry and there is no recent evidence of ground water in the shaft or the mine. Therefore, there is no need for measures to protect ground water.

After the headframe is removed and before other earthwork is started, the shaft will be backfilled with radwaste, broken concrete, and other incompressible mine debris to -2 ft. of collar level. Radwaste backfill placement, including crushed concrete from building foundation demolition, will be dropped free-fall from the shaft collar to improve backfill compaction.. The shaft backfill will be given time during reclamation to settle, then topped by a mound of clean soil that will be supplemented as necessary.

Two vent shafts are located northwest of the main shaft (Figure 2). Both vents have five-foot diameter shafts with steel casings that extend to four feet above ground surface. The west vent has been backfilled previously. The east vent is open to full depth and has a steel rebar grid cover that is spot-welded to the top of the casing. The easterly vent cover will be replaced with a more durable steel rebar cover designed for easy ingress/ egress for bats.

4.2.6 Contaminated-Material Excavation

Waste rock and radiologically-contaminated soil (radwaste) will be excavated from all mine areas except the designated repository location and placed in compacted lifts within the repository footprint at that location. The location for the repository is the area east of the mine access road and west of the fence along the east side of the mine area, where substantial radwaste is already in place (Figure 3). The radwaste will be excavated first from the most distal locations and carried directly to the repository, working progressively toward the repository.

Informal communications with BLM indicate that it will cooperate with SRI in the mine reclamation by providing access to the west end of Section 7, R 9 W, T 14 N that has contamination from the mine (Figure 3). SRI will request a written agreement from BLM for this access that will include assurance that the disturbed ground will be reclaimed to the same standards as the mine site.

All existing radwaste is within a few hundred feet of the proposed repository location. This short haul distance will make it feasible to:

- Excavate by dozer and push most of the radwaste directly to the repository or the shaft, and
- Excavate by wheel loader and load trucks to carry radwaste to the repository, or both excavate and haul radwaste by wheel loader to the repository or shaft from distances beyond efficient dozer push.

The choice of excavation equipment will be left to the contractor.

Radwaste excavation will follow a procedure that has been used successfully at other radiologically contaminated facilities. It consists of removing contaminated rock and soil in successive lifts until the ground surface appears to be clean, then performing gamma surveys of the exposed surface, and repeating the excavation-and-scan steps until the ground surface gamma emission is at or below the clean-up standard.

SRI plans to excavate first those areas with the highest gamma signature so that those materials are placed in the deepest part of the waste repository. Otherwise, excavation and radiological surveying by gamma meter will advance progressively toward the repository so that each excavated area will be verified to be clean before moving to the next area closer to the repository.

4.2.7 Repository Construction

The repository will be located as shown on Figures 3, 5, and 7. This is the optimal location for both vertical and horizontal separation from Ambrosia Lake. SRI estimated the elevation of the maximum water level of Ambrosia Lake to be elevation 7068.5 ft. AMSL based on the high water mark indicated by vegetation contrasts. The current lowest elevation (outfall point) of the lake perimeter, 7068.5 ft. AMSL, sets the maximum water level of the lake, as shown on Figure 2. The repository site was selected to be as far above 7068.5 ft. and as far horizontally as possible from the lake basin.

The specification for repository construction is included in Appendix G. Construction drawings, identified in the specification and to be prepared upon approval of this Reclamation Plan, will show the reclamation work illustrated in Figures 3, 5, and 7. Repository construction will include subgrade preparation, placement and compaction of radwaste, and placement and compaction of soil cover. These activities will be conducted in accordance with construction drawings and specifications identified in Appendix G, the HASP (Appendix H), and the CQMP (Appendix I). Application of the CQMP will be under the direction of SRI's Site Supervisor/ Site Reclamation Manager (SRM), with assistance of the QC Inspector and the Professional Engineer.

4.2.7.1 Radwaste Placement

Repository construction will include subgrade preparation, placement and compaction of radwaste, and placement and compaction of soil cover.

The subgrade across the entire footprint of the repository consists of high-plasticity clay (CH, clay). The soil surface will be stripped of vegetation, which will be burned, then the exposed soil will be compacted to a uniform, stable surface.

The repository will be shaped approximately like a truncated pyramid, with sides sloped not steeper than approximately 20% or 5H:1V and top surface sloped toward the sides at approximately 1% grade (Figure 7). The size will be sufficient to contain all contaminated materials, including mine and demolition debris that are not placed in the shaft. Because the actual volume of radwaste cannot be determined until excavation is complete, the radwaste will be placed in a sequence that incrementally expands the footprint and increases the height of the repository.

Radwaste will be placed in loose lifts of 8-10 inches and compacted by multiple passes of earthwork equipment. The most contaminated materials will be preferentially placed in the middle of the lower lifts, to optimize radon attenuation through the overlying and less contaminated materials. Mine debris (e.g.; roof bolts, vent bags, timbers) that is too large or too compressible to include in the lifts of waste rock will be sorted and placed either in the shaft or in a debris cell within the repository, where it will be either compacted with the radwaste or, if too large or incompressible, flooded with a soil-cement slurry (flowable fill) for solidification.

4.2.7.2 Repository Cover

After placement of radwaste in the repository is complete, and gamma surveys verify that the site is otherwise cleared of radwaste, a soil cover will be constructed over the repository. The cover will have a radon barrier component and a seeding medium component (Figure 8). The thickness of the cover needed to limit radon flux at the cover surface to not more than 20 pCi/m^2/s has been calculated by the RADON computer model (the Windows-compatible version of the RAECOM model per NUREG Guide 3.64 developed for design of uranium tailing covers) with site-specific material property values as input. The RADON model files (Appendix F) and results of the model, listed on Table 2, show that either the clay soil or the loam soil, or a combination of the two soils, can be used to attenuate radon to meet the 20 $pCi/m^2/s$ flux limit.

Based on this information, SRI will use the soil that satisfies both the radon attenuation function and the growth medium function with the least amount of land disturbance and construction cost, which will ideally be 3.0 feet of loam soil. However, 1.0 feet of clay covered by 2.0 feet of loam is the more likely scenario because most of the area where waste rock will be removed (and the ground will be already disturbed) is underlain by clay, making clay more abundant and accessible for borrow material than the loam soil, which exists mostly in the southeast corner of the site in uncontaminated ground. Note that vegetation grows in clay soils everywhere on the site and appears to have no problem with rooting into clay.

Cover soil will be obtained from on-site locations that 1) minimize the area of land disturbance, and 2) utilize areas where the appropriate soils exist at ground surface. Since lake areas that have radiological contamination will have to be disturbed to remove contamination anyway, using those exposures in the lake as borrow sources satisfies both criteria.

Cover soil will be placed in loose lifts of 8-10 inches and compacted by multiple passes of earthwork equipment. Each lift will be compacted by not fewer than four passes of self-propelled sheepsfoot or tamping rollers with operating weight of not less than 22,000 pounds.

Cover construction is addressed in the specification included in Appendix G.

Soil investigations documented in Appendix E indicate that sufficient clean soil is available on site in the SE ¼ of the SW ¼ of Section 12 for construction of both the radon barrier and the seeding medium. The primary criteria in locating borrow areas are 1) minimizing the area of land disturbance, and 2) utilizing areas where the appropriate soils exist at ground surface. Since lake areas that have radiological contamination will have to be disturbed to remove contamination anyway, using those exposures in the lake as borrow sources satisfies the primary criteria. SRI does not plan to disturb the existing berm or ditch north and west of the mine; the local surface water drainage patterns have adjusted to these features that were not part of the mine. Before the repository cover is deemed complete, the radon attenuation performance of the cover will be verified by radon canister measurements.

4.2.8 Site Grading

After the repository is constructed and the cover is in place, final grading of the site will be performed to achieve a free-draining surface that will prevent ponding of water in the repository area and minimize concentration of runoff that would cause rills or other conditions leading to scour. The re-graded contours are estimated to be approximately those shown on Figure 7 and will be shown, along with surveys requirements, on construction drawings identified in Appendix G.

SRI has no plans to alter runoff to Ambrosia Lake or Arroyo del Puerto, and nothing to be done in mine reclamation will affect any water rights connected to Arroyo del Puerto. SRI does not plan to disturb the existing berm or ditch north and west of the mine; the local surface water drainage patterns have adjusted to these features that were not part of the mine. Expect for grading to direct runoff away from the repository, whatever flow paths of surface water runoff that have existed since cessation of mining in 1982 will be unchanged by reclamation of the Section 12 Mine.

The site grading plan will be based on the topography remaining after removal of waste rock and contaminated soil. Grading will direct surface water away from the repository and toward Ambrosia Lake or other natural water courses west of the mine site. The existing discharge point of Ambrosia Lake, , will be left undisturbed at elevation 7068.5 feet so that the maximum standing water level in the lake will be limited to that elevation and lake water will not rise to the elevation of the base of the repository.

With the exception of that part of the access road with contaminant levels above clean-up standards, the road will be left intact for post-mining land use, expected to be grazing and/or equipment storage. The portion of the road that is excavated for contaminant removal will not be restored but will be graded and re-vegetated with the rest of the disturbed areas.

Waste rock and contaminated soil will be isolated in the repository where they will be protected from erosion. Site grading will direct runoff away from the repository and toward the lake basin, where it naturally goes presently. There will be no new drainage courses that would convey drainage off-site or trigger actions under the CWA for permitting under Section 404 or NPDES. SRI believes that, because the reclamation of the mine area will produce no pollutants and will be not involve dredging or filling of a waterway, neither of these CWA sections will apply.

4.2.9 Revegetation

Using site-specific vegetation data from the Reference Vegetation Survey and appropriate MMD guidance, the vegetation consultant has prepared the plan to revegetate ground that has been disturbed by mining or reclamation (Appendix D).

Native species planted into a site lacking residues and active biology rarely establish with success. Therefore, a cover crop will be planted in the spring to increase residues to protect the soil surface from erosion and build the soil microbiology before planting the native species later in the year. Ideally the cover crop mix (Table 3) would be planted during April 1-April 15. Applications of soil carbon, microbiology inoculant and organic fertilizer along with cover crop will allow the soil biology to build before seeding native grass mix. The application of soil carbon and microbiology inoculant can be done with one single product. The organic nitrogen can be applied as a pelleted chicken manure to provide a high- carbon, slow-release nitrogen product that does not encourage annual weeds and is more favorable of native grasses.

The seed mix for the native perennial vegetation will be consistent with local natural vegetation, as determined during the reference area survey conducted in 2019 (Appendix D). Recommended species and rates mix are listed in Table 4. Seeding or planting will be done at a time and in a manner that best ensures establishment and growth of the selected species, ideally from July 15-August 1 with seed placed in the upper ½” of soil to minimize disturbance of the soil surface. If annual vegetation does not establish due to lack of moisture, hydroseeding using hydromulch techniques with doubled seeding rate may be used.

Ground preparation, planting methods, seed application rates, amendments (if any), and mulching will be overseen by the vegetation consultant. The plan proposes success criteria including species diversity, density, and ground cover that will be measured for at least five years after seeding.

The mine site is presently mostly fenced, and repairs and extensions will be made as needed to enclose the revegetated areas and maintain exclusion of livestock from those areas for at least two years.

5 SCHEDULE (Order ¶32r, 35)

The proposed schedule for Section 12 Mine reclamation is illustrated on Table 5 and the flow chart for the reclamation activities is shown on Figure 4. The primary factors that will impact the actual performance of the reclamation tasks are:

a) Arrangements for removal of the resin drums, the hoist and headframe,
b) Volume of radwaste found,
c) Weather,
d) Regulatory approvals

The present uncertainties regarding removal of the hoist and headframe are being addressed in on-going negotiations between SRI and a mine equipment broker. At this point SRI has identified three possibilities for disposition of the hoist and headframe:

1) Hoist and headframe are dismantled and removed from the site prior to earthwork.
2) Hoist is removed but headframe is demolished.
3) Headframe is removed but hoist remains to be buried on site.

Possibility #1 is preferable but could take more time than #2 or #3. If the hoist and headframe are removed for recycling/reuse rather than demolished, the time for removal would be at least two months longer than for demolition. Negotiations are under way to implement #1. Local parties have stated interest in removing the two steel buildings from the site and could do so at any time, probably before either the hoist or the headframe can be removed. In any case, the first six months of reclamation will likely be needed for removal of buildings, hoist, and headframe.

The volume of radwaste has been estimated from the ERG radiological survey and field measurements of waste rock pile heights. Radwaste depth measurements are not yet sufficient to support a more robust estimate of radwaste volume, but SRI's estimate is 50,000 cubic yards (CY), of which 10,000 to 15,000 CY is already located within the repository footprint, leaving 35,000 to 40,000 CY to be excavated. At 1000 CY per day, excavation of radwaste would take 35 to 40 working days.

Weather conditions will have two types of impact – wet conditions preventing earthwork and thunderstorms causing shutdown of all activity. The clay-rich soils of the site become impassible during and for days after precipitation events.

The proposed schedule assumes that MMD and NMED comments on the draft Reclamation Plan will be made in not more than 30 days from submittal and that approval of the Final Reclamation Plan will be received not more than 30 days after submittal.

6 MONITORING

Reclamation activities performed under this RP will comply with relevant requirements and practices contained in the Health and Safety Plan (HASP, Appendix H) and the Construction Quality Management Plan (CQMP, Appendix I).

After excavation of radwaste is determined to be complete based on gamma surveys performed in conjunction with radwaste excavation, a confirmatory gamma survey will be conducted on a 150-foot grid across the area of original contamination shown on Figure 3. At any point where the gamma radiation rate exceeds 24,520 counts per minutes (cpm) and the exposure rate exceeds 22.1μR/h, the ground will be surveyed radially from that point to delineate the extent of remaining contamination and the additional excavation needed. Subsequent scans of that ground and additional excavation will be made until the radiation rates are below the clean-up levels. This confirmatory survey and additional clean-up will be completed before the repository cover is completed.

Approximately one month after the repository cover has been completed, radon detection canisters will be placed across the cover at a spacing of not greater than one canister per half acre. The canisters will be collected after several days, depending on weather conditions, and tested for radon using the sodium iodide counting system.

A stanchion with 1/10 foot markings will be installed at the deepest point in the lake basin to provide a visual means for measuring the depth of lake water. The lake water level will be measured and recorded at the same time as other monitoring on the site is performed.

Post-reclamation performance of the waste repository, shaft closures, erosion controls, and vegetation will be measured and documented annually for not less than five years after completion of the reclamation of the site. In addition to annual vegetation surveys on the reseeded ground, this monitoring will include visual inspections, possibly UAV-based, of indications of erosion by wind or water, grazing or burrowing impacts, and structural stability of the repository and backfilled shaft.

6.1.1 Documentation and Reporting

Prior to reclamation construction, a Construction Quality Control (CQC) program will be developed and then applied during construction to:

- Establish the construction standards and procedures to be used in achieving the Reclamation Objectives,
- Guide construction with specifications and drawings,

- Measure and test the reclamation elements for conformance with the specifications and drawings,
- Document the reclamation elements as evidence of conformance and of satisfaction of requirements in the Order, and
- Document radon canister measurements.

CQC personnel will be independent of the construction contractor and will report directly to SRI or its designated representative.

6.1.2 Reclamation Summary Report

The Reclamation Summary Report, required under ¶ 36 of the Order, will be prepared upon completion of the reclamation work and after results of confirmatory radiological testing are available, approximately 90 days after the last task is finished. The report will include the chronology of reclamation activities, as-built drawings, description of variances and deviations from the approved plan, documentation of QC records, and photographs of the reclamation work.

7 REFERENCES

Energy, Minerals & Natural Resources Department Mining and Minerals Division (MMD), draft 2019, *Director's Order of Abatement on Consent with Findings of Fact and Conclusions of Law* in the Matter of Southwest Resources Inc.'s Section 12 Mine

Energy, Minerals & Natural Resources Department Mining and Minerals Division (MMD), and New Mexico Environment Department Mining Environmental Compliance Section (MECS), 2016, *Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico*

EPA Grants Mining District Information Meeting and Negotiations Update, October 2, 2019

Environmental Restoration Group, Inc. (ERG), 2017, *Baseline Radiological Characterization of the Section 11/12 Mine – Phase 1* prepared for Permits West, Inc.

Tierney, R., 2018, *Waste Characterization Study – Phase 2, Section 12 Mine (Mine Permit Application - NM MK046RE)* prepared by Permits West for Southwest Resources, Inc.

Table 1 – Inventory and Disposition of Existing Facilities and Materials

Facility or Material	Composition	Disposition	Comments
Access road	native soil and crushed rock	retain for PMLU	maintain throughout reclamation
Mine shaft, 14 ft. diameter	concrete, steel	backfill with waste rock, broken concrete, selected debris	may include solid, un-contaminated mine debris
Ore- and man- skips	steel	remove and scrap or drop to bottom of shaft	possible sale & re-cycle
Shaft headframe	steel	remove, scrap, re-cycle	negotiations with mine equipment broker
Ore chute	steel	remove, scrap	possible sale & re-cycle
Sheaves (2)	steel	remove, scrap	possible sale & re-cycle
Hoists – double barrel	steel	remove, scrap, re-cycle	negotiations with mine equipment broker
Hoisting electrical and controls	steel	remove, scrap	obsolete
Hoisting rope	1 1/4" steel cable	remove, scrap or drop in shaft	
Drums of uranium-loaded resin (12)	steel	remove and ship off-site for uranium recovery	negotiations with NRC-licensed facility
Drums of charcoal (4)	steel	remove to licensed landfill	
Hoist house	steel frame, metal roof and siding	remove for off-site use	negotiations with local buyer
Office and dry building	steel frame, metal roof & siding	remove for off-site use	insulation, possibly containing asbestos
Pump house	wood frame, metal roof & siding	remove, scrap	
Water tank	steel	remove, scrap	
East vent	steel casing	Fabricate a bat-compatible cap	west vent was previously backfilled
Building foundations	reinforced concrete	demolish all above final grade, break up and leave remainder in place	cover foundations left in place with 2 feet of loam
Chain link fencing	galvanized steel wire	remove, scrap	
Various debris	Sheet metal, plastic, wood, rubber, glass, paper, etc.	Bury in debris cell in repository or remove to landfill	

NOTES:

PMLU = post-mining land use (grazing and wildlife, self-sustaining ecosystem)
Scrap = decontaminate as necessary, sell for re-use or scrap
Recycle = re-use at another mine site (negotiations pending)

Table 2 - RADON Model for Cover Design
SECTION 12 MINE

Input values for all models:	Ra 226, pCi/g	Rn 222 Emanation Fraction	Porosity	Moisture Content, %	Minus #200 fraction	Rn 222 diffusion coeff.
Natural Ground[1]	1.5	0.35	0.47	27	0.85	default
Waste rock[2]	17.3	0.35	0.43	5.5	0.5	default
Clay Layer	6.5	0.35	0.47	27	0.85	default
Loam Layer	6.5	0.35	0.45	11.7	0.37	default

	Model #					
Layer Thickness, m	**1**	**2**	**3**	**4**	**5**	**6**
Natural Ground	4.57	4.57	4.57	4.57	4.57	4.57
Waste rock[3]	3.048	3.048	3.048	3.048	3.048	3.048
Clay Layer	0.6096	0.3048	0.15	0.001	0.3048	0.001
Loam Layer	0.6096	0.6096	0.6096	0.6096	0.6096	0.6096
Waste rock Ra 225, pCi/g	**17.3**	**17.3**	**17.3**	**17.3**	**370** [2]	**30** [2]
Exit flux, top of cover, pCi/m²/s	**4.8**	**5.1**	**5.7**	**12.5**	**19.84**	**19.45**

1) Natural ground is assumed to have background Ra 226 of 1.5 pCi/g
2) Waste rock is assigned the average Ra 226 concentration of 17.3 pCi/g based on page 18 in ERG report, *"Baseline Radiological Characterization of the Section 11/12 Mine – Phase 1".* Higher values in models #5 and #6 were used to determine upper limits of source term for clay layer thicknesses.
3) Waste rock thickness in the repository is expected to be not more than 10 feet; average will be less.

Input soil parametric values based on soil tests by DBSA laboratory and references cited.

See Appendix F for details.

Table 3 - Cover Crop Seed Mix and Amendments

Species	Lbs Per Acre	Percent by Volume	Seeds Per Lb	Seeds Per Acre	Percent by Seeds
Chickpea	2	4	2200	4400	1%
Sunn Hemp	2	4	15000	30000	3%
White Clover	1	2	70000	70000	8%
Spring Wheat	8	16	17000	136000	15%
Spring Triticale	8	16	15000	120000	13%
Black Oats	8	16	22000	176000	18%
Wildlife Grain Sorghum	3	6	20000	60000	7%
Cereal Rye	8	16	17000	136000	15%
Spring Barley	8	16	18000	144000	16%
Buckwheat	2	4	18000	36000	4%

Total Lbs/Acre = 50
Seeds/Acre = 912400

Amendments

Product	Manufacturer	Rate Per Acre
Carbon Angel	Sterling Pacific	66lbs/Acre
Pelleted Chicken Manure	Pacific Blend	2000lbs/Acre

Table 4 - Native Species and Seeding Rates

Species	Lbs per acre	Percent by Volume	Seeds Per Lb	Seeds Per Acre	Percent by Seeds
Blue Grama	2.0	8%	800,000	1,600,000	48%
Western Wheatgrass	6.0	22%	110,000	660,000	20%
Sideoats Grama	1.0	4%	190,000	190,000	6%
Galleta	2.0	8%	160,000	320,000	10%
Four Winged Saltbush	2.0	30%	60,000	120,000	4%
Winterfat	2.0	30%	200,000	400,000	12%

Total: 15 lbs./Acre

Seeds 3,290,000/Acre

Table 5 Proposed Reclamation Schedule
Section 12 Mine

Task #	RP Section #	Task Description	Months from RP approval		Comments
			Start	Finish	
1	NA	Bid Package Preparation	RP approval	2	for tasks #4,5,6,7,8, and 9-13 plus QC and radiation survey
2	NA	Contracting	2	3.5	includes pre-bid meeting and 30 days to submit bid
3	NA	Award and Mobilization	3.5	5	
4	4.2.1	Materials Decontamination	5	6	includes removal of resin
5	4.2.2	Building Demolition	6	7.5	
6	4.2.3	Hoisting Equipment Removal	7.5	10	includes hoists, hoisting ropes, ore skip, man skip
7	4.2.4	Shaft Headframe Removal	10	13	depends on type of removal
8	4.2.5	Shaft and Vent Closure	13	15	
9	4.2.6	Contaminated-Material Excavation	13	16	with Task 8
10	4.2.7.1	Radwaste Placement	13	16	with Task 9
11	4.2.7.2	Repository Cover	16	18	
12	4.2.8	Site Grading	18	19	
13	4.2.9	Vegetation	19	20	seasonal limitations
14	6	Monitoring	20		ongoing but intermittent; quarterly through 3rd year, then annual
15	6.1.1	Documentation and Reporting	20	21	completion of project files
16	6.1.2	Reclamation Summary Report	20	21	

Assumptions:

Task 1 starts upon approval of the Reclamation Plan (RP).
Weather delays are not included.

APPENDIX A

PHOTOGRAPHS OF EXISTING CONDITIONS

SECTION 12 MINE

Photo #1 Main mine site features

Photo #2 Drone image of mine area and dry lake basin

Photo #3 Headframe

Photo #4 Headframe with pump house and water tank

Photo #5 Hoist house with hoisting ropes intact

Photo #6 Double drum hoists

Photo #7 Office and dry building

Photo #8 Office and dry building looking north from hoist house

Photo #9 Boneyard north of office and dry building

Photo #10 Waste pile in left background, waste rock spread on foreground

Photo #11 Ambrosia Lake from shaft area, with water after a recent rain.

Photo #12 Mine on left, Ambrosia Lake dry basin on right.

Photo #13 Mine area and dry lake basin on right, old diversion berm center, Arroyo del Puerto in foreground

Photo #14 Arroyo del Puerto (foreground) and Don Andres Hill (background), looking east

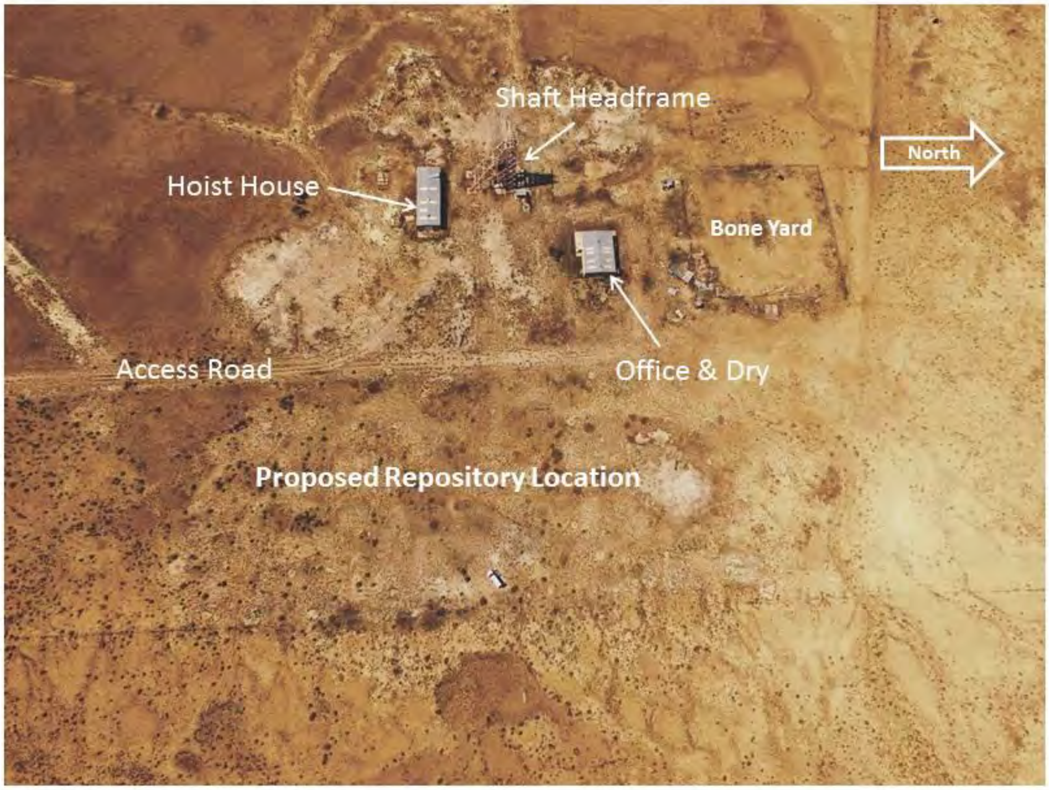

Photo #1 Main mine site features

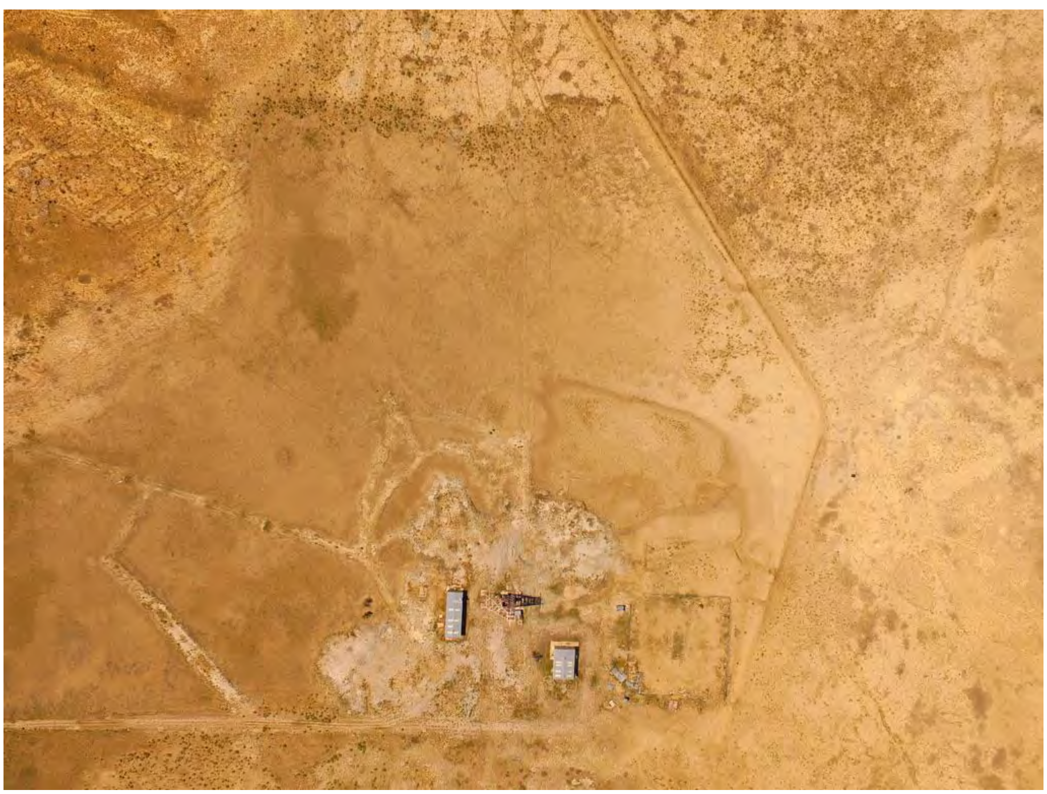

Photo #2 Drone image of mine area and dry lake basin

Photo # 3 Headframe

Photo # 4 Headframe with pump house and water tank

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Photo #8 Office and dry building looking north from hoist house

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Photo # 12 Mine on left, Ambrosia Lake dry basin on right.

Photo # 13 Mine area and dry lake basin on right, old diversion berm center, Arroyo del Puerto in foreground

Photo # 14 Arroyo del Puerto (foreground) and Don Andres Hill (background), looking east

APPENDIX B

Baseline Radiological Characterization of the Section 11/12 Mine

Phase 1, 2017

SECTION 12 MINE

Baseline Radiological Characterization of the Section 11/12 Mine – Phase 1

January 2017

prepared for:

Permits West, Inc.

37 Verano Loop
Santa Fe, NM
87508

prepared by:

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Section 1.0 - Introduction

Environmental Restoration Group, Inc. (ERG), on behalf of Permits West, Inc., conducted the first phase of a baseline characterization of radiological conditions at the Section 11/12 Mine (formerly known as the Section 12 Mine [McLemore and Chenoweth, 1991]) on June 13, 2016. The second phase will be comprised of sampling and analysis of surface and subsurface soils.

The location of the mine, which is owned by Southwest Resources, Inc. (SRI) is in the southwest quarter of Section 12, TI4N, R10W, McKinley County, New Mexico, of the Ambrosia Lake Mining District (see Figure 1-1). The mine was operated by Cobb Resources, the predecessor operator to SRI from 1974 to 1982. Current features at the site include mine buildings, a shaft and headframe, and waste piles. The footprint of the site (site) is approximately 58 acres, corresponding to an area identified in 2011 by the U.S. Environmental Protection Agency (EPA) in an Aerial Spectrophotometric Environmental Collection Technology (ASPECT) survey as exhibiting levels of gamma radiation exceeding background (EPA, 2011). The 58-acre site encompasses the mine permit area.

The characterization was performed to obtain a current assessment of exposure rates and concentrations of radium-226 in surface soils. By extension, we determined a "site-specific value of gamma radiation that correlates to 5 [picocuries per gram] (pCi/g) Ra-226 above background at the 95th percentile value" (Energy, Minerals and Natural Resources Department/New Mexico Environment Department [EMNRD/NMED], 2016). The work was performed in accordance with "Radiological Survey Plan for the Section 11/12 Mine" (ERG, 2015) and consisted of:

- a walkover gamma radiation (gamma) surveys over the site and a 4-acre background reference area (BRA) located on land managed by the U.S. Bureau of Land Management in the northeast quarter of the southwest quarter of Section 12;

- co-located gamma count and exposure rate measurements to compare gamma count rates to exposure rates; and

- additional gamma surveys coupled with the sampling and analysis of soil samples to compare gamma count rates to concentrations of radium-226 in surface soils:

- beginning to establish a site-specific value of gamma radiation that corresponds to 5 pCi/g of radium-226 in soil plus background.

The gamma survey of the BRA was performed to provide measurements of reference, to which the gamma count rates - and by extension - exposure rates and concentrations of radium-226 in surface soils observed at the site could be compared.

This report first describes the collection and analysis of radiological measurements. The report ends with conclusions and recommendations regarding radiological conditions at the site.

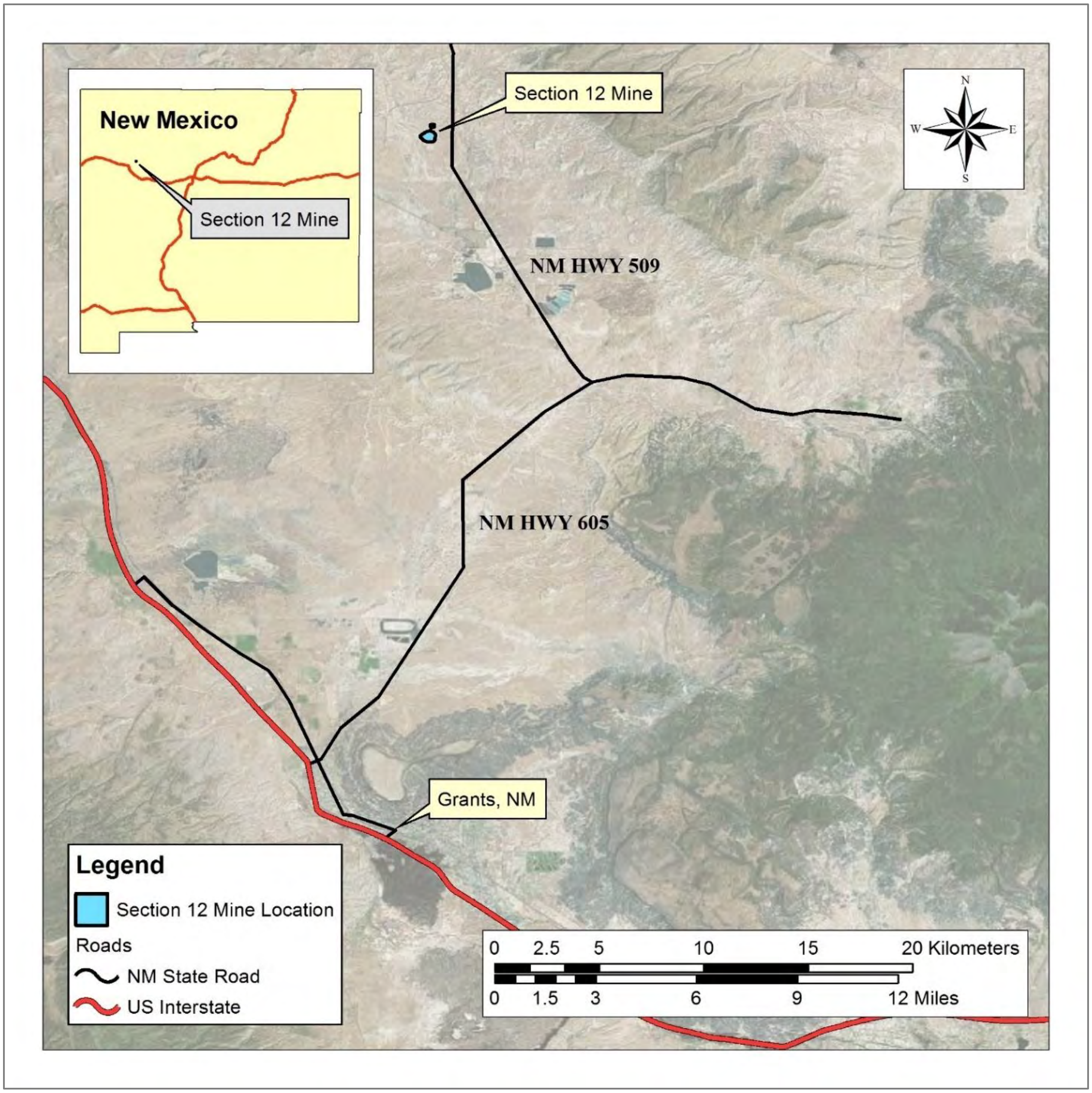


Figure 1-1. Site Location

Section 2.0 - Gamma Radiation Survey

The following subsections provide descriptions of the method and results of the gamma surveys.

2.1 Method

Two field personnel performed the gamma surveys of the site and BRA on foot, each using a Ludlum Model 44-10 2-inch by 2-inch sodium iodide high energy gamma detector coupled to a Ludlum Model 2221 ratemeter/scaler. Each of the ratemeter/scalers was paired to a Trimble sub-meter grade Global Positioning System with datalogger. The detectors were held at approximately 18 inches above ground surface (ags) as field personal walked at about 1 meter per second (m/s) along transects spaced at approximately 10 m. Gamma count rates and associated geopositions were recorded every second in the dataloggers. The gamma count rate measurements were downloaded to a laptop computer upon completion of the survey and reviewed in ArcMap version 10.4. Additional gamma surveys were conducted at each of eight, 100 square meter (m^2) soil sample locations, as described in Section 4.1. The survey locations were selected to represent the range of observed gamma count rates in the background and project areas for conducting the correlation studies described in Sections 3.0 and 4.0.

Table 2-1 lists the serial numbers of each of the radiological instruments, which were function-checked before and after each day of use and calibrated on January 20, 2016; i.e., within calibration in accordance with American National Standards Institute (ANSI) Standard N232A (ANSI, 1997). Appendix A presents the completed function check forms and calibration certificates for the instruments.

Table 2-1. Instruments used in the Gamma Survey

	Serial Numbers	
System	Ludlum Model 44-10	Ludlum Model 2221
1	PR288465	190206
2	PR303727	254772

2.2 Results

Table 2-2 presents summary statistics of the gamma count rate measurements made in the BRA. Table 2-3 presents summary statistics of the gamma count rate measurements made at the site. Appendix B presents the statistical outputs of the gamma count rate measurements, using JMP Version 11.2.1. Appendix B also includes the statistical output for the 1) predicted exposure rates addressed in Section 3.0 - and 2) predicted concentrations of radium-226 described in Section 4.0 - .

The range of gamma count rates in the BRA is 9,751 to 16,571, with a mean and median of 12,506 and 12,489 counts per minute (cpm), respectively. The range of gamma count rates at the site is 10,305 to 339,244, with a mean and median of 38,115 and 20,963 cpm, respectively.

The distributions of both sets of gamma count rates are different, based on a comparison of their respective means and medians. This observation indicates that the site is impacted radiologically from historic activities. The distributions are described in detail both numerically and spatially in Section 3.2, where the gamma count rates are converted to predicted exposure rates, given that it is 1) a simple conversion by a linear relationship and 2) the latter are more suited as a common unit to which future radiological conditions can be compared.

Table 2-2. Gamma Count Rate Measurements in the Background Reference Area

Parameter	Gamma Count Rate (cpm)
Number	2,057
Minimum	9,751
Maximum	16,571
Mean	12,506
Median	12,489

Notes:
cpm = counts per minute

Table 2-3. Gamma Count Rate Measurements at the Site

Parameter	Gamma Count Rate (cpm)
Number	19,612
Minimum	10,305
Maximum	339,244
Mean	38,115
Median	20,963

Notes:
cpm = counts per minute

Section 3.0 - Comparison of Exposure and Gamma Count Rate Measurements

The following subsections provide descriptions of the method and results of the comparison of gamma count rate and exposure rate measurements.

3.1 Method

ERG made ten co-located (measurements made at the same location) exposure (using the HPIC) and static (integrated) gamma count rate measurements at 8 locations at the site and two locations in the BRA (one co-located measurement at each location). The locations were chosen such that the radiological measurements made as described in this section and Section 4.0 would represent the range of those observed during the gamma survey.

Figure 3-1 presents the locations of the 1) BRA and site; and 2) locations of the measurements used to develop the comparisons described here and in Section 4.0. The exposure rate measurements were made every second for 5 to 10 minutes at each location using a GE RSS-131 high pressure ionization chamber (HPIC), Serial Number 070J00KM1. The gamma count rate measurements were made for one minute, using Detection System 2 listed in Table 2-1, with the detector held approximately 18 inches ags.

3.2 Results

Table 3-1 presents the results for the two types of measurements made at each of the 8 locations. Appendix C presents the individual (one second) exposure rate measurements.

The Pearson's Correlation Coefficient (R^2) is a measure of the linear dependence between two variables, and is expressed as a value between -1 and +1 where +1 is a positive linear correlation, 0 is no linear correlation, and -1 is a negative linear correlation. The best predictive relationship between the measurements is linear with a R^2 of 0.9961 strongly indicating a positive linear correlation. The following equation is the linear regression (shown in Figure 3-2) between the average exposure rate and gamma count rate results in Table 3-1 that was generated using MS Excel:

$$\text{Exposure Rate } (\mu R/h) = 0.0006 \times \text{Gamma Count Rate (cpm)} + 7.4$$

This equation was used to convert the gamma count rate measurements observed in the survey to predicted exposure rates. Table 3-2 and Table 3-3 present summary statistics for the predicted exposure rates at the BRA and site, respectively.

The range of predicted exposure rate measurements at the BRA is 13.3 to 17.4, with a mean and median of 14.9 microRoentgens per hour (µR/h). The range of predicted exposure rate measurements at the site is 13.6 to 211.0, with an average and median of 30.3 and 20.0 µR/h, respectively.

Figure 3-3 presents isocontours of the exposure rates predicted from the gamma count rate measurements. Radiological impacts are limited to the area around the existing mine shaft and buildings; and extend along the road leading southwest off the permit area and along an L-shaped berm off the southern edge of the mine. The horizontal extent of radiological contamination appears to go beyond the southwest edge of

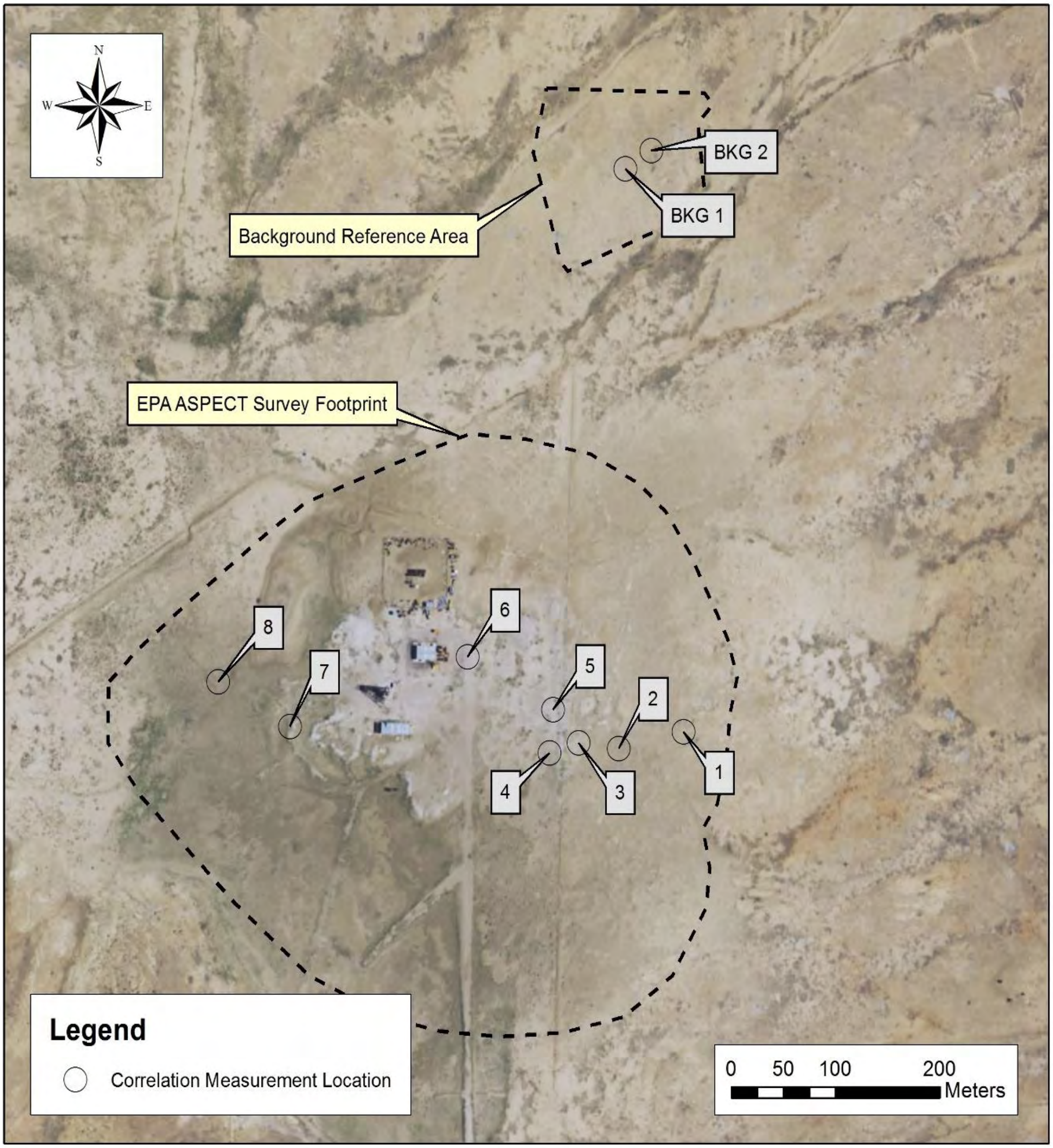


Figure 3-1. Locations of Radiological Measurements and Surface Soil Samples

Table 3-1. Co-located Gamma Count and Exposure Rate Measurements

Location	Exposure Rate Measurements			Gamma Count Rate (cpm)	cpm/µR/h
	Records	Duration of Measurement Period (minutes)	Average Exposure Rate (µR/h)		
BRA-1	485	8.1	15.6	12,374	795
BRA-1	598	10.0	15.7	12,865	819
1	375	6.3	15.7	14,733	938
2	367	6.1	23.5	29,203	1244
3	287	4.8	53.6	86,664	1617
4	403	6.7	92.2	148,554	1611
5	284	4.7	81.1	122,145	1507
6	551	9.2	33.9	46,192	1362
7	318	5.3	22.8	27,624	1214
8	406	6.8	18.9	19,236	1020

Notes:
cpm = count per minute
µR/h = microRoentgens per hour

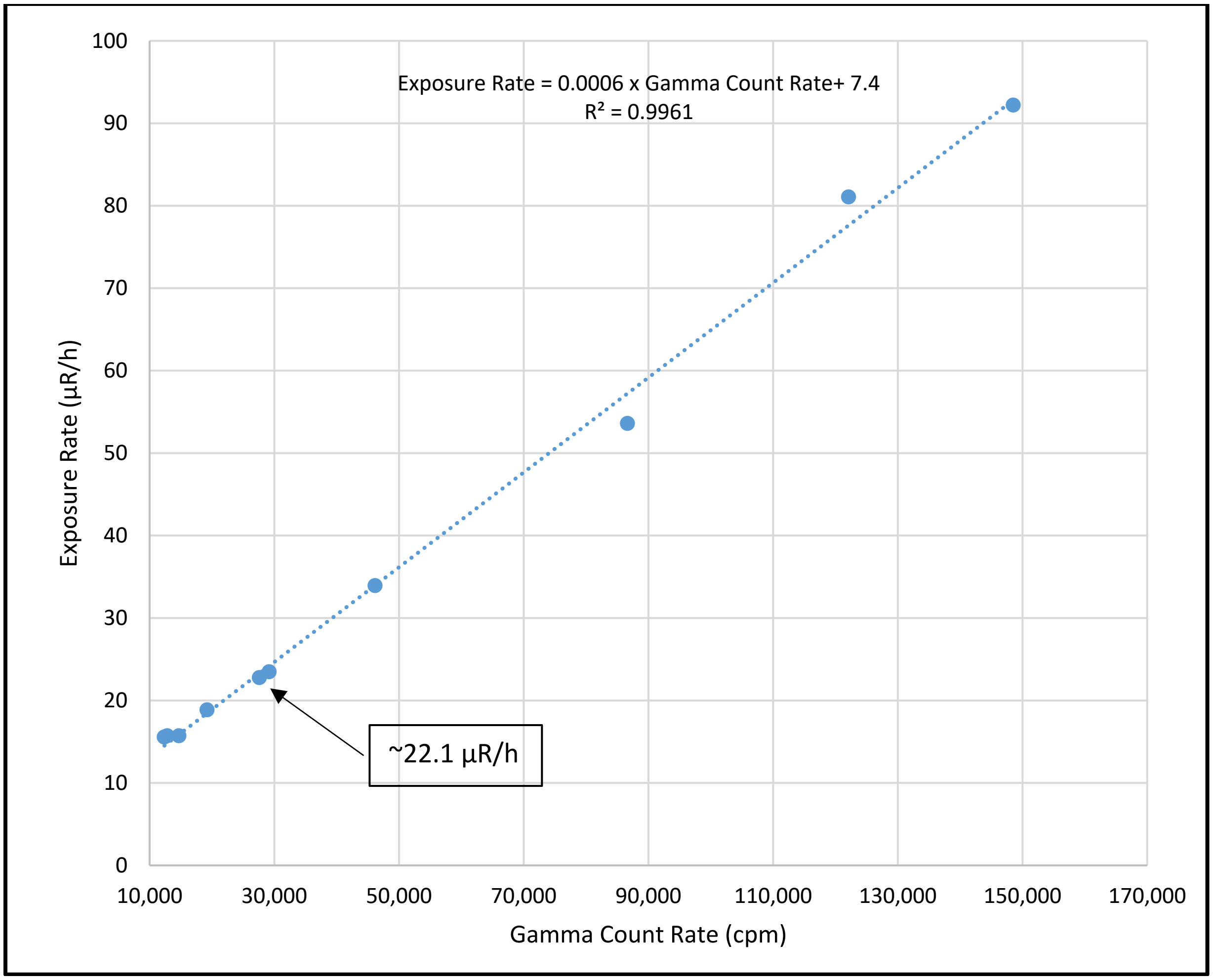


Figure 3-2. Correlation of Gamma Count and Exposure Rates

Table 3-2. Predicted Exposure Rates in the Background Reference Area

Parameter	Exposure Rate (µR/h)
Number	2,057
Minimum	13.3
Maximum	17.4
Mean	14.9
Median	14.9

Notes:
µR/h = microRoentgens per hour

Table 3-3. Predicted Exposure Rates at the Site

Parameter	Exposure Rate (µR/h)
Number	19,612
Minimum	13.6
Maximum	211.0
Mean	30.3
Median	20.0

Notes:
µR/h = microRoentgens per hour

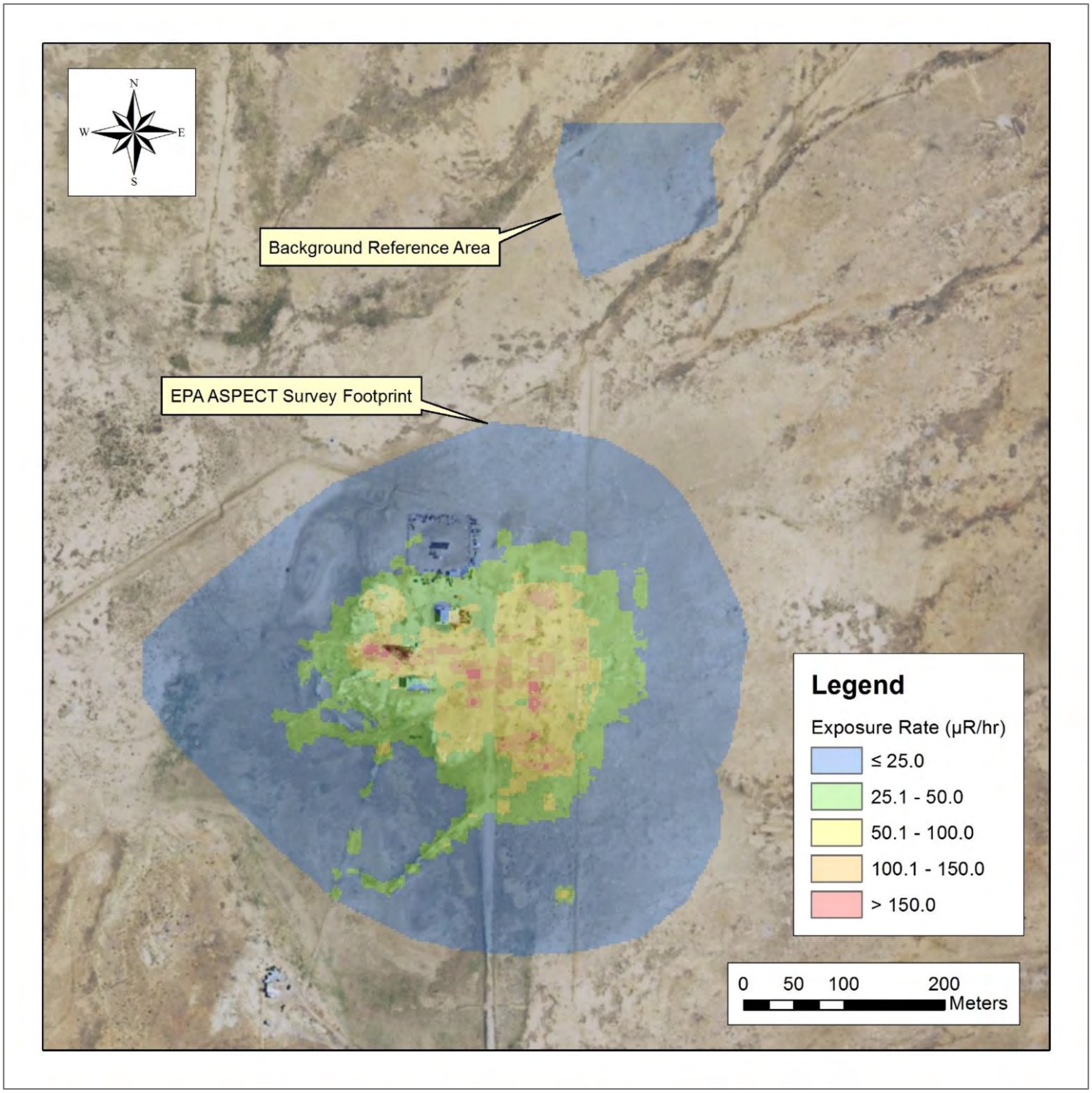


Figure 3-3. Isocontours of Predicted Exposure Rates

the permit boundary along the road. The predicted exposure rates are highest in the center of the permit area around the mine shaft and decrease with increasing distance outward to levels that are comparable to those in the BRA.

Figure 3-4 presents the distributions as histograms and box plots for each of the sets of predicted exposure rates, made using JMP version 11.2.1. Theoretical normal and lognormal distributions also are plotted in Figure 3-4 such that the theoretical and actual distributions can be compared visually. The predicted exposure rates appear to approach a normal distribution. However, the distribution is not normal according to a Kolmogorov-Smirnov Lilliefors test, as performed using JMP. The distribution of predicted exposure rates at the site is not lognormal, as determined both visually and according to a Kolmogorov's D test, as performed using JMP.

To assist the reader, box plots represent cutoffs within distributions. The median and 25th and 75th percentiles are represented as the inside and outside vertical lines of the central box, respectively. The remaining vertical lines represent the 0, 0.5, 2.5, 10, 90, 97.5, 99.5, and 100th percentiles of the sets of predicted exposure rates.

The box plot for the BRA shows that 50 percent (the values between the 25th and 75th percentiles) of the predicted exposure rates are between 14.6 and 15.2 µR/h. Similarly, the box plot for the site shows that 50 percent of the predicted exposure rates are between 18.0 and 28.4 µR/h. The 95th percentile exposure rate that corresponds to a radium-226 concentration of 5 pCi/g plus background (5 plus 1.4, or 6.4 pCi/g) is approximately 22.1 µR/h (see derivation of this value in Section 4.2).

Not shown in the box plots is that 83.6 percent of the predicted exposure rates at the site exceed the highest value predicted in the BRA (17.4 µR/h). Figure 3-5 is a side-by-side comparison of the box plots of predicted exposure rates at the site and BRA. The difference in the relative ranges of the magnitudes of predicted exposure rates clearly indicates impacts at the site.

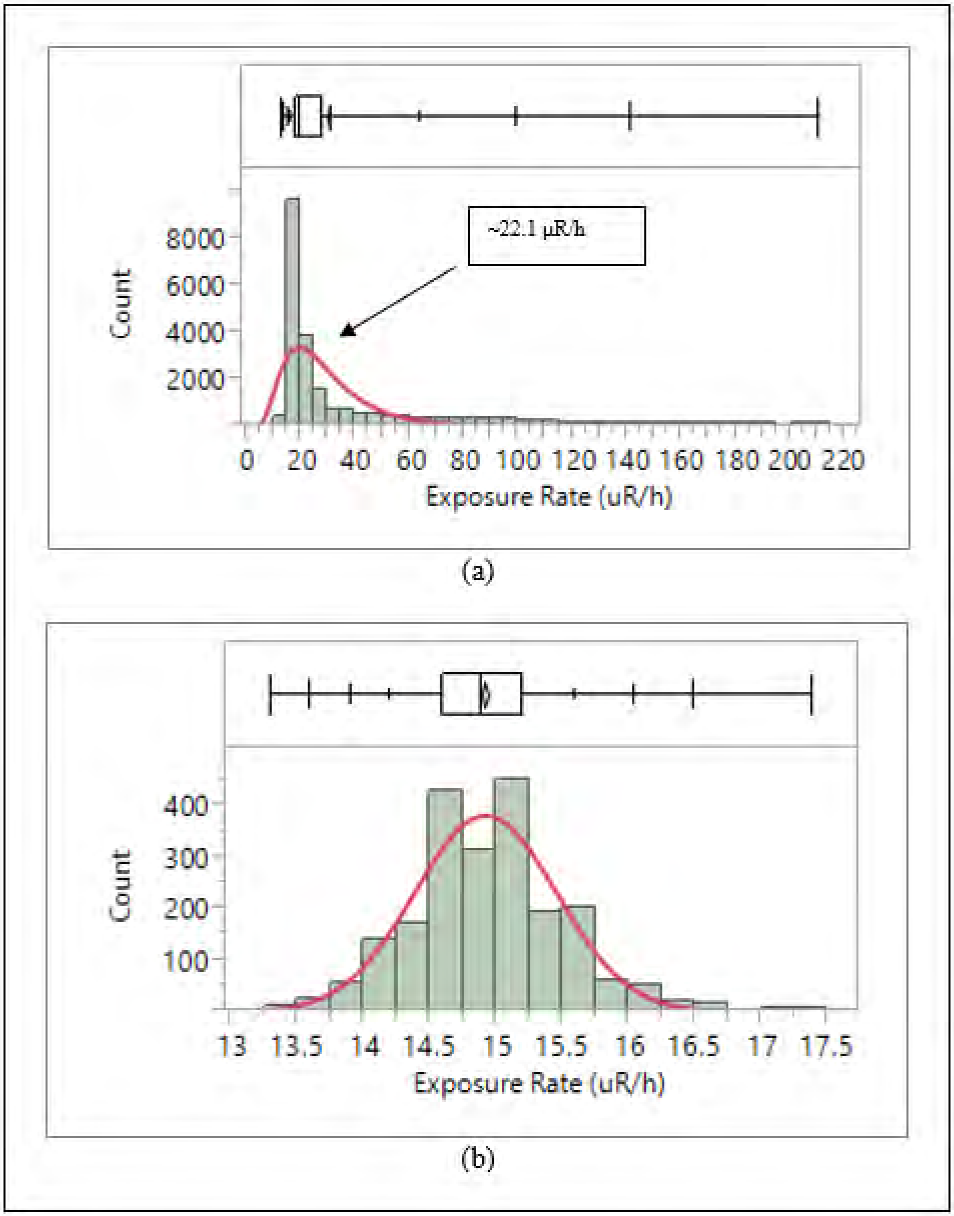


Figure 3-4. Distributions of Predicted Exposure Rates at the (a) BRA and (b) Site

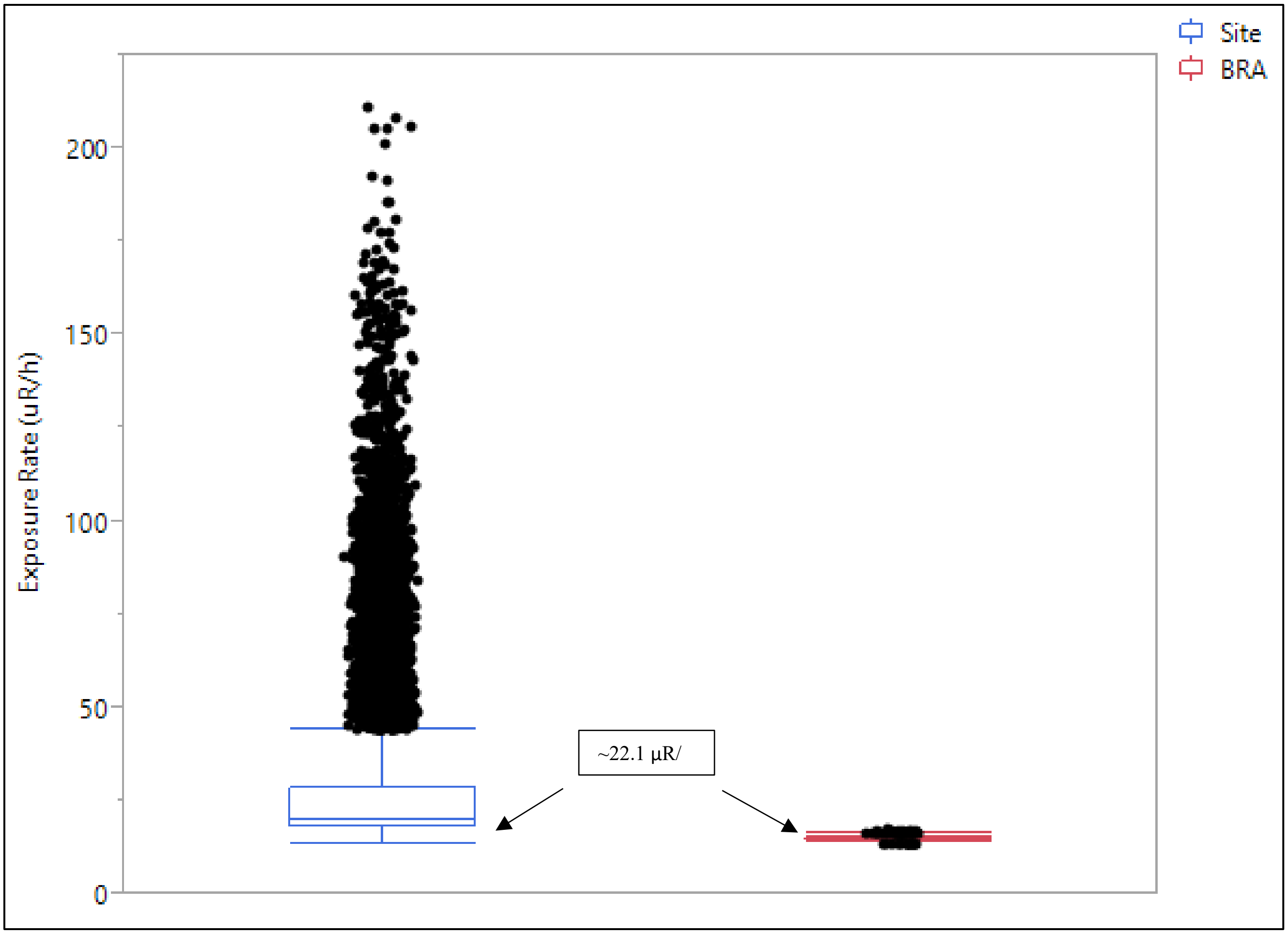


Figure 3-5. Box Plots of Predicted Exposure Rates

Section 4.0 - Comparison of Gamma Count Rates and Radium-226 Concentrations in Soil

The following subsections provide descriptions of the method and results of the comparison of gamma count rates to radium-226 concentrations in soil.

4.1 Method

The method to compare gamma count rates and radium-226 concentrations in soil was performed in 100 m^2 areas, established at the 8 locations on site and at two locations in the BRA shown in Figure 3-1. ERG performed additional gamma surveys and collected soil samples in each of the 100 m^2 areas.

The gamma surveys were conducted as described in Section 2.1, except that the transect spacing was reduced to approximately 0.5 m. Field personnel also collected a 5-point composite sample of surface soils from each area, at 0 to 15 centimeters below ground surface. The 5-point composite was comprised of grab samples collected at the center and the midpoints between the center and the corners of each area.

The soil samples were collected using a hand auger and shipped to ALS Laboratories in Fort Collins CO, where they were analyzed by gamma spectroscopy after period of 21 days to allow radium-226 decay products to reach equilibrium.

4.2 Results

Table 4-1 lists the average gamma count rate at each location and the associated concentration, error and minimum detectable concentration of radium-226. Appendix D presents the laboratory analytical results. The average concentrations of radium-226 in the samples of surface soil collected at the site and BRA are 31.0 and 1.41 pCi/g, respectively.

Table 4-1. Co-located Gamma Count Rates and Predicted Concentrations of Radium-226 in Soil

		Radium-226 (pCi/g)		
Sample Number	Gamma Count Rate (cpm)	Result	Error	MDC
BRA-1	12,333.3	1.27	0.32	0.47
BRA-1	12,752.4	1.55	0.32	0.44
1	15,329.3	1.56	0.36	0.53
2	30,007.8	9.2	1.3	0.7
3	77,778.6	58.1	6.9	1.1
4	130,007.8	93	11	1
5	128,955.8	62.9	1.4	1
6	54,113.6	15.5	1.9	0.6
7	27,312.9	2.38	0.51	0.79
8	19,118.0	5.01	0.48	1

Notes:
MDC = minimum detectable concentration ; pCi/g = picocuries per gram

The best predictive relationship between the measurements, shown in Figure 4-1 with upper and lower 95 percent confidence curves, is a power function with a Pearson's Correlation Coefficient (R^2) of 0.9376, as expressed in the equation:

$$\text{Radium-226 concentration (pCi/g)} = 8 \times 10^{-8} \times \text{Gamma Count Rate (cpm)}^{1.7717}$$

This equation was used to convert the gamma count rate measurements observed in the survey to predicted concentrations of radium-226. This was done by first log transforming both the gamma count rate and the radium-226 concentrations in soil (the X and Y variables), then performing a linear regression on the transformed data. The linear equation of the log transformed data was then solved algebraically to express the relationship between the non-transformed variables. Figure 4-2 shows the predicted concentrations of radium-226 as isocontours, the spatial and numerical distribution of which parallel those depicted in Figure 3-3. Table 4-2 and Table 4-3 present summary statistics for the predicted concentrations of radium-226 at the BRA and the site, respectively. Appendix B presents statistical outputs of the linear regression of the transformed data.

The range of the predicted concentrations of radium-226 at the BRA is 0.9 to 2.4 pCi/g, with an average and median of 1.5 and 1.4 pCi/g, respectively. The range of predicted concentrations of radium-226 at the site is 1.0 to 502.9, with an average and median of 17.3 and 3.6 pCi/g, respectively.

The 95th percentile gamma count rate corresponding by interpretation of Figure 4-1 to a radium-226 concentration of 5 pCi/g plus background (5 plus 1.4, or 6.4 pCi/g) is approximately 24,520 cpm. This value correlates to a predicted exposure rate of 22.1 μR/h, using the equation given in Section 3.2.

Table 4-2. Predicted Concentrations of Radium-226 in the BRA

Parameter	Ra-226 (pCi/g)
Number	2,057
Minimum	0.9
Maximum	2.4
Mean	1.5
Median	1.4

Notes:
pCi/g = picocuries per gram

Table 4-3. Predicted Concentrations of Radium-226 at the Site

Parameter	Ra-226 (pCi/g)
Number	19,612
Minimum	1.0
Maximum	502.9
Mean	17.3
Median	3.6

Notes:
pCi/g = picocuries per gram

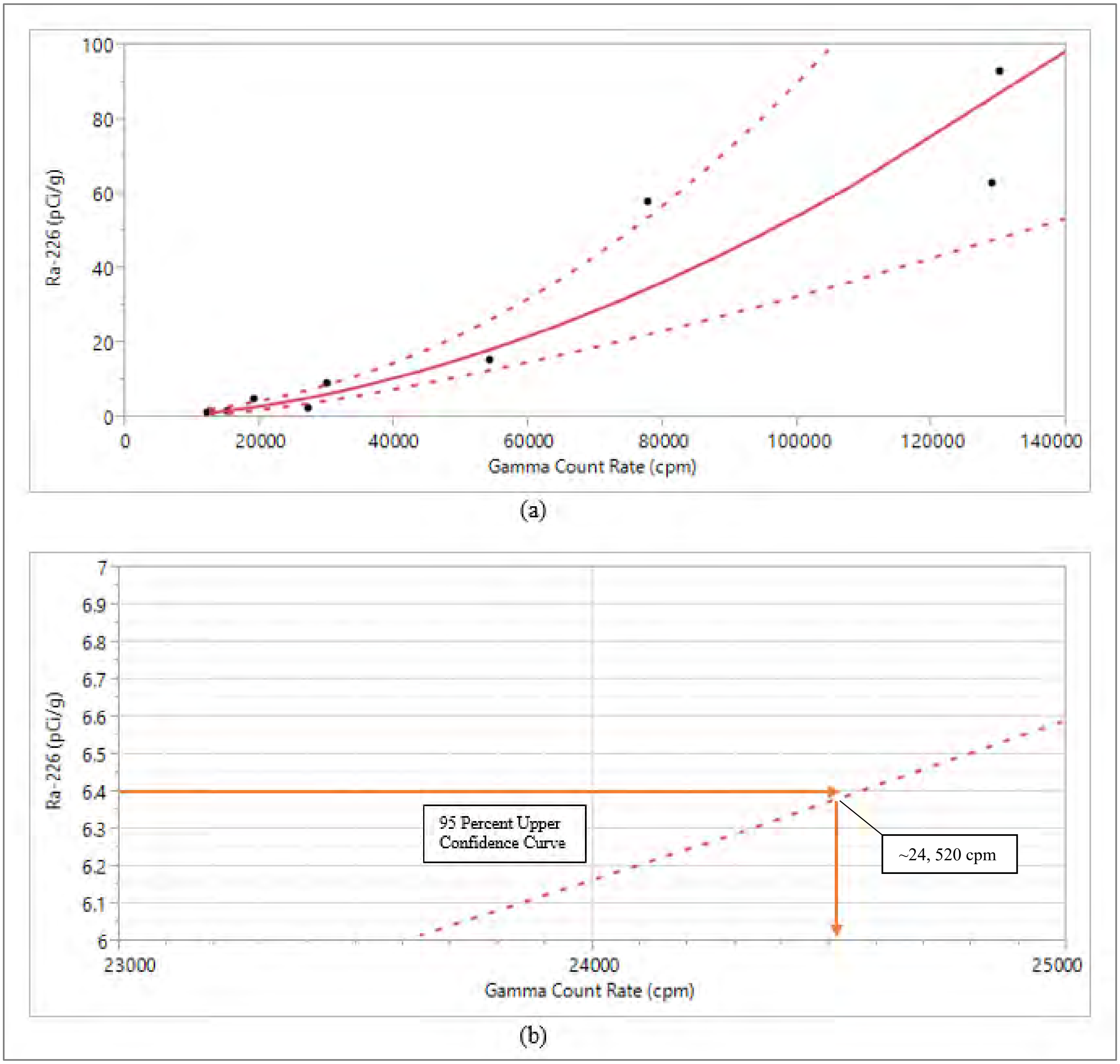


Figure 4-1. Correlation of Gamma Count Rates and Radium-226 Concentrations in Surface Soils: (a) All Data (b) Data used for Interpretation of Site-Specific Predicted Exposure Rate Corresponding to 5 pCi/g Ra-226 Plus Background

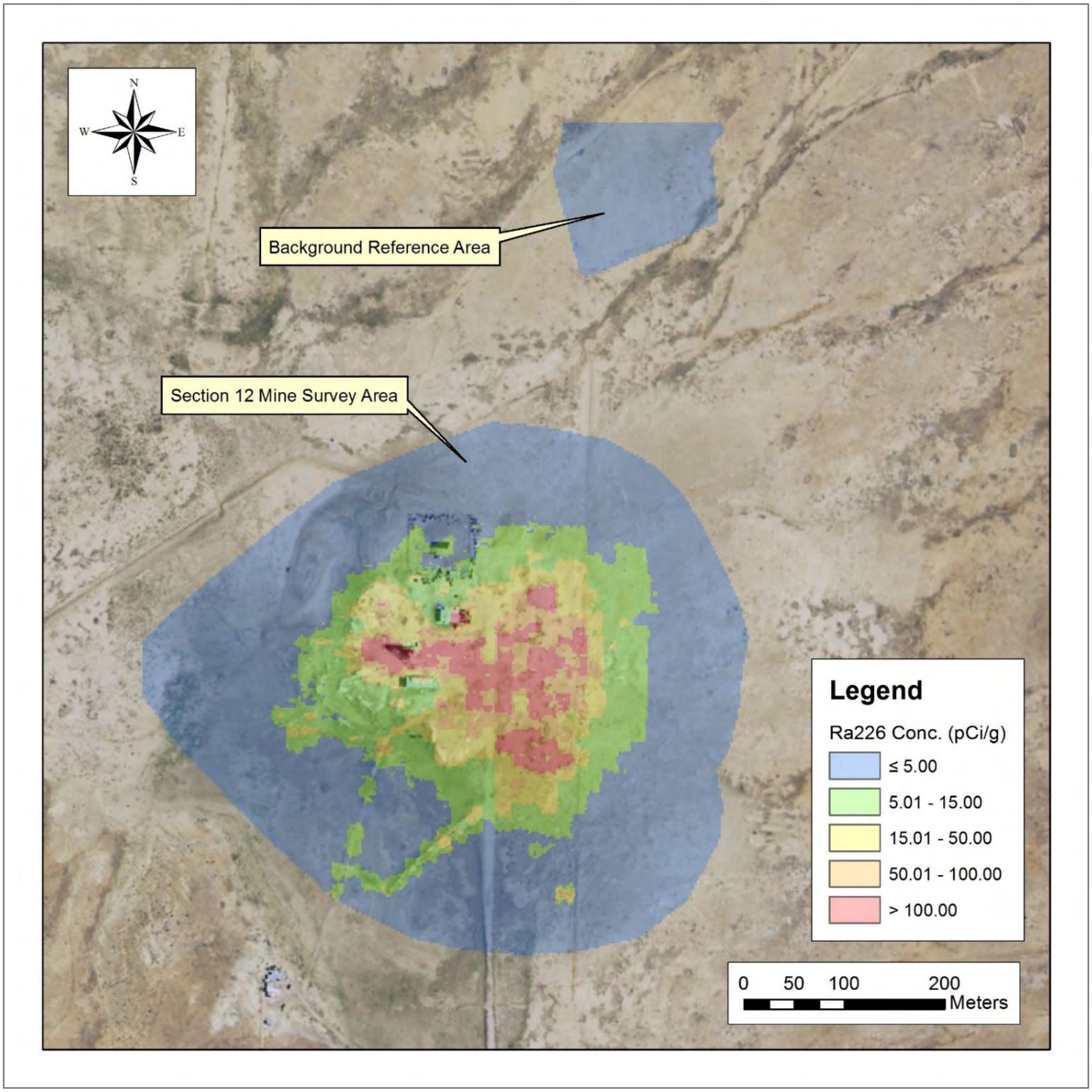


Figure 4-2. Isocontours of Predicted Concentrations of Radium-226

Section 5.0 - Conclusions

The following conclusions and recommendations are presented based on the results of the gamma survey and correlations between gamma count rates and exposure rates and concentrations of radium-226 in soil:

- Gamma count rate measurements correlate strongly to both exposure rates and the concentrations of radium-226 in surface soils at the site. Gamma count rates are related linearly to exposure rates and non-linearly to radium-226 concentrations in soil.

- Radiological impacts are limited to the area around the existing mine shaft and buildings; and extend along a road leading southwest off the permit area and on an L-shaped berm off the southern edge of the mine. The predicted exposure rates and concentrations of radium-226 in soil are highest in the center of the permit area and decrease with increasing distance outward to levels that are comparable to those in the BRA.

- The range of gamma count rates in the BRA is 9,751 to 16,571, with an average and median of 12,506 and 12,489 cpm, respectively. The range of gamma count rates at the site is 10,305 to 339,244, with an average and median of 38,115 and 20,963 cpm, respectively.

- The range of predicted exposure rate measurements at the BRA is 13.3 to 17.4, with an average and median of 14.9 µR/h. The range of predicted exposure rate measurements at the site is 13.6 to 211.0, with a mean and median of 30.3 and 20.0 µR/h, respectively.

- The range of the predicted concentrations of radium-226 in surface soils at the BRA is 0.9 to 2.4 pCi/g, with an average and median of 1.5 and 1.4 pCi/g, respectively. The range of predicted concentrations of radium-226 in surface soils at the site is 1.0 to 502.9, with an average and median of 17.3 and 3.6 pCi/g, respectively.

- The horizontal extent of radiological contamination appears to go beyond the southwest edge of the permit boundary along the road. If practicable, the road should be surveyed in the next phase of work.

- The 95th percentile exposure rate that corresponds to a radium-226 concentration of 5 pCi/g plus background is approximately 22.1 µR/h.

Section 6.0 - Future Site Investigations

This document presents the gamma radiation data collected pursuant to the "Radiological Survey Plan for the Section 11/12 Mine" (ERG, 2015). This data is intended to meet the gamma radiation emission survey recommendations contained in "Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico" (EMNRD/NMED, 2016). The second characterization component recommended in this guidance, to perform horizontal and vertical profiling of the site with soil sampling, has not been conducted. Similarly, the recommendations contained in Section 3.2 and 3.3 of "Guidance for Meeting Radiation Criteria Levels and Reclamation at New Uranium Mining Operations" (EMNRD, 2016) have not been implemented, although selection of the BRA follows these guidelines. Additional soil sampling at the site and the BRA to meet the recommendations in these guidance documents may be implemented following discussions with the New Mexico Mining and Minerals Division.

Section 7.0 - References

ANSI, 1997. Radiation Protection Instrumentation Test and Calibration, Portable Survey Instruments, ANSI N323A, December 31, 1997.

EMNRD, 2016. Guidance for Meeting Radiation Criteria Levels and Reclamation at New Uranium Mining Operations. Issued March 2016.

EMNRD/NMED, 2016. Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in Mexico. Issued March 2016.

EPA, 2011. Region 6, Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Survey.

ERG, 2015. Radiological Survey Plan for the Section 11/12 Mine, June 2015.

McLemore, V.T. and W.L. Chenoweth, 1991. Uranium Mines and Deposits in the Grants District, Cibola and McKinley Counties, New Mexico. New Mexico Bureau of Mines and Mineral Resources, Open-file Report 353.

Appendix A. Completed Instrument Function Check Forms and Calibration Certificates

ERG

Single-Channel Function Check Log

Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

METER	
Manufacturer:	LUDLUM
Model:	2221
Serial No.:	190206
Cal. Due Date:	1/20/17

DETECTOR	
Manufacturer:	LUDLUM
Model:	44-10
Serial No.:	PR288465
Cal. Due Date:	1/20/17

Comments:
ERG JTG IN OFFICE

Source: Cs-137 Activity: 5.0 uCi Source Date: 8/7/03 Distance to Source: ≈ 5' IN JTG

Serial No.: 1698-03 Emission Rate: N/A cpm/emissions

Date	Time	Battery	High Voltage	Threshhold	Source Counts	BKG Counts	Net Counts	Initials	Note(s):
6/13/16	06:50	5.7	997	100	63165	10863	52302	CF	
6/13/16	19:25	5.6	995	100	61904	10920	50984	CF	

Reviewed by: CF Review Date: 6/28/16

SECTION 11/12 MINE

ERG

Single-Channel Function Check Log

Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224

METER	
Manufacturer:	LUDLUM
Model:	2221
Serial No.:	254772
Cal. Due Date:	1/20/17

DETECTOR	
Manufacturer:	LUDLUM
Model:	44-10
Serial No.:	PR303727
Cal. Due Date:	1/20/17

Comments:
ERG JIG IN office.

Source: Cs-137 Activity: 5.0 uCi Source Date: 8/7/03 Distance to Source: ≈ 5" IN JIG

Serial No.: 1698-03 Emission Rate: N/A cpm/emissions

Date	Time	Battery	High Voltage	Threshhold	Source Counts	BKG Counts	Net Counts	Initials	Note(s):
6/13/16	06:45	5.7	998	100	62341	11565	50776	CF	
6/13/16	19:25	5.5	996	59	60853	11081	49772	cf	

Reviewed by: cf Review Date: 6/28/16

ERG

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter:	Manufacturer:	Ludlum	Model Number:	2221r	Serial Number:	190206
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR288465

✓ Mechanical Check ✓ THR/WIN Operation
✓ F/S Response Check ✓ Reset Check
✓ Geotropism ✓ Audio Check
✓ Meter Zeroed ✓ Battery Check (Min 4.4 VDC)

HV Check (+/- 2.5%): ✓ 500 V ✓ 1000 V ✓ 1500 V
Cable Length: __ 39-inch ✓ 72-inch __ Other:

Source Distance: __ Contact ✓ 6 inches __ Other:
Source Geometry ✓ Side __ Below __ Other:

Threshold: 10 mV
Window:

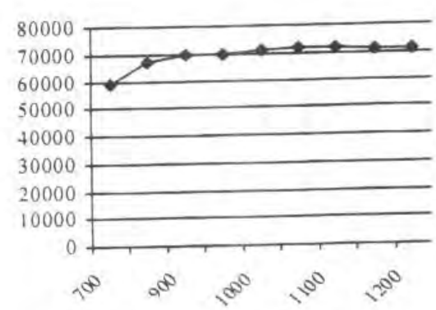
Barometric Pressure: 24.54 inches Hg
Temperature: 71 °F
Relative Humidity: 20 %

Instrument found within tolerance: ✓ Yes __ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Cou[nt]
x 1000	400	400	400	399414	400
x 1000	100	100	100		100
x 100	400	400	400	39954	400
x 100	100	100	100		100
x 10	400	400	400	3996	400
x 10	100	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	59266	
800	67330	
900	69690	
950	69728	
1000	71188	10070
1050	71562	
1100	72192	
1150	71326	
1200	71316	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: __ 97743 ✓ 201932
__ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
__ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: __ 8749012
✓ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
__ Other Source:

Calibrated By: [signature] Calibration Date: 1-20-16 Calibration Due 1-20-17

Reviewed By: [signature] Date: 1/20/16

ERG

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

Meter:	Manufacturer:	Ludlum	Model Number:	2221r	Serial Number:	254772
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR303727

✔ Mechanical Check ✔ THR/WIN Operation
✔ F/S Response Check ✔ Reset Check
✔ Geotropism ✔ Audio Check
✔ Meter Zeroed ✔ Battery Check (Min 4.4 VDC)
Source Distance: ☐ Contact ✔ 6 inches ☐ Other:
Source Geometry ✔ Side ☐ Below ☐ Other:

HV Check (+/- 2.5%): ✔ 500 V ✔ 1000 V ✔ 1500 V
Cable Length: ☐ 39-inch ✔ 72-inch ☐ Other:

Threshold: 10 mV
Window:

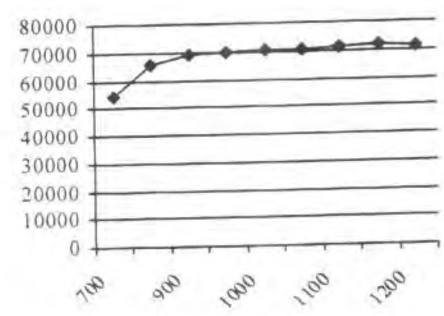
Barometric Pressure: 24.6 inches Hg
Temperature: 73 °F
Relative Humidity: 20 %

Instrument found within tolerance: ✔ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398773	400
x 1000	100	100	100		100
x 100	400	400	400	39887	400
x 100	100	100	100		100
x 10	400	400	400	3988	400
x 10	100	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	53957	
800	65946	
900	69049	
950	69687	
1000	70240	9925
1050	70288	
1100	71224	
1150	71563	
1200	71161	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV = 1000

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ✔ 201932
☐ Alpha Source: Th-230 @ 12,800 dpm (1/4/12) sn: 4098-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/4/12) sn: 4099-03

Fluke multimeter serial number: ☐ 8749012
✔ Gamma Source Cs-137 @ 5.2 uCi (1/4/12) sn: 4097-03
☐ Other Source:

Calibrated By: [signature] Calibration Date: 1-20-16 Calibration Due 1-20-17

Reviewed By: [signature] Date: 1/20/16

ERG Form ITC. 101.A

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997

Reuter-Stokes

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique*, and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

Sensor Type: 100 R/Hr

Serial Number: 07J00KM1

Calibration Date: 7/27/2015

Sensitivity: 10.02 mV/μR/h

Authorized Signature

*Calibration Procedure: RS-SOP 238.1

Calibration Certificate

Reuter-Stokes certifies that the Environmental Radiation Monitor, identified below, has been calibrated for output using the shadow shield technique* and calibrated with radiation sources traceable to the National Institute of Standards and Technology.

*Calibration Procedure: RS-SOP 238.1

Sensor Type:	100 R/Hr	Source (CS-137):	BB-400
Serial Number:	07J00KM1	Date of Certification:	12/1/1994
Sensitivity (Ra-226):	10.02 mV/μR/h	Exposure Rate at 1 meter:	4.226 mR/h

Customer Name: ENVIRONMENTAL RESTORATION GROUP

Distance		Exposure Rate	P+S+A	S+A	P	k(CS-137)
Feet	cm	μR/h	V	V	V	mV/μR/h
12	366	192.471	2.490	0.536	1.953	10.15
14	427	140.822	1.900	0.473	1.426	10.13
16	488	107.371	1.513	0.427	1.086	10.12
18	549	84.486	1.248	0.393	0.855	10.12

k(CS-137) = 10.13 mv/μR/h

k(Ra-226) = 0.9892 k(CS-137)

k(Ra-226) = 10.02 mv/μR/h

$\bar{k}$ = 10.13 mv/μR/h

σ = .013 mv/μR/h

$V = \frac{\sigma}{k} =$ 0.131%

Date: 8-3-15

Reuter-Stokes

RSS-131 FIRMWARE PARAMETERS

S/N 07J00KM1

RAC	2.169E-08
ZLN	0.000E+00
ZMN	3.520E-01
ZHN	2.000E-03
ZLD	0.000E+00
ZMD	-2.414E-04
ZHD	-6.174E-07
RLN	4.619E+11
RMN	2.231E+09
RHN	1.001E+07
RLV	-1.524E+08
RMV	2.093E+04
RHV	-1.548E+02

By: ______________________
Level 2 Nuclear / Electrical Inspector

Date: 5-3-15

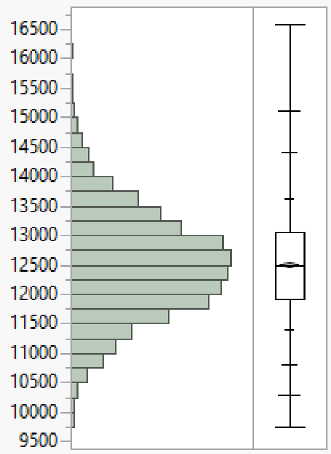
Reviewed By: ______________________
Product Engineer

Appendix B. JMP Version 11.2.1 Statistical Output

JMP Version 11.2.1 Output: Statistical Analysis Gamma Count Rates, Predicted Radium-226 Concentrations in Surface Soils, and Predicted Exposure Rates in the Background Reference Area

Distributions

Gamma Count Rate (cpm)



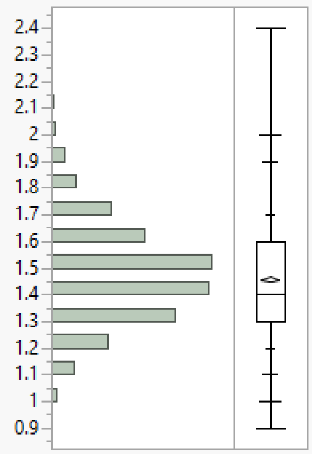
Quantiles

100.0%	maximum	16571
99.5%		15114.9
97.5%		14400.3
90.0%		13620.8
75.0%	quartile	13056.5
50.0%	median	12489
25.0%	quartile	11921.5
10.0%		11390.8
2.5%		10813.1
0.5%		10288.1
0.0%	minimum	9751

Summary Statistics

Mean	12505.641
Std Dev	891.78064
Std Err Mean	19.662598
Upper 95% Mean	12544.201
Lower 95% Mean	12467.08
N	2057
CV	7.1310272
Minimum	9751
Maximum	16571
Geometric Mean	12473.997

Radium-226 (pCi/g)



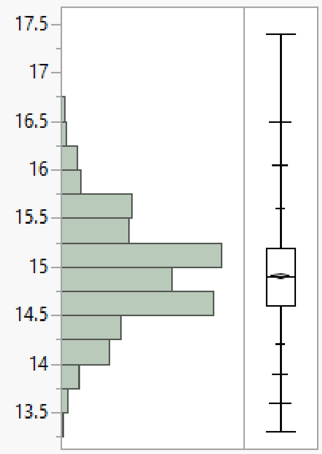
Quantiles

100.0%	maximum	2.4
99.5%		2
97.5%		1.9
90.0%		1.7
75.0%	quartile	1.6
50.0%	median	1.4
25.0%	quartile	1.3
10.0%		1.2
2.5%		1.1
0.5%		1
0.0%	minimum	0.9

Summary Statistics

Mean	1.4564414
Std Dev	0.1871312
Std Err Mean	0.004126
Upper 95% Mean	1.464533
Lower 95% Mean	1.4483498
N	2057
CV	12.848519
Minimum	0.9
Maximum	2.4
Geometric Mean	1.4446021

Exposure Rate (uR/h)



Quantiles

100.0%	maximum	17.4
99.5%		16.5
97.5%		16.055
90.0%		15.6
75.0%	quartile	15.2
50.0%	median	14.9
25.0%	quartile	14.6
10.0%		14.2
2.5%		13.9
0.5%		13.6
0.0%	minimum	13.3

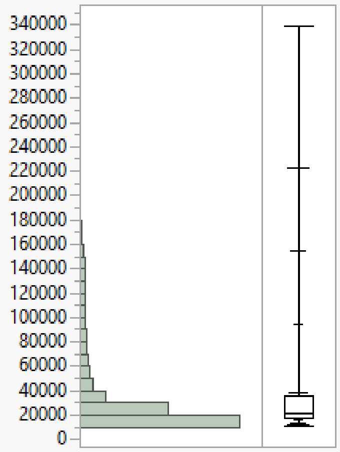
Summary Statistics

Mean	14.912834
Std Dev	0.5369885
Std Err Mean	0.0118399
Upper 95% Mean	14.936054
Lower 95% Mean	14.889615
N	2057
CV	3.6008478
Minimum	13.3
Maximum	17.4
Geometric Mean	14.90321

JMP Version 11.2.1 Output: Statistical Analysis Gamma Count Rates, Predicted Radium-226 Concentrations in Surface Soils, and Predicted Exposure Rates in the Footprint of the EPA ASPECT Survey

Distributions

Gamma Count Rate (cpm)



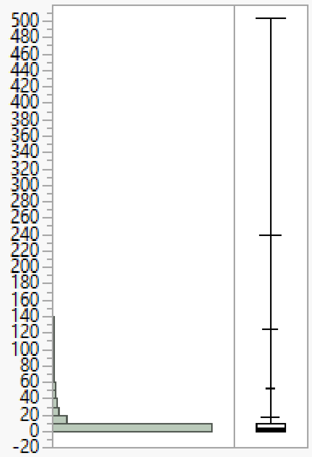
Quantiles

100.0%	maximum	339244
99.5%		223367
97.5%		154420
90.0%		94261.9
75.0%	quartile	35044
50.0%	median	20962.5
25.0%	quartile	17693.3
10.0%		15586.8
2.5%		13252.7
0.5%		11783.3
0.0%	minimum	10305

Summary Statistics

Mean	38115.275
Std Dev	39509.066
Std Err Mean	282.12126
Upper 95% Mean	38668.257
Lower 95% Mean	37562.293
N	19612
CV	103.65678
Minimum	10305
Maximum	339244
Geometric Mean	28054.663

Radium-226 (pCi/g)



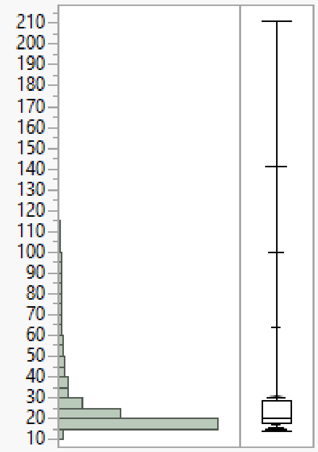
Quantiles

100.0%	maximum	502.9
99.5%		239.829
97.5%		124.7
90.0%		52
75.0%	quartile	9
50.0%	median	3.6
25.0%	quartile	2.7
10.0%		2.1
2.5%		1.6
0.5%		1.3
0.0%	minimum	1

Summary Statistics

Mean	17.33298
Std Dev	37.515399
Std Err Mean	0.2678851
Upper 95% Mean	17.858057
Lower 95% Mean	16.807902
N	19612
CV	216.43941
Minimum	1
Maximum	502.9
Geometric Mean	6.0757548

Exposure Rate (uR/h)



Quantiles

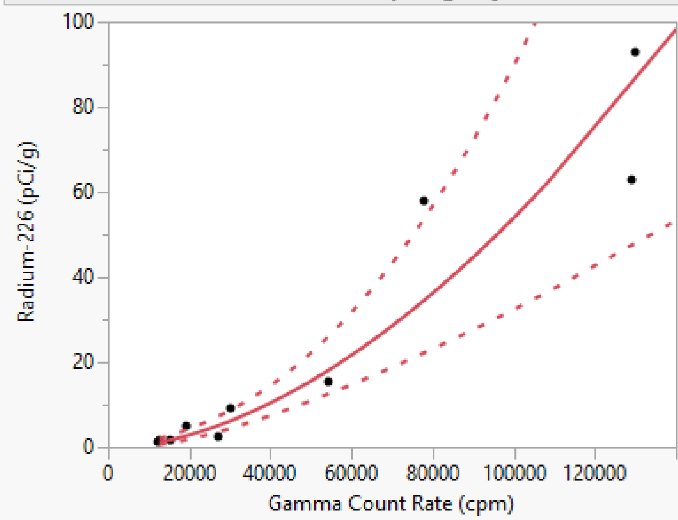
100.0%	maximum	211
99.5%		141.474
97.5%		100.1
90.0%		63.97
75.0%	quartile	28.4
50.0%	median	20
25.0%	quartile	18
10.0%		16.8
2.5%		15.4
0.5%		14.5
0.0%	minimum	13.6

Summary Statistics

Mean	30.279543
Std Dev	23.7058
Std Err Mean	0.1692753
Upper 95% Mean	30.611337
Lower 95% Mean	29.947749
N	19612
CV	78.289822
Minimum	13.6
Maximum	211
Geometric Mean	25.323861

JMP Version 11.2.1 Output: Regression Analysis of Co-Located Gamma Count Rates and Radium-226 Concentrations in Surface Soils (Laboratory Analytical Results)

Bivariate Fit of Radium-226 (pCi/g) By Gamma Count Rate (cpm)



Transformed Fit Log to Log

Transformed Fit Log to Log

Log(Radium-226 (pCi/g)) = -16.40199 + 1.7717248*Log(Gamma Count Rate (cpm))

Summary of Fit

RSquare	0.937612
RSquare Adj	0.929814
Root Mean Square Error	0.442207
Mean of Response	2.129685
Observations (or Sum Wgts)	10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	23.510701	23.5107	120.2306
Error	8	1.564373	0.1955	Prob > F
C. Total	9	25.075074		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	-16.40199	1.695855	-9.67	<.0001*
Log(Gamma Count Rate (cpm))	1.7717248	0.16158	10.96	<.0001*

Fit Measured on Original Scale

Sum of Squared Error	1114.9244
Root Mean Square Error	11.805319
RSquare	0.8892782
Sum of Residuals	5.9609393

Appendix C. Exposure Rate Measurements

Location: BRA-1

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 13:57	0.0153	06/13/2016 13:58	0.017	06/13/2016 13:59	0.0153
06/13/2016 13:57	0.0153	06/13/2016 13:58	0.017	06/13/2016 13:59	0.0153
06/13/2016 13:57	0.0155	06/13/2016 13:58	0.017	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.017	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0168	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0167	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0165	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0163	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0161	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0156	06/13/2016 13:58	0.0161	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.016	06/13/2016 13:59	0.0153
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.016	06/13/2016 13:59	0.0152
06/13/2016 13:57	0.016	06/13/2016 13:58	0.016	06/13/2016 13:59	0.0152
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0158	06/13/2016 13:59	0.0152
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0158	06/13/2016 13:59	0.0152
06/13/2016 13:57	0.0162	06/13/2016 13:58	0.0158	06/13/2016 13:59	0.0153
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0158	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.016	06/13/2016 13:58	0.0158	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.0156	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.0156	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.0156	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0156	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0155	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.0161	06/13/2016 13:58	0.0154	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.016	06/13/2016 13:58	0.0153	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.016	06/13/2016 13:58	0.0152	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.0151	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0158	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0155
06/13/2016 13:57	0.016	06/13/2016 13:58	0.0149	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0162	06/13/2016 13:58	0.0149	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0163	06/13/2016 13:58	0.0148	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0164	06/13/2016 13:58	0.0148	06/13/2016 13:59	0.0154
06/13/2016 13:57	0.0165	06/13/2016 13:58	0.0147	06/13/2016 13:59	0.0154
06/13/2016 13:58	0.0166	06/13/2016 13:58	0.0148	06/13/2016 13:59	0.0153
06/13/2016 13:58	0.0167	06/13/2016 13:58	0.0149	06/13/2016 13:59	0.0153
06/13/2016 13:58	0.0168	06/13/2016 13:58	0.0149	06/13/2016 13:59	0.0152
06/13/2016 13:58	0.0169	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.017	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.017	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.017	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.0172	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.0172	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0152
06/13/2016 13:58	0.0172	06/13/2016 13:58	0.0151	06/13/2016 13:59	0.0153
06/13/2016 13:58	0.0172	06/13/2016 13:58	0.015	06/13/2016 13:59	0.0153
06/13/2016 13:58	0.017	06/13/2016 13:59	0.015	06/13/2016 13:59	0.0152
06/13/2016 13:58	0.017	06/13/2016 13:59	0.0151	06/13/2016 13:59	0.0152
06/13/2016 13:58	0.017	06/13/2016 13:59	0.0152	06/13/2016 13:59	0.0151
06/13/2016 13:58	0.017	06/13/2016 13:59	0.0152	06/13/2016 13:59	0.015
06/13/2016 13:58	0.017	06/13/2016 13:59	0.0152	06/13/2016 13:59	0.0149

Note:
mR/h = microRoentgens per hour

Location: BRA-1

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 13:59	0.0148	06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0154
06/13/2016 13:59	0.0147	06/13/2016 14:00	0.0154	06/13/2016 14:01	0.0154
06/13/2016 13:59	0.0145	06/13/2016 14:00	0.0153	06/13/2016 14:01	0.0155
06/13/2016 13:59	0.0144	06/13/2016 14:00	0.0153	06/13/2016 14:01	0.0155
06/13/2016 13:59	0.0143	06/13/2016 14:00	0.0152	06/13/2016 14:01	0.0155
06/13/2016 13:59	0.0143	06/13/2016 14:00	0.0151	06/13/2016 14:01	0.0155
06/13/2016 14:00	0.0143	06/13/2016 14:00	0.0151	06/13/2016 14:01	0.0155
06/13/2016 14:00	0.0143	06/13/2016 14:00	0.0152	06/13/2016 14:01	0.0155
06/13/2016 14:00	0.0144	06/13/2016 14:00	0.0152	06/13/2016 14:01	0.0155
06/13/2016 14:00	0.0144	06/13/2016 14:00	0.0153	06/13/2016 14:01	0.0156
06/13/2016 14:00	0.0145	06/13/2016 14:00	0.0155	06/13/2016 14:01	0.0156
06/13/2016 14:00	0.0146	06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0147	06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0148	06/13/2016 14:00	0.0158	06/13/2016 14:01	0.016
06/13/2016 14:00	0.0149	06/13/2016 14:01	0.0158	06/13/2016 14:01	0.016
06/13/2016 14:00	0.0152	06/13/2016 14:01	0.0158	06/13/2016 14:01	0.016
06/13/2016 14:00	0.0154	06/13/2016 14:01	0.0156	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0156	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0155	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0155	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0154	06/13/2016 14:01	0.0158
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0155	06/13/2016 14:01	0.016
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0155	06/13/2016 14:02	0.0161
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0155	06/13/2016 14:02	0.0161
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0155	06/13/2016 14:02	0.016
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0155	06/13/2016 14:02	0.0158
06/13/2016 14:00	0.0161	06/13/2016 14:01	0.0154	06/13/2016 14:02	0.0158
06/13/2016 14:00	0.0161	06/13/2016 14:01	0.0153	06/13/2016 14:02	0.0158
06/13/2016 14:00	0.0161	06/13/2016 14:01	0.0152	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.0161	06/13/2016 14:01	0.0152	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.0161	06/13/2016 14:01	0.0151	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.016	06/13/2016 14:01	0.015	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.015	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0149	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0149	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0148	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0148	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.0155	06/13/2016 14:01	0.0147	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0148	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0149	06/13/2016 14:02	0.0153
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.015	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0156	06/13/2016 14:01	0.0151	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0151	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0153	06/13/2016 14:02	0.0154
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0155	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0155
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.016	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0156
06/13/2016 14:00	0.0158	06/13/2016 14:01	0.0156	06/13/2016 14:02	0.0156

Note:
mR/h = microRoentgens per hour

Location: BRA-1

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:02	0.0155	06/13/2016 14:03	0.0153	06/13/2016 14:04	0.0153
06/13/2016 14:02	0.0155	06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0152
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0154	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0155	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0152
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0152
06/13/2016 14:02	0.0158	06/13/2016 14:03	0.0154	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0153	06/13/2016 14:04	0.0151
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0153	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0156	06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0158	06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0148
06/13/2016 14:02	0.0158	06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0158	06/13/2016 14:03	0.0153	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0161	06/13/2016 14:03	0.0154	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0162	06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0163	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0163	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0164	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0164	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0149
06/13/2016 14:02	0.0164	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0163	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0162	06/13/2016 14:03	0.016	06/13/2016 14:04	0.015
06/13/2016 14:02	0.0161	06/13/2016 14:03	0.016	06/13/2016 14:04	0.015
06/13/2016 14:02	0.016	06/13/2016 14:03	0.016	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0158	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0156	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0156	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0155	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0155	06/13/2016 14:03	0.0158	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0155	06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0149
06/13/2016 14:03	0.0154	06/13/2016 14:04	0.0155	06/13/2016 14:04	0.0149
06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0154	06/13/2016 14:04	0.0148
06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0153	06/13/2016 14:04	0.0148
06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0152	06/13/2016 14:04	0.0148
06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151	06/13/2016 14:04	0.0148
06/13/2016 14:03	0.0156	06/13/2016 14:04	0.0151	06/13/2016 14:04	0.0148
06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0151	06/13/2016 14:04	0.015
06/13/2016 14:03	0.0155	06/13/2016 14:04	0.0151	06/13/2016 14:05	0.0152
06/13/2016 14:03	0.0154	06/13/2016 14:04	0.0151	06/13/2016 14:05	0.0155
06/13/2016 14:03	0.0153	06/13/2016 14:04	0.0152	06/13/2016 14:05	0.0156
06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0153	06/13/2016 14:05	0.0158
06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0153	06/13/2016 14:05	0.0165
06/13/2016 14:03	0.0152	06/13/2016 14:04	0.0154	06/13/2016 14:05	0.0166
06/13/2016 14:03	0.0153	06/13/2016 14:04	0.0154	06/13/2016 14:05	0.0167
06/13/2016 14:03	0.0154	06/13/2016 14:04	0.0153	06/13/2016 14:05	0.0167

Note:
mR/h = microRoentgens per hour

Location: BRA-1

Date / Time	Exposure Rate (mR/h)
06/13/2016 14:05	0.0167
06/13/2016 14:05	0.0166
06/13/2016 14:05	0.0165
06/13/2016 14:05	0.0164
06/13/2016 14:05	0.0163
06/13/2016 14:05	0.0162
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0162
06/13/2016 14:05	0.0162
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.0161
06/13/2016 14:05	0.016
06/13/2016 14:05	0.016
06/13/2016 14:05	0.0158
06/13/2016 14:05	0.0158
06/13/2016 14:05	0.0158
06/13/2016 14:04	0.0154
06/13/2016 14:05	0.0162
06/13/2016 14:05	0.0163

Note:
mR/h = microRoentgens per hour

Location: BRA-2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0163
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0163
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0162
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.0149	06/13/2016 14:09	0.0162
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.0149	06/13/2016 14:09	0.0161
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0162
06/13/2016 14:07	0.0148	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0161
06/13/2016 14:07	0.0147	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0161
06/13/2016 14:07	0.0147	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.016
06/13/2016 14:07	0.0147	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0147	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0147	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0149	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0151	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0152	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0153	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0154	06/13/2016 14:08	0.015	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0151	06/13/2016 14:09	0.0156
06/13/2016 14:07	0.0154	06/13/2016 14:08	0.0152	06/13/2016 14:09	0.0156
06/13/2016 14:07	0.0154	06/13/2016 14:08	0.0153	06/13/2016 14:09	0.0156
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0156	06/13/2016 14:08	0.0155	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0156	06/13/2016 14:09	0.0158
06/13/2016 14:07	0.0155	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0158
06/13/2016 14:08	0.0154	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0158
06/13/2016 14:08	0.0153	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0158
06/13/2016 14:08	0.0153	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0153	06/13/2016 14:08	0.016	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:08	0.016	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0155
06/13/2016 14:08	0.0153	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0154
06/13/2016 14:08	0.0154	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0154
06/13/2016 14:08	0.0154	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0154
06/13/2016 14:08	0.0155	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0153
06/13/2016 14:08	0.0155	06/13/2016 14:08	0.0158	06/13/2016 14:09	0.0153
06/13/2016 14:08	0.0155	06/13/2016 14:09	0.016	06/13/2016 14:09	0.0153
06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0161	06/13/2016 14:09	0.0153
06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0162	06/13/2016 14:09	0.0155
06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0162	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0155	06/13/2016 14:09	0.0163	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0154	06/13/2016 14:09	0.0163	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0153	06/13/2016 14:09	0.0164	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0153	06/13/2016 14:09	0.0164	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:09	0.0163	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:09	0.0164	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:09	0.0163	06/13/2016 14:09	0.0156
06/13/2016 14:08	0.0152	06/13/2016 14:09	0.0163	06/13/2016 14:10	0.0156

Note:
mR/h = microRoentgens per hour

Location: BRA-2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:10	0.0156	06/13/2016 14:10	0.0163	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0158	06/13/2016 14:10	0.0163	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.016	06/13/2016 14:10	0.0164	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0161	06/13/2016 14:10	0.0164	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0163	06/13/2016 14:10	0.0163	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0164	06/13/2016 14:10	0.0162	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0165	06/13/2016 14:10	0.016	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0166	06/13/2016 14:10	0.0158	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0158	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0158
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0156
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0156
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0156
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0155
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0156	06/13/2016 14:11	0.0155
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0158	06/13/2016 14:11	0.0154
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0161	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0162	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0165	06/13/2016 14:11	0.0163	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0165	06/13/2016 14:11	0.0163	06/13/2016 14:12	0.0152
06/13/2016 14:10	0.0165	06/13/2016 14:11	0.0163	06/13/2016 14:12	0.0151
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0162	06/13/2016 14:12	0.015
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0161	06/13/2016 14:12	0.015
06/13/2016 14:10	0.0168	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0151
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0151
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0156
06/13/2016 14:10	0.0172	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0158
06/13/2016 14:10	0.0172	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0158
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.016
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.016
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0155	06/13/2016 14:12	0.0158
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0154	06/13/2016 14:12	0.0158
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0154	06/13/2016 14:12	0.0156
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0155	06/13/2016 14:12	0.0156
06/13/2016 14:10	0.017	06/13/2016 14:11	0.0155	06/13/2016 14:12	0.0155
06/13/2016 14:10	0.0169	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0154
06/13/2016 14:10	0.0168	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0154
06/13/2016 14:10	0.0167	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0166	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0165	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0152
06/13/2016 14:10	0.0164	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0153
06/13/2016 14:10	0.0164	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0155
06/13/2016 14:10	0.0163	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0156
06/13/2016 14:10	0.0162	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0158
06/13/2016 14:10	0.0161	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.016
06/13/2016 14:10	0.016	06/13/2016 14:11	0.0156	06/13/2016 14:12	0.0162
06/13/2016 14:10	0.0161	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0162
06/13/2016 14:10	0.0162	06/13/2016 14:11	0.0158	06/13/2016 14:12	0.0163

Note:
mR/h = microRoentgens per hour

Location: BRA-2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.016
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.016
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.016
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.0158
06/13/2016 14:12	0.0162	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.0158
06/13/2016 14:12	0.0161	06/13/2016 14:13	0.0152	06/13/2016 14:14	0.0158
06/13/2016 14:12	0.016	06/13/2016 14:13	0.0152	06/13/2016 14:14	0.0158
06/13/2016 14:12	0.016	06/13/2016 14:13	0.0152	06/13/2016 14:14	0.0158
06/13/2016 14:12	0.016	06/13/2016 14:13	0.0152	06/13/2016 14:14	0.0156
06/13/2016 14:12	0.016	06/13/2016 14:13	0.0152	06/13/2016 14:14	0.0156
06/13/2016 14:12	0.0161	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:12	0.0162	06/13/2016 14:13	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:12	0.0162	06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0164	06/13/2016 14:13	0.0155	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0155	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0164	06/13/2016 14:13	0.0155	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0163	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0164	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0165	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0154
06/13/2016 14:12	0.0165	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0166	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0167	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0167	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0153
06/13/2016 14:12	0.0167	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0153
06/13/2016 14:13	0.0166	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0154
06/13/2016 14:13	0.0165	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0163	06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0161	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.016	06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0158	06/13/2016 14:13	0.0155	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0158	06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0154	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.016	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0161	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0162	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0161	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0154
06/13/2016 14:13	0.0162	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0155
06/13/2016 14:13	0.0161	06/13/2016 14:14	0.0153	06/13/2016 14:14	0.0156
06/13/2016 14:13	0.0161	06/13/2016 14:14	0.0153	06/13/2016 14:15	0.0156
06/13/2016 14:13	0.016	06/13/2016 14:14	0.0154	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.016	06/13/2016 14:14	0.0154	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.016	06/13/2016 14:14	0.0155	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0156	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.0158	06/13/2016 14:14	0.0156	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.0156	06/13/2016 14:14	0.0156	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.0155	06/13/2016 14:14	0.0156	06/13/2016 14:15	0.016
06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0156	06/13/2016 14:15	0.0158
06/13/2016 14:13	0.0153	06/13/2016 14:14	0.0158	06/13/2016 14:15	0.0156
06/13/2016 14:13	0.0154	06/13/2016 14:14	0.0158	06/13/2016 14:15	0.0156
06/13/2016 14:13	0.0153	06/13/2016 14:14	0.016	06/13/2016 14:15	0.0155

Note:
mR/h = microRoentgens per hour

Location: BRA-2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:15	0.0154	06/13/2016 14:16	0.0154	06/13/2016 14:17	0.0164
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0154	06/13/2016 14:17	0.0164
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0154	06/13/2016 14:17	0.0165
06/13/2016 14:15	0.0152	06/13/2016 14:16	0.0155	06/13/2016 14:17	0.0164
06/13/2016 14:15	0.0152	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0165
06/13/2016 14:15	0.0152	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0166
06/13/2016 14:15	0.0151	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0166
06/13/2016 14:15	0.0149	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0165
06/13/2016 14:15	0.0148	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0166
06/13/2016 14:15	0.0147	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0167
06/13/2016 14:15	0.0146	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0168
06/13/2016 14:15	0.0145	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0167
06/13/2016 14:15	0.0144	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0167
06/13/2016 14:15	0.0144	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0166
06/13/2016 14:15	0.0143	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0166
06/13/2016 14:15	0.0142	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0165
06/13/2016 14:15	0.0142	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0163
06/13/2016 14:15	0.0143	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0162
06/13/2016 14:15	0.0144	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0161
06/13/2016 14:15	0.0144	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.016
06/13/2016 14:15	0.0145	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0158
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0158
06/13/2016 14:16	0.0165	06/13/2016 14:16	0.0158	06/13/2016 14:17	0.0158
06/13/2016 14:15	0.015	06/13/2016 14:16	0.0158	06/13/2016 14:17	0.0156
06/13/2016 14:15	0.0151	06/13/2016 14:16	0.0158	06/13/2016 14:17	0.0156
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0156
06/13/2016 14:15	0.0154	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0158
06/13/2016 14:15	0.0155	06/13/2016 14:16	0.0156	06/13/2016 14:17	0.0158
06/13/2016 14:15	0.0156	06/13/2016 14:16	0.0155	06/13/2016 14:17	0.0158
06/13/2016 14:15	0.0156	06/13/2016 14:16	0.0154	06/13/2016 14:17	0.0156
06/13/2016 14:15	0.0156	06/13/2016 14:16	0.0153	06/13/2016 14:17	0.0156
06/13/2016 14:15	0.0156	06/13/2016 14:16	0.0152		
06/13/2016 14:15	0.0156	06/13/2016 14:16	0.0151		
06/13/2016 14:15	0.0155	06/13/2016 14:16	0.0151		
06/13/2016 14:15	0.0154	06/13/2016 14:16	0.0151		
06/13/2016 14:15	0.0154	06/13/2016 14:16	0.0152		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0152		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0155		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0158		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0162		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0164		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0166		
06/13/2016 14:15	0.0153	06/13/2016 14:15	0.0158		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0165		
06/13/2016 14:15	0.0153	06/13/2016 14:16	0.0164		
06/13/2016 14:16	0.0154	06/13/2016 14:16	0.0164		
06/13/2016 14:16	0.0154	06/13/2016 14:16	0.0163		
06/13/2016 14:16	0.0155	06/13/2016 14:16	0.0163		
06/13/2016 14:16	0.0155	06/13/2016 14:16	0.0164		
06/13/2016 14:16	0.0155	06/13/2016 14:16	0.0164		
06/13/2016 14:16	0.0155	06/13/2016 14:16	0.0164		
06/13/2016 14:16	0.0155	06/13/2016 14:17	0.0164		

Note:
mR/h = microRoentgens per hour

Location: Sample 1

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:35	0.0152	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:35	0.0152	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0156	06/13/2016 14:37	0.0149
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0149
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0148
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0147
06/13/2016 14:35	0.0149	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0146
06/13/2016 14:35	0.0149	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0146
06/13/2016 14:35	0.0149	06/13/2016 14:36	0.016	06/13/2016 14:37	0.0146
06/13/2016 14:35	0.0148	06/13/2016 14:36	0.0161	06/13/2016 14:37	0.0145
06/13/2016 14:35	0.015	06/13/2016 14:36	0.0161	06/13/2016 14:37	0.0145
06/13/2016 14:35	0.0152	06/13/2016 14:36	0.0161	06/13/2016 14:37	0.0145
06/13/2016 14:35	0.0154	06/13/2016 14:36	0.0161	06/13/2016 14:37	0.0145
06/13/2016 14:35	0.0155	06/13/2016 14:36	0.0162	06/13/2016 14:37	0.0145
06/13/2016 14:35	0.0156	06/13/2016 14:36	0.0162	06/13/2016 14:37	0.0145
06/13/2016 14:36	0.016	06/13/2016 14:36	0.0163	06/13/2016 14:37	0.0146
06/13/2016 14:36	0.0161	06/13/2016 14:36	0.0163	06/13/2016 14:37	0.0147
06/13/2016 14:36	0.0162	06/13/2016 14:36	0.0162	06/13/2016 14:37	0.0147
06/13/2016 14:36	0.0162	06/13/2016 14:36	0.0162	06/13/2016 14:37	0.0149
06/13/2016 14:36	0.0163	06/13/2016 14:36	0.0161	06/13/2016 14:37	0.0149
06/13/2016 14:36	0.0163	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:36	0.0164	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:36	0.0166	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0151
06/13/2016 14:36	0.0167	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.015
06/13/2016 14:36	0.0167	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0151
06/13/2016 14:36	0.0167	06/13/2016 14:36	0.0158	06/13/2016 14:37	0.0152
06/13/2016 14:36	0.0168	06/13/2016 14:37	0.0158	06/13/2016 14:37	0.0154
06/13/2016 14:36	0.0168	06/13/2016 14:37	0.0158	06/13/2016 14:37	0.0155
06/13/2016 14:36	0.0168	06/13/2016 14:37	0.0161	06/13/2016 14:37	0.0156
06/13/2016 14:36	0.0167	06/13/2016 14:37	0.0161	06/13/2016 14:37	0.0156
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0162	06/13/2016 14:37	0.0156
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0162	06/13/2016 14:37	0.0158
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0162	06/13/2016 14:37	0.0158
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0162	06/13/2016 14:37	0.0158
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0162	06/13/2016 14:37	0.0158
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0161	06/13/2016 14:37	0.016
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.016	06/13/2016 14:37	0.0161
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0158	06/13/2016 14:38	0.0162
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0156	06/13/2016 14:38	0.0163
06/13/2016 14:36	0.0167	06/13/2016 14:37	0.0154	06/13/2016 14:38	0.0163
06/13/2016 14:36	0.0167	06/13/2016 14:37	0.0153	06/13/2016 14:38	0.0163
06/13/2016 14:36	0.0167	06/13/2016 14:37	0.0153	06/13/2016 14:38	0.0163
06/13/2016 14:36	0.0167	06/13/2016 14:37	0.0152	06/13/2016 14:38	0.0162
06/13/2016 14:36	0.0166	06/13/2016 14:37	0.0152	06/13/2016 14:38	0.0161
06/13/2016 14:36	0.0164	06/13/2016 14:37	0.0151	06/13/2016 14:38	0.0158
06/13/2016 14:36	0.0163	06/13/2016 14:37	0.015	06/13/2016 14:38	0.0158
06/13/2016 14:36	0.0162	06/13/2016 14:37	0.015	06/13/2016 14:38	0.0156
06/13/2016 14:36	0.016	06/13/2016 14:37	0.015	06/13/2016 14:38	0.0156

Note:
mR/h = microRoentgens per hour

Location: Sample 1

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0161	06/13/2016 14:39	0.0153
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.016	06/13/2016 14:39	0.0155
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.0158	06/13/2016 14:39	0.0156
06/13/2016 14:38	0.016	06/13/2016 14:39	0.0158	06/13/2016 14:39	0.0156
06/13/2016 14:38	0.0161	06/13/2016 14:39	0.0158	06/13/2016 14:39	0.0156
06/13/2016 14:38	0.0161	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0162	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0163	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0155
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0155
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0154
06/13/2016 14:38	0.0164	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0163	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0152
06/13/2016 14:38	0.0162	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0151
06/13/2016 14:38	0.016	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0151
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0152
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.016	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0162	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0163	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.0152
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0165	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0165	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0165	06/13/2016 14:40	0.0152
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0165	06/13/2016 14:40	0.0151
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0165	06/13/2016 14:40	0.0151
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.0151
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.015
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0164	06/13/2016 14:40	0.015
06/13/2016 14:38	0.0156	06/13/2016 14:39	0.0163	06/13/2016 14:40	0.0149
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.0161	06/13/2016 14:40	0.0149
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.016	06/13/2016 14:40	0.0149
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.016	06/13/2016 14:40	0.015
06/13/2016 14:38	0.0158	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.015
06/13/2016 14:38	0.0161	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0152
06/13/2016 14:38	0.0163	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0153
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0154
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0154
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0158	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0166	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0156	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0165	06/13/2016 14:39	0.0154	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0164	06/13/2016 14:39	0.0153	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0163	06/13/2016 14:39	0.0152	06/13/2016 14:40	0.0156
06/13/2016 14:38	0.0162	06/13/2016 14:39	0.0151	06/13/2016 14:40	0.0156
06/13/2016 14:39	0.0162	06/13/2016 14:39	0.0151	06/13/2016 14:40	0.0156
06/13/2016 14:39	0.0162	06/13/2016 14:39	0.0151	06/13/2016 14:40	0.0156

Note:
mR/h = microRoentgens per hour

Location: Sample 1

Date / Time	Exposure Rate (mR/h)
06/13/2016 14:40	0.0158
06/13/2016 14:40	0.0158
06/13/2016 14:40	0.016
06/13/2016 14:40	0.016
06/13/2016 14:40	0.016
06/13/2016 14:40	0.016
06/13/2016 14:40	0.0161
06/13/2016 14:40	0.0161
06/13/2016 14:40	0.016
06/13/2016 14:40	0.0158
06/13/2016 14:40	0.0156
06/13/2016 14:40	0.0155
06/13/2016 14:40	0.0153
06/13/2016 14:41	0.0152
06/13/2016 14:41	0.0151
06/13/2016 14:41	0.015
06/13/2016 14:41	0.0149
06/13/2016 14:41	0.0149
06/13/2016 14:41	0.0148
06/13/2016 14:41	0.0148
06/13/2016 14:41	0.0149
06/13/2016 14:41	0.015
06/13/2016 14:41	0.0151
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.016
06/13/2016 14:41	0.016
06/13/2016 14:41	0.0161
06/13/2016 14:41	0.016
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154

Date / Time	Exposure Rate (mR/h)
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0154
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0155
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0156
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.016
06/13/2016 14:41	0.016
06/13/2016 14:41	0.016
06/13/2016 14:41	0.016
06/13/2016 14:41	0.016
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158
06/13/2016 14:41	0.0158

Note:
mR/h = microRoentgens per hour

Location: Sample 2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0241	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0241	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0241	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0223	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0223	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0223	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.024	06/13/2016 14:47	0.0223	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0239	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0237	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0237	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0235	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0235	06/13/2016 14:47	0.0225	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0234	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0233	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0228	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0228	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0228	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0227	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0228	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0229	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.0231	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0233	06/13/2016 14:47	0.0231	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:46	0.0232	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0231	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.023	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.023	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0229	06/13/2016 14:47	0.0231	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0228	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0229	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0229	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.023	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0231	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0231	06/13/2016 14:47	0.023	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0232	06/13/2016 14:47	0.0229	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0232	06/13/2016 14:48	0.0229	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0232	06/13/2016 14:48	0.0228	06/13/2016 14:48	0.0231
06/13/2016 14:47	0.0232	06/13/2016 14:48	0.0228	06/13/2016 14:48	0.0245
06/13/2016 14:47	0.0231	06/13/2016 14:48	0.0228	06/13/2016 14:48	0.0245
06/13/2016 14:47	0.023	06/13/2016 14:48	0.0229	06/13/2016 14:48	0.0244
06/13/2016 14:47	0.0231	06/13/2016 14:48	0.0229	06/13/2016 14:48	0.0244
06/13/2016 14:47	0.023	06/13/2016 14:48	0.023	06/13/2016 14:48	0.0243
06/13/2016 14:47	0.0229	06/13/2016 14:48	0.023	06/13/2016 14:48	0.0242
06/13/2016 14:47	0.0228	06/13/2016 14:48	0.023	06/13/2016 14:48	0.0241
06/13/2016 14:47	0.0228	06/13/2016 14:48	0.0231	06/13/2016 14:48	0.024

Note:
mR/h = microRoentgens per hour

Location: Sample 2

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:48	0.024	06/13/2016 14:49	0.0232	06/13/2016 14:50	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0232	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0232	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0233	06/13/2016 14:50	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0235	06/13/2016 14:50	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0235	06/13/2016 14:50	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:49	0.0235	06/13/2016 14:50	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0235	06/13/2016 14:50	0.023
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0234	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0234	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0234	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0233	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0233	06/13/2016 14:50	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0232	06/13/2016 14:50	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0231	06/13/2016 14:50	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.023	06/13/2016 14:51	0.0233
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.023	06/13/2016 14:51	0.0233
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.023	06/13/2016 14:51	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.023	06/13/2016 14:51	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0231	06/13/2016 14:51	0.0232
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0231	06/13/2016 14:51	0.0231
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0231
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0231	06/13/2016 14:51	0.0231
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0231
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.023
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0231	06/13/2016 14:51	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.023	06/13/2016 14:51	0.0229
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0229	06/13/2016 14:51	0.0229
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0228	06/13/2016 14:51	0.023
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0227	06/13/2016 14:51	0.0231
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0227	06/13/2016 14:51	0.0232
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0233
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0233
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0234
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0235
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0235
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0235
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0225	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0228	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0228	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0228	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0239	06/13/2016 14:50	0.0229	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0231	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0237	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0235	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0237
06/13/2016 14:49	0.0234	06/13/2016 14:50	0.0232	06/13/2016 14:51	0.0239

Note:
mR/h = microRoentgens per hour

Location: Sample 2

Date / Time	Exposure Rate (mR/h)
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.024
06/13/2016 14:51	0.024
06/13/2016 14:51	0.0239
06/13/2016 14:51	0.024
06/13/2016 14:51	0.024
06/13/2016 14:51	0.024
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0241
06/13/2016 14:51	0.0242
06/13/2016 14:51	0.0244
06/13/2016 14:51	0.0244
06/13/2016 14:51	0.0245
06/13/2016 14:52	0.0245
06/13/2016 14:52	0.0247
06/13/2016 14:52	0.0247
06/13/2016 14:52	0.0247
06/13/2016 14:52	0.0245
06/13/2016 14:52	0.0245
06/13/2016 14:52	0.0245
06/13/2016 14:52	0.0244
06/13/2016 14:52	0.0243
06/13/2016 14:52	0.0242
06/13/2016 14:52	0.0241
06/13/2016 14:52	0.0241
06/13/2016 14:52	0.0241
06/13/2016 14:52	0.024
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024

Date / Time	Exposure Rate (mR/h)
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024
06/13/2016 14:52	0.0241
06/13/2016 14:52	0.0241
06/13/2016 14:52	0.024
06/13/2016 14:52	0.024
06/13/2016 14:52	0.0239
06/13/2016 14:52	0.0237
06/13/2016 14:52	0.0237
06/13/2016 14:52	0.0235

Note:
mR/h = microRoentgens per hour

Location: Sample 3

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0551
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0551
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0551
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0551
06/13/2016 14:59	0.054	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0551
06/13/2016 14:59	0.054	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0549
06/13/2016 14:59	0.054	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0547
06/13/2016 14:59	0.054	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0545
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0544
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0542
06/13/2016 14:59	0.0542	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0538
06/13/2016 14:59	0.0544	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0537
06/13/2016 15:00	0.0547	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0536
06/13/2016 15:00	0.0548	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0536
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0536
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0536
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0537
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0538
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0542	06/13/2016 15:01	0.0538
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0542	06/13/2016 15:01	0.0538
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0542	06/13/2016 15:01	0.054
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.054	06/13/2016 15:01	0.0542
06/13/2016 15:00	0.0551	06/13/2016 15:00	0.0542	06/13/2016 15:01	0.0544
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0542	06/13/2016 15:01	0.0547
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0542	06/13/2016 15:01	0.0547
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0542	06/13/2016 15:01	0.0547
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0549
06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0549
06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0544	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0545	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0544	06/13/2016 15:01	0.0548
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0544	06/13/2016 15:02	0.0548
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0544	06/13/2016 15:02	0.0547
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0544	06/13/2016 15:02	0.0547
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0544	06/13/2016 15:02	0.0545
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0544	06/13/2016 15:02	0.0545
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0547	06/13/2016 15:02	0.0545
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0548	06/13/2016 15:02	0.0544
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0544
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0542
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0542
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0542
06/13/2016 15:00	0.0549	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0544
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0544
06/13/2016 15:00	0.0548	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0544
06/13/2016 15:00	0.0547	06/13/2016 15:01	0.0551	06/13/2016 15:02	0.0544

Note:
mR/h = microRoentgens per hour

Location: Sample 3

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0547
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0545
06/13/2016 15:02	0.0544
06/13/2016 15:02	0.0544
06/13/2016 15:02	0.0544
06/13/2016 15:02	0.0544
06/13/2016 15:02	0.0542
06/13/2016 15:02	0.0542
06/13/2016 15:02	0.0542
06/13/2016 15:02	0.054
06/13/2016 15:02	0.054
06/13/2016 15:02	0.054
06/13/2016 15:02	0.0538
06/13/2016 15:02	0.0537
06/13/2016 15:02	0.0536
06/13/2016 15:02	0.0534
06/13/2016 15:02	0.0533
06/13/2016 15:02	0.0533
06/13/2016 15:02	0.0532
06/13/2016 15:02	0.0531
06/13/2016 15:02	0.0529
06/13/2016 15:02	0.0528
06/13/2016 15:02	0.0528
06/13/2016 15:02	0.0527
06/13/2016 15:02	0.0527
06/13/2016 15:02	0.0527
06/13/2016 15:02	0.0525
06/13/2016 15:02	0.0524
06/13/2016 15:02	0.0524
06/13/2016 15:02	0.0524
06/13/2016 15:02	0.0525
06/13/2016 15:02	0.0524
06/13/2016 15:02	0.0523
06/13/2016 15:02	0.0523
06/13/2016 15:02	0.052
06/13/2016 15:02	0.052
06/13/2016 15:02	0.0518
06/13/2016 15:02	0.0518
06/13/2016 15:03	0.0516
06/13/2016 15:03	0.0516
06/13/2016 15:03	0.0514
06/13/2016 15:03	0.0512
06/13/2016 15:03	0.0511
06/13/2016 15:03	0.0507

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0508
06/13/2016 15:03	0.0508
06/13/2016 15:03	0.0511
06/13/2016 15:03	0.0512
06/13/2016 15:03	0.0512
06/13/2016 15:03	0.0512
06/13/2016 15:03	0.0511
06/13/2016 15:03	0.0509
06/13/2016 15:03	0.0508
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0505
06/13/2016 15:03	0.0504
06/13/2016 15:03	0.0504
06/13/2016 15:03	0.0504
06/13/2016 15:03	0.0503
06/13/2016 15:03	0.0503
06/13/2016 15:03	0.0504
06/13/2016 15:03	0.0504
06/13/2016 15:03	0.0505
06/13/2016 15:03	0.0507
06/13/2016 15:03	0.0508
06/13/2016 15:03	0.0509
06/13/2016 15:03	0.0509
06/13/2016 15:03	0.0511
06/13/2016 15:03	0.0512
06/13/2016 15:03	0.0513
06/13/2016 15:03	0.0514
06/13/2016 15:03	0.0516
06/13/2016 15:03	0.0518
06/13/2016 15:03	0.052
06/13/2016 15:03	0.0522
06/13/2016 15:03	0.0523
06/13/2016 15:03	0.0524
06/13/2016 15:03	0.0527
06/13/2016 15:03	0.0529
06/13/2016 15:03	0.0532
06/13/2016 15:03	0.0532
06/13/2016 15:03	0.0533
06/13/2016 15:03	0.0534
06/13/2016 15:03	0.0534
06/13/2016 15:03	0.0533
06/13/2016 15:03	0.0532
06/13/2016 15:03	0.0531

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:03	0.0529
06/13/2016 15:04	0.0529
06/13/2016 15:04	0.0528
06/13/2016 15:04	0.0527
06/13/2016 15:04	0.0527
06/13/2016 15:04	0.0527
06/13/2016 15:04	0.0528
06/13/2016 15:04	0.0529
06/13/2016 15:04	0.0529
06/13/2016 15:04	0.0529
06/13/2016 15:04	0.0531
06/13/2016 15:04	0.0532
06/13/2016 15:04	0.0533
06/13/2016 15:04	0.0534
06/13/2016 15:04	0.0536
06/13/2016 15:04	0.0536
06/13/2016 15:04	0.0537
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.0537
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.0542
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.054
06/13/2016 15:04	0.0538
06/13/2016 15:04	0.0537
06/13/2016 15:04	0.0536

Note:
mR/h = microRoentgens per hour

Location: Sample 4

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:12	0.0932	06/13/2016 15:13	0.0886	06/13/2016 15:14	0.0928
06/13/2016 15:12	0.0932	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0929
06/13/2016 15:12	0.0931	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0932
06/13/2016 15:12	0.093	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0934
06/13/2016 15:12	0.0929	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0938
06/13/2016 15:12	0.0929	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.094
06/13/2016 15:12	0.0928	06/13/2016 15:13	0.0884	06/13/2016 15:14	0.0942
06/13/2016 15:12	0.0926	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0945
06/13/2016 15:12	0.0924	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0946
06/13/2016 15:12	0.0921	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0946
06/13/2016 15:12	0.0919	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0945
06/13/2016 15:12	0.0916	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0945
06/13/2016 15:12	0.0912	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0946
06/13/2016 15:12	0.0911	06/13/2016 15:13	0.0885	06/13/2016 15:14	0.0945
06/13/2016 15:12	0.0909	06/13/2016 15:13	0.0886	06/13/2016 15:14	0.0944
06/13/2016 15:12	0.0907	06/13/2016 15:13	0.089	06/13/2016 15:14	0.0942
06/13/2016 15:12	0.0903	06/13/2016 15:13	0.0892	06/13/2016 15:14	0.094
06/13/2016 15:12	0.0902	06/13/2016 15:13	0.0893	06/13/2016 15:14	0.0938
06/13/2016 15:12	0.09	06/13/2016 15:13	0.0895	06/13/2016 15:14	0.0937
06/13/2016 15:12	0.0899	06/13/2016 15:13	0.0897	06/13/2016 15:14	0.0936
06/13/2016 15:12	0.0897	06/13/2016 15:13	0.0898	06/13/2016 15:14	0.0936
06/13/2016 15:12	0.0894	06/13/2016 15:13	0.0899	06/13/2016 15:14	0.0934
06/13/2016 15:12	0.0893	06/13/2016 15:13	0.0901	06/13/2016 15:14	0.0934
06/13/2016 15:12	0.0893	06/13/2016 15:13	0.0902	06/13/2016 15:14	0.0934
06/13/2016 15:12	0.0891	06/13/2016 15:13	0.0902	06/13/2016 15:14	0.0934
06/13/2016 15:12	0.089	06/13/2016 15:13	0.0906	06/13/2016 15:14	0.0934
06/13/2016 15:13	0.0888	06/13/2016 15:13	0.0908	06/13/2016 15:14	0.0934
06/13/2016 15:13	0.0886	06/13/2016 15:13	0.0911	06/13/2016 15:14	0.0933
06/13/2016 15:13	0.0885	06/13/2016 15:13	0.0912	06/13/2016 15:14	0.0933
06/13/2016 15:13	0.0885	06/13/2016 15:13	0.0915	06/13/2016 15:14	0.0932
06/13/2016 15:13	0.0885	06/13/2016 15:13	0.0917	06/13/2016 15:14	0.0933
06/13/2016 15:13	0.0886	06/13/2016 15:13	0.0919	06/13/2016 15:14	0.0934
06/13/2016 15:13	0.0888	06/13/2016 15:13	0.0922	06/13/2016 15:14	0.0934
06/13/2016 15:13	0.089	06/13/2016 15:13	0.0923	06/13/2016 15:14	0.0934
06/13/2016 15:13	0.0892	06/13/2016 15:13	0.0923	06/13/2016 15:14	0.0936
06/13/2016 15:13	0.0893	06/13/2016 15:13	0.0923	06/13/2016 15:14	0.0936
06/13/2016 15:13	0.0894	06/13/2016 15:13	0.0923	06/13/2016 15:14	0.0936
06/13/2016 15:13	0.0894	06/13/2016 15:14	0.0922	06/13/2016 15:14	0.0937
06/13/2016 15:13	0.0895	06/13/2016 15:14	0.0922	06/13/2016 15:14	0.0938
06/13/2016 15:13	0.0897	06/13/2016 15:14	0.0923	06/13/2016 15:14	0.0939
06/13/2016 15:13	0.0897	06/13/2016 15:14	0.0924	06/13/2016 15:14	0.0939
06/13/2016 15:13	0.0895	06/13/2016 15:14	0.0925	06/13/2016 15:14	0.0939
06/13/2016 15:13	0.0895	06/13/2016 15:14	0.0926	06/13/2016 15:14	0.094
06/13/2016 15:13	0.0895	06/13/2016 15:14	0.0928	06/13/2016 15:14	0.0939
06/13/2016 15:13	0.0894	06/13/2016 15:14	0.0929	06/13/2016 15:14	0.0938
06/13/2016 15:13	0.0893	06/13/2016 15:14	0.093	06/13/2016 15:14	0.0937
06/13/2016 15:13	0.0892	06/13/2016 15:14	0.093	06/13/2016 15:14	0.0936
06/13/2016 15:13	0.0891	06/13/2016 15:14	0.0929	06/13/2016 15:14	0.0936
06/13/2016 15:13	0.0889	06/13/2016 15:14	0.0928	06/13/2016 15:15	0.0934

Note:
mR/h = microRoentgens per hour

Location: Sample 4

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:15	0.0937	06/13/2016 15:15	0.0932	06/13/2016 15:16	0.0911
06/13/2016 15:15	0.0938	06/13/2016 15:15	0.093	06/13/2016 15:16	0.0911
06/13/2016 15:15	0.0938	06/13/2016 15:15	0.0929	06/13/2016 15:16	0.0911
06/13/2016 15:15	0.0939	06/13/2016 15:15	0.0927	06/13/2016 15:16	0.091
06/13/2016 15:15	0.0941	06/13/2016 15:15	0.0925	06/13/2016 15:16	0.091
06/13/2016 15:15	0.0942	06/13/2016 15:15	0.0923	06/13/2016 15:16	0.091
06/13/2016 15:15	0.0942	06/13/2016 15:15	0.0923	06/13/2016 15:16	0.0909
06/13/2016 15:15	0.0944	06/13/2016 15:16	0.0924	06/13/2016 15:16	0.091
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0924	06/13/2016 15:16	0.0911
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:16	0.0911
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:16	0.0912
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:16	0.0912
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0922	06/13/2016 15:16	0.0915
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:16	0.0917
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:16	0.0918
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0923	06/13/2016 15:17	0.092
06/13/2016 15:15	0.0941	06/13/2016 15:16	0.0924	06/13/2016 15:17	0.0921
06/13/2016 15:15	0.094	06/13/2016 15:16	0.0925	06/13/2016 15:17	0.0922
06/13/2016 15:15	0.0941	06/13/2016 15:16	0.0926	06/13/2016 15:17	0.0923
06/13/2016 15:15	0.0941	06/13/2016 15:16	0.0925	06/13/2016 15:17	0.0923
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0925	06/13/2016 15:17	0.0926
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0924	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0924	06/13/2016 15:17	0.0928
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0924	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0945	06/13/2016 15:16	0.0924	06/13/2016 15:17	0.0928
06/13/2016 15:15	0.0945	06/13/2016 15:16	0.0923	06/13/2016 15:17	0.0928
06/13/2016 15:15	0.0945	06/13/2016 15:16	0.0921	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0946	06/13/2016 15:16	0.0918	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0946	06/13/2016 15:16	0.0918	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0947	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0926
06/13/2016 15:15	0.0948	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0926
06/13/2016 15:15	0.0949	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0925
06/13/2016 15:15	0.095	06/13/2016 15:16	0.0918	06/13/2016 15:17	0.0925
06/13/2016 15:15	0.0951	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0924
06/13/2016 15:15	0.0953	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0924
06/13/2016 15:15	0.0953	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0924
06/13/2016 15:15	0.0953	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0924
06/13/2016 15:15	0.0953	06/13/2016 15:16	0.0918	06/13/2016 15:17	0.0925
06/13/2016 15:15	0.095	06/13/2016 15:16	0.0919	06/13/2016 15:17	0.0926
06/13/2016 15:15	0.0949	06/13/2016 15:16	0.092	06/13/2016 15:17	0.0927
06/13/2016 15:15	0.0948	06/13/2016 15:16	0.0921	06/13/2016 15:17	0.0929
06/13/2016 15:15	0.0947	06/13/2016 15:16	0.0921	06/13/2016 15:17	0.0931
06/13/2016 15:15	0.0945	06/13/2016 15:16	0.092	06/13/2016 15:17	0.0932
06/13/2016 15:15	0.0944	06/13/2016 15:16	0.0918	06/13/2016 15:17	0.0932
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0932
06/13/2016 15:15	0.0942	06/13/2016 15:16	0.0917	06/13/2016 15:17	0.0934
06/13/2016 15:15	0.0941	06/13/2016 15:16	0.0916	06/13/2016 15:17	0.0937
06/13/2016 15:15	0.0939	06/13/2016 15:16	0.0915	06/13/2016 15:17	0.0938
06/13/2016 15:15	0.0937	06/13/2016 15:16	0.0914	06/13/2016 15:17	0.0938
06/13/2016 15:15	0.0934	06/13/2016 15:16	0.0912	06/13/2016 15:17	0.0939
06/13/2016 15:15	0.0933	06/13/2016 15:16	0.0911	06/13/2016 15:17	0.094

Note:
mR/h = microRoentgens per hour

Location: Sample 4

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:17	0.0938	06/13/2016 15:18	0.0949
06/13/2016 15:17	0.0937	06/13/2016 15:18	0.0937
06/13/2016 15:17	0.0936	06/13/2016 15:18	0.0936
06/13/2016 15:17	0.0936	06/13/2016 15:18	0.0936
06/13/2016 15:17	0.0934	06/13/2016 15:18	0.0938
06/13/2016 15:17	0.0932	06/13/2016 15:18	0.094
06/13/2016 15:17	0.0931	06/13/2016 15:18	0.0941
06/13/2016 15:17	0.093	06/13/2016 15:18	0.0941
06/13/2016 15:17	0.093	06/13/2016 15:18	0.094
06/13/2016 15:17	0.0931	06/13/2016 15:18	0.0939
06/13/2016 15:17	0.0933	06/13/2016 15:18	0.0937
06/13/2016 15:17	0.0936	06/13/2016 15:18	0.0934
06/13/2016 15:17	0.0938	06/13/2016 15:18	0.0931
06/13/2016 15:17	0.0941	06/13/2016 15:18	0.0929
06/13/2016 15:17	0.0942	06/13/2016 15:18	0.0928
06/13/2016 15:17	0.0946	06/13/2016 15:18	0.0926
06/13/2016 15:17	0.0948	06/13/2016 15:18	0.0924
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.0919
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.091
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.09
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.0889
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.0876
06/13/2016 15:17	0.0949	06/13/2016 15:18	0.0864
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0854
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0846
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0845
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0847
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0849
06/13/2016 15:18	0.095	06/13/2016 15:18	0.0846
06/13/2016 15:18	0.0949	06/13/2016 15:19	0.0838
06/13/2016 15:18	0.0949	06/13/2016 15:19	0.0827
06/13/2016 15:18	0.095	06/13/2016 15:19	0.0816
06/13/2016 15:18	0.0951	06/13/2016 15:19	0.0811
06/13/2016 15:18	0.0954	06/13/2016 15:19	0.0815
06/13/2016 15:18	0.0956	06/13/2016 15:19	0.0828
06/13/2016 15:18	0.0957	06/13/2016 15:19	0.0842
06/13/2016 15:18	0.0956	06/13/2016 15:19	0.0852
06/13/2016 15:18	0.0956	06/13/2016 15:19	0.0858
06/13/2016 15:18	0.0956	06/13/2016 15:19	0.0864
06/13/2016 15:18	0.0957	06/13/2016 15:19	0.0874
06/13/2016 15:18	0.0957	06/13/2016 15:19	0.0884
06/13/2016 15:18	0.0956	06/13/2016 15:19	0.0893
06/13/2016 15:18	0.0954	06/13/2016 15:19	0.0902
06/13/2016 15:18	0.0953	06/13/2016 15:19	0.0907
06/13/2016 15:18	0.095	06/13/2016 15:19	0.0909
06/13/2016 15:18	0.095	06/13/2016 15:19	0.0909
06/13/2016 15:18	0.0951		
06/13/2016 15:18	0.095		
06/13/2016 15:18	0.095		
06/13/2016 15:18	0.0939		
06/13/2016 15:18	0.0937		

Note:
mR/h = microRoentgens per hour

Location: Sample 5

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:20	0.0803	06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0794
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0793
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0807	06/13/2016 15:22	0.0793
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0807	06/13/2016 15:22	0.0793
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0807	06/13/2016 15:22	0.0793
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0806	06/13/2016 15:22	0.0794
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0805	06/13/2016 15:22	0.0795
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0803	06/13/2016 15:22	0.0797
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.0801	06/13/2016 15:22	0.0797
06/13/2016 15:20	0.0805	06/13/2016 15:21	0.08	06/13/2016 15:22	0.0801
06/13/2016 15:20	0.0803	06/13/2016 15:21	0.0798	06/13/2016 15:22	0.0803
06/13/2016 15:20	0.0802	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0805
06/13/2016 15:20	0.0802	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0807
06/13/2016 15:21	0.0801	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0809
06/13/2016 15:21	0.0801	06/13/2016 15:21	0.0798	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.0797	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.0798	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0801	06/13/2016 15:21	0.0798	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.08	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0803	06/13/2016 15:21	0.08	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0803	06/13/2016 15:21	0.08	06/13/2016 15:22	0.0814
06/13/2016 15:21	0.0802	06/13/2016 15:21	0.0798	06/13/2016 15:22	0.0815
06/13/2016 15:21	0.0802	06/13/2016 15:22	0.0797	06/13/2016 15:22	0.0814
06/13/2016 15:21	0.0802	06/13/2016 15:22	0.0795	06/13/2016 15:22	0.0814
06/13/2016 15:21	0.0802	06/13/2016 15:22	0.0794	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0801	06/13/2016 15:22	0.0793	06/13/2016 15:22	0.0812
06/13/2016 15:21	0.0801	06/13/2016 15:22	0.0791	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0801	06/13/2016 15:22	0.0789	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.08	06/13/2016 15:22	0.0788	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.08	06/13/2016 15:22	0.0786	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0802	06/13/2016 15:22	0.0784	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0802	06/13/2016 15:22	0.0781	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0803	06/13/2016 15:22	0.078	06/13/2016 15:22	0.0811
06/13/2016 15:21	0.0803	06/13/2016 15:22	0.078	06/13/2016 15:23	0.0811
06/13/2016 15:21	0.0806	06/13/2016 15:22	0.078	06/13/2016 15:23	0.0814
06/13/2016 15:21	0.0807	06/13/2016 15:22	0.0781	06/13/2016 15:23	0.0815
06/13/2016 15:21	0.0807	06/13/2016 15:22	0.0782	06/13/2016 15:23	0.0816
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0786	06/13/2016 15:23	0.0816
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0788	06/13/2016 15:23	0.0818
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.079	06/13/2016 15:23	0.0819
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0793	06/13/2016 15:23	0.082
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0795	06/13/2016 15:23	0.0822
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0797	06/13/2016 15:23	0.0824
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0797	06/13/2016 15:23	0.0826
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0797	06/13/2016 15:23	0.0828
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0795	06/13/2016 15:23	0.0828
06/13/2016 15:21	0.0809	06/13/2016 15:22	0.0795	06/13/2016 15:23	0.0829

Note:
mR/h = microRoentgens per hour

Location: Sample 5

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0833
06/13/2016 15:23	0.0833
06/13/2016 15:23	0.0833
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0832
06/13/2016 15:23	0.0831
06/13/2016 15:23	0.0829
06/13/2016 15:23	0.0828
06/13/2016 15:23	0.0825
06/13/2016 15:23	0.0822
06/13/2016 15:23	0.082
06/13/2016 15:23	0.0819
06/13/2016 15:23	0.0816
06/13/2016 15:23	0.0815
06/13/2016 15:23	0.0814
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0811
06/13/2016 15:23	0.0809
06/13/2016 15:23	0.0807
06/13/2016 15:23	0.0803
06/13/2016 15:23	0.0802
06/13/2016 15:23	0.08
06/13/2016 15:23	0.0797
06/13/2016 15:23	0.0795
06/13/2016 15:23	0.0794
06/13/2016 15:23	0.0794
06/13/2016 15:23	0.0794
06/13/2016 15:23	0.0794
06/13/2016 15:23	0.0795
06/13/2016 15:23	0.0795
06/13/2016 15:23	0.0797
06/13/2016 15:23	0.0798
06/13/2016 15:23	0.08
06/13/2016 15:23	0.0798
06/13/2016 15:24	0.0801
06/13/2016 15:24	0.0802
06/13/2016 15:24	0.0803
06/13/2016 15:24	0.0803
06/13/2016 15:24	0.0802

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:24	0.0798
06/13/2016 15:24	0.0797
06/13/2016 15:24	0.0797
06/13/2016 15:24	0.0797
06/13/2016 15:24	0.0797
06/13/2016 15:24	0.0797
06/13/2016 15:24	0.0798
06/13/2016 15:24	0.0798
06/13/2016 15:24	0.0801
06/13/2016 15:24	0.0802
06/13/2016 15:24	0.0803
06/13/2016 15:24	0.0803
06/13/2016 15:24	0.0805
06/13/2016 15:24	0.0806
06/13/2016 15:24	0.0807
06/13/2016 15:24	0.0809
06/13/2016 15:24	0.081
06/13/2016 15:24	0.081
06/13/2016 15:24	0.081
06/13/2016 15:24	0.081
06/13/2016 15:24	0.0811
06/13/2016 15:24	0.0812
06/13/2016 15:24	0.0814
06/13/2016 15:24	0.0816
06/13/2016 15:24	0.0816
06/13/2016 15:24	0.0819
06/13/2016 15:24	0.0819
06/13/2016 15:24	0.0819
06/13/2016 15:24	0.082
06/13/2016 15:24	0.082
06/13/2016 15:24	0.082
06/13/2016 15:24	0.0822
06/13/2016 15:24	0.0823
06/13/2016 15:24	0.0824
06/13/2016 15:24	0.0825
06/13/2016 15:24	0.0825
06/13/2016 15:24	0.0826
06/13/2016 15:24	0.0826
06/13/2016 15:24	0.0827
06/13/2016 15:24	0.0828
06/13/2016 15:24	0.0828
06/13/2016 15:24	0.0829
06/13/2016 15:24	0.0829
06/13/2016 15:24	0.0829
06/13/2016 15:24	0.0831
06/13/2016 15:24	0.0831
06/13/2016 15:24	0.0831
06/13/2016 15:24	0.0833
06/13/2016 15:24	0.0834
06/13/2016 15:24	0.0834
06/13/2016 15:24	0.0833

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:24	0.0833
06/13/2016 15:24	0.0834
06/13/2016 15:25	0.0835
06/13/2016 15:25	0.0836
06/13/2016 15:25	0.0835
06/13/2016 15:25	0.0835
06/13/2016 15:25	0.0835
06/13/2016 15:25	0.0834
06/13/2016 15:25	0.0834
06/13/2016 15:25	0.0833
06/13/2016 15:25	0.0834
06/13/2016 15:25	0.0833
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0831
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0833
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0832
06/13/2016 15:25	0.0831
06/13/2016 15:25	0.0829
06/13/2016 15:25	0.0829
06/13/2016 15:25	0.0829
06/13/2016 15:25	0.0829
06/13/2016 15:25	0.0831
06/13/2016 15:25	0.0831
06/13/2016 15:25	0.0831
06/13/2016 15:25	0.0829
06/13/2016 15:25	0.0828

Note:
mR/h = microRoentgens per hour

Location: Sample 6

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:30	0.0346	06/13/2016 15:31	0.033	06/13/2016 15:31	0.034
06/13/2016 15:30	0.035	06/13/2016 15:31	0.033	06/13/2016 15:31	0.034
06/13/2016 15:30	0.0352	06/13/2016 15:31	0.033	06/13/2016 15:31	0.034
06/13/2016 15:30	0.0354	06/13/2016 15:31	0.033	06/13/2016 15:31	0.034
06/13/2016 15:30	0.0355	06/13/2016 15:31	0.033	06/13/2016 15:31	0.0341
06/13/2016 15:30	0.0354	06/13/2016 15:31	0.033	06/13/2016 15:32	0.0341
06/13/2016 15:30	0.0352	06/13/2016 15:31	0.033	06/13/2016 15:32	0.0341
06/13/2016 15:30	0.0351	06/13/2016 15:31	0.0331	06/13/2016 15:32	0.0341
06/13/2016 15:30	0.0348	06/13/2016 15:31	0.0332	06/13/2016 15:32	0.0341
06/13/2016 15:30	0.0346	06/13/2016 15:31	0.0335	06/13/2016 15:32	0.034
06/13/2016 15:30	0.0344	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.0337
06/13/2016 15:30	0.0341	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.0336
06/13/2016 15:30	0.0341	06/13/2016 15:31	0.0337	06/13/2016 15:32	0.0332
06/13/2016 15:30	0.034	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.0332
06/13/2016 15:30	0.0339	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.033
06/13/2016 15:30	0.0337	06/13/2016 15:31	0.0335	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0335	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0335	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0335	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0334	06/13/2016 15:31	0.0336	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0337	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.033
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0339	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.034	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.034	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0331	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.033	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0328
06/13/2016 15:30	0.0331	06/13/2016 15:31	0.0343	06/13/2016 15:32	0.0327
06/13/2016 15:30	0.0332	06/13/2016 15:31	0.0343	06/13/2016 15:32	0.0327
06/13/2016 15:30	0.0334	06/13/2016 15:31	0.0344	06/13/2016 15:32	0.0326
06/13/2016 15:30	0.0335	06/13/2016 15:31	0.0345	06/13/2016 15:32	0.0326
06/13/2016 15:30	0.0335	06/13/2016 15:31	0.0345	06/13/2016 15:32	0.0324
06/13/2016 15:30	0.0335	06/13/2016 15:31	0.0345	06/13/2016 15:32	0.0324
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0344	06/13/2016 15:32	0.0322
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0344	06/13/2016 15:32	0.0322
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0344	06/13/2016 15:32	0.0322
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0343	06/13/2016 15:32	0.0322
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0343	06/13/2016 15:32	0.0324
06/13/2016 15:30	0.0336	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0324
06/13/2016 15:31	0.0336	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0326
06/13/2016 15:31	0.0335	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0326
06/13/2016 15:31	0.0334	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0326
06/13/2016 15:31	0.0332	06/13/2016 15:31	0.034	06/13/2016 15:32	0.0327
06/13/2016 15:31	0.0332	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0327
06/13/2016 15:31	0.0331	06/13/2016 15:31	0.0341	06/13/2016 15:32	0.0327

Note:
mR/h = microRoentgens per hour

Location: Sample 6

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:32	0.0326	06/13/2016 15:33	0.0344	06/13/2016 15:34	0.033
06/13/2016 15:32	0.0326	06/13/2016 15:33	0.0343	06/13/2016 15:34	0.0331
06/13/2016 15:32	0.0326	06/13/2016 15:33	0.0343	06/13/2016 15:34	0.0332
06/13/2016 15:32	0.0326	06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0332
06/13/2016 15:32	0.0328	06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0335
06/13/2016 15:32	0.0328	06/13/2016 15:33	0.034	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.033	06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.033	06/13/2016 15:33	0.0337	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.0331	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.0331	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.0332	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0336
06/13/2016 15:32	0.0332	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0337
06/13/2016 15:32	0.0332	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0337
06/13/2016 15:32	0.0334	06/13/2016 15:33	0.0334	06/13/2016 15:34	0.0339
06/13/2016 15:32	0.0334	06/13/2016 15:33	0.0332	06/13/2016 15:34	0.034
06/13/2016 15:32	0.0334	06/13/2016 15:33	0.0332	06/13/2016 15:34	0.0341
06/13/2016 15:33	0.0334	06/13/2016 15:33	0.0332	06/13/2016 15:34	0.0341
06/13/2016 15:33	0.0334	06/13/2016 15:33	0.0334	06/13/2016 15:34	0.0343
06/13/2016 15:33	0.0335	06/13/2016 15:33	0.0335	06/13/2016 15:34	0.0344
06/13/2016 15:33	0.0336	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0345
06/13/2016 15:33	0.0336	06/13/2016 15:33	0.0336	06/13/2016 15:34	0.0346
06/13/2016 15:33	0.0336	06/13/2016 15:33	0.0337	06/13/2016 15:34	0.0346
06/13/2016 15:33	0.0337	06/13/2016 15:33	0.034	06/13/2016 15:34	0.0346
06/13/2016 15:33	0.0337	06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0346
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0344	06/13/2016 15:34	0.0346
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0344	06/13/2016 15:34	0.0345
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0344	06/13/2016 15:34	0.0345
06/13/2016 15:33	0.034	06/13/2016 15:34	0.0344	06/13/2016 15:34	0.0344
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0343	06/13/2016 15:34	0.0343
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0343	06/13/2016 15:34	0.0341
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0341	06/13/2016 15:34	0.0341
06/13/2016 15:33	0.034	06/13/2016 15:34	0.0343	06/13/2016 15:34	0.0341
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0341	06/13/2016 15:35	0.034
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0341	06/13/2016 15:35	0.0339
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0339	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0337	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0337	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0337	06/13/2016 15:34	0.0336	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0337	06/13/2016 15:34	0.0336	06/13/2016 15:35	0.0339
06/13/2016 15:33	0.0339	06/13/2016 15:34	0.0336	06/13/2016 15:35	0.034
06/13/2016 15:33	0.034	06/13/2016 15:34	0.0336	06/13/2016 15:35	0.0341
06/13/2016 15:33	0.034	06/13/2016 15:34	0.0335	06/13/2016 15:35	0.0341
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0335	06/13/2016 15:35	0.034
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0335	06/13/2016 15:35	0.0339
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0334	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0332	06/13/2016 15:35	0.0337
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0331	06/13/2016 15:35	0.0336
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0328	06/13/2016 15:35	0.0336
06/13/2016 15:33	0.0341	06/13/2016 15:34	0.0328	06/13/2016 15:35	0.0335
06/13/2016 15:33	0.0343	06/13/2016 15:34	0.0328	06/13/2016 15:35	0.0335
06/13/2016 15:33	0.0344	06/13/2016 15:34	0.0328	06/13/2016 15:35	0.0335

Note:
mR/h = microRoentgens per hour

Location: Sample 6

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:35	0.0335	06/13/2016 15:36	0.0343	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0336	06/13/2016 15:36	0.0345	06/13/2016 15:37	0.0351
06/13/2016 15:35	0.0336	06/13/2016 15:36	0.0345	06/13/2016 15:37	0.0352
06/13/2016 15:35	0.0339	06/13/2016 15:36	0.0343	06/13/2016 15:37	0.0354
06/13/2016 15:35	0.034	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0354
06/13/2016 15:35	0.0341	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0355
06/13/2016 15:35	0.0344	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0354
06/13/2016 15:35	0.0345	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0354
06/13/2016 15:35	0.0346	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0352
06/13/2016 15:35	0.0346	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0351
06/13/2016 15:35	0.0346	06/13/2016 15:36	0.0339	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0345	06/13/2016 15:36	0.0339	06/13/2016 15:37	0.0346
06/13/2016 15:35	0.0344	06/13/2016 15:36	0.0337	06/13/2016 15:37	0.0345
06/13/2016 15:35	0.0343	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0344
06/13/2016 15:35	0.0341	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0343
06/13/2016 15:35	0.034	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0343
06/13/2016 15:35	0.0339	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0344
06/13/2016 15:35	0.0337	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0344
06/13/2016 15:35	0.0336	06/13/2016 15:36	0.0336	06/13/2016 15:37	0.0344
06/13/2016 15:35	0.0336	06/13/2016 15:36	0.0337	06/13/2016 15:37	0.0345
06/13/2016 15:35	0.0335	06/13/2016 15:36	0.0339	06/13/2016 15:37	0.0346
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0351
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0351
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.034	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0332	06/13/2016 15:36	0.0339	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0332	06/13/2016 15:36	0.0339	06/13/2016 15:37	0.035
06/13/2016 15:35	0.0332	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0334	06/13/2016 15:36	0.034	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0335	06/13/2016 15:36	0.0341	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0336	06/13/2016 15:36	0.0343	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0337	06/13/2016 15:36	0.0345	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.0339	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.034	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0348
06/13/2016 15:35	0.034	06/13/2016 15:36	0.0348	06/13/2016 15:37	0.0346
06/13/2016 15:35	0.034	06/13/2016 15:36	0.0348	06/13/2016 15:37	0.0346
06/13/2016 15:36	0.0341	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0345
06/13/2016 15:36	0.0341	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0344
06/13/2016 15:36	0.0341	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0344
06/13/2016 15:36	0.0341	06/13/2016 15:36	0.0346	06/13/2016 15:37	0.0344
06/13/2016 15:36	0.0341	06/13/2016 15:36	0.0348	06/13/2016 15:37	0.0344
06/13/2016 15:36	0.0343	06/13/2016 15:36	0.0348	06/13/2016 15:37	0.0345
06/13/2016 15:36	0.0343	06/13/2016 15:37	0.0348	06/13/2016 15:37	0.0348
06/13/2016 15:36	0.0343	06/13/2016 15:37	0.0348	06/13/2016 15:37	0.0348
06/13/2016 15:36	0.0343	06/13/2016 15:37	0.0348	06/13/2016 15:37	0.0348
06/13/2016 15:36	0.0345	06/13/2016 15:37	0.0348	06/13/2016 15:38	0.0348
06/13/2016 15:36	0.0345	06/13/2016 15:37	0.0348	06/13/2016 15:38	0.0348

Note:
mR/h = microRoentgens per hour

Location: Sample 6

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0346
06/13/2016 15:38	0.0345
06/13/2016 15:38	0.0344
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.034
06/13/2016 15:38	0.0337
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0335
06/13/2016 15:38	0.0335
06/13/2016 15:38	0.0334
06/13/2016 15:38	0.0334
06/13/2016 15:37	0.0348
06/13/2016 15:37	0.0346
06/13/2016 15:38	0.0335
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0336
06/13/2016 15:38	0.0337
06/13/2016 15:38	0.0339
06/13/2016 15:38	0.034
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0341
06/13/2016 15:38	0.0343
06/13/2016 15:38	0.0345
06/13/2016 15:38	0.035
06/13/2016 15:38	0.0351
06/13/2016 15:38	0.0351
06/13/2016 15:38	0.0351
06/13/2016 15:38	0.035
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0346
06/13/2016 15:38	0.0346

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0348
06/13/2016 15:38	0.0346
06/13/2016 15:38	0.0346
06/13/2016 15:39	0.0346
06/13/2016 15:39	0.0345
06/13/2016 15:39	0.0344
06/13/2016 15:39	0.0343
06/13/2016 15:39	0.0343
06/13/2016 15:39	0.0341
06/13/2016 15:39	0.0341
06/13/2016 15:39	0.0341
06/13/2016 15:39	0.0343
06/13/2016 15:39	0.0343
06/13/2016 15:39	0.0343
06/13/2016 15:39	0.0341
06/13/2016 15:39	0.0341
06/13/2016 15:39	0.034
06/13/2016 15:39	0.0339
06/13/2016 15:39	0.0337
06/13/2016 15:39	0.0336
06/13/2016 15:39	0.0335
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0334
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0332
06/13/2016 15:39	0.0334
06/13/2016 15:39	0.0334
06/13/2016 15:51	0.0352
06/13/2016 15:37	0.0346

Note:
mR/h = microRoentgens per hour

Location: Sample 7

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:52	0.0247	06/13/2016 15:53	0.0218	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0245	06/13/2016 15:53	0.0218	06/13/2016 15:54	0.0219
06/13/2016 15:52	0.0245	06/13/2016 15:53	0.0218	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0243	06/13/2016 15:53	0.0219	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0243	06/13/2016 15:53	0.022	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0243	06/13/2016 15:53	0.0221	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0242	06/13/2016 15:53	0.0222	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0242	06/13/2016 15:53	0.0223	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0241	06/13/2016 15:53	0.0223	06/13/2016 15:54	0.022
06/13/2016 15:52	0.024	06/13/2016 15:53	0.0225	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0239	06/13/2016 15:53	0.0227	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0239	06/13/2016 15:53	0.0228	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0237	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0237	06/13/2016 15:53	0.023	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0237	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0237	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0237	06/13/2016 15:53	0.0232	06/13/2016 15:54	0.0223
06/13/2016 15:52	0.0235	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0223
06/13/2016 15:52	0.0235	06/13/2016 15:53	0.023	06/13/2016 15:54	0.0223
06/13/2016 15:52	0.0234	06/13/2016 15:53	0.023	06/13/2016 15:54	0.0223
06/13/2016 15:52	0.0233	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.0223
06/13/2016 15:52	0.0232	06/13/2016 15:53	0.0228	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0232	06/13/2016 15:53	0.0228	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0232	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0232	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0231	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0231	06/13/2016 15:53	0.0229	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0229	06/13/2016 15:53	0.023	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0229	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0228	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0228	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0228	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0227	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0227	06/13/2016 15:53	0.0231	06/13/2016 15:54	0.0222
06/13/2016 15:52	0.0225	06/13/2016 15:53	0.023	06/13/2016 15:54	0.0221
06/13/2016 15:52	0.0225	06/13/2016 15:53	0.0228	06/13/2016 15:54	0.022
06/13/2016 15:52	0.0225	06/13/2016 15:53	0.0227	06/13/2016 15:54	0.0219
06/13/2016 15:53	0.0223	06/13/2016 15:53	0.0225	06/13/2016 15:54	0.0219
06/13/2016 15:53	0.0223	06/13/2016 15:53	0.0225	06/13/2016 15:54	0.0219
06/13/2016 15:53	0.0223	06/13/2016 15:53	0.0223	06/13/2016 15:54	0.0219
06/13/2016 15:53	0.0223	06/13/2016 15:53	0.0223	06/13/2016 15:54	0.022
06/13/2016 15:53	0.0221	06/13/2016 15:53	0.0222	06/13/2016 15:54	0.0221
06/13/2016 15:53	0.022	06/13/2016 15:53	0.0222	06/13/2016 15:54	0.0222
06/13/2016 15:53	0.0219	06/13/2016 15:53	0.0221	06/13/2016 15:54	0.0223
06/13/2016 15:53	0.0219	06/13/2016 15:53	0.0221	06/13/2016 15:54	0.0223
06/13/2016 15:53	0.0219	06/13/2016 15:53	0.022	06/13/2016 15:54	0.0225
06/13/2016 15:53	0.0219	06/13/2016 15:53	0.022	06/13/2016 15:54	0.0225
06/13/2016 15:53	0.0219	06/13/2016 15:53	0.022	06/13/2016 15:54	0.0228
06/13/2016 15:53	0.0218	06/13/2016 15:54	0.022	06/13/2016 15:54	0.0229

Note:
mR/h = microRoentgens per hour

Location: Sample 7

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 15:54	0.023	06/13/2016 15:55	0.0234	06/13/2016 15:56	0.0231
06/13/2016 15:54	0.023	06/13/2016 15:55	0.0234	06/13/2016 15:56	0.0231
06/13/2016 15:54	0.023	06/13/2016 15:55	0.0235	06/13/2016 15:56	0.0231
06/13/2016 15:54	0.0231	06/13/2016 15:55	0.0237	06/13/2016 15:56	0.0231
06/13/2016 15:54	0.0232	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.023
06/13/2016 15:54	0.0233	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.0228
06/13/2016 15:54	0.0234	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.0227
06/13/2016 15:54	0.0235	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.0227
06/13/2016 15:54	0.0235	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.0225
06/13/2016 15:54	0.0235	06/13/2016 15:55	0.0239	06/13/2016 15:56	0.0225
06/13/2016 15:55	0.0234	06/13/2016 15:55	0.0237	06/13/2016 15:56	0.0223
06/13/2016 15:55	0.0234	06/13/2016 15:55	0.0237	06/13/2016 15:56	0.0222
06/13/2016 15:55	0.0233	06/13/2016 15:55	0.0235	06/13/2016 15:56	0.0222
06/13/2016 15:55	0.0232	06/13/2016 15:55	0.0235	06/13/2016 15:56	0.0221
06/13/2016 15:55	0.0231	06/13/2016 15:55	0.0235	06/13/2016 15:56	0.022
06/13/2016 15:55	0.023	06/13/2016 15:55	0.0233	06/13/2016 15:56	0.022
06/13/2016 15:55	0.0229	06/13/2016 15:55	0.0233	06/13/2016 15:56	0.0219
06/13/2016 15:55	0.0228	06/13/2016 15:55	0.0233	06/13/2016 15:56	0.0217
06/13/2016 15:55	0.0227	06/13/2016 15:56	0.0234	06/13/2016 15:56	0.0216
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0235	06/13/2016 15:56	0.0215
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0223	06/13/2016 15:56	0.0237	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0223	06/13/2016 15:56	0.0237	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0223	06/13/2016 15:56	0.0239	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0223	06/13/2016 15:56	0.0239	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0223	06/13/2016 15:56	0.0239	06/13/2016 15:56	0.0213
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0213
06/13/2016 15:55	0.0227	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0213
06/13/2016 15:55	0.0228	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0213
06/13/2016 15:55	0.0228	06/13/2016 15:56	0.0235	06/13/2016 15:57	0.0213
06/13/2016 15:55	0.0228	06/13/2016 15:56	0.0234	06/13/2016 15:57	0.0213
06/13/2016 15:55	0.0228	06/13/2016 15:56	0.0234	06/13/2016 15:57	0.0215
06/13/2016 15:55	0.0227	06/13/2016 15:56	0.0235	06/13/2016 15:57	0.0219
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0235	06/13/2016 15:57	0.0222
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0225
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0228
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0229
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0231
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0231
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0231
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0231
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.023
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0239	06/13/2016 15:57	0.023
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0237	06/13/2016 15:57	0.0229
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0235	06/13/2016 15:57	0.0228
06/13/2016 15:55	0.0227	06/13/2016 15:56	0.0234	06/13/2016 15:57	0.0229
06/13/2016 15:55	0.0225	06/13/2016 15:56	0.0233	06/13/2016 15:57	0.023
06/13/2016 15:55	0.0228	06/13/2016 15:56	0.0233	06/13/2016 15:57	0.0231
06/13/2016 15:55	0.0229	06/13/2016 15:56	0.0232	06/13/2016 15:57	0.023
06/13/2016 15:55	0.0231	06/13/2016 15:56	0.0231	06/13/2016 15:57	0.0232
06/13/2016 15:55	0.0232	06/13/2016 15:56	0.0232	06/13/2016 15:57	0.0233

Note:
mR/h = microRoentgens per hour

Location: Sample 7

Date / Time	Exposure Rate (mR/h)
06/13/2016 15:57	0.0233
06/13/2016 15:57	0.0232
06/13/2016 15:57	0.0231
06/13/2016 15:57	0.023
06/13/2016 15:57	0.0229
06/13/2016 15:57	0.0228
06/13/2016 15:57	0.0227
06/13/2016 15:57	0.0225
06/13/2016 15:57	0.0225
06/13/2016 15:57	0.0225
06/13/2016 15:57	0.0223
06/13/2016 15:57	0.0223
06/13/2016 15:57	0.0222
06/13/2016 15:57	0.0221
06/13/2016 15:57	0.022
06/13/2016 15:57	0.0219

Note:
mR/h = microRoentgens per hour

Location: Sample 8

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 16:06	0.0189	06/13/2016 16:07	0.019	06/13/2016 16:08	0.019
06/13/2016 16:07	0.0187	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.019
06/13/2016 16:07	0.0185	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0192
06/13/2016 16:07	0.0184	06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0184	06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0185	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0186	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0187	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0188	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0194
06/13/2016 16:07	0.0188	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0192
06/13/2016 16:07	0.0188	06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0192
06/13/2016 16:07	0.0189	06/13/2016 16:08	0.019	06/13/2016 16:08	0.0192
06/13/2016 16:07	0.0189	06/13/2016 16:08	0.019	06/13/2016 16:08	0.019
06/13/2016 16:07	0.0189	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.019
06/13/2016 16:07	0.019	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.019
06/13/2016 16:07	0.019	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.0189
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.0188
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0194	06/13/2016 16:08	0.0187
06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.0186
06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.0185
06/13/2016 16:07	0.0196	06/13/2016 16:08	0.0192	06/13/2016 16:08	0.0184
06/13/2016 16:07	0.0196	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.0182
06/13/2016 16:07	0.0197	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.0182
06/13/2016 16:07	0.0198	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.0182
06/13/2016 16:07	0.0199	06/13/2016 16:08	0.0194	06/13/2016 16:09	0.0182
06/13/2016 16:07	0.0199	06/13/2016 16:08	0.0194	06/13/2016 16:09	0.0182
06/13/2016 16:07	0.0199	06/13/2016 16:08	0.0194	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0198	06/13/2016 16:08	0.0194	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0198	06/13/2016 16:08	0.0194	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0197	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0196	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0196	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0194	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0192	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.019	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.019	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0189	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0192	06/13/2016 16:08	0.0188	06/13/2016 16:09	0.018
06/13/2016 16:07	0.019	06/13/2016 16:08	0.0188	06/13/2016 16:09	0.018
06/13/2016 16:07	0.019	06/13/2016 16:08	0.0187	06/13/2016 16:09	0.018
06/13/2016 16:07	0.019	06/13/2016 16:08	0.0186	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0189	06/13/2016 16:08	0.0186	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0189	06/13/2016 16:08	0.0186	06/13/2016 16:09	0.0179
06/13/2016 16:07	0.0188	06/13/2016 16:08	0.0186	06/13/2016 16:09	0.0178
06/13/2016 16:07	0.0188	06/13/2016 16:08	0.0188	06/13/2016 16:09	0.0178
06/13/2016 16:07	0.0188	06/13/2016 16:08	0.0189	06/13/2016 16:09	0.0179
06/13/2016 16:07	0.0187	06/13/2016 16:08	0.0189	06/13/2016 16:09	0.018
06/13/2016 16:07	0.0188	06/13/2016 16:08	0.019	06/13/2016 16:09	0.018

Note:
mR/h = microRoentgens per hour

Location: Sample 8

Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)	Date / Time	Exposure Rate (mR/h)
06/13/2016 16:09	0.0182	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0182	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0182	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.018	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.019
06/13/2016 16:09	0.018	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.019
06/13/2016 16:09	0.018	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0182	06/13/2016 16:10	0.0187	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0184	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0185	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0186	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0189	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.0192
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.0189	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0188
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0187
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0186
06/13/2016 16:09	0.0189	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0186
06/13/2016 16:09	0.019	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0185
06/13/2016 16:09	0.019	06/13/2016 16:10	0.0192	06/13/2016 16:11	0.0186
06/13/2016 16:09	0.019	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0187
06/13/2016 16:09	0.0189	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0188
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.019	06/13/2016 16:11	0.0189
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0188	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0187	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.0186	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0187	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.019
06/13/2016 16:09	0.0188	06/13/2016 16:10	0.0184	06/13/2016 16:11	0.019
06/13/2016 16:10	0.0189	06/13/2016 16:10	0.0184	06/13/2016 16:11	0.0189
06/13/2016 16:10	0.019	06/13/2016 16:10	0.0184	06/13/2016 16:11	0.0189
06/13/2016 16:10	0.0192	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.0188
06/13/2016 16:10	0.0194	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.0187
06/13/2016 16:10	0.0194	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.0185
06/13/2016 16:10	0.0194	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.0184
06/13/2016 16:10	0.0194	06/13/2016 16:10	0.0184	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.0196	06/13/2016 16:10	0.0185	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.0198	06/13/2016 16:11	0.0187	06/13/2016 16:11	0.018
06/13/2016 16:10	0.0199	06/13/2016 16:11	0.0188	06/13/2016 16:11	0.018
06/13/2016 16:10	0.02	06/13/2016 16:11	0.0189	06/13/2016 16:11	0.018
06/13/2016 16:10	0.02	06/13/2016 16:11	0.019	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.02	06/13/2016 16:11	0.019	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.02	06/13/2016 16:11	0.019	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.0199	06/13/2016 16:11	0.019	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.0198	06/13/2016 16:11	0.019	06/13/2016 16:11	0.0182
06/13/2016 16:10	0.0197	06/13/2016 16:11	0.0192	06/13/2016 16:12	0.0185
06/13/2016 16:10	0.0196	06/13/2016 16:11	0.0192	06/13/2016 16:12	0.0186
06/13/2016 16:10	0.0194	06/13/2016 16:11	0.0192	06/13/2016 16:12	0.0187
06/13/2016 16:10	0.019	06/13/2016 16:11	0.0192	06/13/2016 16:12	0.0188

Note:
mR/h = microRoentgens per hour

Location: Sample 8

Date / Time	Exposure Rate (mR/h)
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019
06/13/2016 16:12	0.0192
06/13/2016 16:12	0.0192
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0187
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0185
06/13/2016 16:12	0.0184
06/13/2016 16:12	0.0182
06/13/2016 16:12	0.0182
06/13/2016 16:12	0.0182
06/13/2016 16:12	0.0182
06/13/2016 16:12	0.0184
06/13/2016 16:12	0.0185
06/13/2016 16:12	0.0185
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0187
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0186
06/13/2016 16:12	0.0187
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.0188
06/13/2016 16:12	0.019
06/13/2016 16:12	0.019

Date / Time	Exposure Rate (mR/h)
06/13/2016 16:12	0.0189
06/13/2016 16:12	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.0188
06/13/2016 16:13	0.0187
06/13/2016 16:13	0.0186
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0185
06/13/2016 16:13	0.0185
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0182
06/13/2016 16:13	0.0182
06/13/2016 16:13	0.0182
06/13/2016 16:13	0.0182
06/13/2016 16:13	0.0184
06/13/2016 16:13	0.0185
06/13/2016 16:13	0.0185
06/13/2016 16:13	0.0186
06/13/2016 16:13	0.0187
06/13/2016 16:13	0.0189
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.0192
06/13/2016 16:13	0.019
06/13/2016 16:13	0.019
06/13/2016 16:13	0.0188

Note:
mR/h = microRoentgens per hour

Appendix D. Laboratory Analytical Results

Gamma Spectroscopy

Case Narrative

Environmental Restoration Group, Inc.

Permits West-Section 12 Mine – 0216-01-02

Work Order Number: 1606332

1. This report consists of the analytical results for ten soil samples received by ALS on 6/17/2016.

2. These samples were prepared according to the current revision of SOP 736 and SOP 739. The samples were sealed in steel cans on 6/21/2016 and stored for at least 21 days to allow ^{222}Rn to approach secular equilibrium with its parent, ^{226}Ra. The degree of ingrowth achieved prior to analysis on 7/12/2016 is at least 97.8%. Conservatively assuming a radon emanation efficiency of approximately 50%, the effective radon progeny ingrowth for these samples would be greater than 98.9%.

3. The samples were analyzed for the presence of gamma emitting radionuclides according to the current revision of SOP 713. The analyses were completed on 7/12/2016.

4. The results for these samples are reported on a “Dry Weight” basis in units of pCi/gram.

5. ALS has observed a reproducible low bias in ^{226}Ra results (about -30% for the geometry in question) when using a mixed gamma source for the calibration of HPGe detectors for solid samples. This bias is eliminated by calibration using a NIST traceable ^{226}Ra source in the same geometry and configuration as the samples.

6. The library used for calibration and analysis employs multiple peaks for the ^{226}Ra progeny, ^{214}Pb (352 and 295 keV) and ^{214}Bi (609 and 1120 keV). Using these peaks avoids the use of the problematic ^{226}Ra photopeak at 186 keV, which suffers from poorly resolvable interference from ^{235}U at the same energy. Final activity results for ^{226}Ra are calculated, using the uncertainty-weighted mean of the activities for the four photopeaks, by the Seeker gamma spectroscopy software assuming secular equilibrium.

7. In cases where there are no peaks found in the peak search routine, the software performs a net quantification. This indicates that nuclides are not detected or supported at any level above the reported MDC. Consequently, these nuclides are flagged with an "NQ" qualifier on the final reports. Please refer to the Technical Bulletin Addendum at the end of this report.

8. ALS has found there to be a significant low bias to ^{214}Pb and ^{214}Bi results when using a mixed nuclide gamma source for efficiency calibrations. The magnitude of this bias has been determined to be approximately 32% for ^{214}Bi, and 23% for ^{214}Pb. Therefore, any reported results for ^{214}Pb and ^{214}Bi are flagged with a "J" qualifier, indicating the activity values to be an estimated value. Results are reported without further qualification

9. Activity concentrations above the calculated MDC are reported in some instances where minimum nuclide identification criteria are not met. Such tentative identifications result when the software attempts to calculate net activity concentrations for analytes where either one or both of the following criteria are not satisfied: the 'diagnostic' peak for a nuclide must be identified above the critical level, or the minimum library peak abundance must be attained. Nuclides not meeting these requirements have been flagged with a "TI" qualifier.

10. There are cases where the sample density is less than the associated calibration standard density. Cases that exceed the limit of +/- 15% of the density of the calibration standard are flagged with a 'G', denoting a significant density difference between the sample and calibration standard. Consequently, the results may be biased high for the flagged results in this work order. If requested, ALS can perform a transmission spike in order to estimate a magnitude of this bias. The results are reported without further qualification.

11. Upon review of the raw data for samples 1606332-5 and 6, it was noted that there was observed activity greater than the achieved detection limit for ^{227}Th. However, in the analyst's judgment this quantification is rejected due to mis-identification of one photo-peak and lack of other supporting photo-peaks. In this sample, the software identified a peak at 235.65 keV for sample 1606332-5 and at 235.85 keV for sample 6 as ^{227}Th. The emission of ^{227}Th occurs at 236.00 keV. Although this is within the 2.0 keV search tolerance of the software, it is not believed to be an emission of ^{227}Th based on this sample not showing any evidence of the other supporting peak for ^{227}Th. Thus, in the analyst's judgment, there is no measurable activity greater than the reported detection limit for ^{227}Th in this sample. The result for this nuclide is flagged with an 'SI' qualifier on the final report to indicate that the reported activity for this nuclide is considered to be a 'false-positive' due to peak mis-identification. Results are submitted without further qualification

12. There are cases where the magnitude of negative activity is greater than the 3σ TPU. ALS is currently investigating the possible cause and frequency of this occurrence. Review of the data does not indicate a problem with the instrument or reporting systems and results are reported without further qualification.

13. No further problems were encountered with either the client samples or the associated quality control samples. All remaining quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Hannah Alt ______________________ 7/14/16
Hannah Alt Date
Radiochemistry Primary Data Reviewer

______________________ 7/15/16
Radiochemistry Final Data Reviewer Date

ALS Environmental -- FC

Sample Number(s) Cross-Reference Table

OrderNum: 1606332
Client Name: Environmental Restoration Group, Inc.
Client Project Name: Permits West-Section 12 Mine
Client Project Number: 0216-01-02
Client PO Number: CF-PWest-061616

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
S12BRA-01-06-061316	1606332-1		SOIL	13-Jun-16	13:58
S12BRA-02-06-061316	1606332-2		SOIL	13-Jun-16	14:08
S12-01-06-061316	1606332-3		SOIL	13-Jun-16	14:35
S12-02-06-061316	1606332-4		SOIL	13-Jun-16	14:46
S12-03-06-061316	1606332-5		SOIL	13-Jun-16	15:00
S12-04-06-061316	1606332-6		SOIL	13-Jun-16	15:15
S12-05-06-061316	1606332-7		SOIL	13-Jun-16	15:22
S12-06-06-061316	1606332-8		SOIL	13-Jun-16	15:32
S12-07-06-061316	1606332-9		SOIL	13-Jun-16	15:54
S12-08-06-061316	1606332-10		SOIL	13-Jun-16	16:05

ALS Environmental

225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

Turnaround time for samples received Saturday will be calculated beginning from the next business day.

ALS WORKORDER #	1606332
PAGE	1 of 1
DISPOSAL	BY LAB or RETURN

TURNAROUND TIME	ASAP	SAMPLER	CFarr

PROJECT NAME	Permits West - Section 12 Mine	SITE ID	Sec12
PROJECT No.	0216-01-02	EDD FORMAT	Electronic
		PURCHASE ORDER	CF-PWest-061616
COMPANY NAME	ERG	BILL TO COMPANY	ERG
SEND REPORT TO	Chuck Farr	INVOICE ATTN TO	Chuck Farr
ADDRESS	8809 Washington St. NE, #150	ADDRESS	8809 Washington St. NE, #150
CITY / STATE / ZIP	Albuquerque, NM 87113	CITY / STATE / ZIP	Albuquerque, NM 87113
PHONE	505-298-4224	PHONE	505-298-4224
FAX	505-797-1404	FAX	505-797-1404
E-MAIL	chuckfarr@ergoffice.com	E-MAIL	chuckfarr@ergoffice.com

PARAMETER/METHOD REQUEST FOR ANALYSIS

A	Ra-226 & natural emitting gamma radionuclides using Method 901.1M *(reference quote: 160120-1)*
B	
C	
D	
E	
F	
G	
H	
I	
J	

LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
See Field ID	1 S12BRA-01-06-061316	S	6/13/16	13:58	1	n/a	See needed lab QC requirements (attached)	×										A
See Field ID	2 S12BRA-02-06-061316	S	6/13/16	14:08	1	n/a		×										A
See Field ID	3 S12-01-06-061316 #1	S	6/13/16	14:35	1	n/a		×										A
See Field ID	4 S12-02-06-061316 #2	S	6/13/16	14:46	1	n/a		×										A
See Field ID	5 S12-03-06-061316 #3	S	6/13/16	15:00	1	n/a		×										A
See Field ID	6 S12-04-06-061316 #4	S	6/13/16	15:15	1	n/a		×										A
See Field ID	7 S12-05-06-061316 #5	S	6/13/16	15:22	1	n/a		×										A
See Field ID	8 S12-06-06-061316 #6	S	6/13/16	15:32	1	n/a		×										A
See Field ID	9 S12-07-06-061316 #7	S	6/13/16	15:54	1	n/a		×										A
See Field ID	10 S12-08-06-061316 #8	S	6/13/16	16:05	1	n/a		×										A
See Field ID																		
See Field ID																		

*Time Zone (Circle): EST CST MST PST Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter

NOTES

REPORT LEVEL / QC REQUIRED	
	Summary (Standard QC)
	LEVEL II (Standard QC)
	LEVEL III (Std QC + forms)
	LEVEL IV (Std QC + forms + raw data)

Form 202r9

	SIGNATURE	PRINTED NAME	DATE	TIME
RELINQUISHED BY	[signature]	Chuck Farr	6/16/2016	16:30
RECEIVED BY	[signature]	Scott McElroy	6-17-16	1020
RELINQUISHED BY				
RECEIVED BY				
RELINQUISHED BY				
RECEIVED BY				

PRESERVATION KEY: 1-HCl 2-HNO3 3-H2SO4 4-NaOH 5-NaOH/ZnAcetate 6-NaHSO4 7-4°C 8-Other

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ERG   Workorder No: 1606332

Project Manager: LRS   Initials: SDM   Date: 6-17-16

			YES	NO
1.	Does this project require any special handling in addition to standard ALS procedures?		YES	NO
2.	Are custody seals on shipping containers intact?	NONE	YES	NO
3.	Are Custody seals on sample containers intact?	NONE	YES	NO
4.	Is there a COC (Chain-of-Custody) present or other representative documents?		YES	NO
5.	Are the COC and bottle labels complete and legible?		YES	NO
6.	Is the COC in agreement with samples received? (IDs, dates, times, no. of samples, no. of containers, matrix, requested analyses, etc.)		YES	NO
7.	Were airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
8.	Are all aqueous samples requiring preservation preserved correctly? (excluding volatiles)	N/A	YES	NO
9.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO
10.	Is there sufficient sample for the requested analyses?		YES	NO
11.	Were all samples placed in the proper containers for the requested analyses?		YES	NO
12.	Are all samples within holding times for the requested analyses?		YES	NO
13.	Were all sample containers received intact? (not broken or leaking, etc.)		YES	NO
14.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) headspace free? Size of bubble: ____ < green pea ____ > green pea	N/A	YES	NO
15.	Do any water samples contain sediment? Amount of sediment: ____ dusting ____ moderate ____ heavy Amount	N/A	YES	NO
16.	Were the samples shipped on ice?		YES	NO
17.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #2 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	Amb							
No. of custody seals on cooler:	0							
External µR/hr reading:	15							
Background µR/hr reading:	11							

DOT Survey/ Acceptance Information

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

Additional Information: PROVIDE DETAILS BELOW FOR A NO RESPONSE TO ANY QUESTION ABOVE, EXCEPT #1 AND #16.

If applicable, was the client contacted? **YES / NO / NA** Contact: ______ Date/Time: ______

Project Manager Signature / Date: 6/17/16

*IR Gun #2: Oakton, SN 29922500201-0066
*IR Gun #4: Oakton, SN 2372220101-0002

Form 201r24.xls (06/04/2012)

Page 1 of 1

1606332

1606332

ORIGIN ID:ABQA (505) 298-4224
SCOTT HERONIMUS
ERG
8809 WASHINGTON ST. NE
SUITE 150
ALBUQUERQUE, NM 87113
UNITED STATES US

SHIP DATE: 16JUN16
ACTWGT: 70.00 LB
CAD: 5044249/INET3730
DIMS: 26x17x16 IN
BILL SENDER

TO **SAMPLE RECEIVING**
ALS ENVIRONMENTAL
225 COMMERCE DR.

FORT COLLINS CO 80524
(970) 490-1522 REF: SOIL SAMPLES ERRG
INV:
PO: DEPT:

15-0

540J2/30BD/727F

Ang

FedEx Express

E

J161016020501uv

FRI - 17 JUN 3:00P
STANDARD OVERNIGHT

TRK# 0201 **7765 4199 9155**

DSR
80524

XH FTCA

CO-US **DEN**

After printing this label:

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Gamma Spectroscopy Results

PAI 713 Rev 13

Method Blank Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Lab ID: GS160620-5MB
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 21-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 160692d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	0.07 +/- 0.23	0.44	2	NA	U
14913-49-6	Bi-212	-0.19 +/- 0.77	1.64		NA	U
14733-03-0	Bi-214	0.04 +/- 0.15	0.27		NA	U,J
13966-00-2	K-40	-0.65 +/- 0.92	2.07	10	NA	U
15100-28-4	Pa-234m	-3 +/- 11	24		NA	U
15092-94-1	Pb-212	-0.026 +/- 0.094	0.179		NA	U
15067-28-4	Pb-214	0.02 +/- 0.13	0.24		NA	U,J
15623-47-9	Th-227	-0.19 +/- 0.29	0.59		NA	U
15065-10-8	Th-234	0.16 +/- 0.68	1.19		NA	U
14913-50-9	Tl-208	-0.030 +/- 0.078	0.156		NA	U
15117-96-1	U-235	0.07 +/- 0.24	0.42		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Method Blank Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Lab ID: GS160620-5MB
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 21-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 160692d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	0.03 +/- 0.18	0.33	1	NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
M - Requested MDC not met.
B - Analyte concentration greater than MDC.
B3 - Analyte concentration greater than MDC but less than Requested MDC.
DL - Decision Level

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Lab ID: GS160620-5ALCS
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 21-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 160833d01

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
13982-63-3	Ra-226	462 +/- 54	3	468.7	98.6	85 - 115	P,M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU
LT - Result is less than Requested MDC, greater than sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS Recovery within control limits.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Laboratory Control Sample(s)

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Lab ID: GS160620-5LCS
Library: ANALYTICAL

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 21-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes

Final Aliquot: 215 g
Result Units: pCi/g
File Name: 160667d09

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14596-10-2	Am-241	429 +/- 50	3	463.1	92.7	85 - 115	P
10198-40-0	Co-60	209 +/- 25	1	216.4	96.5	85 - 115	P
10045-97-3	Cs-137	175 +/- 21	1	179.1	97.6	85 - 115	P

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU

LT - Result is less than Requested MDC, greater than sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS Recovery within control limits.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-01-06-061316
Lab ID: 1606332-1DUP
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 200 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160714d07

CASNO	Analyte	Sample			Duplicate			DER	DER Lim
		Result +/- 2 s TPU	MDC	Flags	Result +/- 2 s TPU	MDC	Flags		
15262-20-1	Ra-228	1.21 +/- 0.48	0.86	LT,G,TI	1.00 +/- 0.51	0.66	LT,TI	0.308	2.13
14913-49-6	Bi-212	1.9 +/- 1.6	2.4	U,G	0.4 +/- 1.3	2.3	U	0.73	2.13
14733-03-0	Bi-214	0.58 +/- 0.33	0.46	G,J	0.74 +/- 0.30	0.38	J	0.364	2.13
13966-00-2	K-40	10.2 +/- 3.2	3.1	G	13.6 +/- 3.1	1.9		0.749	2.13
15100-28-4	Pa-234m	6 +/- 15	27	U,G	20 +/- 17	25	U	0.605	2.13
15092-94-1	Pb-212	0.78 +/- 0.26	0.31	G	0.92 +/- 0.23	0.23		0.408	2.13
15067-28-4	Pb-214	1.01 +/- 0.27	0.31	G,J	1.13 +/- 0.27	0.34	J	0.333	2.13
15623-47-9	Th-227	0.42 +/- 0.96	1.56	U,G	0.08 +/- 0.56	0.97	U	0.31	2.13
15065-10-8	Th-234	0.5 +/- 1.3	2.2	U,G	0.8 +/- 1.4	2.4	U	0.15	2.13
14913-50-9	Tl-208	0.25 +/- 0.15	0.20	G	0.19 +/- 0.11	0.16		0.368	2.13
15117-96-1	U-235	0.24 +/- 0.45	0.77	U,G	0.33 +/- 0.42	0.69	U	0.141	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Duplicate Sample Results (DER)

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-01-06-061316
Lab ID: 1606332-1DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 200 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160714d07A

CASNO	Analyte	Sample Result +/- 2 s TPU	Sample MDC	Sample Flags	Duplicate Result +/- 2 s TPU	Duplicate MDC	Duplicate Flags	DER	DER Lim
13982-63-3	Ra-226	1.27 +/- 0.32	0.47	G	1.40 +/- 0.31	0.47		0.281	2.13

Comments:

Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13
LT - Result is less than Request MDC, greater than sample specific MDC
M - Requested MDC not met.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
L - LCS Recovery below lower control limit.
H - LCS Recovery above upper control limit.
P - LCS, Matrix Spike Recovery within control limits.
N - Matrix Spike Recovery outside control limits
SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
DER - Duplicate Error Ratio
BDL - Below Detection Limit
NR - Not Reported

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID:	S12BRA-01-06-061316
Lab ID:	1606332-1

Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 182 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160999d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.21 +/- 0.48	0.86	2	NA	LT,G,TI
14913-49-6	Bi-212	1.9 +/- 1.6	2.4		NA	U,G
14733-03-0	Bi-214	0.58 +/- 0.33	0.46		NA	G,J
13966-00-2	K-40	10.2 +/- 3.2	3.1	10	NA	G
15100-28-4	Pa-234m	6 +/- 15	27		NA	U,G
15092-94-1	Pb-212	0.78 +/- 0.26	0.31		NA	G
15067-28-4	Pb-214	1.01 +/- 0.27	0.31		NA	G,J
15623-47-9	Th-227	0.42 +/- 0.96	1.56		NA	U,G
15065-10-8	Th-234	0.5 +/- 1.3	2.2		NA	U,G
14913-50-9	Tl-208	0.25 +/- 0.15	0.20		NA	G
15117-96-1	U-235	0.24 +/- 0.45	0.77		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-01-06-061316
Lab ID: 1606332-1
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 182 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160999d03A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.27 +/- 0.32	0.47	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Duplicate Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-01-06-061316
Lab ID: 1606332-1DUP
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 200 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160714d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.00 +/- 0.51	0.66	2	NA	LT,TI
14913-49-6	Bi-212	0.4 +/- 1.3	2.3		NA	U
14733-03-0	Bi-214	0.74 +/- 0.30	0.38		NA	J
13966-00-2	K-40	13.6 +/- 3.1	1.9	10	NA	
15100-28-4	Pa-234m	20 +/- 17	25		NA	U
15092-94-1	Pb-212	0.92 +/- 0.23	0.23		NA	
15067-28-4	Pb-214	1.13 +/- 0.27	0.34		NA	J
15623-47-9	Th-227	0.08 +/- 0.56	0.97		NA	U
15065-10-8	Th-234	0.8 +/- 1.4	2.4		NA	U
14913-50-9	Tl-208	0.19 +/- 0.11	0.16		NA	
15117-96-1	U-235	0.33 +/- 0.42	0.69		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Duplicate Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-01-06-061316
Lab ID: 1606332-1DUP
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 200 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160714d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.40 +/- 0.31	0.47	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TPU.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M - The requested MDC was not met.
M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.
W - DER is greater than Warning Limit of 1.42
D - DER is greater than Control Limit of 2.13

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:
TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-02-06-061316
Lab ID: 1606332-2
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 182 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160691d08

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.08 +/- 0.41	0.65	2	NA	LT,G
14913-49-6	Bi-212	1.0 +/- 1.4	2.4		NA	U,G
14733-03-0	Bi-214	1.05 +/- 0.33	0.39		NA	G,J
13966-00-2	K-40	13.0 +/- 3.2	2.0	10	NA	G
15100-28-4	Pa-234m	7 +/- 16	28		NA	U,G
15092-94-1	Pb-212	1.16 +/- 0.28	0.27		NA	G
15067-28-4	Pb-214	1.14 +/- 0.28	0.32		NA	G,J
15623-47-9	Th-227	-0.42 +/- 0.63	1.23		NA	U,G
15065-10-8	Th-234	0.75 +/- 0.96	1.58		NA	U,G
14913-50-9	Tl-208	0.36 +/- 0.14	0.16		NA	G
15117-96-1	U-235	0.18 +/- 0.44	0.75		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12BRA-02-06-061316
Lab ID: 1606332-2
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 182 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160691d08A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.55 +/- 0.32	0.44	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-01-06-061316
Lab ID: 1606332-3
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 188 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160666d09

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	0.79 +/- 0.50	0.66	2	NA	LT,TI
14913-49-6	Bi-212	1.0 +/- 1.6	2.7		NA	U
14733-03-0	Bi-214	1.14 +/- 0.38	0.39		NA	J
13966-00-2	K-40	11.0 +/- 3.2	2.3	10	NA	
15100-28-4	Pa-234m	-7 +/- 16	35		NA	U
15092-94-1	Pb-212	0.93 +/- 0.25	0.24		NA	
15067-28-4	Pb-214	1.05 +/- 0.29	0.38		NA	J
15623-47-9	Th-227	-0.37 +/- 0.70	1.34		NA	U
15065-10-8	Th-234	0.80 +/- 0.84	1.88		NA	U
14913-50-9	Tl-208	0.20 +/- 0.14	0.20		NA	
15117-96-1	U-235	0.08 +/- 0.51	0.89		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-01-06-061316
Lab ID: 1606332-3
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 188 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160666d09A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	1.56 +/- 0.36	0.53	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-02-06-061316
Lab ID: 1606332-4
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 156 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160832d01

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.04 +/- 0.59	0.92	2	NA	LT,G,TI
14913-49-6	Bi-212	2.6 +/- 2.4	3.7		NA	U,G
14733-03-0	Bi-214	6.0 +/- 1.0	0.6		NA	G,J
13966-00-2	K-40	17.0 +/- 4.5	3.7	10	NA	G
15100-28-4	Pa-234m	-2 +/- 23	45		NA	U,G
15092-94-1	Pb-212	1.29 +/- 0.37	0.42		NA	G
15067-28-4	Pb-214	6.8 +/- 1.0	0.5		NA	G,J
15623-47-9	Th-227	0.74 +/- 0.90	1.47		NA	U,G
15065-10-8	Th-234	3.2 +/- 3.1	4.9		NA	U,G
14913-50-9	Tl-208	0.33 +/- 0.17	0.22		NA	G
15117-96-1	U-235	-0.03 +/- 0.76	1.35		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-02-06-061316
Lab ID: 1606332-4
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 156 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160832d01A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	9.2 +/- 1.3	0.7	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results
PAI 713 Rev 13
Sample Results

Lab Name: ALS Environmental -- FC
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-03-06-061316
Lab ID: 1606332-5
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 175 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160795d02

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.1 +/- 1.2	1.9	2	NA	U,G
14913-49-6	Bi-212	0.3 +/- 2.5	4.4		NA	U,G
14733-03-0	Bi-214	38.4 +/- 4.7	0.7		NA	G,J
13966-00-2	K-40	17.2 +/- 4.2	4.2	10	NA	G
15100-28-4	Pa-234m	0 +/- 41	72		NA	U,G
15092-94-1	Pb-212	1.54 +/- 0.54	0.78		NA	G
15067-28-4	Pb-214	42.6 +/- 5.1	0.9		NA	G,J
15623-47-9	Th-227	3.5 +/- 1.9	3.0		NA	G,SI
15065-10-8	Th-234	27.7 +/- 6.8	9.0		NA	G
14913-50-9	Tl-208	0.40 +/- 0.20	0.29		NA	G
15117-96-1	U-235	1.8 +/- 1.2	2.3		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-03-06-061316
Lab ID: 1606332-5
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 175 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160795d02A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	58.1 +/- 6.9	1.1	1	NA	M3,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-04-06-061316
Lab ID: 1606332-6
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 235 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 161000d03

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	0.8 +/- 1.2	2.0	2	NA	U,M
14913-49-6	Bi-212	-1.9 +/- 4.0	7.0		NA	U
14733-03-0	Bi-214	62.3 +/- 7.5	0.9		NA	J
13966-00-2	K-40	19.0 +/- 5.2	6.3	10	NA	
15100-28-4	Pa-234m	47 +/- 43	68		NA	U
15092-94-1	Pb-212	1.40 +/- 0.81	1.25		NA	NQ
15067-28-4	Pb-214	62.0 +/- 7.4	0.9		NA	G,J
15623-47-9	Th-227	3.0 +/- 1.6	2.4		NA	SI
15065-10-8	Th-234	29.4 +/- 6.1	7.2		NA	TI
14913-50-9	Tl-208	0.14 +/- 0.29	0.48		NA	U
15117-96-1	U-235	2.7 +/- 2.3	3.7		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-04-06-061316
Lab ID: 1606332-6
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 235 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 161000d03A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	93 +/- 11	1	1	NA	M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID:	S12-05-06-061316
Lab ID:	1606332-7

Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 221 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160988d04

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.1 +/- 1.4	2.2	2	NA	U,M
14913-49-6	Bi-212	0.4 +/- 3.6	6.3		NA	U
14733-03-0	Bi-214	43.3 +/- 5.3	1.0		NA	J
13966-00-2	K-40	16.9 +/- 4.6	4.9	10	NA	
15100-28-4	Pa-234m	68 +/- 58	92		NA	U
15092-94-1	Pb-212	-0.39 +/- 0.50	1.20		NA	U
15067-28-4	Pb-214	44.4 +/- 5.3	1.0		NA	J
15623-47-9	Th-227	1.1 +/- 1.7	2.8		NA	U
15065-10-8	Th-234	40.0 +/- 6.7	6.9		NA	
14913-50-9	Tl-208	0.11 +/- 0.30	0.50		NA	U
15117-96-1	U-235	3.0 +/- 2.1	3.3		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-05-06-061316
Lab ID: 1606332-7
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 221 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160988d04A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	62.9 +/- 7.5	1.4	1	NA	M3

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP
U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-06-06-061316
Lab ID: 1606332-8
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 229 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160740d05

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	0.51 +/- 0.45	0.71	2	NA	U
14913-49-6	Bi-212	0.6 +/- 1.4	2.4		NA	U
14733-03-0	Bi-214	10.4 +/- 1.4	0.4		NA	J
13966-00-2	K-40	10.2 +/- 2.6	2.3	10	NA	
15100-28-4	Pa-234m	-2 +/- 19	34		NA	U
15092-94-1	Pb-212	0.37 +/- 0.24	0.36		NA	
15067-28-4	Pb-214	11.1 +/- 1.4	0.4		NA	J
15623-47-9	Th-227	0.3 +/- 1.0	1.7		NA	U
15065-10-8	Th-234	5.5 +/- 3.0	4.6		NA	TI
14913-50-9	Tl-208	0.09 +/- 0.12	0.19		NA	U
15117-96-1	U-235	0.43 +/- 0.71	1.17		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-06-06-061316
Lab ID: 1606332-8
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 229 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160740d05A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	15.5 +/- 1.9	0.6	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-07-06-061316
Lab ID: 1606332-9
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 151 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160663d06

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.54 +/- 0.66	1.13	2	NA	G,NQ
14913-49-6	Bi-212	1.8 +/- 2.3	3.8		NA	U,G
14733-03-0	Bi-214	1.16 +/- 0.45	0.56		NA	G,J
13966-00-2	K-40	15.2 +/- 4.6	4.6	10	NA	G
15100-28-4	Pa-234m	3 +/- 24	45		NA	U,G
15092-94-1	Pb-212	1.83 +/- 0.44	0.44		NA	G
15067-28-4	Pb-214	2.04 +/- 0.47	0.57		NA	G,J
15623-47-9	Th-227	-1.0 +/- 1.3	2.5		NA	U,G
15065-10-8	Th-234	2.3 +/- 2.0	3.2		NA	U,G
14913-50-9	Tl-208	0.37 +/- 0.19	0.26		NA	G
15117-96-1	U-235	0.34 +/- 0.68	1.15		NA	U,G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U
Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.
Y2 - Chemical Yield outside default limits.
LT - Result is less than Requested MDC, greater than sample specific MDC.
M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.
SI - Nuclide identification and/or quantitation is tentative.
TI - Nuclide identification is tentative.
R - Nuclide has exceeded 8 halflives.
G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty
MDC - Minimum Detectable Concentration
BDL - Below Detection Limit
DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-07-06-061316
Lab ID: 1606332-9
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 151 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160663d06A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	2.38 +/- 0.51	0.79	1	NA	G

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-08-06-061316
Lab ID: 1606332-10
Library: NATURAL(SUB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 215 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160715d07

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
15262-20-1	Ra-228	1.04 +/- 0.47	0.88	2	NA	LT,TI
14913-49-6	Bi-212	1.2 +/- 1.5	2.5		NA	U
14733-03-0	Bi-214	3.30 +/- 0.57	0.36		NA	J
13966-00-2	K-40	16.3 +/- 3.5	2.4	10	NA	
15100-28-4	Pa-234m	13 +/- 19	31		NA	U
15092-94-1	Pb-212	0.82 +/- 0.23	0.27		NA	
15067-28-4	Pb-214	3.67 +/- 0.56	0.35		NA	J
15623-47-9	Th-227	-0.24 +/- 0.72	1.29		NA	U
15065-10-8	Th-234	4.3 +/- 2.0	3.0		NA	TI
14913-50-9	Tl-208	0.16 +/- 0.10	0.14		NA	
15117-96-1	U-235	0.59 +/- 0.53	0.83		NA	U

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

Gamma Spectroscopy Results

PAI 713 Rev 13

Sample Results

Lab Name: **ALS Environmental -- FC**
Work Order Number: 1606332
Client Name: Environmental Restoration Group, Inc.
ClientProject ID: Permits West-Section 12 Mine 0216-01-02

Field ID: S12-08-06-061316
Lab ID: 1606332-10
Library: RA226.LIB

Sample Matrix: SOIL
Prep SOP: PAI 739 Rev 12
Date Collected: 13-Jun-16
Date Prepared: 21-Jun-16
Date Analyzed: 12-Jul-16

Prep Batch: GS160620-5
QCBatchID: GS160620-5-1
Run ID: GS160620-5A
Count Time: 30 minutes
Report Basis: Dry Weight

Final Aliquot: 215 g
Prep Basis: Dry Weight
Moisture(%): NA
Result Units: pCi/g
File Name: 160715d07A

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
13982-63-3	Ra-226	5.01 +/- 0.70	0.48	1	NA	

Comments:

Qualifiers/Flags:

U - Result is less than the sample specific MDC or less than the associated TP U

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

SQ - Spectral quality prevents accurate quantitation.

SI - Nuclide identification and/or quantitation is tentative.

TI - Nuclide identification is tentative.

R - Nuclide has exceeded 8 halflives.

G - Sample density differs by more than 15% of LCS density.

Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: *GSS1606332-1*

TECHNICAL BULLETIN ADDENDUM

The library used for analysis defines the gamma emission(s) to be used for analysis of each nuclide. If multiple gamma emissions are used for quantification, then a 'NET' quantification emission (or peak) must be defined in the library. This designation provides for the calculation of nuclide activity concentrations and detection limits in the case of non-presence of the nuclide. When the nuclide is not present, or the software is unable to resolve a peak at the library defined 'NET' energy, the software evaluates the 'NET' region of interest ('NET' peak energy +/- 2 keV) by performing a summation of the net counts above the background level. This 'NET' quantification can result in net negative, zero, or positive activity results, and is highly dependent on the spectral distribution in the region of interest of the 'NET' peak. In cases where only the 'NET' peak is found, and the software performs a net quantification, the nuclide result will be flagged with an 'NQ' qualifier on the final reports. This indicates that the nuclide is not detected or supported at any level above the reported MDC. Results are submitted without further qualification.

All nuclides specified in the library of analysis for gamma spectroscopy are evaluated for positive <u>OR</u> tentative identification on the following criteria:

- The individual abundances for the gamma emissions specified for each nuclide are summed to obtain a total nuclide abundance.
- From the total nuclide abundance, a positive identification criterion is set as 75% of this total nuclide abundance.
- For all nuclide peaks that are not net quantified, those peak abundances are summed. The total non-net quantified peak sum is compared to the calculated 75% abundance criterion. If this sum is greater than the 75% criterion, the nuclide is considered to be positively identified at the reported concentration. If the sum is less than the 75% criterion, the nuclide is tentatively identified at the reported concentration. These results will be flagged with a 'TI' qualifier on the final reports to indicate that the 75% abundance criterion was not met.

APPENDIX C

Waste Characterization Study – Phase 2
Section 12 Mine (Mine Permit Application - NM MK046RE)

SECTION 12 MINE

Waste Characterization Study – Phase 2

Section 12 Mine (Mine Permit Application - NM MK046RE)
SW/4, Section 12, Township 14 North, Range 10 West, McKinley County, New Mexico

PREPARED FOR

Southwest Resources, Inc.

PREPARED BY

Robyn W. Tierney

PERMITS WEST, INC.
PROVIDING PERMITS for LAND USERS
37 Verano Loop, Santa Fe, NM 87508 (505) 466-8120

October 2018

INTRODUCTION

This report describes the results of a waste characterization study at the Section 12 mine as conducted by Permits West personnel on August 22, 2017. The Section 12 mine is located in the southwest quarter of Section 12, Township 14 North, Range 10 West, McKinley County, New Mexico. This second phase of the waste characterization study was designed to utilize the maps developed from the radiological gamma ray survey of the Section 12 mine site as performed by Environmental Restoration Group, Inc. (ERG 2017), and further characterize sub-surface conditions at the Section 12 mine for future site reclamation.

Scope of Work

The Section 12 mine area includes the main access road, an ore loadout area, an equipment yard, a mine shaft with a head frame and hoist, a hoist (mechanical) house, a metal office building, parking areas and driveways around the buildings, piles of non-economical waste rock, and two ventilation shafts.

Gamma radiation levels across the mine range from 13.6 to 211.0 µR/h (micro-Roentgens/hour) and are primarily associated with uranium (U) and its radium-226 and radon daughter decay products. Most of the elevated radiation levels documented at the mine are associated with piles of mineralized waste rock, drill cuttings, and spoils which were brought to the surface as the mine shaft was developed. An ore load-out area located east of the mine's head frame (Figure 1) also evidenced elevated exposure rates. Based on previous visual inspections and walkover surveys of the Section 12 mine by Permits West personnel and others, it is likely that materials in many of these areas have been mixed and/or redistributed by repeated grading and other earthwork at the mine site.

Purpose of Waste Characterization Study

The upper bounds of the exposure rates to be achieved in cleaning up the core area around the mine is 22.112 µR/h (ERG 2017). Thus, the purpose of the study was to collect additional information about the characteristics of the waste materials at the Section 12 mine, their depths, their likely sub-surface distributions, and their extent across the impacted area. This information was used to: 1) develop a more detailed gridded cleanup map of the mine site; 2) estimate -- as a first approximation -- the volumes of materials to be removed and disposed of; and 3) make additional project scope decisions as they relate to planning and advancement of the mine's reclamation at closure.

METHODS

Prior to conducting the excavation of the trenches, and using the exposure rate map (Figure 1) and the Ra-226 concentration map (Figure 2) generated from the ERG radiological report (ERG 2017), Permits West personnel conducted a preliminary field investigation and identified 10 potential areas for excavation of soil trenches at the Section 12 mine (Figure 3). Excavation of the soil trenches was conducted on August 22, 2017 with Michael Coleman, Senior Reclamation Specialist, New Mexico Mining and Minerals Division, and Permits West field personnel Mike Deutsch, Robyn Tierney, and Dan Gibson-Reinemer, jointly evaluating each trench, recording observations, photographing the soil profiles in each trench, and directing the equipment operator.

The excavation work was carried out by Coyote Drilling and used a 3-cubic yard bucket backhoe. Work began at approximately 10:30 and ended at 4:00 PM. Temperatures during the day ranged from 70^{o}F in the morning to 90^{o}F in the afternoon with clear skies and light breezes. The Ambrosia Lake lakebed was dry and has not contained water since June of 2017.

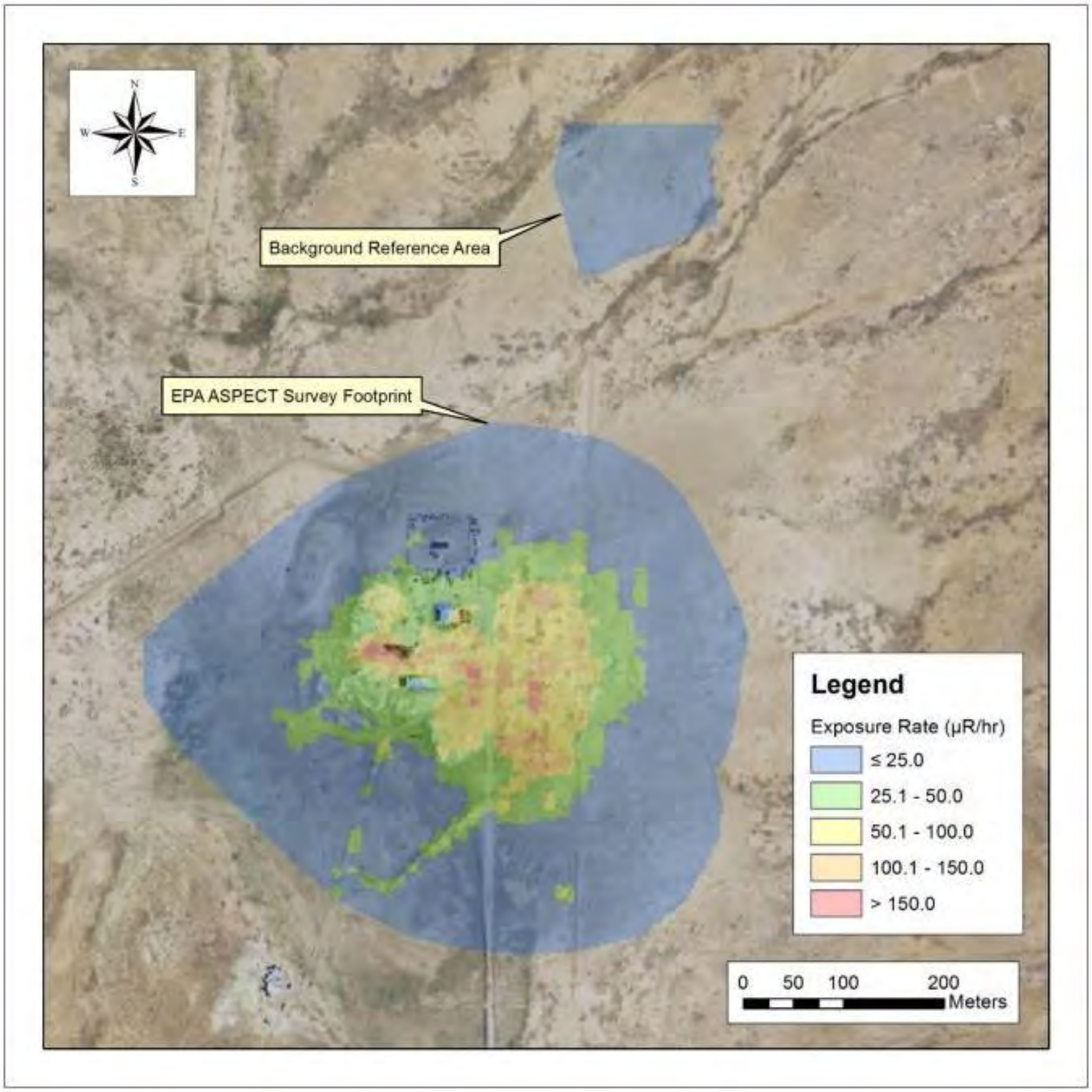


Figure 1. Isocontours of expected exposure rates (µR/hr), Figure 3.3 from ERG 2017 radiological survey report. ERG figure is superimposed on EPA ASPECT survey footprint.

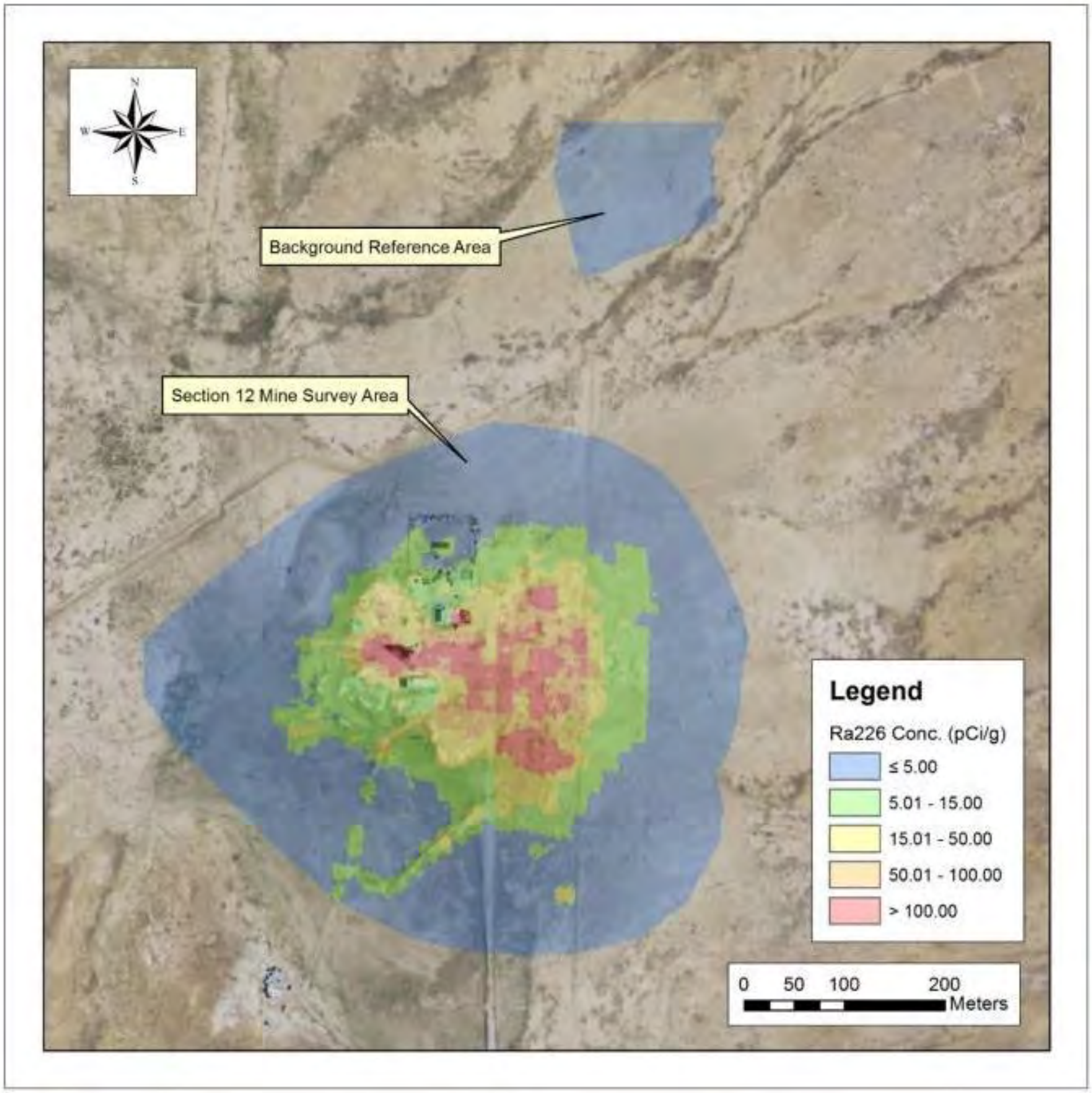


Figure 2. Isocontours of predicted concentrations of Ra-226 (pCi/g), Figure 4-2 from ERG 2017 radiological survey report. ERG figure is superimposed on EPA ASPECT survey footprint.

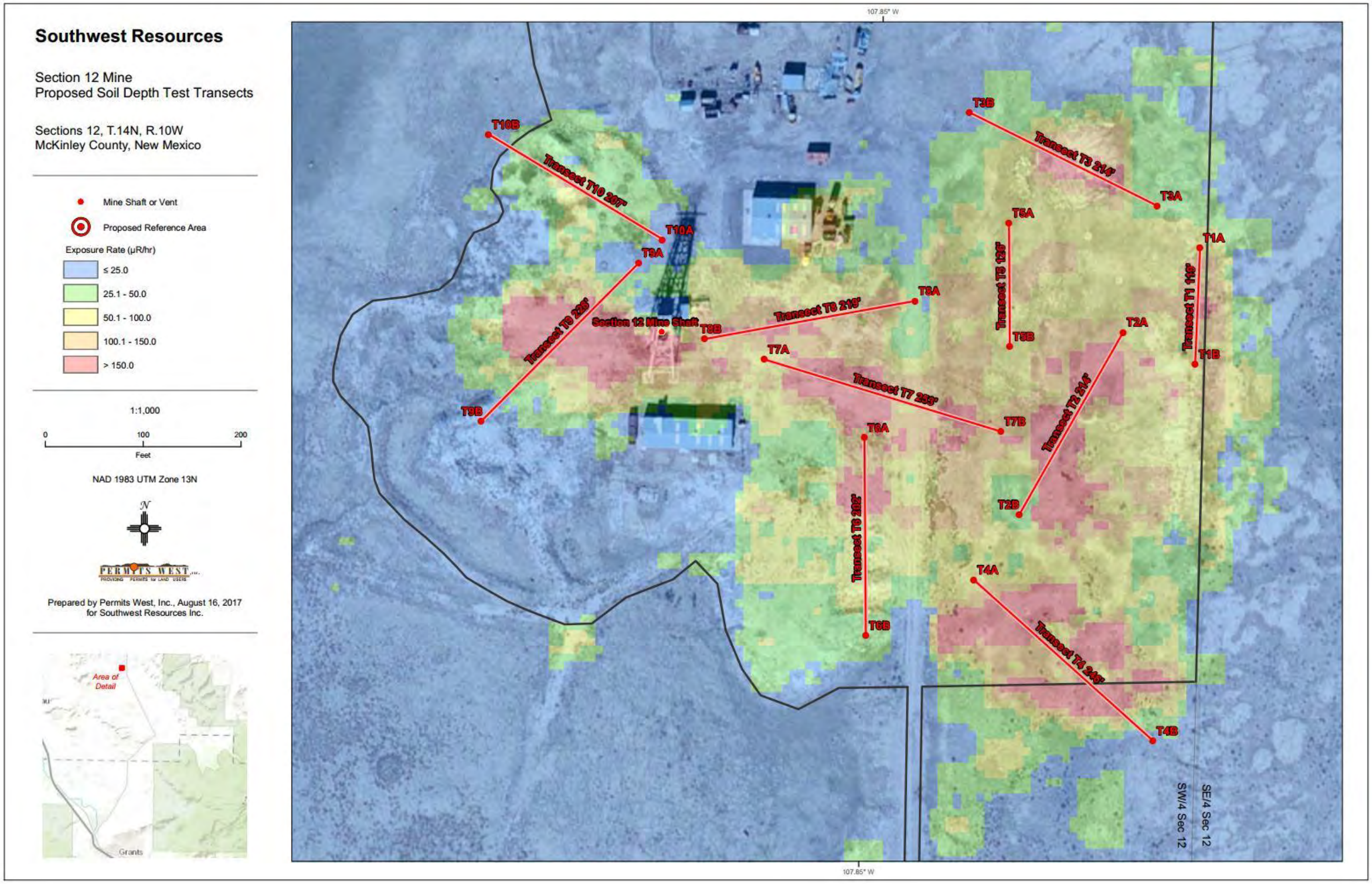


Figure 3. Preliminary layout of 12 soil trenches as selected by Permits West.

Baseline readings were taken using a hand-held gamma detector in an undisturbed area east of the Section 12 mine, and a relative baseline reading of 300 cps (counts per second[1]) was set by Mr. Coleman as the natural un-impacted background level or reference level for this phase of the study.

A total of 13 soil trenches were excavated and visually evaluated by Permits West personnel for changes in color, texture, and soil structure, and by Mr. Coleman, who used the hand-held gamma detector to determine where materials with elevated readings were located in the trenches (Figure 4). The detector was held at approximately 18 inches above the ground surface (ags) as Mr. Coleman walked in or along each trench (Figure 5). Readings and observations were recorded by Robyn Tierney, Permits West Natural Resources Specialist, as they were called out by Mr. Coleman. Additional visual observations about the soil and waste rock's physical characteristics were also made and recorded by Ms. Tierney and photographs were tagged with positional information (i.e. GPS coordinates) for later review. Once the excavation and evaluation of each trench had been completed, the trenches were backfilled and lightly compacted.

Figure 4. Beginning (A) and ending (B) locations of waste characterization trenches

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[1] Counts per second (cps) is a measure of the rate that detection events are registered by the measuring instrument on a per second basis, and not the rate of disintegrations or emissiosn from the source of radiation. Readers are reminded that count rates do not universally equate to dose rates, and there is no simple universal conversion factor since conversions are instrument-specific. Rather, the measure of counts per second, is the number of events detected on a per second basis. Dose rate relates to the amount of ionizing energy deposited in the sensor of the radiation detector. The conversion calculation is dependent on the radiation energy levels, the type of radiation being detected and the radiometric characteristics of the detector.

Figure 5. Photo: UQXW5676. Michael Coleman samples the sidewalls of waste characterization trench T-1.

RESULTS

The following descriptions and photographs were compiled from the direct observations and field notes as made by Robyn Tierney during the August 22, 2017 field study. Readers are referred to Figure 4 above for the locations of the waste characterization trenches at the Section 12 Mine.

Trench T-1

Figure 6. Photo: AMNI18284. Trench 1-B (south end of trench)

Figure 7. Photo: CRER5389. Trench 1-A (north end of trench at fenceline)

Figure 8. Photo: UEES6706. Trench 1-B (south end of trench)

Trench T-2 (broken into two smaller discontinuous trenches)
Readings at the northeast end of the T-2 trench were elevated (3,400 cps or counts per second) to a depth of 18 inches. The introduced materials were a distinct light grey with darker organic inclusions to a depth of 18 inches and were distinguished from the underlying layer of consolidated brownish lakebed clays below. Readings from these lakebed clays were not elevated and approached the baseline of 300 cps (400 – 600 cps). This suggests these lakebed clays may act as a barrier to downward leaching of materials. Readings of grey materials in the upper 18 inches at the southwest end of trench were also elevated (3,000 – 4,500 cps range).

Figure 9. Photo: AMNI18284. Trench 2-B (southwest end of trench). Note darker grey inclusions or materials in left mid-frame of photograph.

Figure 10. Photo: FWMJ. Note platy and blocky layer of brown-colored lakebed clays.

The southwestern or second part of the Trench T-2 is located adjacent to BLM land. Readings in this trench were also elevated (3,400 cpm) to an 18-inch depth, but not elevated below in the underlying lakebed clay layer. The first 18 inches of the material consists of a sandy, disintegrated waste material, with no clasts. There is a chalky or talc-like quality to the bottom of this 18-inch layer. Wires for blasting caps were identified in this trench.

Figure 11. Photo: OBCG5018. Trench 2-B (southwest end of trench). Note brownish clay layer below 18 inches.

Figure 12. Photo: JZVX5553. Trench 2-B (southwest end of trench)

Figure 13. Photo: VGTB3533. Trench 2-G (also at southwest end of trench)

Figure 14. Photo: SBEE5011. T-2H (also at southwest end of trench). Note ashy layers overlying blocky clay layers.

Third trench at T-3 pile – east facing of side of pile

A trench was excavated from the east-facing side of a large waste rock pile, west to the apex or crest of the pile. The trench began in an eight-inch layer of atypical material overlying brown lakebed clays at the edge of the pile. The excavation on the east-facing side of the pile revealed an ashy grey layer of material with uniformly elevated readings (> 3,000 cps) interspersed with darker humate materials in the pile. The waste rock pile is estimated to be between six and eight feet deep and based on the readings from this trench, the entire pile should be removed.

Figure 15. Photo: ANTE4371. Beginning of trench T-3 on east of waste pile. Note brownish lakebed clays in mid-frame of photograph.

Figure 16. Photo: TXUY7756. Trench T-3 on east of waste pile

Fourth trench at T-3 pile – west side of pile

A separate trench on the west-facing side of the waste rock pile began in a smaller pile of atypical blocky rock fragments located at the base of the larger pile, then proceeded eastward through the pile to the pile's apex or crest. The materials in this trench rapidly changed from the blocky rock fragments at the base of the pile to a fine ash-like layer with elevated readings (>4,000 cps), then into three-and a half to four foot deep layer of altered sandstone and limonite materials (yellow streaky) near the crest of the pile. Again, the waste rock pile is estimated to be between six and eight feet deep and should be removed in its entirety.

Figure 17. Photo: QLUH0714. Trench T-3C on east side of waste pile. Note blocky and angular lakebed clays as well as fragments of sandstone rock with yellowish chroma (limonite).

Fifth trench at T-11

Excavation of this trench revealed a soft, fine black surface layer (4,000 cps) that extended to a one-foot depth. This layer overlies a clay layer with approximately 2,400 cps. The area surrounding the trench may have been missed in the ERG survey, since it was not reflected in that survey's isocontour maps. However, the hand-held radiometer picked this area up and there appears to be a "pinkish ghost" of an area containing "hotter" materials on the survey map. There is insufficient neutral cover material over this area and the readings from the trench T-11 reflect this.

Sixth trench at T-4

There are two places along this trench with intermittent grayish ash-like materials and elevated readings. The northwest end of the trench contains materials with a 1,400 cps reading to the six-inch depth, but not at deeper depths. The materials in the middle segment of the trench are yellowish with no elevated readings.

Figure 18. Photo: VIGF0896. Trench T-4C

Figure 19. Photo: RXEW3330. Trench T-4A.

Seventh trench at T-6

Excavation of the T-6 trench began at the south end of trench. Material in trench consists of a sandy white material (700 cps) on top of a darker ashy material with elevated readings (1,400 cps) to an eight-foot depth.

Figure 20. Photo: PXUQ0610. Trench T-6A

Figure 21. Photo: UNRK9162. Trench T-6A (detail).

Eighth trench (West of T6B) at T12

Material in this trench also consists of a layer fine whitish-gray sand (700 cps) which extends to an 18 inch depth (1,300 cps). The material is well weathered and may have come from the initial development of the shaft.

Figure 22. Photo: UGSH8425. Trench T-12A.

Ninth trench at T7

This trench was excavated in a flat area just west of the access road. Material in the trench at the six-inch to one-foot depth is blackish in coloration with elevated readings (3,200 cps) and is layered with or interbedded with a green montmorillonite clay. There are also some yellowish inclusions in the material. The bottom of the trench had a lakebed clay bottom (900 cps) that appears to contain the overlying material and limit its leaching.

Figure 23. Photo: SCN14332. Trench T-7A

Figure 24. Photo: RNC16822. Trench T-7A (detail).

Figure 25. Photo: INBC1023. Trench T7B (detail)

Tenth trench at T9A

This excavation was conducted west of the headframe. Material from the trench consisted of a dominant light gray layer above thinner darker gray layers and blackish inclusions. No elevated readings were observed at the north end of the trench, though readings from the one-foot to 18-inch depth at the south end of the trench were somewhat elevated (1,800 – 2,300 cps).

Figure 26. Photo: UGKT4037. Trench T-9A (beginning of trench)

Figure 27. Photo: YCNB5702. Trench T-9A.

Eleventh trench at T9B

Excavation of the 9B trench was conducted in a graded area located just west of the headframe, west to the edge of the lake bed. The trench material consisted of a dark gray, chalky, homogeneous layer generally eight inches to one-foot deep with 2,500 cps. This layer overlies a greenish clay (montmorillonite) layer that contains some black charcoal-like organic or humate materials. Below this clay layer there were no elevated readings. Again, the clay layer probably represents the original lakebed profile and may act as a barrier to downward leaching of materials.

:

Figure 28. Photo: OSBV1639. Trench T-9B (at edge of lake bed)

Twelfth trench at T10A or east side of waste rock pile in the NW corner of the operations area (above the lakebed)

The excavation indicated that the east side of the waste pile was composed of a pale gray sand with some yellow-orange staining on the sand particles at a three-foot depth. Only moderately elevated readings (1,800 cps) were observed to a three-foot depth in the trench.

Figure 29. Photo: ARAJ5976. Trench 10-A

Thirteenth trench T10B, or west side of waste rock pile in the NW corner of the operations area (above the lakebed)

The excavated material on the west side of this waste rock pile was composed of the same pale gray sand seen on the east side of the pile. Readings ranged from 1,400 cps to 2,400 cps to a two-foot depth.

Figure 30. Photo: RMOS3054. Trench 10B.

DISCUSSION

Based on these results we have identified three areas that likely contain thicker layers of waste rock materials with elevated readings. The first is the graded area containing the T-12 trench (Figure 4). Located approximately 100 feet south of the mechanical building or hoist house, this area appears to contain waste rock materials from the first days of the mine's development that were later re-worked and manipulated through grading. Moreover, the five-foot depth of the T-12 trench and the dispersed materials with elevated readings observed throughout the trench to the lakebed clays, indicate that most of this 1.25 acre area contains waste rock material that will have to be removed.

The T-6 and T-7 trenches located east and southeast of the mine (Figure 4), also show elevated readings ranging from 1,300 cps in Trench T-6 and 3,200 cps in Trench T-7. Both areas contain a mixture of variously sourced materials to a 4 - 5-foot depth above the lakebed clay. These materials were generated in the early 1980s during the construction of the Section 12 mine shaft and have been spread, graded, and compacted in layers on top of lakebed clays which appear to have slowed and limited the downward movement of water and leachates.

A 10 meter by 10 meter grid (Figure 31) was superimposed onto a map of the predicted exposure rates at the Section 12 Mine (ERG 2017) as the prescribed cleanup interval for an existing mine (See Joint Guidance document of March 2016). Based on this grid, the total acreage of the red zone (>150 uR/hr) is 1.08 acres and the total acreage of the orange zone (100-150 uR/hr) is 1.73 acres.

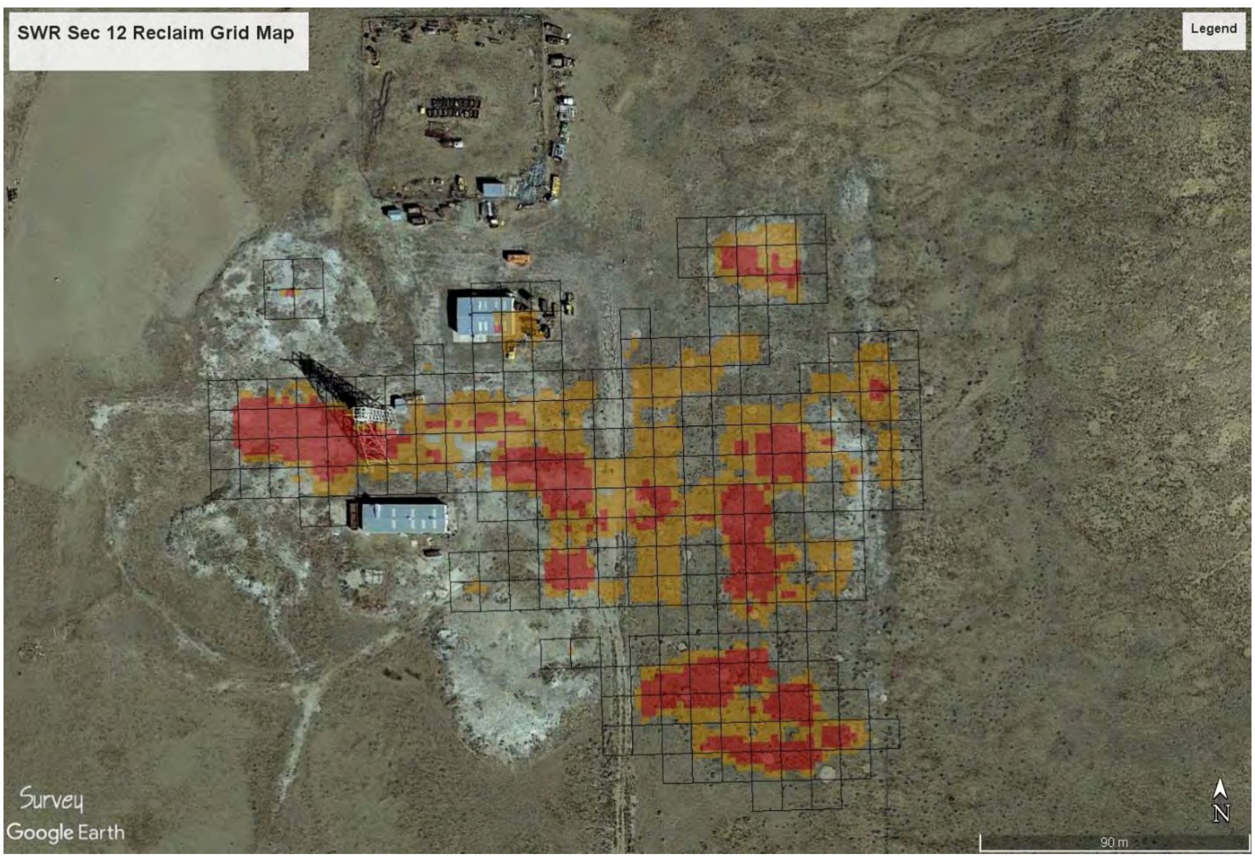


Figure 31. Detail of orange (100-150 uR/hr), and red (>150 uR/hr) exposure rate zones with 10 x 10 meter grid.

Data from the 10 x 10 meter grid were also recombined with the fine-scale (2 m^2 grid) survey data from the ERG study (ERG 2017) and re-analyzed using a “nearest neighbor” sampling process in GIS as shown in Figure 32 below. This nearest neighbor analysis was done to improve our estimates of how much of the Section 12 Mine’s sub-surface may contain potentially elevated readings that exceed the standard.

For example, the purple and pink colored grid cells shown in Figure 32 are adjacent to -- or within 2 meters of a red (>150 uR/hr), orange (100-150 uR/hr), or yellow (50 – 100 uR/hr) exposure rate grid cell.

Using this approach we estimated that the total area of purple grid cells representing a combination of the purple, yellow, orange, and red exposure rates is 11 acres (5 acres in the western half of the mine and 6 acres in the eastern half of the mine), and the total area of the pink colored areas, representing the yellow, orange and red exposure rate zones is 6 acres (2.34 acres in the western half of the mine and 3.58 acres in the eastern half of the mine. Thus, removal of soils and materials with elevated radiation levels and the replacement of those materials with clean fill in the western half of the mine may be carried out on as much as five (5) acres. Similarly, the removal of soils and materials with elevated radiation levels and their replacement with clean fill in the eastern half of the mine may be carried out on as much as six (6) acres (Figure 33).

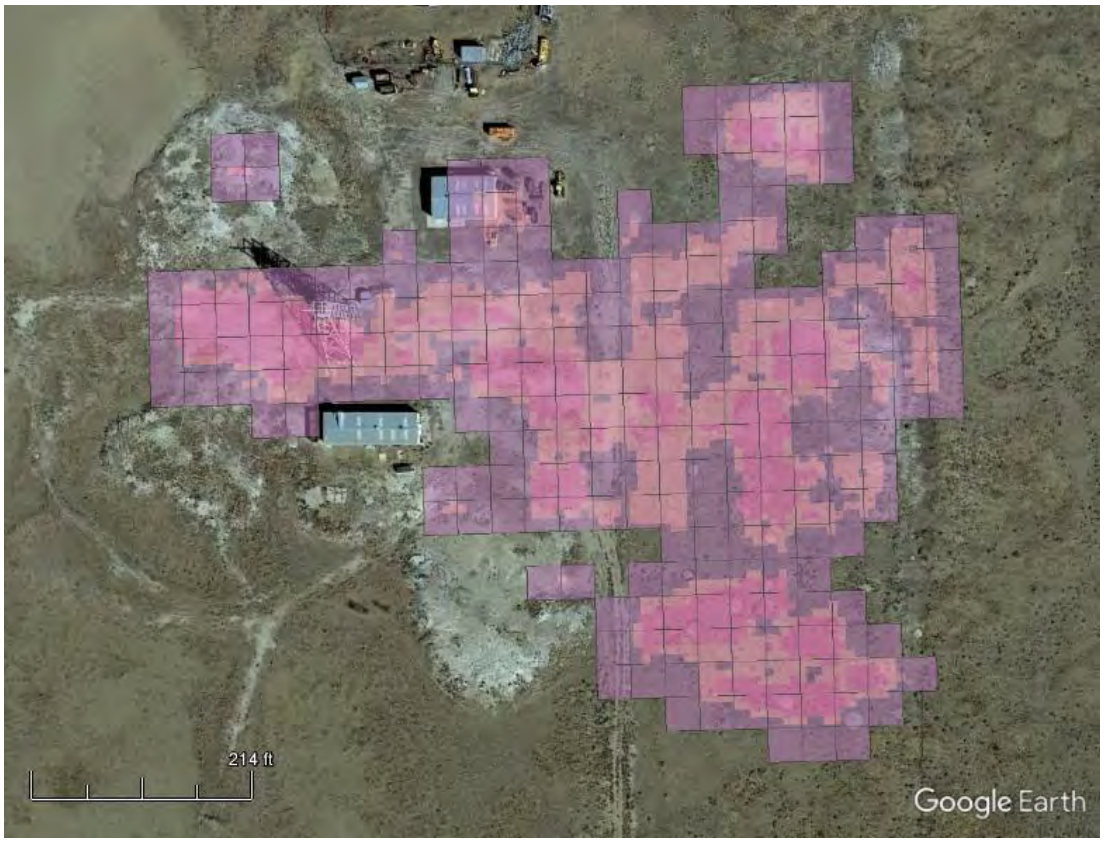


Figure 32. 100 m² grid overlay on a 2 x 2 meter nearest neighbor analysis. Purple areas indicate a 2 x 2 meter "sub- cell" with elevated readings.

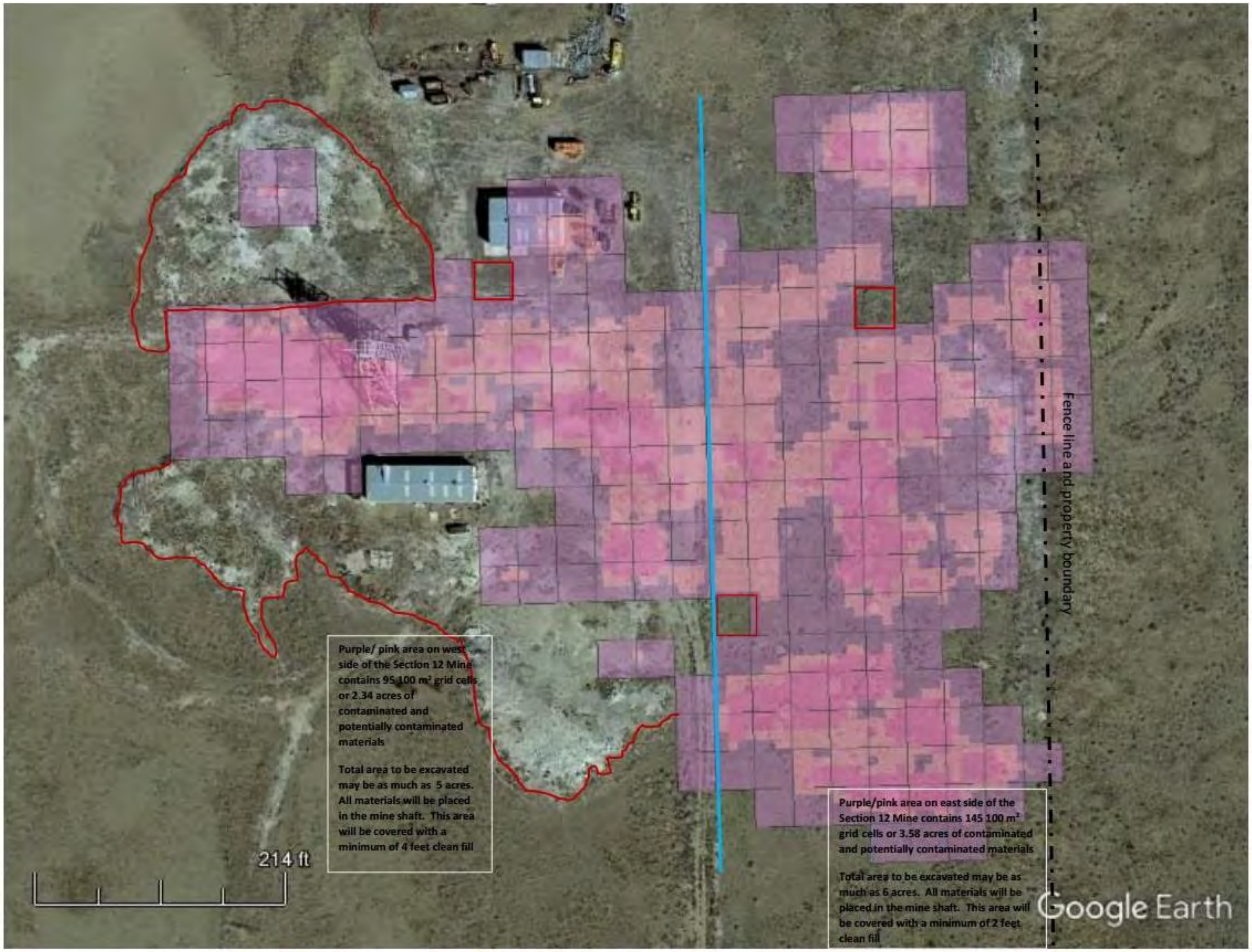


Figure 33. Probable extent of materials with elevated sub-surface radiation readings at the Section 12 Mine.

The results of the materials characterization study (Permits West 2018) indicated exposure rates and concentrations of radium-226 (Ra-226) were elevated above background levels near the headframe and ore loadout area, as previously determined in the radiological investigation performed by ERG (2017). Most of the elevated radiation levels measured at the headframe were associated with piles of a mixture of coarse grained, sandy, and chalky mineralized waste rock, drill cuttings, and spoils which had been brought to the surface when the mine shaft was developed in the mid to late 1970s.

CONCLUSION

Finally, it is important to note that the thick layer of lakebed clay observed in the bottoms of many of the trenches, may limit the downward movement of water and leachates from the waste rock materials and spoils, since gamma radiation readings were generally lower in the undisturbed soils beneath the intact undisturbed layers of clay. The average thickness of the materials containing the elevated readings as observed across eight trenches in the western half of the mine site, was four - five feet above the lakebed clays and soils. The ore load-out area located directly east the mine's head frame (Figure 1) and other graded areas also evidenced elevated readings to an average depth of two-feet across five transects above the lakebed clays in the eastern half of the mine site.

Because removal of soils and materials with elevated radiation levels and the replacement of these materials with clean fill may be carried out to an average depth of four feet on as much as five (5) acres in the western half of the mine, we can project a need for approximately 32,267 cubic yards of clean fill material for reclaiming that part of the mine. Similarly, the removal of soils and materials with elevated radiation levels and their replacement with clean fill may be carried out to an average depth of two feet on as much as six (6) acres in the eastern half of the mine – resulting in the need for approximately 19,367 cubic yards of clean fill material for reclamation.

REFERENCES

Environmental Restoration Group, Inc. 2017. Baseline Radiological Characterization of the Section 11/12 Mine – Phase 1. Report prepared for Southwest Resources and Permits West, Inc. January 2017.

EPA, 2011. Region 6, Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Survey.

Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico Mining and Minerals Division, Energy, Minerals & Natural Resources Department and Mining
March 2016

APPENDIX D

VEGETATION SURVEY AND REVEGETATION PLAN

SECTION 12 MINE

Section 12 Mine

2019 Vegetation Growth Report

Prepared by Kevin Branum-Enchanted Agromanagement Solutions

The following methods were used to do four transects in the approved area to help determine amount of species cover and species diversity on the reference area.

Running a Transect Determine the transect bearing and select a prominent distant landmark such as a peak, rocky point, etc., that can be used as the transect bearing point.

(1) Start a transect by randomly selecting a point which was done using a pin flag thrown over the shoulder. The direction of the pin flag was utilized and a point in the distance was used to stretch the 100’ tape.

(2) Read hits at specified intervals which were done on a 1’ mark along a 100’ tape.

(3) When obstructions such as juniper trees, cholla cactus, or ledge rock, etc., are encountered, sidestep at 90° from the transect line and continue pacing parallel to the transect to avoid the obstructions. Return to the original transect line as soon as possible by sidestepping at 90° in the opposite direction. Continue pacing along the transect bearing. If the obstruction (juniper tree, cholla cactus, or ledge rock) is determined to be a highly important component of the community, this information can be recorded qualitatively on the back of the form.

(4) In most cases, do not count hits along portions of a transect that have been unnaturally disturbed, such as roads or trails. When such areas are encountered, proceed three paces past the disturbance before resuming the reading of hits along the transect line.

Collecting Cover Data At each observation point, identify the ground level or basal hit with the point of the pin and record the data by dot count tally by category and/or plant species code in the appropriate section of the Cover Data form. If there is a vegetation canopy layer, lower the pin through the vegetation until a basal or ground level hit is determined. Record the basal or ground level hit and any subsequent vegetation layers that intersect the pin. For vegetation structure above 3-feet (length of pin), a visual observation of plant intercepts above the notch in the boot can be made and recorded as additional canopy or foliar level hits on the data form.

(1) Ground-level or basal hits

(a) Ground-level hits (excluding basal vegetation hits) will fall into four cover categories. They can be redefined and/or additional categories added, depending on the data needed. The four categories are:

L - Litter
B - Bare ground
G - Gravel (particle sizes between 1/12 inch and 10 inches)
S - Stone (greater than 10 inches)

(b) Record the ground-level hits by dot count tally by ground-level cover category in the Ground-Level Cover section of the form, except where there are ground-level and, basal or canopy cover hit combinations. In this situation, use the Basal and Canopy/Foliar Cover section of the form.

(c) Basal hits on live vegetation are identified by species (includes mosses and lichens more than 1/16 inch thick). To count as a basal hit on live vegetation, the plant crown at or below a l-inch height above the ground MUST be intercepted by the pin.

(d) Enter the appropriate plant species code in the Basal or Ground-Level Column in the Basal and Canopy/Foliar Cover section of the form.

(e) Enter a dot count tally for each basal hit on a species in the Dot Count Column in the Basal and Canopy/Foliar Cover section of the form when the plant species code is first entered on the form. Enter an additional dot count tally each time there is a basal hit on that species on the transect, except where there are basal and canopy/foliar cover hit combinations.

(2) Ground-level or basal and canopy/foliar cover hit combinations

(a) Identify the ground-level or basal hit, as well as any canopy cover hit(s) below 3 feet in height, intercepted at each point by the pin. For canopy cover above 3 feet, use line-of-sight observations directly perpendicular to the notch in the boot.

(b) Enter the appropriate ground-level cover category code and/or plant species code for each level of hit (up to four levels) in the appropriate columns in the Basal and Canopy/Foliar Cover section of the form (see Illustration 13).

(c) Enter a dot count tally for each ground-level or basal and canopy/foliar cover hit combination when it is first entered on the form and each time this same combination is encountered on the transect.

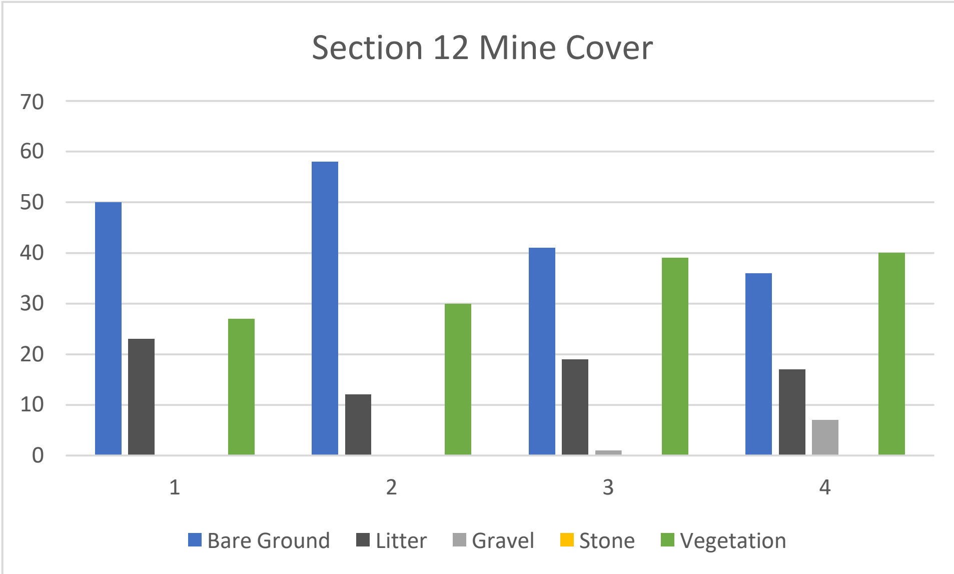
(d) Enclose plant species codes for vegetation cover hits more than 20 feet above ground level in brackets [ ].

The following were the results of the four transects:

I would say that precipitation and growth were about average in this area this year and the results should be a good reflection of ground cover and species that should be targeted upon revegetation.

Transect Number	Bare Ground	Litter	Gravel	Stone	Vegetation
1	50	23			27
2	58	12			30
3	41	19	1		39
4	36	17	7		40

*Numbers are actual hits but also reflective of percentage with 100’ transect performed



The average bare ground per transect was 46.25%.

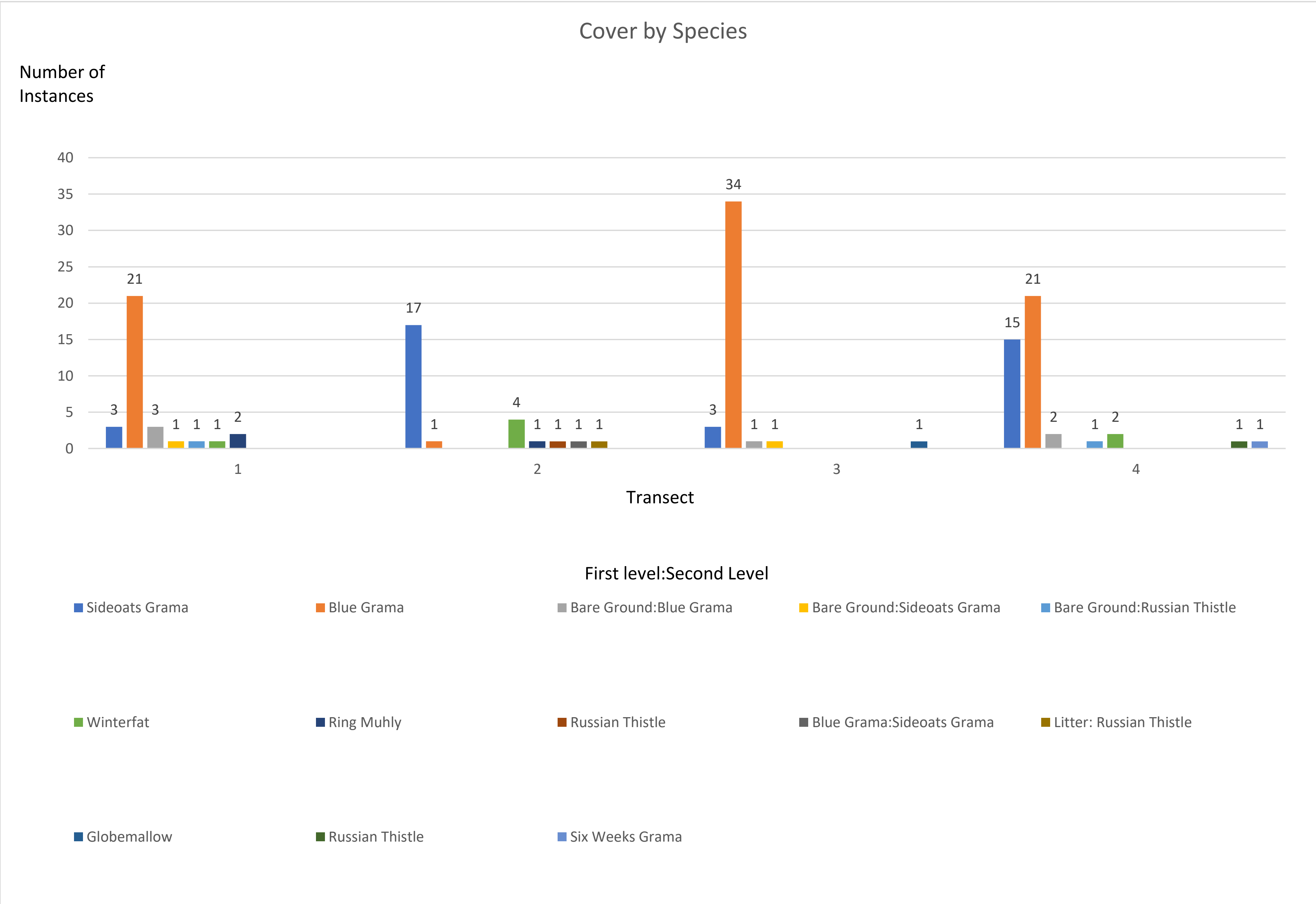
Average litter per transect was 17.75%

Average gravel was 2%

Average vegetative cover was 34%

Frequency of Species by Transect

	Transect Number			
Species	**1**	**2**	**3**	**4**
Six Weeks Grama				1
Russian Thistle				1
Globemallow			1	
Litter: RussianThistle		1		
Blue Grama:Sideoats Grama		1		
Russian Thistle		1		
Ring Muhly	2	1		
Winterfat	1	4		2
Bare Ground:Russian Thistle	1			1
Bare Ground:Sideoats Grama	1		1	
Bare Ground:BlueGrama	3		1	2
Blue Grama	21	1	34	21
Sideoats Grama	3	17	3	15


Cover by Species
Number of Instances
40
35
30
25
20
15
10
5
0
3
21
3
1
1
1
2
17
1
4
1
1
1
1
3
34
1
1
1
15
21
2
1
2
1
1
1
2
3
4
Transect
First level:Second Level
Sideoats Grama
Blue Grama
Bare Ground:Blue Grama
Bare Ground:Sideoats Grama
Bare Ground:Russian Thistle
Winterfat
Ring Muhly
Russian Thistle
Blue Grama:Sideoats Grama
Litter: Russian Thistle
Globemallow
Russian Thistle
Six Weeks Grama

SECTION 12 MINE
VEGETATION PLAN

Goal

To establish permanent vegetation on 30.2 disturbed acres that have been void of or had temporary annual vegetation for many years. Establishing permanent vegetation on sites that could potentially have high erosion rates, and on sites that have physical, chemical or biological conditions that prevent the establishment of vegetation with normal practices.

Site Preparation

A site investigation shall be conducted to identify any physical, chemical, or biological conditions that could affect the successful establishment of vegetation. Areas to be planted will be cleared of unwanted materials and smoothed or shaped, if needed, to meet planting purposes. A suitable seedbed shall be prepared for all seeded species. This may include top dressing the soil with the amendments and fertilizer mix suggested in recommendations made by the soil testing lab. Make sure seedbed has firmed back-up before drilling seed so that seed can be placed in the top ½" of soil. As site conditions dictate, when grading slopes, stockpile topsoil to be redistributed over area to be planted. If needed on steep slopes, landscape can be contoured to minimize water erosion in those areas.

Planting

Species, rates of seeding or planting, minimum quality of planting stock (e.g. pure live seed (PLS) or stem caliper), method of seedbed preparation, and method of establishment shall be specified before application. Only viable, high quality seed or planting stock will be used.

Cover Crop Planting

A cover crop shall be planted in the spring to try to increase residues to protect the soil surface from erosion and build the soil microbiology before planting the native species. Native species planted into a site lacking residues and active biology rarely establish with success. Ideally the cover crop mix would be planted between April 1-April 15th. The species and lbs per acre can be seen in Table 1- Cover Crop Mix.

Applications of soil carbon, microbiology inoculant and organic fertilizer along with cover crop will allow the soil biology to build before seeding native grass mix. The application of soil carbon and microbiology inoculant can be done with one single product. The organic nitrogen can be applied as a pelleted chicken manure to provide a high- carbon, slow-release nitrogen product that does not encourage annual weeds and is more favorable of native grasses. (See application rates in Table 2-Amendments)

Information of several suitable soil amendments is attached to this plan.

Table 1-Cover Crop Mix

Species	Lbs Per Acre	Percent by Volume	Seeds Per Lb	Seeds Per Acre	Percent by Seeds
Chickpea	2	4	2200	4400	1%
Sunn Hemp	2	4	15000	30000	3%
White Clover	1	2	70000	70000	8%
Spring Wheat	8	16	17000	136000	15%
Spring Triticale	8	16	15000	120000	13%
Black Oats	8	16	22000	176000	18%
Wildlife Grain Sorghum	3	6	20000	60000	7%
Cereal Rye	8	16	17000	136000	15%
Spring Barley	8	16	18000	144000	16%
Buckwheat	2	4	18000	36000	4%

Total Lbs/Acre = 50
Seeds/Acre = 912400

Table 2-Amendments

Product	Manufacturer	Rate Per Acre
Carbon Angel	Sterling Pacific	66lbs/Acre
Pelleted Chicken Manure	Pacific Blend	2000lbs/Acre

Native Species Planting

Recommended species and rates for the native perennial vegetation mix can be seen in Table 3-Native Species and Seeding Rates. These species are a recommendation from the Reference Area Vegetation Study (Those results can be seen within that report) Seeding or planting shall be done at a time and in a manner that best ensures establishment and growth of the selected species. Seed shall be placed in the upper ½" of soil with a "No till" style drill which will provide minimal disturbance of the soil surface. In areas where the seed may not be drilled due to any circumstances and needs to be broadcasted, the seeding rate needs to be doubled. The seed shall be immediately raked to help incorporate it into the soil so that it will not be susceptible to external factors. If annual vegetation does not establish due to lack of moisture, another option is to hydroseed those areas using hydromulch techniques, but the seeding rate in this instance should also be doubled in comparison to the drilled seeding rate. For the recommended species the planting shall be done from July 15-August 1.

Table 3. Native Species and Seeding Rates

Species	Lbs per acre	Percent by Volume	Seeds Per Lb	Seeds Per Acre	Percent by Seeds
Blue Grama	2.0	8%	800,000	1,600,000	48%
Western Wheatgrass	6.0	22%	110,000	660,000	20%
Sideoats Grama	1.0	4%	190,000	190,000	6%
Galleta	2.0	8%	160,000	320,000	10%
Four Winged Saltbush	2.0	30%	60,000	120,000	4%
Winterfat	2.0	30%	200,000	400,000	12%

Total: 15 lbs/Acre

Seeds 3,290,000/Acre

Each bag of seed shall be sealed and labeled by the seed dealer in accordance with Federal Seed Act and New Mexico Department of Agriculture labeling laws. Note all rates are based on 100% purity (PLS) and 100% germination rate.

The seed supplier shall make sure PLS is adjusted to reflect 100% germ and purity.

Hydromulching is a good option to protect native grass establishment. Material selected for the mulch needs to be certified free of noxious weeds and should be applied at a rate sufficient enough to protect the area without hindering germination rate of the drilled native mix. All areas shall be immediately hydromulched after the area has been drilled with the native species mixture. Mulch placement shall be evenly distributed and shall leave no bare areas or thick pile of mulch material as these areas will be either susceptible to erosion or will not allow proper germination. Mulch materials shall be applied and spread with approved equipment that will not excessively break down the original size of the individual stems of the mulch.

Operation and Maintenance

1. Manage the area as long as necessary to ensure the site remains stable.
2. Protect plantings from pests (e.g. weeds, insects, diseases, livestock, or wildlife) as necessary to ensure long-term survival. Control weeds by mowing or organic herbicides. Mow at the end of the first growing season and then also at the end of the following growing season, if possible, to control weeds and encourage stand density.
3. Inspect establishment frequently within the first 3 years of establishment. Replant areas of poor establishment due to drought, insects, or other events, which prevented adequate stand establishment. Replanting may vary from complete reestablishment to over seeding or spot planting.
4. Do a periodic inspection and evaluation of vegetation to determine maintenance needs. Reseeding or replanting, and fertilization may be needed to ensure that this practice functions as intended throughout its expected life.
5. Site should be deferred from livestock grazing for a minimum of 1-2 growing seasons or until the seedlings are well established.

carbon ANGEL

Soil Enhancement Formula

Carbon Angel is a proprietary blend of soil conditioning and wetting agents, designed to improve topsoil conditions, increase carbon content, and may aid in the uptake of micronutrients. Our product is Humic based, along with other naturally derived ingredients, and is made without the use of fillers or binders.

Application Instructions:

Turf use—Apply no more than 120 lbs/ 1000sqft before laying sod or seed. For best results, mix product into the first 6 inches of soil.

Agriculture—Apply no more than 40 lbs/ 1000sqft up to 4 times a growing season. For best results, mix product into the first 6 inches of soil before planting, or between rows after planting

Additional instructions can be obtained by contacting Sterling Pacific or your local representative.

Soil Amending Ingredients:
Humic Shale Ore, Kelp (*Ascophyllum nodosum*), *Yucca schidigera*, Azomite

CAUTION: Harmful if swallowed, avoid contact with eyes, ears and nose and throat. Flush with water, if irritation persists seek medical attention. Potentially harmful to aquatic life, do not apply over or near bodies of water or drainage systems.

Guaranteed by Sterling Pacific-950 N Lemon St. Orange, CA, 92876
714.602.9704 Distributed (sold) by:_________

sterling pacific

Net Weight: lbs(kg)

Expiration Date: _________

Batch#: ________

Great for Lawns!

Covers up to 4,000 sq. ft.

Slow Release Fertilizer!

Apply with any conventional fertilizer spreader!

PERFECT FERTILIZERS BLEND

8-4-2

LAWN FOOD WITH 13 ESSENTIAL ELEMENTS

Sustains beautiful lawns and restores Low Soil Organic Matter Levels In Worn-Out Lawns.

Even the best cared for lawns will become depleted of the valuable nutrients found in soil organic matter after repeated use of synthetic fertilizers that do not contain organic nutrients. Perfect Blend will sustain beautiful lawns and will provide valuable organic components specially formulated to restore and rejuvenate lawns.

The Perfect Blend Advantage:

Perfect Blend fertilizers are made using a proprietary process that produces high quality nutrients focused as nutrition for the soil microbes responsible for natural soil fertility.

DIRECTIONS FOR LAWN APPLICATIONS:

Established lawns: Will require routine applications; they are benefi c ial and highly recommended. Apply at the rate of 25 lbs for every 4,000 square feet every 60 days. Water well and wait overnight before allowing children and pets onto the fertilized area.

New Lawns: Will benefi t from a heavy base application of Perfect Blend 8-4-2. Apply at the rate of 25 lbs per 2,000 square feet and water well. For Sod application: Apply lawn food to soil, lay sod and water well.

Newly seeded lawns: Will benefi t from a heavy base application of Perfect Blend 8-4-2. Apply at a rate of 25 lbs per 1,500 square feet and water well ! After lawn is established follow existing lawn food application guidelines.

NON-LAWN APPLICATIONS:

Perfect Blend is a mild natural-based fertilizer that may be applied on flowers, shrubs, trees and other non-lawn applications. It may also be used in vegetable gardens and house plants. Apply 2 cups around and in the hole of a new shrub or tree avoiding direct contact with plant roots. For containers mix two tablespoons for every quart of potting soil.

SPREADER SETTINGS:

Most Rotary Spreaders including Scotts Broadcast Rotary Spreader - Setting 7 ½

Most Drop Spreaders including Scotts Drop Spreader – Setting 10 ½

Guaranteed Analysis

Total Nitrogen (N)	8.00%
1.76% Ammoniacal Nitrogen	
0.04% Nitrate Nitrogen	
3.20% **Urea** Nitrogen	
3.00% Water Insoluble Nitrogen *	
Available Phosphate (P_2O_5)	4.00%
Soluble Potash (K_2O)	2.00%
Calcium (Ca)	7.0000%
Magnesium (Mg)	0.7000%
Sulfur (S)	1.5000%
Boron (B)	0.0200%
Cobalt (Co)	0.0005%
Copper (Cu)	0.0500%
Iron (Fe)	0.1000%
Manganese (Mn)	0.0500%
Molybdenum (Mo)	0.0005%
Zinc (Zn)	0.0500%

Derived From:

Chicken Manure, Raw Fish, Urea, Cobalt Sulfate, Copper Sulfate, Ferrous Sulfate, Manganese Sulfate, Molybdic Oxide, Potassium Chloride, Sulfuric Acid, Boric Acid and Zinc Sulfate.

* 3% Slow Release Nitrogen from Chicken Manure

Information regarding the contents and levels of metals in this product is available on the internet at **http://www.aapfco.org/metals.htm**

Perfect Blend, LLC

DBA Perfect Blend Organics

Guaranteed by Perfect Blend Organics

188 106th Avenue NE, Suite 401

Bellevue, WA 98004

Phone: 866.456.8890

www.perfect-blend.com

MADE IN USA

CAUTION

KEEP OUT OF REACH OF CHILDREN

Perfect Blend Organics recomends that this product, as well as any fertilizer, be kept out of reach of children. This product, while of a relatively mild nature, may be harmful or fatal if swallowed and may cause skin and eye irritaion. Avoid breathing in the dust. Avoid contact with skin, eyes, and clothing. Washing skin with water and soap after handling. If in eyes, flush eyes thoroughly with water for 10 minutes. Repeat as needed, and follow up with a physician.

100% MONEY BACK GUARANTEE

Perfect Blend Organics is so confident that you will find our products to be the best plant food manufactured today that we are able to offer the following simple 100% guarantee of satisfaction.

If, for any reason whatsoever, you are not 100% satisfied with a Perfect Blend product, please send proof of purchase and a copy of the cash register receipt to the address provided on this package. Your purchase price will be fully refunded.

7 97734 36268 8

Net Weight 25lbs. (11.3 kg)

APPENDIX E

GEOTECHNICAL SITE INVESTIGATIONS DATA

SECTION 12 MINE

SECTION 12 MINE SOIL SAMPLES

SYSTEMATIC SAMPLING - September 2019

	NAD 83 NM West			
Pt No.	Easting	Northing	ELEV *	Description
1	2718136	1620971	7070	S12 p-01
2	2718087	1620910	7069	S12 p-02
3	2717946	1620920	7070	S12 p-03
4	2718128	1621233	7070	S12 p-04
5	2717739	1619565	7068	S12 p-05
6	2717623	1619788	7068	S12 p-06
7	2717350	1620101	7069	S12 p-07
8	2717292	1619879	7071	S12 p-08
9	2717342	1619596	7076	S12 p-09
10	2717441	1619606	7074	S12 p-10
11	2718393	1620344	7070	S12 p-11
12	2718385	1620212	7070	S12 p-12
13	2718368	1620020	7070	S12 p-13
14	2718103	1619949	7067	S12 p-14
15	2717872	1620071	7066	S12 p-15
16	2717896	1620303	7066	S12 p-16
17	2717623	1620364	7066	S12 p-17
18	2718011	1620222	7066	S12 p-18
19	2718310	1620596	7066	S12 p-19
20	2718310	1620758	7071	S12 p-20
21	2718360	1621217	7073	S12 p-21
22	2718010	1621071	7070.5	S12 p-22
23	2718404	1619576	7070	S12 P-23
24	2716309	1620526	7070.5	S 12 p-24

* Elevations estimated from topo mapping by EL Engineering.

RECONNAISSANCE SAMPLING - February 2019

Soil samples collected at ground surface

SWR 1 Lean clay in repository area east of office
SWR 2 Waste rock between east fence and road
SWR 3 Fat clay west of road, south of south waste pile
SWR 4 Native lake clay south of hoist house

SOIL SAMPLE LOGS

Alan Kuhn Associates LLC

Project Name	**Section 12 Mine**	**Project No**	**SRI.1**
Location SW 1/4, T14N, R10W	**Coordinates below**	**Surface Elevation:**	see below
Logged by:	**Alan Kuhn & John North**	**Date**	**9/17/2019**

NOTES

Sample hole # P-1 — **Location Coordinates** E 2718136 | N 1620970 | **Elevation:** 7070 ft

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION	Notes
0						
0.2						
0.4		12-1	grab	shale	weathered shale, brown	at P-1, at SE corner of junk yard
0.6						
0.8						
1						

Sample hole # P-2 — **Location Coordinates** E 2718087 | N 1620919 | **Elevation:** 7069

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION	Notes
0						
0.2					fine sand and foreign rock in top 3 inches	at P-2, ~ 50 feet N. of NE corner of office
0.4		12-2	grab	CL-CH		
0.6					yellow-brown, moist stiff clay	
0.8						
1					weathered shale	
1.2						

Sample hole # P-3 — **Location Coordinates** E 2717946 | N 1620920 | **Elevation:** 7070

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION	Notes
0						
0.2						at P-3, NW of office, ~ 200 ft. due north of headframe
0.4						
0.6		12-3	grab	CH	brown, moist clay	
0.8						
1						
1.2						

Sample hole # P-4 — **Location Coordinates** E 2718128 | N 1621233 | **Elevation:** 7070

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION	Notes
0						
0.2						
0.4						P-4, ~ 80 ft NNE of NE corner of bone yard
		12-4	grab	CH	dry, hard brown clay	
1						

Sample hole # P-5 — **Location Coordinates** E 2717739 | N 1619565 | **Elevation:** 7068

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION	Notes
0						
0.2						
0.4		12-5	grab	CL-CH	dark brown moist clay	East limit of loam area near south Section 12 line
0.6						
0.8						
1						

Sample hole # P-6 | **Location Coordinates** E 2717623 | N 1619788 | **Elevation:** 7068

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-6	grab	CH	dark brown moist clay; hard, sign of shale chips in bottom of sample
0.6					
0.8					
1					

at ST 12 #2, edge of lake basin

Sample hole # P-7 | **Location Coordinates** E 2717350 | N 1620101 | **Elevation:** 7069

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-7	grab	CL	brown, moist sandt clay
0.6					
0.8					
1					weathered sandstone, light brown
1.2					

~400 ft W. of P-6, N. limit loam area at S12 #3 location

Sample hole # P-8 | **Location Coordinates** E 2717292 | N 1619879 | **Elevation:** 7071

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6		12-8	grab	SP-SM	light brown sand to silty sand
0.8					
1					
1.2					weathered sandstone at bottom of hole

at S12 #4, south section line, edge of lake basin and east limit of loam area

Sample hole # P-9 | **Location Coordinates** E 2717342 | N 1619596 | **Elevation:** 7076

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6		12-9	grab	SP-SM	light brown silty sand
0.8					
1					weathered sandstone
1.2					

near south section line, ~500 ft W. of P-6

Sample hole # P-10 | **Location Coordinates** E 2717441 | N 1619605 | **Elevation:** 7074

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-10	grab	SP	light tan-gray fine sand
0.6					
0.8					weathered rock
1					

at ST12 #6, near S. it of loam area, near old road to bunk house

Sample hole # P-11 | **Location Coordinates** E 2718393 N 1620344 **Elevation:** 7070

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6					
0.8		12-11	bucket	shale	brown weathered shale, clayey, breaks into gravel-size pieces
1					
1.2					

at P-11

Sample hole # P-12 | **Location Coordinates** E 2718385 N 1620212 **Elevation:** 7070

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6		12-12	bucket	CL	brown silty- sandy clay
0.8					
1					
1.2					

at P-12

Sample hole # P-13 | **Location Coordinates** E 2718368 N 1620020 **Elevation:** 7070

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-13	bucket	CL	brown, very stiff, slightly moist to dry clay
0.6					
0.8					
1					

at P-13

Sample hole # P-14 | **Location Coordinates** E 2718103 N 1619949 **Elevation:** 7067

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-14	bucket	CL	brown, very stiff, slightly moist clay
0.6					
0.8					
1					

at P-14 in lake bed east of elbow in road fill

Sample hole # P-15 | **Location Coordinates** E 2717872 N 1620071 **Elevation:** 7066

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6		12-15	bucket	CH	brown moist stiff clay - looks like lacustrine clay
0.8					
1					
1.2					

at P-15 in lake bed west of elbow road

Sample hole #P-16 | **Location Coordinates** E 2717896 | N 1620303 | **Elevation:** 7066

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-16	bucket	CH	brown, very stiff, dry clay
0.6					
0.8					
1					

at P-16 between short end elbow road in lake bed due S. of shaft

Sample hole #P-17 | **Location Coordinates** E 2717623 | N 1620364 | **Elevation:** 7066

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2		12-17	grab	CH	brown stiff dry clay
0.4					
0.6					
0.8					
1					

at P17 in lake bed W. of P16

Sample hole #P-18 | **Location Coordinates** E 2718011 | N 1620222 | **Elevation:** 7066

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-18	grab	CH	brown hard clay
0.6					
0.8					
1					

at P18 S. of south toe of large waste pile in lake bed

Sample hole # #P-19 | **Location Coordinates** E 2718310 | N 1620596 | **Elevation:** 7066

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-19	grab	CL-CH	brown moist clay
0.6					
0.8					
1					

at P-19 in repository footprint along E-W line of S. wall of hoist house at SE corner

Sample hole # #P-20 | **Location Coordinates** E 2718310 | N 1620758 | **Elevation:** 7071

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4		12-20	grab	CL-CH	brown , stiff, moist clay - could be top of weathered shale
0.6					dessication crack to ~ 24 inches
0.8					
1					

at P-20, due E. of shaft, ~ 80 ft E. of road

Sample hole # #P-21 | **Location Coordinates** E 2718360 | N 1621217 | **Elevation:** 7073

Depth, feet	Graphic Log	Sample No.	Sample Type	USCS	DESCRIPTION
0					
0.2					
0.4					
0.6					
0.8		12-21	grab	CL-CH	Brown damp clay, hard
1					
1.2					
1.4					

~100 feet west of east half-section fence, ~80 feet north of bone yard north fence

Sample hole #	#P-22			Location Coordinates	E 2718010	N 1621071	Elevation: 7070.5	
Depth, feet	**Graphic Log**	**Sample No.**	**Sample Type**	**USCS**	**DESCRIPTION**			**Notes**
0								
0.2								
0.4								
0.6								
0.8		12-22	grab	CL-CH	Brown damp clay, stiff			center of bone yard
1								

Sample hole #	#P-23			Location Coordinates	E 2718404	N 1619576	Elevation: 7070	
Depth, feet	**Graphic Log**	**Sample No.**	**Sample Type**	**USCS**	**DESCRIPTION**			**Notes**
0								
0.2								
0.4								
0.6								along northing of short fence
0.8		12-23	grab	CL	Light brown sandy clay, dry			across the road, ~ 50 feet
1								west of half-section fence

Sample hole #	#P-24			Location Coordinates	E 2716309	N 1620526	Elevation: 7070.5	
Depth, feet	**Graphic Log**	**Sample No.**	**Sample Type**	**USCS**	**DESCRIPTION**			**Notes**
0								
0.2								
0.4								~20 feet west of half-secion
0.6		12-24	grab	CL	Light brown sandy clay, dry			fence,200 feet north of power
0.8								line/ south section line
1								

Laboratory Report for

Alan Kuhn

Section 12 Mine

October 18, 2019

Daniel B. Stephens & Associates, Inc.

4400 Alameda Blvd. NE, Suite C • Albuquerque, New Mexico 87113

October 18, 2019

Alan Kuhn
Alan Kuhn Associates, LLC
13212 Manitoba Dr. NE
Albuquerque, NM 87111
505-350-9188

Re: DBS&A Laboratory Report for the Alan Kuhn Associates, LLC Section 12 Mine Project

Dear Mr. Kuhn:

Enclosed is the report for the Alan Kuhn Associates, LLC Section 12 Mine project samples. Please review this report and provide any comments as samples will be held for a maximum of 30 days. After 30 days samples will be returned or disposed of in an appropriate manner.

All testing results were evaluated subjectively for consistency and reasonableness, and the results appear to be reasonably representative of the material tested. However, DBS&A does not assume any responsibility for interpretations or analyses based on the data enclosed, nor can we guarantee that these data are fully representative of the undisturbed materials at the field site. We recommend that careful evaluation of these laboratory results be made for your particular application.

The testing utilized to generate the enclosed report employs methods that are standard for the industry. The results do not constitute a professional opinion by DBS&A, nor can the results affect any professional or expert opinions rendered with respect thereto by DBS&A. You have acknowledged that all the testing undertaken by us, and the report provided, constitutes mere test results using standardized methods, and cannot be used to disqualify DBS&A from rendering any professional or expert opinion, having waived any claim of conflict of interest by DBS&A.

We are pleased to provide this service to Alan Kuhn Associates, LLC and look forward to future laboratory testing on other projects. If you have any questions about the enclosed data, please do not hesitate to call.

Sincerely,

DANIEL B. STEPHENS & ASSOCIATES, INC.
SOIL TESTING & RESEARCH LABORATORY

Adam Bland
Laboratory Operations Manager

Enclosure

Daniel B. Stephens & Associates, Inc.
Soil Testing & Research Laboratory
4400 Alameda Blvd. NE, Suite C
Albuquerque, NM 87113
505-889-7752
FAX 505-889-0258

Summaries

Summary of Tests Performed

Laboratory	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-	Atterberg	Proctor
Sample Number	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C	eability	Limits	Compaction
Sec12-1																X	X				X	
Sec12-2																X	X				X	
Sec12-3																						
Sec12-4																X	X				X	
Sec12-5																X	X				X	
Sec12-6																X	X				X	
Sec12-7																X	X				X	
Sec12-8																X	X					
Sec12-9																X	X					
Sec12-10																X	X					
Sec12-11																X	X				X	X
Sec12-12																X	X				X	X
Sec12-13																X	X				X	X
Sec12-14																X	X				X	X
Sec12-15																X	X				X	X

[1] G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method
[2] CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall
[3] HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box,
EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity
[4] DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer
[5] F = Fine (<4.75mm), C = Coarse (>4.75mm)

Summary of Tests Performed (Continued)

Laboratory Sample Number	Initial Soil Properties[1]			Saturated Hydraulic Conductivity[2]			Moisture Characteristics[3]								Particle Size[4]			Specific Gravity[5]		Air Perm-eability	Atterberg Limits	Proctor Compaction
	G	VM	VD	CH	FH	FW	HC	PP	FP	DPP	RH	EP	WHC	K_{unsat}	DS	WS	H	F	C			
Sec12-16																X	X				X	X
Sec12-17																X	X				X	
Sec12-18																X	X				X	
Sec12-19																X	X				X	
Sec12-20																X	X				X	

[1] G = Gravimetric Moisture Content, VM = Volume Measurement Method, VD = Volume Displacement Method
[2] CH = Constant Head Rigid Wall, FH = Falling Head Rigid Wall, FW = Falling Head Rising Tail Flexible Wall
[3] HC = Hanging Column, PP = Pressure Plate, FP = Filter Paper, DPP = Dew Point Potentiometer, RH = Relative Humidity Box, EP = Effective Porosity, WHC = Water Holding Capacity, Kunsat = Calculated Unsaturated Hydraulic Conductivity
[4] DS = Dry Sieve, WS = Wet Sieve, H = Hydrometer
[5] F = Fine (<4.75mm), C = Coarse (>4.75mm)

Notes

Sample Receipt:
Twenty samples were hand-delivered on September 18, 2019. Six were received, each as loose material in a 5-gallon bucket without a lid. The remaining fourteen samples were received each as loose material in a quart Ziploc bag contained in two 5-gallon buckets. All samples were received in good order.

Sample Preparation and Testing Notes:
Six of the samples were subjected to standard proctor compaction testing, nineteen of the samples were subjected to particle size analysis and sixteen of the samples were subjected to Atterberg limits testing.

Based on the proctor compaction method, material larger than 4.75mm was removed from the sample material prior to compaction and remolding. Oversize correction calculations are not presented since the fraction removed was less than 5% of the bulk sample mass for each sample.

The particle diameter calculations in the hydrometer portion of the particle size analysis testing, are based on the use of an assumed specific gravity value of 2.65.

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
Sec12-1	9.0E-05	0.0019	0.0042	47	0.44	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-2	2.1E-05	0.0018	0.0044	210	0.39	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-4	0.00014	0.0028	0.0061	44	0.38	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-5	4.5E-05	0.0040	0.011	244	0.34	WS/H	Lean clay with sand (CL)s	Clay	(Est)
Sec12-6	0.00013	0.0048	0.038	292	0.10	WS/H	Sandy lean clay s(CL)	Clay	(Est)
Sec12-7	0.00018	0.014	0.059	328	0.11	WS/H	Sandy lean clay s(CL)	Clay Loam	(Est)
Sec12-8	0.00027	0.088	0.12	444	49	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	(Est)
Sec12-9	0.00024	0.13	0.15	625	78	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	(Est)
Sec12-10	0.0044	0.26	0.30	68	15	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
Sec12-11	0.00013	0.0019	0.0039	30	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-12	0.00035	0.0029	0.0046	13	0.54	WS/H	Fat clay (CH)	Clay	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Summary of Particle Size Characteristics (Continued)

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
Sec12-13	0.00021	0.0015	0.0028	13	0.51	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-14	0.00011	0.0013	0.0027	25	0.46	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-15	0.00010	0.00094	0.0016	16	0.60	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-16	8.1E-05	0.00082	0.0015	19	0.56	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-17	5.4E-05	0.00077	0.0015	28	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-18	9.7E-05	0.0010	0.0018	19	0.55	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-19	0.00013	0.0018	0.0038	29	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-20	0.00012	0.0014	0.0026	22	0.54	WS/H	Fat clay (CH)	Clay	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
Sec12-1	0.8	11.6	37.2	50.5
Sec12-2	5.2	9.7	34.0	51.1
Sec12-4	0.3	11.2	41.1	47.4
Sec12-5	0.0	27.2	28.5	44.4
Sec12-6	0.0	31.6	26.2	42.2
Sec12-7	0.0	36.4	27.2	36.4
Sec12-8	0.5	53.1	31.7	14.7
Sec12-9	0.2	65.2	17.3	17.3
Sec12-10	3.1	76.8	10.8	9.3
Sec12-11	0.5	10.4	38.2	50.9
Sec12-12	0.2	11.3	42.7	45.8
Sec12-13	0.0	8.2	35.8	56.0
Sec12-14	0.0	8.8	33.8	57.3
Sec12-15	0.0	3.0	33.6	63.4
Sec12-16	0.0	4.0	30.5	65.5
Sec12-17	0.0	1.4	34.1	64.5

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Percent Gravel, Sand, Silt and Clay* (Continued)

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
Sec12-18	0.0	6.0	32.0	62.0
Sec12-19	0.2	13.0	35.2	51.6
Sec12-20	0.0	10.1	33.7	56.1

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
Sec12-1	55	24	31	CH
Sec12-2	58	25	33	CH
Sec12-4	52	22	30	CH
Sec12-5	49	21	28	CL
Sec12-6	44	19	25	CL
Sec12-7	40	19	21	CL
Sec12-11	53	25	28	CH
Sec12-12	54	25	29	CH
Sec12-13	61	27	34	CH
Sec12-14	58	24	34	CH
Sec12-15	72	27	45	CH
Sec12-16	68	28	40	CH
Sec12-17	72	27	45	CH
Sec12-18	64	26	38	CH
Sec12-19	51	24	27	CH
Sec12-20	56	23	33	CH

--- = Soil requires visual-manual classification due to non-plasticity

Summary of Proctor Compaction Tests

Sample Number	Measured		Oversize Corrected	
	Optimum Moisture Content (% g/g)	Maximum Dry Bulk Density (g/cm^3)	Optimum Moisture Content (% g/g)	Maximum Dry Bulk Density (g/cm^3)
Sec12-11	23.5	1.56	---	---
Sec12-12	24.0	1.52	---	---
Sec12-13	25.8	1.45	---	---
Sec12-14	26.6	1.50	---	---
Sec12-15	26.7	1.50	---	---
Sec12-16	25.0	1.43	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

NR = Not requested

NA = Not applicable

Particle Size Analysis

Summary of Particle Size Characteristics

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
Sec12-1	9.0E-05	0.0019	0.0042	47	0.44	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-2	2.1E-05	0.0018	0.0044	210	0.39	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-4	0.00014	0.0028	0.0061	44	0.38	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-5	4.5E-05	0.0040	0.011	244	0.34	WS/H	Lean clay with sand (CL)s	Clay	(Est)
Sec12-6	0.00013	0.0048	0.038	292	0.10	WS/H	Sandy lean clay s(CL)	Clay	(Est)
Sec12-7	0.00018	0.014	0.059	328	0.11	WS/H	Sandy lean clay s(CL)	Clay Loam	(Est)
Sec12-8	0.00027	0.088	0.12	444	49	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	(Est)
Sec12-9	0.00024	0.13	0.15	625	78	WS/H	Classification by ASTM 2487 requires Atterberg test	Sandy Loam	(Est)
Sec12-10	0.0044	0.26	0.30	68	15	WS/H	Classification by ASTM 2487 requires Atterberg test	Loamy Sand	
Sec12-11	0.00013	0.0019	0.0039	30	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-12	0.00035	0.0029	0.0046	13	0.54	WS/H	Fat clay (CH)	Clay	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Summary of Particle Size Characteristics (Continued)

Sample Number	d_{10} (mm)	d_{50} (mm)	d_{60} (mm)	C_u	C_c	Method	ASTM Classification	USDA Classification	
Sec12-13	0.00021	0.0015	0.0028	13	0.51	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-14	0.00011	0.0013	0.0027	25	0.46	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-15	0.00010	0.00094	0.0016	16	0.60	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-16	8.1E-05	0.00082	0.0015	19	0.56	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-17	5.4E-05	0.00077	0.0015	28	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-18	9.7E-05	0.0010	0.0018	19	0.55	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-19	0.00013	0.0018	0.0038	29	0.49	WS/H	Fat clay (CH)	Clay	(Est)
Sec12-20	0.00012	0.0014	0.0026	22	0.54	WS/H	Fat clay (CH)	Clay	(Est)

d_{50} = Median particle diameter

Est = Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

$$C_u = \frac{d_{60}}{d_{10}}$$

$$C_c = \frac{(d_{30})^2}{(d_{10})(d_{60})}$$

DS = Dry sieve

H = Hydrometer

WS = Wet sieve

† Greater than 10% of sample is coarse material

Percent Gravel, Sand, Silt and Clay*

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
Sec12-1	0.8	11.6	37.2	50.5
Sec12-2	5.2	9.7	34.0	51.1
Sec12-4	0.3	11.2	41.1	47.4
Sec12-5	0.0	27.2	28.5	44.4
Sec12-6	0.0	31.6	26.2	42.2
Sec12-7	0.0	36.4	27.2	36.4
Sec12-8	0.5	53.1	31.7	14.7
Sec12-9	0.2	65.2	17.3	17.3
Sec12-10	3.1	76.8	10.8	9.3
Sec12-11	0.5	10.4	38.2	50.9
Sec12-12	0.2	11.3	42.7	45.8
Sec12-13	0.0	8.2	35.8	56.0
Sec12-14	0.0	8.8	33.8	57.3
Sec12-15	0.0	3.0	33.6	63.4
Sec12-16	0.0	4.0	30.5	65.5
Sec12-17	0.0	1.4	34.1	64.5

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Percent Gravel, Sand, Silt and Clay* (Continued)

Sample Number	% Gravel (>4.75mm)	% Sand (<4.75mm, >0.075mm)	% Silt (<0.075mm, >0.002mm)	% Clay (<0.002mm)
Sec12-18	0.0	6.0	32.0	62.0
Sec12-19	0.2	13.0	35.2	51.6
Sec12-20	0.0	10.1	33.7	56.1

*USCS classification does not classify clay fraction based on particle size. USDA definition of clay (<0.002mm) used in this table.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-1
Date Sampled: 9/17/19 1100
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 495.20
Weight Passing #10 (g): 490.21
Weight Retained #10 (g): 4.99
Weight of Hydrometer Sample (g): 54.70
Calculated Weight of Sieve Sample (g): 55.26

Shape: Rounded
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	495.20	100.00
	2"	50	0.00	0.00	495.20	100.00
	1.5"	38.1	0.00	0.00	495.20	100.00
	1"	25	0.00	0.00	495.20	100.00
	3/4"	19.0	0.00	0.00	495.20	100.00
	3/8"	9.5	2.24	2.24	492.96	99.55
	4	4.75	1.52	3.76	491.44	99.24
	10	2.00	1.23	4.99	490.21	98.99
-10			(Based on calculated sieve wt.)			
	20	0.85	0.20	0.76	54.50	98.63
	40	0.425	1.02	1.78	53.48	96.78
	60	0.250	1.66	3.44	51.82	93.78
	140	0.106	2.74	6.18	49.08	88.82
	200	0.075	0.63	6.81	48.45	87.68
	dry pan		0.04	6.85	48.41	
	wet pan			48.41	0.00	

d_{10} (mm): 9.0E-05
d_{16} (mm): 0.00014
d_{30} (mm): 0.00041
d_{50} (mm): 0.0019
d_{60} (mm): 0.0042
d_{84} (mm): 0.053

Median Particle Diameter --d_{50} (mm): 0.0019
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 47
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.44
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.018

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-1
Date Sampled: 9/17/19 1100
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:00

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

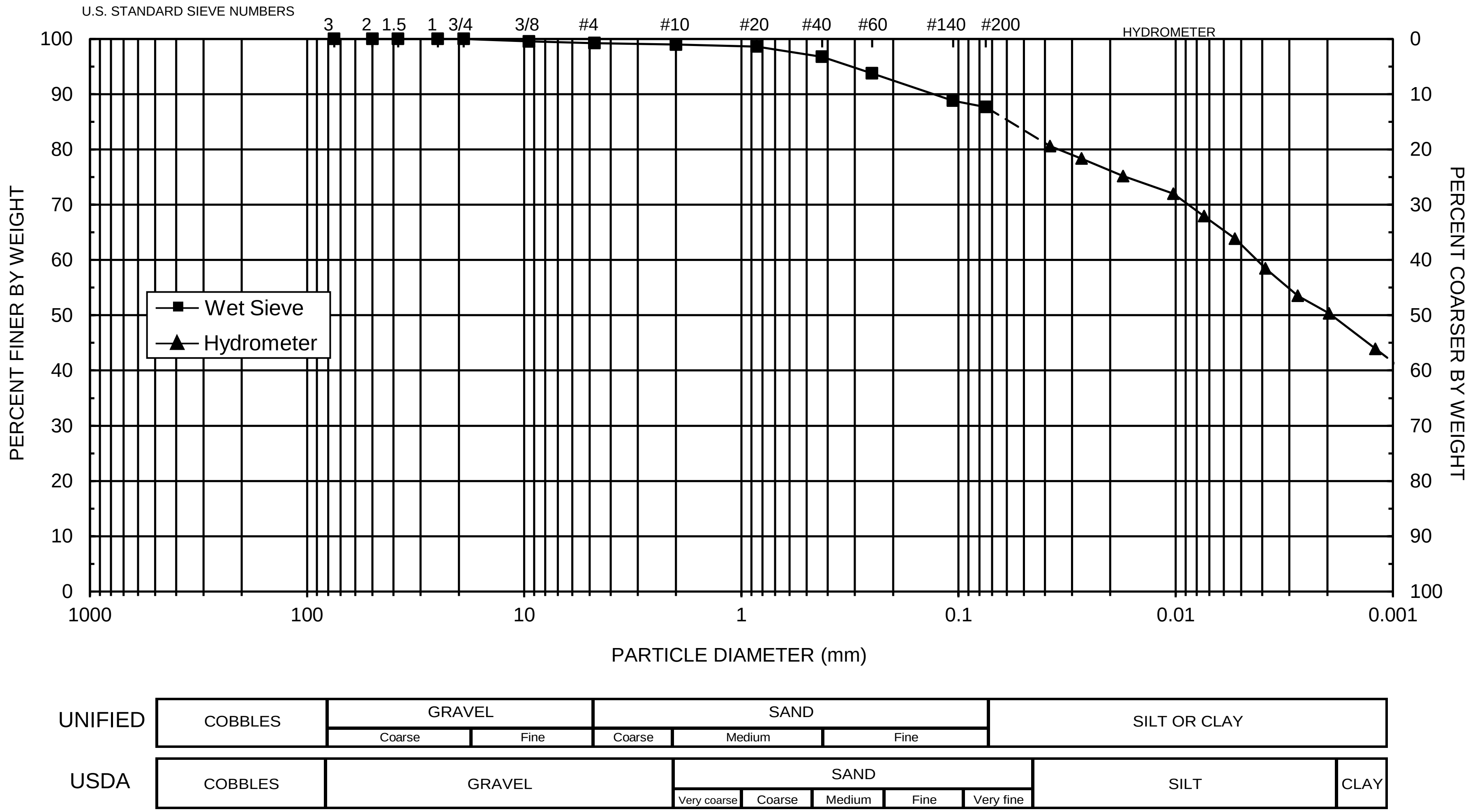
Initial Wt. (g): 54.70
Total Sample Wt. (g): 495.20
Wt. Passing #10 (g): 490.21

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	50.3	5.7	44.5	8.1	0.03789	81.4	80.6
	2	21.7	49.0	5.7	43.3	8.3	0.02713	79.1	78.3
	5	21.7	47.3	5.7	41.5	8.6	0.01746	75.9	75.2
	15	21.7	45.5	5.7	39.8	8.8	0.01025	72.7	72.0
	30	21.7	43.3	5.7	37.5	9.2	0.00739	68.6	67.9
	60	21.7	41.0	5.7	35.3	9.6	0.00533	64.5	63.9
	120	21.8	38.0	5.7	32.3	10.1	0.00386	59.1	58.5
	250	21.8	35.3	5.7	29.6	10.5	0.00273	54.1	53.5
	497	21.8	33.5	5.7	27.8	10.8	0.00197	50.9	50.3
25-Sep-19	1406	21.6	30.0	5.7	24.3	11.4	0.00120	44.4	43.9

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **9.0E-05**	d_{30} = **0.00041**	d_{50} = **0.0019**	d_{60} = **0.0042**	C_u = **47**	C_c = **0.44**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-1	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-2
Date Sampled: 9/17/19 1120
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 346.08
Weight Passing #10 (g): 324.86
Weight Retained #10 (g): 21.22
Weight of Hydrometer Sample (g): 53.12
Calculated Weight of Sieve Sample (g): 56.59

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	346.08	100.00
	2"	50	0.00	0.00	346.08	100.00
	1.5"	38.1	0.00	0.00	346.08	100.00
	1"	25	0.00	0.00	346.08	100.00
	3/4"	19.0	10.42	10.42	335.66	96.99
	3/8"	9.5	5.14	15.56	330.52	95.50
	4	4.75	2.51	18.07	328.01	94.78
	10	2.00	3.15	21.22	324.86	93.87
-10			(Based on calculated sieve wt.)			
	20	0.85	0.73	4.20	52.39	92.58
	40	0.425	0.59	4.79	51.80	91.54
	60	0.250	0.62	5.41	51.18	90.44
	140	0.106	2.09	7.50	49.09	86.75
	200	0.075	0.94	8.44	48.15	85.09
	dry pan		0.06	8.50	48.09	
	wet pan			48.09	0.00	

d_{10} (mm): 2.1E-05
d_{16} (mm): 4.0E-05
d_{30} (mm): 0.00019
d_{50} (mm): 0.0018
d_{60} (mm): 0.0044
d_{84} (mm): 0.065

Median Particle Diameter --d_{50} (mm): 0.0018
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 210
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.39
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.022

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-2
Date Sampled: 9/17/19 1120
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:06

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

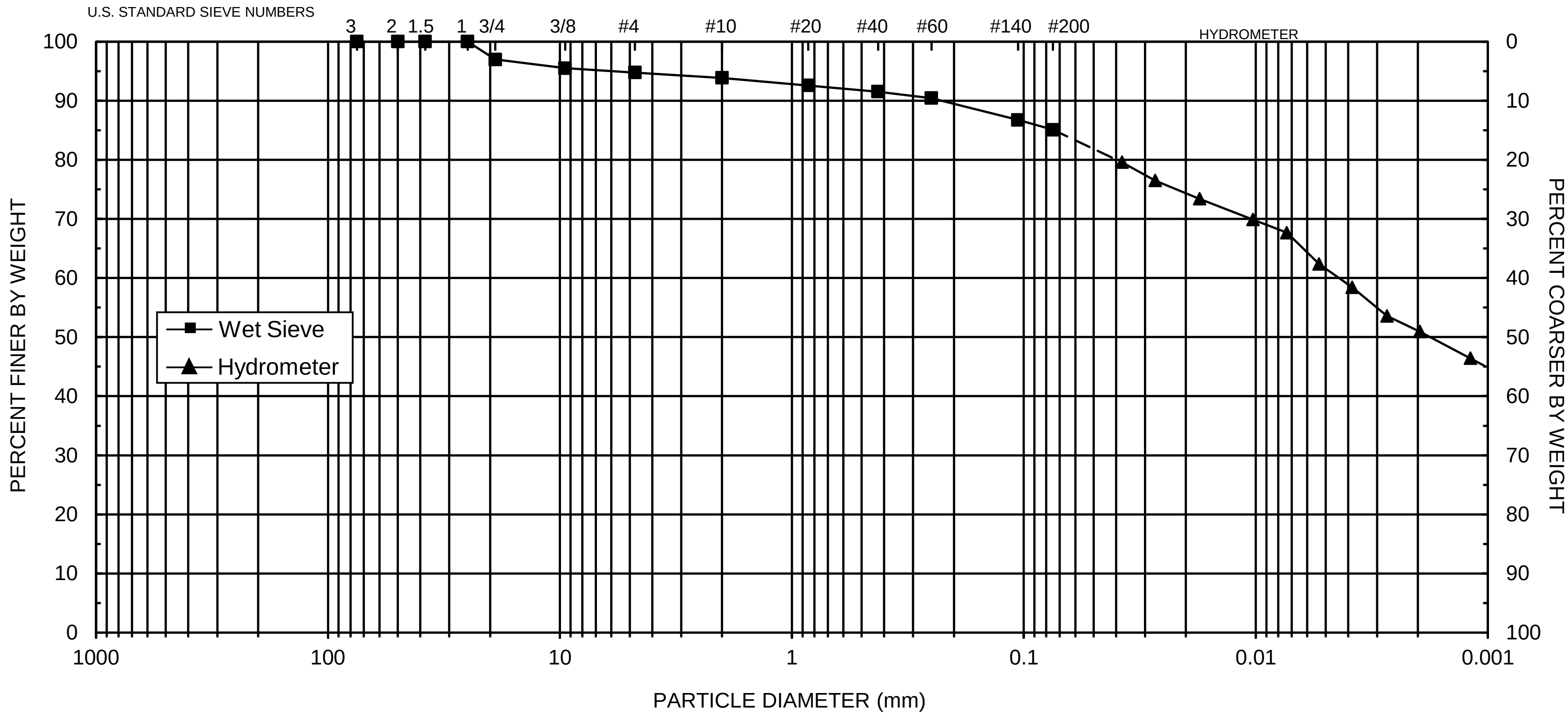
Initial Wt. (g): 53.12
Total Sample Wt. (g): 346.08
Wt. Passing #10 (g): 324.86

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	50.8	5.7	45.0	8.0	0.03770	84.8	79.6
	2	21.7	49.0	5.7	43.3	8.3	0.02713	81.5	76.5
	5	21.7	47.3	5.7	41.5	8.6	0.01746	78.2	73.4
	15	21.7	45.3	5.7	39.5	8.9	0.01027	74.4	69.9
	30	21.7	44.0	5.7	38.3	9.1	0.00734	72.1	67.7
	60	21.7	41.0	5.7	35.3	9.6	0.00533	66.4	62.4
	120	21.8	38.8	5.7	33.1	9.9	0.00384	62.3	58.4
	250	21.8	36.0	5.7	30.3	10.4	0.00272	57.1	53.6
	492	21.8	34.5	5.7	28.8	10.6	0.00196	54.3	50.9
25-Sep-19	1401	21.6	32.0	5.7	26.3	11.1	0.00119	49.5	46.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL Coarse	GRAVEL Fine	SAND Coarse	SAND Medium	SAND Fine	SILT OR CLAY	
USDA	COBBLES	GRAVEL	SAND Very coarse	SAND Coarse	SAND Medium	SAND Fine	SAND Very fine	SILT / CLAY

d_{10} = **2.1E-05**	d_{30} = **0.00019**	d_{50} = **0.0018**	d_{60} = **0.0044**	C_u = **210**	C_c = **0.39**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-2	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-4
Date Sampled: 9/17/19 1230
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 534.70
Weight Passing #10 (g): 529.77
Weight Retained #10 (g): 4.93
Weight of Hydrometer Sample (g): 54.38
Calculated Weight of Sieve Sample (g): 54.89

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	534.70	100.00
	2"	50	0.00	0.00	534.70	100.00
	1.5"	38.1	0.00	0.00	534.70	100.00
	1"	25	0.00	0.00	534.70	100.00
	3/4"	19.0	0.00	0.00	534.70	100.00
	3/8"	9.5	0.00	0.00	534.70	100.00
	4	4.75	1.79	1.79	532.91	99.67
	10	2.00	3.14	4.93	529.77	99.08
-10			(Based on calculated sieve wt.)			
	20	0.85	0.10	0.61	54.28	98.90
	40	0.425	0.26	0.87	54.02	98.42
	60	0.250	0.46	1.33	53.56	97.58
	140	0.106	3.28	4.61	50.28	91.61
	200	0.075	1.70	6.31	48.58	88.51
	dry pan		0.17	6.48	48.41	
	wet pan			48.41	0.00	

d_{10} (mm): 0.00014
d_{16} (mm): 0.00021
d_{30} (mm): 0.00057
d_{50} (mm): 0.0028
d_{60} (mm): 0.0061
d_{84} (mm): 0.056

Median Particle Diameter --d_{50} (mm): 0.0028
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 44
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 0.38
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.020

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-4
Date Sampled: 9/17/19 1230
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:12

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

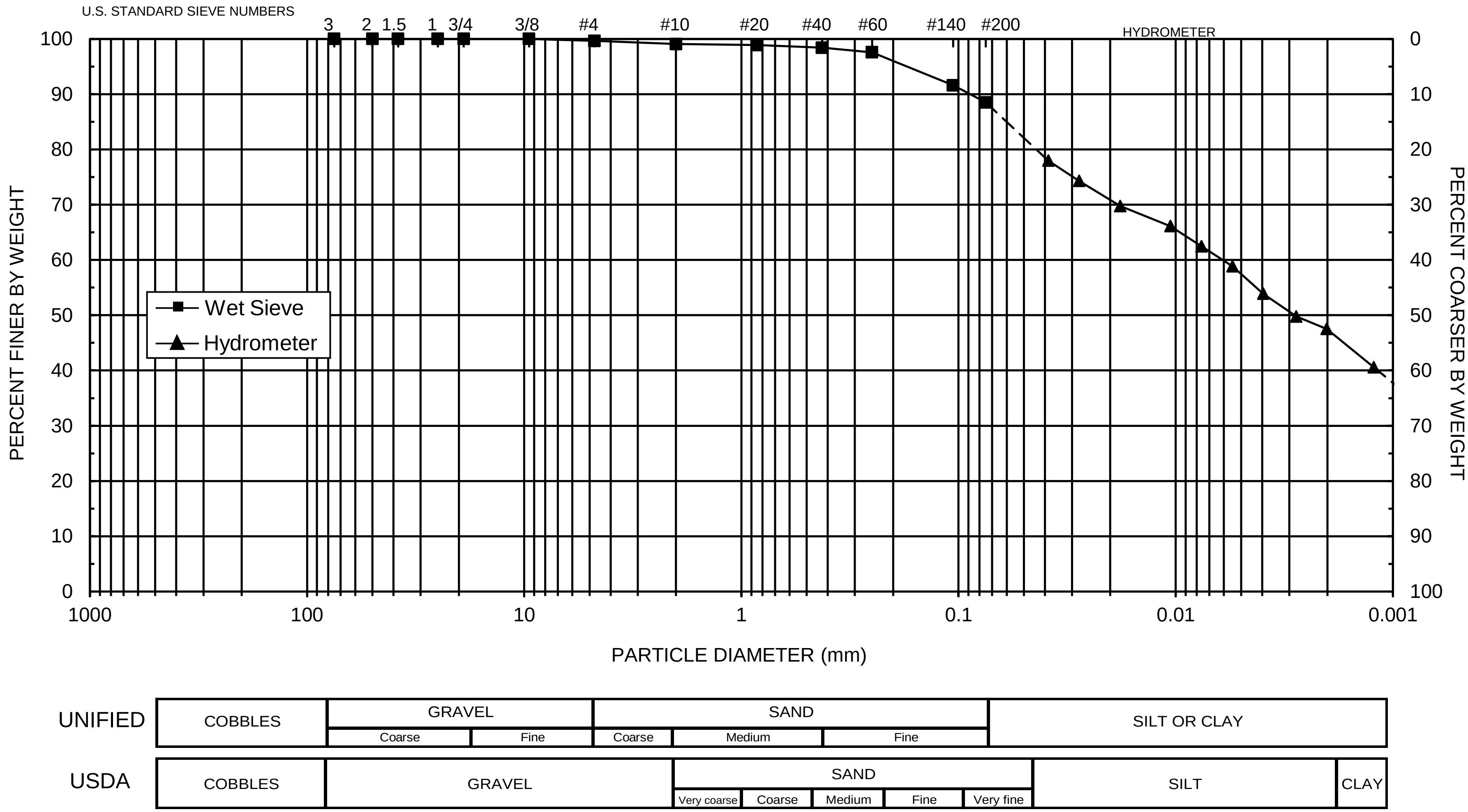
Initial Wt. (g)*:* 54.38
Total Sample Wt. (g)*:* 534.70
Wt. Passing #10 (g): 529.77

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	48.5	5.7	42.8	8.3	0.03856	78.7	78.0
	2	21.7	46.5	5.7	40.8	8.7	0.02780	75.0	74.3
	5	21.7	44.0	5.7	38.3	9.1	0.01799	70.4	69.8
	15	21.7	42.0	5.7	36.3	9.4	0.01057	66.7	66.1
	30	21.7	40.0	5.7	34.3	9.7	0.00761	63.1	62.5
	60	21.7	38.0	5.7	32.3	10.1	0.00547	59.4	58.8
	120	21.8	35.3	5.7	29.6	10.5	0.00395	54.4	53.9
	250	21.8	33.0	5.7	27.3	10.9	0.00278	50.2	49.8
	487	21.8	31.8	5.7	26.1	11.1	0.00201	47.9	47.5
25-Sep-19	1396	21.6	28.0	5.7	22.3	11.7	0.00122	41.0	40.6

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00014**	d_{30} = **0.00057**	d_{50} = **0.0028**	d_{60} = **0.0061**	C_u = **44**	C_c = **0.38**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-4	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-5
Date Sampled: 9/17/19 1245
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 484.44
Weight Passing #10 (g): 484.44
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 55.12
Calculated Weight of Sieve Sample (g): 55.12

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	484.44	100.00
	2"	50	0.00	0.00	484.44	100.00
	1.5"	38.1	0.00	0.00	484.44	100.00
	1"	25	0.00	0.00	484.44	100.00
	3/4"	19.0	0.00	0.00	484.44	100.00
	3/8"	9.5	0.00	0.00	484.44	100.00
	4	4.75	0.00	0.00	484.44	100.00
	10	2.00	0.00	0.00	484.44	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.01	0.01	55.11	99.98
	40	0.425	0.15	0.16	54.96	99.71
	60	0.250	2.79	2.95	52.17	94.65
	140	0.106	10.11	13.06	42.06	76.31
	200	0.075	1.91	14.97	40.15	72.84
	dry pan		0.30	15.27	39.85	
	wet pan			39.85	0.00	

d_{10} (mm): 4.5E-05
d_{16} (mm): 8.8E-05
d_{30} (mm): 0.00041
d_{50} (mm): 0.0040
d_{60} (mm): 0.011
d_{84} (mm): 0.15

Median Particle Diameter --d_{50} (mm): 0.0040
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 244
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.34
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.051

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Lean clay with sand (CL)s
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-5
Date Sampled: 9/17/19 1245
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:18

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

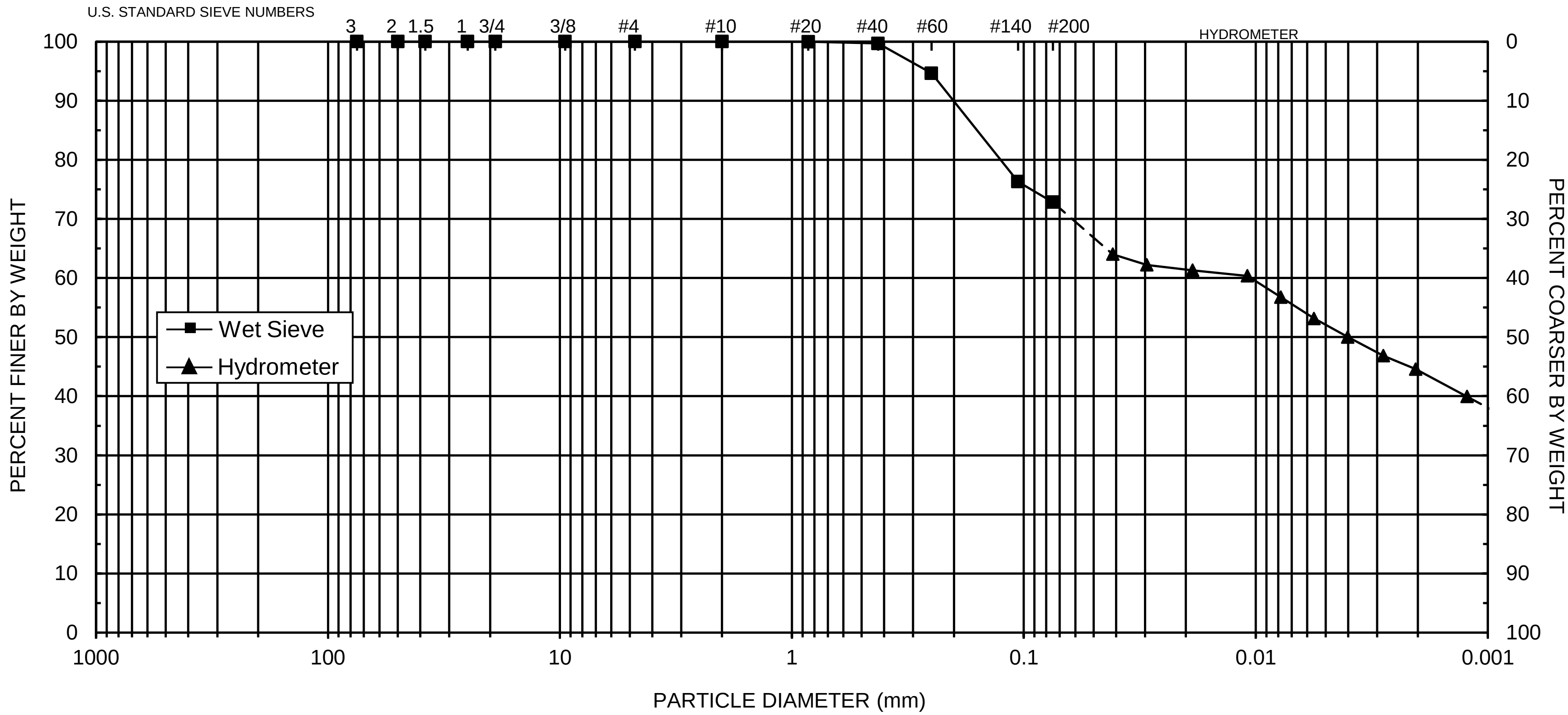
Initial Wt. (g)*:* 55.12
Total Sample Wt. (g)*:* 484.44
Wt. Passing #10 (g): 484.44

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	41.0	5.7	35.3	9.6	0.04130	64.0	64.0
	2	21.7	40.0	5.7	34.3	9.7	0.02945	62.2	62.2
	5	21.7	39.5	5.7	33.8	9.8	0.01871	61.3	61.3
	15	21.6	39.0	5.7	33.3	9.9	0.01086	60.4	60.4
	30	21.7	37.0	5.7	31.3	10.2	0.00779	56.8	56.8
	60	21.7	35.0	5.7	29.3	10.6	0.00560	53.1	53.1
	120	21.8	33.3	5.7	27.6	10.8	0.00401	50.0	50.0
	250	21.8	31.5	5.7	25.8	11.1	0.00281	46.8	46.8
	482	21.8	30.3	5.7	24.6	11.3	0.00204	44.6	44.6
25-Sep-19	1391	21.6	27.8	5.7	22.0	11.8	0.00123	39.9	39.9

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **4.5E-05**	d_{30} = **0.00041**	d_{50} = **0.0040**	d_{60} = **0.011**	C_u = **244**	C_c = **0.34**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-5	**NA**	**Lean clay with sand (CL)s**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-6
Date Sampled: 9/17/19 1330
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 406.39
Weight Passing #10 (g): 406.38
Weight Retained #10 (g): 0.01
Weight of Hydrometer Sample (g): 63.98
Calculated Weight of Sieve Sample (g): 63.98

Shape: Rounded
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	406.39	100.00
	2"	50	0.00	0.00	406.39	100.00
	1.5"	38.1	0.00	0.00	406.39	100.00
	1"	25	0.00	0.00	406.39	100.00
	3/4"	19.0	0.00	0.00	406.39	100.00
	3/8"	9.5	0.00	0.00	406.39	100.00
	4	4.75	0.00	0.00	406.39	100.00
	10	2.00	0.01	0.01	406.38	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.02	0.02	63.96	99.97
	40	0.425	0.38	0.40	63.58	99.37
	60	0.250	3.98	4.38	59.60	93.15
	140	0.106	13.43	17.81	46.17	72.16
	200	0.075	2.39	20.20	43.78	68.43
	dry pan		0.25	20.45	43.53	
	wet pan			43.53	0.00	

d_{10} (mm): 0.00013 d_{50} (mm): 0.0048
d_{16} (mm): 0.00022 d_{60} (mm): 0.038
d_{30} (mm): 0.00071 d_{84} (mm): 0.17

Median Particle Diameter --d_{50} (mm): 0.0048
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 292
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 0.10
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.058

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Sandy lean clay s(CL)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-6
Date Sampled: 9/17/19 1330
Depth: NA

Test Date: 27-Sep-19
Start Time: 9:24

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

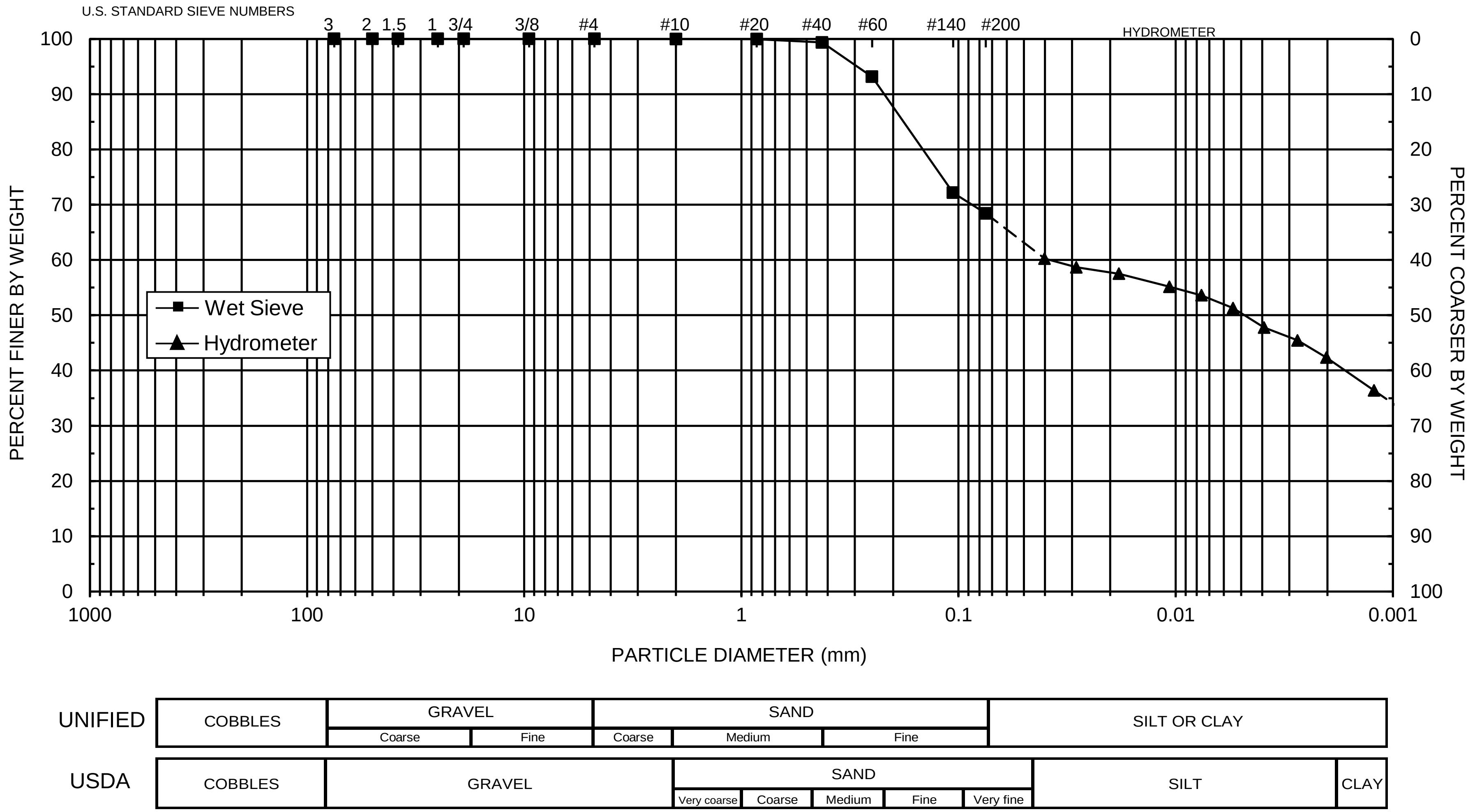
Initial Wt. (g)*:* 63.98
Total Sample Wt. (g)*:* 406.39
Wt. Passing #10 (g): 406.38

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	44.3	5.7	38.5	9.0	0.04014	60.2	60.2
	2	21.7	43.3	5.7	37.5	9.2	0.02864	58.7	58.7
	5	21.7	42.5	5.7	36.8	9.3	0.01823	57.5	57.5
	15	21.7	41.0	5.7	35.3	9.6	0.01066	55.2	55.2
	30	21.7	40.0	5.7	34.3	9.7	0.00761	53.6	53.6
	60	21.8	38.5	5.7	32.8	10.0	0.00544	51.3	51.3
	120	21.8	36.3	5.7	30.6	10.4	0.00392	47.8	47.8
	250	21.8	34.8	5.7	29.1	10.6	0.00275	45.4	45.4
	477	21.8	32.8	5.7	27.1	10.9	0.00202	42.3	42.3
25-Sep-19	1386	21.6	29.0	5.7	23.3	11.5	0.00122	36.4	36.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00013**	d_{30} = **0.00071**	d_{50} = **0.0048**	d_{60} = **0.038**	C_u = **292**	C_c = **0.10**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-6	**NA**	**Sandy lean clay s(CL)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-7
Date Sampled: 9/17/19 1345
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 543.51
Weight Passing #10 (g): 543.51
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 59.02
Calculated Weight of Sieve Sample (g): 59.02

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	543.51	100.00
	2"	50	0.00	0.00	543.51	100.00
	1.5"	38.1	0.00	0.00	543.51	100.00
	1"	25	0.00	0.00	543.51	100.00
	3/4"	19.0	0.00	0.00	543.51	100.00
	3/8"	9.5	0.00	0.00	543.51	100.00
	4	4.75	0.00	0.00	543.51	100.00
	10	2.00	0.00	0.00	543.51	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.05	0.05	58.97	99.92
	40	0.425	0.19	0.24	58.78	99.59
	60	0.250	2.67	2.91	56.11	95.07
	140	0.106	15.65	18.56	40.46	68.55
	200	0.075	2.91	21.47	37.55	63.62
	dry pan		0.39	21.86	37.16	
	wet pan			37.16	0.00	

d_{10} (mm): 0.00018 d_{50} (mm): 0.014
d_{16} (mm): 0.00031 d_{60} (mm): 0.059
d_{30} (mm): 0.0011 d_{84} (mm): 0.17

Median Particle Diameter --d_{50} (mm): 0.014
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 328
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.11
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.061

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CL

ASTM Soil Classification: Sandy lean clay s(CL)
USDA Soil Classification: Clay Loam

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

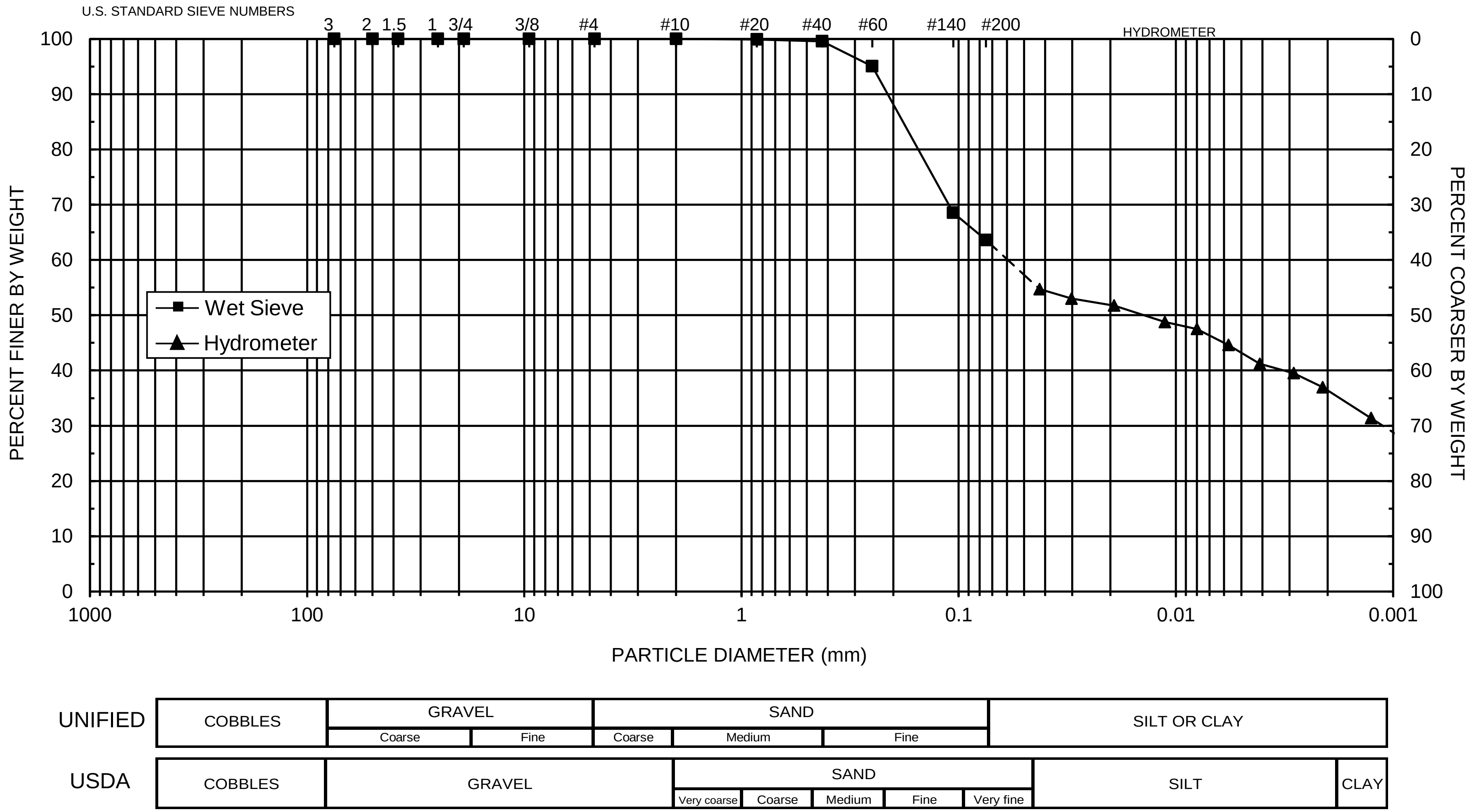
Job Name:	Alan Kuhn Associates, LLC	*Type of Water Used:*	DISTILLED
Job Number:	DB19.1348.00	*Reaction with* H_2O_2*:*	NA
Sample Number:	Sec12-7	*Dispersant*:*	$(NaPO_3)_6$
Date Sampled:	9/17/19 1345	*Assumed particle density:*	2.65
Depth:	NA	*Initial Wt. (g):*	59.02
Test Date:	23-Sep-19	*Total Sample Wt. (g):*	543.51
Start Time:	9:30	*Wt. Passing #10 (g):*	543.51

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	38.0	5.7	32.3	10.1	0.04235	54.7	54.7
	2	21.7	37.0	5.7	31.3	10.2	0.03019	53.0	53.0
	5	21.7	36.3	5.7	30.5	10.4	0.01921	51.7	51.7
	15	21.7	34.5	5.7	28.8	10.6	0.01124	48.8	48.8
	30	21.7	33.8	5.7	28.0	10.8	0.00799	47.5	47.5
	60	21.8	32.0	5.7	26.3	11.1	0.00572	44.6	44.6
	120	21.8	30.0	5.7	24.3	11.4	0.00411	41.2	41.2
	250	21.8	29.0	5.7	23.3	11.5	0.00286	39.5	39.5
	472	21.8	27.5	5.7	21.8	11.8	0.00211	37.0	37.0
25-Sep-19	1381	21.6	24.3	5.7	18.5	12.3	0.00126	31.4	31.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00018**	d_{30} = **0.0011**	d_{50} = **0.014**	d_{60} = **0.059**	C_u = **328**	C_c = **0.11**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-7	**NA**	**Sandy lean clay s(CL)**	**Clay Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-8
Date Sampled: 9/17/2019 1355
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 493.66
Weight Passing #10 (g): 489.02
Weight Retained #10 (g): 4.64
Weight of Hydrometer Sample (g): 62.96
Calculated Weight of Sieve Sample (g): 63.56

Shape: Rounded
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	493.66	100.00
	2"	50	0.00	0.00	493.66	100.00
	1.5"	38.1	0.00	0.00	493.66	100.00
	1"	25	0.00	0.00	493.66	100.00
	3/4"	19.0	0.00	0.00	493.66	100.00
	3/8"	9.5	0.00	0.00	493.66	100.00
	4	4.75	2.40	2.40	491.26	99.51
	10	2.00	2.24	4.64	489.02	99.06
-10			(Based on calculated sieve wt.)			
	20	0.85	0.32	0.92	62.64	98.56
	40	0.425	0.36	1.28	62.28	97.99
	60	0.250	4.65	5.93	57.63	90.67
	140	0.106	23.02	28.95	34.61	54.45
	200	0.075	5.12	34.07	29.49	46.40
	dry pan		1.17	35.24	28.32	
	wet pan			28.32	0.00	

d_{10} (mm): 0.00027 — d_{50} (mm): 0.088
d_{16} (mm): 0.0036 — d_{60} (mm): 0.12
d_{30} (mm): 0.040 — d_{84} (mm): 0.21

Median Particle Diameter --d_{50} (mm): 0.088
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 444
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 49
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.10

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sandy Loam

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-8
Date Sampled: 9/17/2019 1355
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:36

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

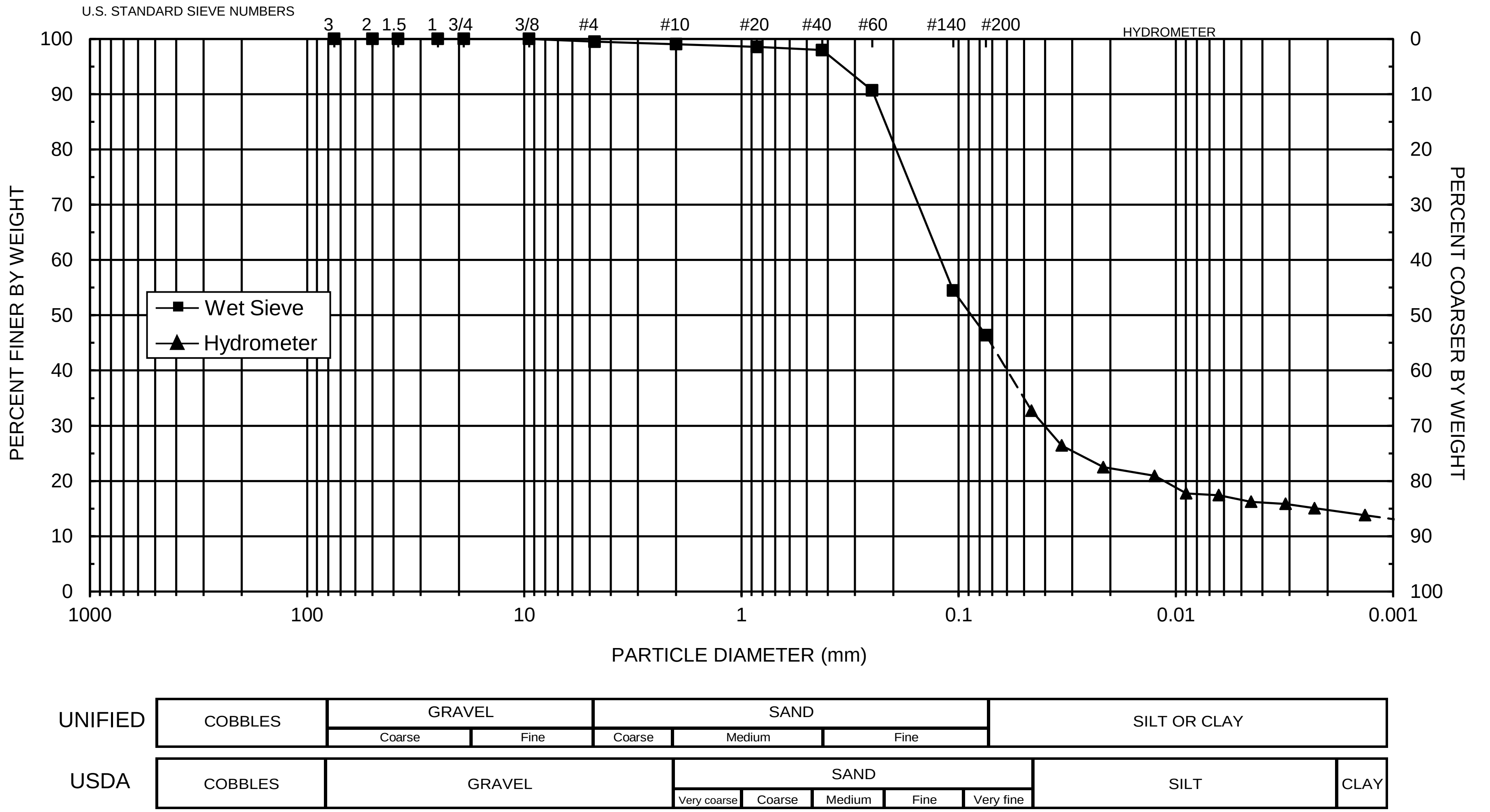
Initial Wt. (g)*:* 62.96
Total Sample Wt. (g)*:* 493.66
Wt. Passing #10 (g): 489.02

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	26.5	5.7	20.8	12.0	0.04614	33.0	32.7
	2	21.7	22.5	5.7	16.8	12.6	0.03351	26.7	26.4
	5	21.7	20.0	5.7	14.3	13.0	0.02154	22.7	22.5
	15	21.7	19.0	5.7	13.3	13.2	0.01251	21.1	20.9
	30	21.7	17.0	5.7	11.3	13.5	0.00896	17.9	17.8
	60	21.8	16.8	5.7	11.1	13.6	0.00634	17.6	17.4
	120	21.8	16.0	5.7	10.3	13.7	0.00450	16.4	16.2
	250	21.8	15.8	5.7	10.1	13.7	0.00312	16.0	15.8
	466	21.8	15.3	5.7	9.6	13.8	0.00229	15.2	15.1
25-Sep-19	1376	21.6	14.5	5.7	8.8	13.9	0.00134	13.9	13.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00027**	d_{30} = **0.040**	d_{50} = **0.088**	d_{60} = **0.12**	C_u = **444**	C_c = **49**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-8	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sandy Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Alan Kuhn Associates, LLC	*Initial Dry Weight of Sample (g):*	570.66
Job Number:	DB19.1348.00	*Weight Passing #10 (g):*	568.23
Sample Number:	Sec12-9	*Weight Retained #10 (g):*	2.43
Date Sampled:	9/17/19 1430	*Weight of Hydrometer Sample (g):*	70.53
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	70.83
Test Date:	27-Sep-19	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	570.66	100.00
	2"	50	0.00	0.00	570.66	100.00
	1.5"	38.1	0.00	0.00	570.66	100.00
	1"	25	0.00	0.00	570.66	100.00
	3/4"	19.0	0.00	0.00	570.66	100.00
	3/8"	9.5	0.00	0.00	570.66	100.00
	4	4.75	1.30	1.30	569.36	99.77
	10	2.00	1.13	2.43	568.23	99.57
-10			(Based on calculated sieve wt.)			
	20	0.85	0.04	0.34	70.49	99.52
	40	0.425	0.25	0.59	70.24	99.16
	60	0.250	7.05	7.64	63.19	89.21
	140	0.106	36.48	44.12	26.71	37.71
	200	0.075	2.22	46.34	24.49	34.57
	dry pan		0.26	46.60	24.23	
	wet pan			24.23	0.00	

d_{10} (mm):	0.00024	d_{50} (mm):	0.13
d_{16} (mm):	0.0014	d_{60} (mm):	0.15
d_{30} (mm):	0.053	d_{84} (mm):	0.23

Median Particle Diameter --d_{50} (mm): 0.13
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 625
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 78
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.12

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Sandy Loam

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-9
Date Sampled: 9/17/19 1430
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:42

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

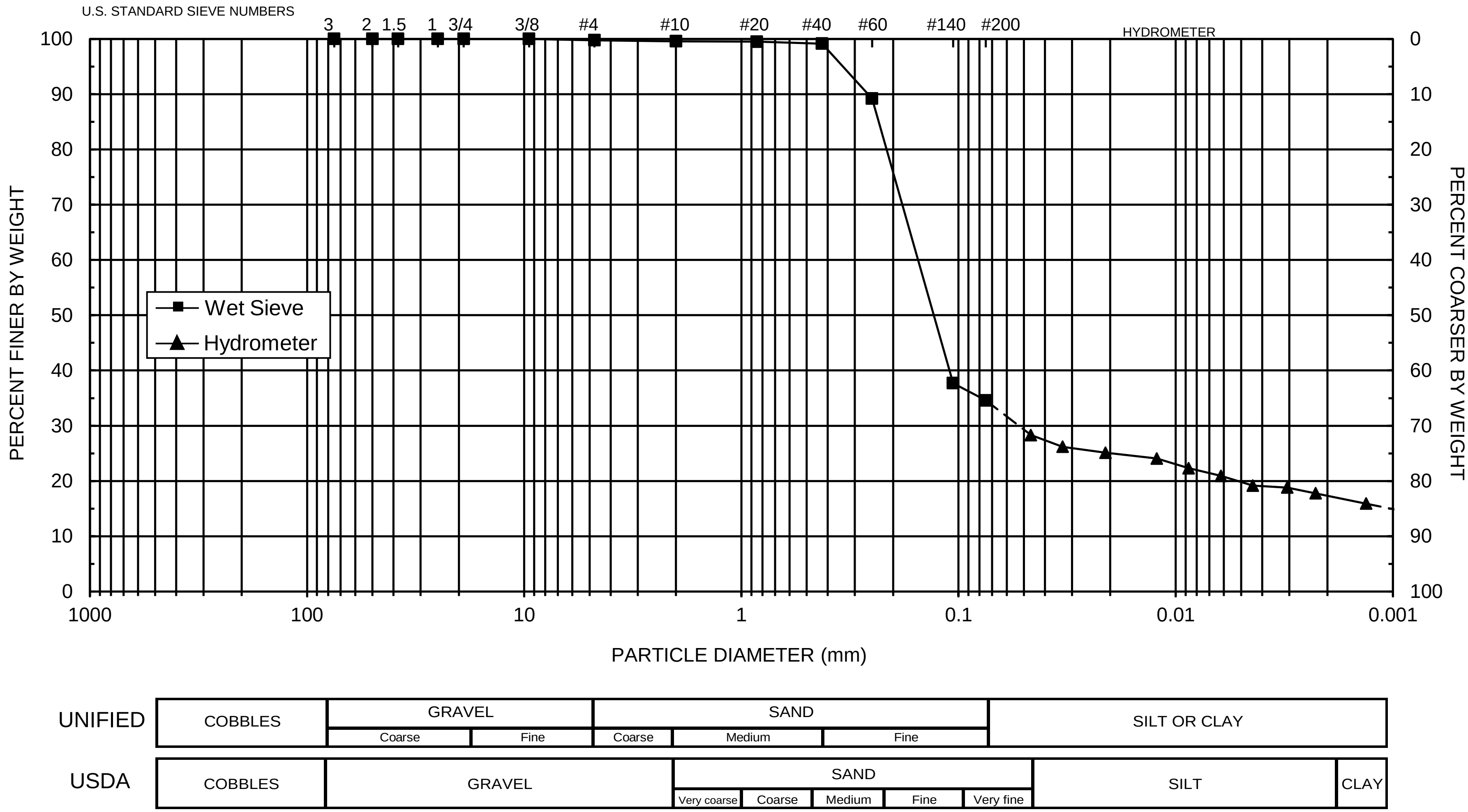
Initial Wt. (g): 70.53
Total Sample Wt. (g): 570.66
Wt. Passing #10 (g): 568.23

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	25.8	5.7	20.0	12.1	0.04638	28.4	28.3
	2	21.7	24.3	5.7	18.5	12.3	0.03313	26.3	26.2
	5	21.7	23.5	5.7	17.8	12.4	0.02106	25.2	25.1
	15	21.7	22.8	5.7	17.0	12.6	0.01222	24.2	24.1
	30	21.7	21.5	5.7	15.8	12.8	0.00871	22.4	22.3
	60	21.8	20.5	5.7	14.8	12.9	0.00619	21.0	20.9
	120	21.8	19.3	5.7	13.6	13.1	0.00441	19.2	19.2
	250	21.8	19.0	5.7	13.3	13.2	0.00306	18.9	18.8
	461	21.8	18.3	5.7	12.6	13.3	0.00226	17.8	17.7
25-Sep-19	1371	21.6	17.0	5.7	11.3	13.5	0.00133	16.0	15.9

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00024**	d_{30} = **0.053**	d_{50} = **0.13**	d_{60} = **0.15**	C_u = **625**	C_c = **78**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-9	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Sandy Loam**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-10
Date Sampled: 9/17/19 1500
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 535.44
Weight Passing #10 (g): 514.37
Weight Retained #10 (g): 21.07
Weight of Hydrometer Sample (g): 74.92
Calculated Weight of Sieve Sample (g): 77.99

Shape: Rounded
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	535.44	100.00
	2"	50	0.00	0.00	535.44	100.00
	1.5"	38.1	0.00	0.00	535.44	100.00
	1"	25	0.00	0.00	535.44	100.00
	3/4"	19.0	0.00	0.00	535.44	100.00
	3/8"	9.5	6.45	6.45	528.99	98.80
	4	4.75	10.41	16.86	518.58	96.85
	10	2.00	4.21	21.07	514.37	96.06
-10			(Based on calculated sieve wt.)			
	20	0.85	0.17	3.24	74.75	95.85
	40	0.425	5.60	8.84	69.15	88.67
	60	0.250	33.47	42.31	35.68	45.75
	140	0.106	18.19	60.50	17.49	22.43
	200	0.075	1.87	62.37	15.62	20.03
	dry pan		0.21	62.58	15.41	
	wet pan			15.41	0.00	

d_{10} (mm): 0.0044
d_{16} (mm): 0.055
d_{30} (mm): 0.14
d_{50} (mm): 0.26
d_{60} (mm): 0.30
d_{84} (mm): 0.40

Median Particle Diameter --d_{50} (mm): 0.26
Uniformity Coefficient, Cu --[d_{60}/d_{10}] (mm): 68
Coefficient of Curvature, Cc --[$(d_{30})^2/(d_{10}*d_{60})$] (mm): 15
Mean Particle Diameter --[$(d_{16}+d_{50}+d_{84})/3$] (mm): 0.24

ASTM Soil Classification: Classification by ASTM 2487 requires Atterberg test
USDA Soil Classification: Loamy Sand

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

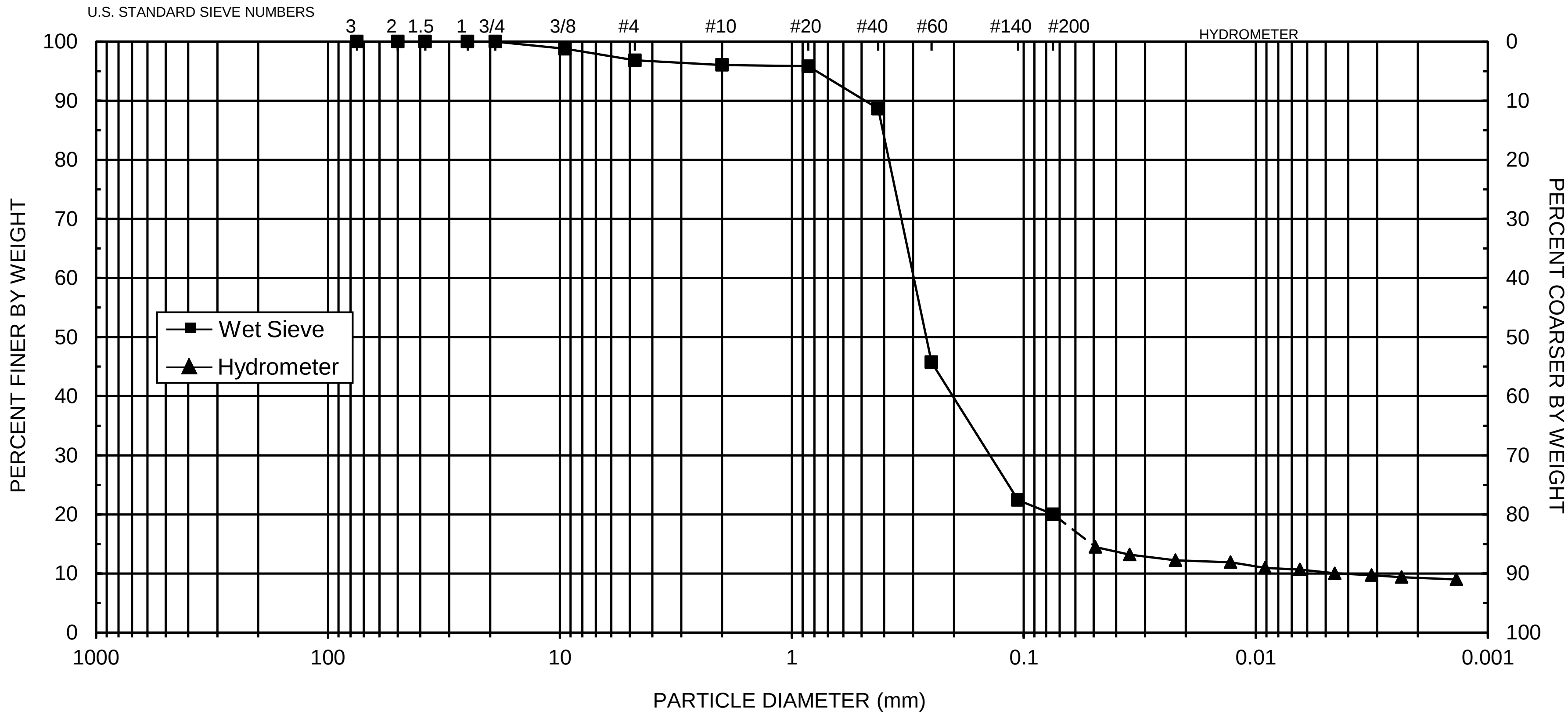
Job Name:	Alan Kuhn Associates, LLC	*Type of Water Used:*	DISTILLED
Job Number:	DB19.1348.00	*Reaction with* H_2O_2*:*	NA
Sample Number:	Sec12-10	*Dispersant**:*	$(NaPO_3)_6$
Date Sampled:	9/17/19 1500	*Assumed particle density:*	2.65
Depth:	NA	*Initial Wt.* (g)*:*	74.92
Test Date:	23-Sep-19	*Total Sample Wt.* (g)*:*	535.44
Start Time:	9:48	*Wt. Passing #10 (g):*	514.37

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	17.0	5.7	11.3	13.5	0.04906	15.1	14.5
	2	21.7	16.0	5.7	10.3	13.7	0.03490	13.7	13.2
	5	21.7	15.3	5.7	9.5	13.8	0.02217	12.7	12.2
	15	21.7	15.0	5.7	9.3	13.8	0.01282	12.4	11.9
	30	21.7	14.3	5.7	8.5	14.0	0.00910	11.4	11.0
	60	21.8	14.0	5.7	8.3	14.0	0.00644	11.1	10.7
	120	21.8	13.5	5.7	7.8	14.1	0.00457	10.4	10.0
	250	21.8	13.3	5.7	7.6	14.1	0.00317	10.1	9.7
	456	21.8	13.0	5.7	7.3	14.2	0.00235	9.8	9.4
25-Sep-19	1365	21.6	12.8	5.7	7.0	14.2	0.00136	9.4	9.0

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.0044**	d_{30} = **0.14**	d_{50} = **0.26**	d_{60} = **0.30**	C_u = **68**	C_c = **15**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-10	**NA**	**Classification by ASTM 2487 requires Atterberg test**	**Loamy Sand**

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-11
Date Sampled: 9/17/19 1115
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 17658.71
Weight Passing #10 (g): 17537.66
Weight Retained #10 (g): 121.04
Weight of Hydrometer Sample (g): 53.76
Calculated Weight of Sieve Sample (g): 54.13

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	17658.71	100.00
	2"	50	0.00	0.00	17658.71	100.00
	1.5"	38.1	0.00	0.00	17658.71	100.00
	1"	25	0.00	0.00	17658.71	100.00
	3/4"	19.0	29.22	29.22	17629.49	99.83
	3/8"	9.5	19.29	48.51	17610.20	99.73
	4	4.75	38.48	86.99	17571.72	99.51
	10	2.00	34.05	121.04	17537.66	99.31
-10			(Based on calculated sieve wt.)			
	20	0.85	0.24	0.61	53.52	98.87
	40	0.425	0.63	1.24	52.89	97.71
	60	0.250	1.17	2.41	51.72	95.55
	140	0.106	2.74	5.15	48.98	90.48
	200	0.075	0.76	5.91	48.22	89.08
	dry pan		0.13	6.04	48.09	
	wet pan			48.09	0.00	

d_{10} (mm): 0.00013 | d_{50} (mm): 0.0019
d_{16} (mm): 0.00020 | d_{60} (mm): 0.0039
d_{30} (mm): 0.00050 | d_{84} (mm): 0.045

Median Particle Diameter --d_{50} (mm): 0.0019
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 30
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.49
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.016

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-11
Date Sampled: 9/17/19 1115
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:00

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

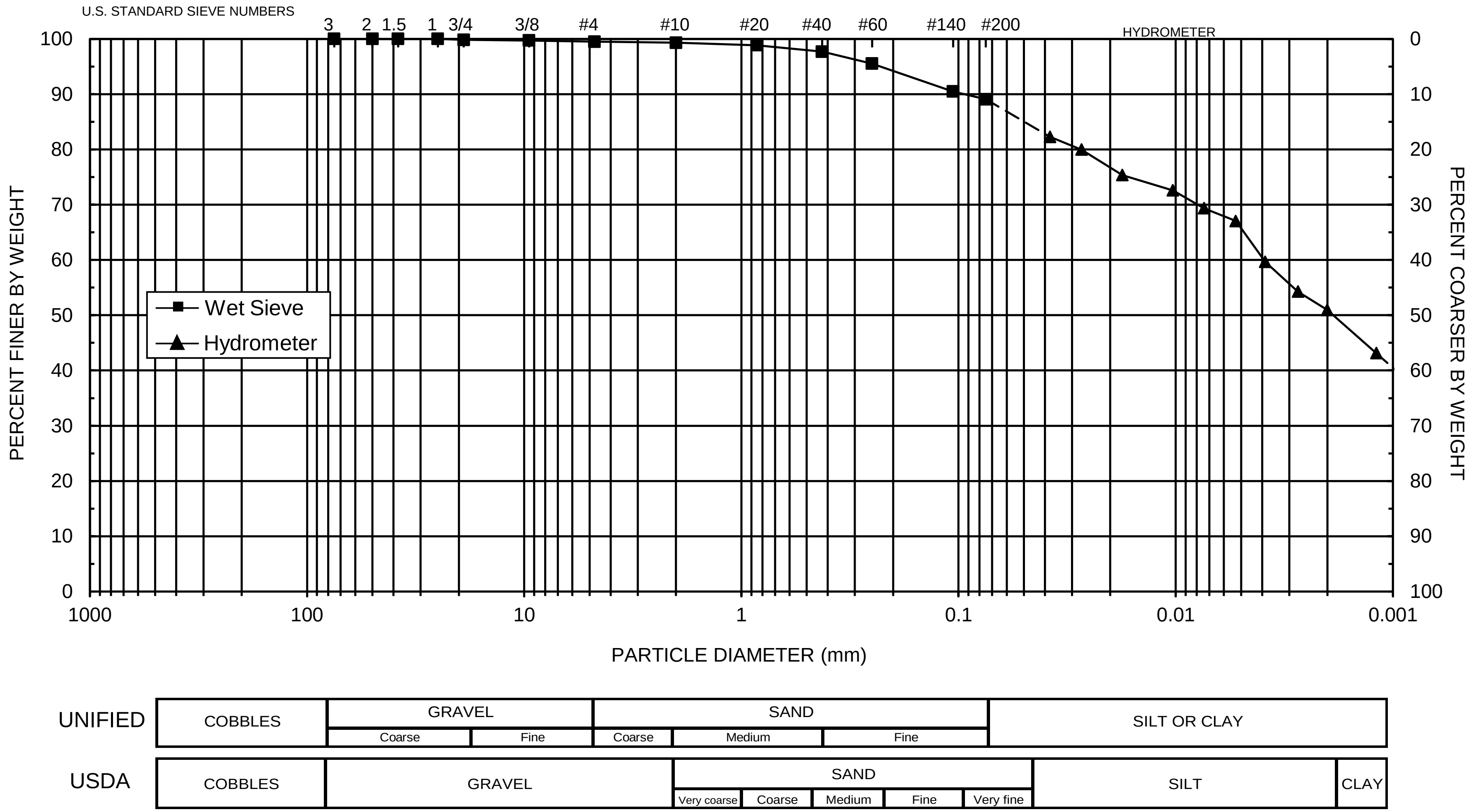
Initial Wt. (g)*:* 53.76
Total Sample Wt. (g)*:* 17658.71
Wt. Passing #10 (g): 17537.66

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	50.3	5.7	44.5	8.1	0.03789	82.8	82.3
	2	21.7	49.0	5.7	43.3	8.3	0.02713	80.5	80.0
	5	21.7	46.5	5.7	40.8	8.7	0.01758	75.9	75.4
	15	21.7	45.0	5.7	39.3	8.9	0.01029	73.1	72.6
	30	21.7	43.3	5.7	37.5	9.2	0.00739	69.8	69.4
	60	21.7	42.0	5.7	36.3	9.4	0.00529	67.5	67.0
	120	21.7	38.0	5.7	32.3	10.1	0.00387	60.1	59.7
	250	22.0	35.0	5.6	29.4	10.6	0.00273	54.6	54.3
	478	21.9	33.3	5.7	27.6	10.8	0.00201	51.3	51.0
26-Sep-19	1446	21.9	29.0	5.7	23.3	11.5	0.00119	43.4	43.1

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00013**	d_{30} = **0.00050**	d_{50} = **0.0019**	d_{60} = **0.0039**	C_u = **30**	C_c = **0.49**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-11	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-12
Date Sampled: 9/17/19 1120
Depth: NA

Initial Dry Weight of Sample (g): 16956.89
Weight Passing #10 (g): 16880.43
Weight Retained #10 (g): 76.46
Weight of Hydrometer Sample (g): 53.90
Calculated Weight of Sieve Sample (g): 54.14

Test Date: 27-Sep-19

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	16956.89	100.00
	2"	50	0.00	0.00	16956.89	100.00
	1.5"	38.1	0.00	0.00	16956.89	100.00
	1"	25	0.00	0.00	16956.89	100.00
	3/4"	19.0	0.00	0.00	16956.89	100.00
	3/8"	9.5	0.69	0.69	16956.20	100.00
	4	4.75	31.47	32.16	16924.73	99.81
	10	2.00	44.30	76.46	16880.43	99.55
-10			(Based on calculated sieve wt.)			
	20	0.85	0.26	0.50	53.64	99.07
	40	0.425	0.70	1.20	52.94	97.78
	60	0.250	1.09	2.29	51.85	95.76
	140	0.106	2.94	5.23	48.91	90.33
	200	0.075	1.01	6.24	47.90	88.47
	dry pan		0.11	6.35	47.79	
	wet pan			47.79	0.00	

d_{10} (mm): 0.00035 d_{50} (mm): 0.0029
d_{16} (mm): 0.00047 d_{60} (mm): 0.0046
d_{30} (mm): 0.00093 d_{84} (mm): 0.056

Median Particle Diameter --d_{50} (mm): 0.0029
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 13
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.54
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.020

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-12
Date Sampled: 9/17/19 1120
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:06

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

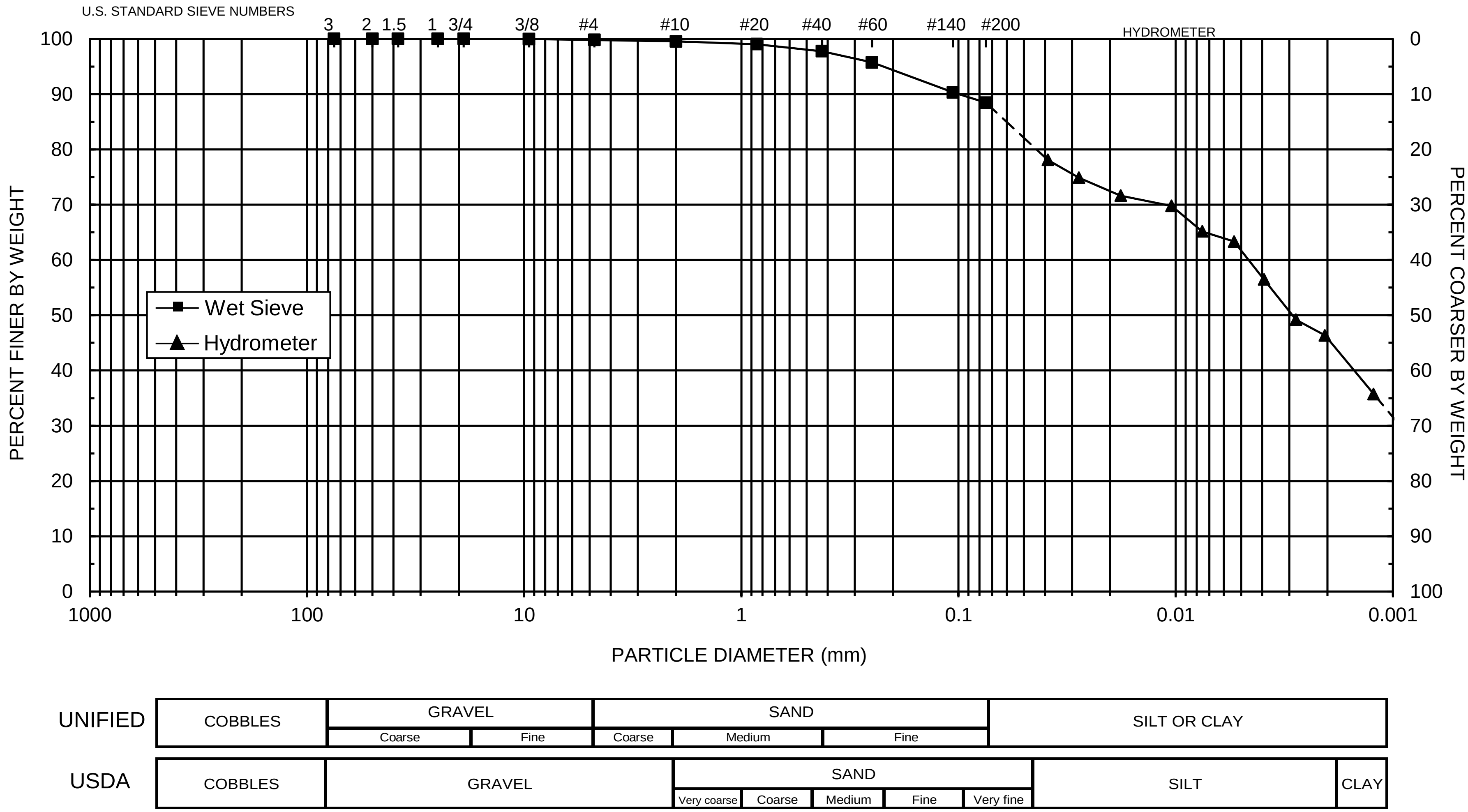
Initial Wt. (g)*:* 53.90
Total Sample Wt. (g)*:* 16956.89
Wt. Passing #10 (g): 16880.43

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	48.0	5.7	42.3	8.4	0.03875	78.5	78.1
	2	21.7	46.3	5.7	40.5	8.7	0.02786	75.2	74.9
	5	21.7	44.5	5.7	38.8	9.0	0.01791	72.0	71.6
	15	21.7	43.5	5.7	37.8	9.2	0.01043	70.1	69.8
	30	21.7	41.0	5.7	35.3	9.6	0.00754	65.5	65.2
	60	21.7	40.0	5.7	34.3	9.7	0.00538	63.6	63.3
	120	21.8	36.3	5.7	30.6	10.4	0.00392	56.7	56.5
	250	22.0	32.3	5.6	26.6	11.0	0.00279	49.4	49.2
	473	21.9	30.8	5.7	25.1	11.3	0.00205	46.5	46.3
26-Sep-19	1441	21.9	25.0	5.7	19.3	12.2	0.00123	35.9	35.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00035**	d_{30} = **0.00093**	d_{50} = **0.0029**	d_{60} = **0.0046**	C_u = **13**	C_c = **0.54**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-12	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-13
Date Sampled: 9/17/19 1130
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 17602.86
Weight Passing #10 (g): 17602.86
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 54.77
Calculated Weight of Sieve Sample (g): 54.77

Shape: Rounded
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	17602.86	100.00
	2"	50	0.00	0.00	17602.86	100.00
	1.5"	38.1	0.00	0.00	17602.86	100.00
	1"	25	0.00	0.00	17602.86	100.00
	3/4"	19.0	0.00	0.00	17602.86	100.00
	3/8"	9.5	0.00	0.00	17602.86	100.00
	4	4.75	0.00	0.00	17602.86	100.00
	10	2.00	0.00	0.00	17602.86	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.01	0.01	54.76	99.98
	40	0.425	0.13	0.14	54.63	99.74
	60	0.250	0.86	1.00	53.77	98.17
	140	0.106	2.85	3.85	50.92	92.97
	200	0.075	0.64	4.49	50.28	91.80
	dry pan		0.10	4.59	50.18	
	wet pan			50.18	0.00	

d_{10} (mm): 0.00021
d_{16} (mm): 0.00028
d_{30} (mm): 0.00055
d_{50} (mm): 0.0015
d_{60} (mm): 0.0028
d_{84} (mm): 0.034

Median Particle Diameter --d_{50} (mm): 0.0015
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 13
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.51
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.012

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

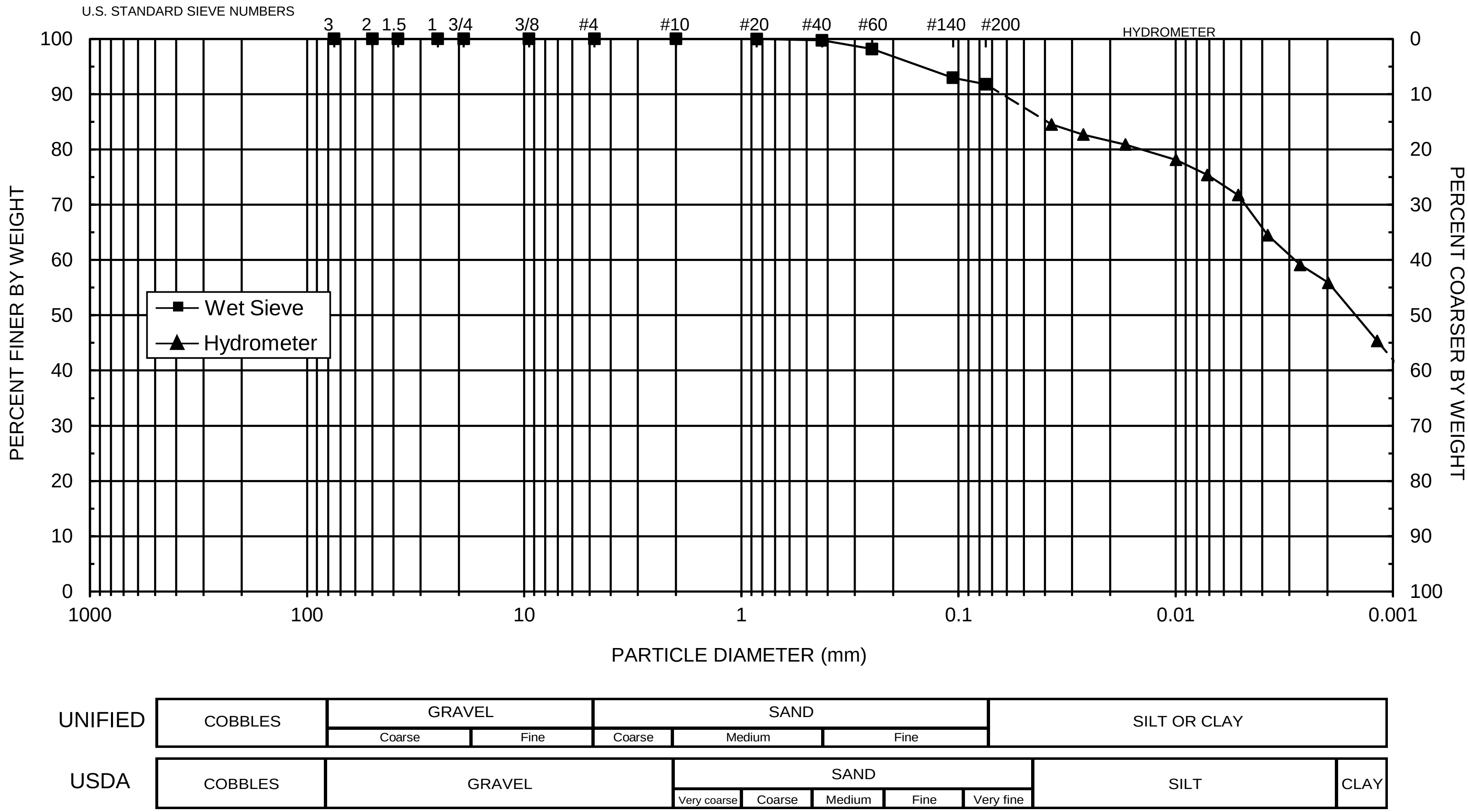
Job Name:	Alan Kuhn Associates, LLC	*Type of Water Used:*	DISTILLED
Job Number:	DB19.1348.00	*Reaction with* H_2O_2:	NA
Sample Number:	Sec12-13	*Dispersant*:*	$(NaPO_3)_6$
Date Sampled:	9/17/19 1130	*Assumed particle density:*	2.65
Depth:	NA	*Initial Wt. (g):*	54.77
Test Date:	24-Sep-19	*Total Sample Wt. (g):*	17602.86
Start Time:	9:12	*Wt. Passing #10 (g):*	17602.86

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	52.0	5.7	46.3	7.8	0.03721	84.5	84.5
	2	21.7	51.0	5.7	45.3	7.9	0.02659	82.7	82.7
	5	21.7	50.0	5.7	44.3	8.1	0.01699	80.9	80.9
	15	21.7	48.5	5.7	42.8	8.3	0.00996	78.1	78.1
	30	21.7	47.0	5.7	41.3	8.6	0.00714	75.4	75.4
	60	21.7	45.0	5.7	39.3	8.9	0.00515	71.7	71.7
	120	21.8	41.0	5.7	35.3	9.6	0.00377	64.5	64.5
	250	22.0	38.0	5.6	32.4	10.1	0.00267	59.1	59.1
	468	21.9	36.3	5.7	30.6	10.4	0.00198	55.9	55.9
26-Sep-19	1436	21.9	30.5	5.7	24.8	11.3	0.00118	45.4	45.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00021**	d_{30} = **0.00055**	d_{50} = **0.0015**	d_{60} = **0.0028**	C_u = **13**	C_c = **0.51**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-13	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-14
Date Sampled: 9/17/19 1140
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 17471.66
Weight Passing #10 (g): 17467.86
Weight Retained #10 (g): 3.80
Weight of Hydrometer Sample (g): 55.18
Calculated Weight of Sieve Sample (g): 55.19

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	17471.66	100.00
	2"	50	0.00	0.00	17471.66	100.00
	1.5"	38.1	0.00	0.00	17471.66	100.00
	1"	25	0.00	0.00	17471.66	100.00
	3/4"	19.0	0.00	0.00	17471.66	100.00
	3/8"	9.5	0.00	0.00	17471.66	100.00
	4	4.75	2.43	2.43	17469.23	99.99
	10	2.00	1.37	3.80	17467.86	99.98
-10			(Based on calculated sieve wt.)			
	20	0.85	0.01	0.02	55.17	99.96
	40	0.425	0.11	0.13	55.06	99.76
	60	0.250	0.85	0.98	54.21	98.22
	140	0.106	3.22	4.20	50.99	92.39
	200	0.075	0.67	4.87	50.32	91.17
	dry pan		0.04	4.91	50.28	
	wet pan			50.28	0.00	

d_{10} (mm): 0.00011 d_{50} (mm): 0.0013
d_{16} (mm): 0.00016 d_{60} (mm): 0.0027
d_{30} (mm): 0.00037 d_{84} (mm): 0.036

Median Particle Diameter --d_{50} (mm): 0.0013
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 25
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.46
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.012

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-14
Date Sampled: 9/17/19 1140
Depth: NA

Test Date: 26-Sep-19
Start Time: 9:18

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

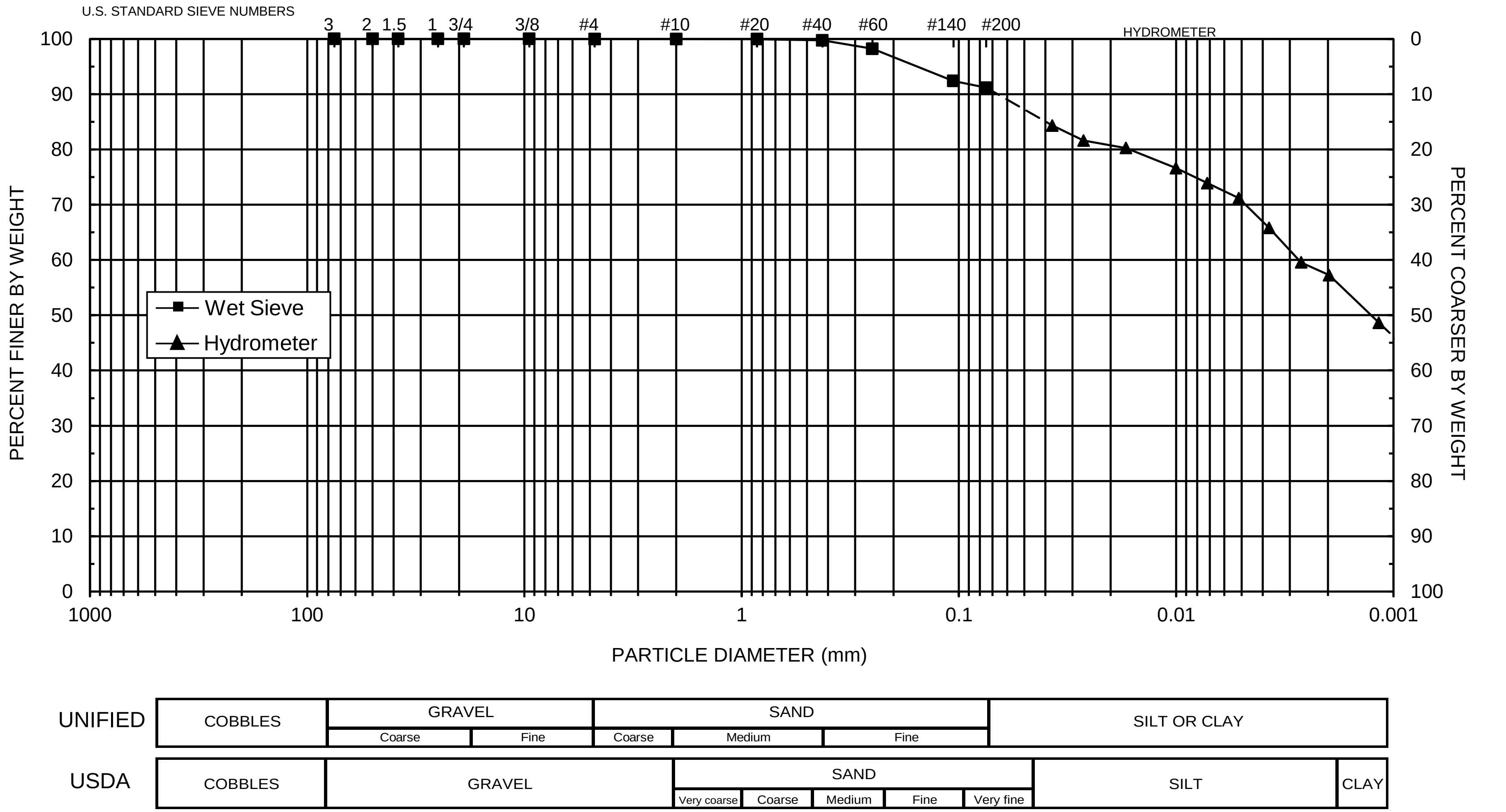
Initial Wt. (g): 55.18
Total Sample Wt. (g): 17471.66
Wt. Passing #10 (g): 17467.86

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	52.3	5.7	46.5	7.7	0.03711	84.3	84.3
	2	21.7	50.8	5.7	45.0	8.0	0.02666	81.6	81.6
	5	21.7	50.0	5.7	44.3	8.1	0.01699	80.3	80.2
	15	21.7	48.0	5.7	42.3	8.4	0.01001	76.6	76.6
	30	21.7	46.5	5.7	40.8	8.7	0.00718	73.9	73.9
	60	21.7	45.0	5.7	39.3	8.9	0.00515	71.2	71.2
	120	21.8	42.0	5.7	36.3	9.4	0.00373	65.8	65.8
	250	22.0	38.5	5.6	32.9	10.0	0.00266	59.6	59.6
	463	21.9	37.3	5.7	31.6	10.2	0.00198	57.2	57.2
26-Sep-19	1431	21.9	32.5	5.7	26.8	11.0	0.00117	48.6	48.6

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **0.00011**	d_{30} = **0.00037**	d_{50} = **0.0013**	d_{60} = **0.0027**	C_u = **25**	C_c = **0.46**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-14	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-15
Date Sampled: 9/17/19 1150
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 16363.04
Weight Passing #10 (g): 16363.04
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 52.74
Calculated Weight of Sieve Sample (g): 52.74

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	16363.04	100.00
	2"	50	0.00	0.00	16363.04	100.00
	1.5"	38.1	0.00	0.00	16363.04	100.00
	1"	25	0.00	0.00	16363.04	100.00
	3/4"	19.0	0.00	0.00	16363.04	100.00
	3/8"	9.5	0.00	0.00	16363.04	100.00
	4	4.75	0.00	0.00	16363.04	100.00
	10	2.00	0.00	0.00	16363.04	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.01	0.01	52.73	99.98
	40	0.425	0.06	0.07	52.67	99.87
	60	0.250	0.25	0.32	52.42	99.39
	140	0.106	1.03	1.35	51.39	97.44
	200	0.075	0.25	1.60	51.14	96.97
	dry pan		0.04	1.64	51.10	
	wet pan			51.10	0.00	

d_{10} (mm): 0.00010
d_{16} (mm): 0.00014
d_{30} (mm): 0.00031
d_{50} (mm): 0.00094
d_{60} (mm): 0.0016
d_{84} (mm): 0.0083

Median Particle Diameter --d_{50} (mm): 0.00094
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 16
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.60
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.0031

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-15
Date Sampled: 9/17/19 1150
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:24

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

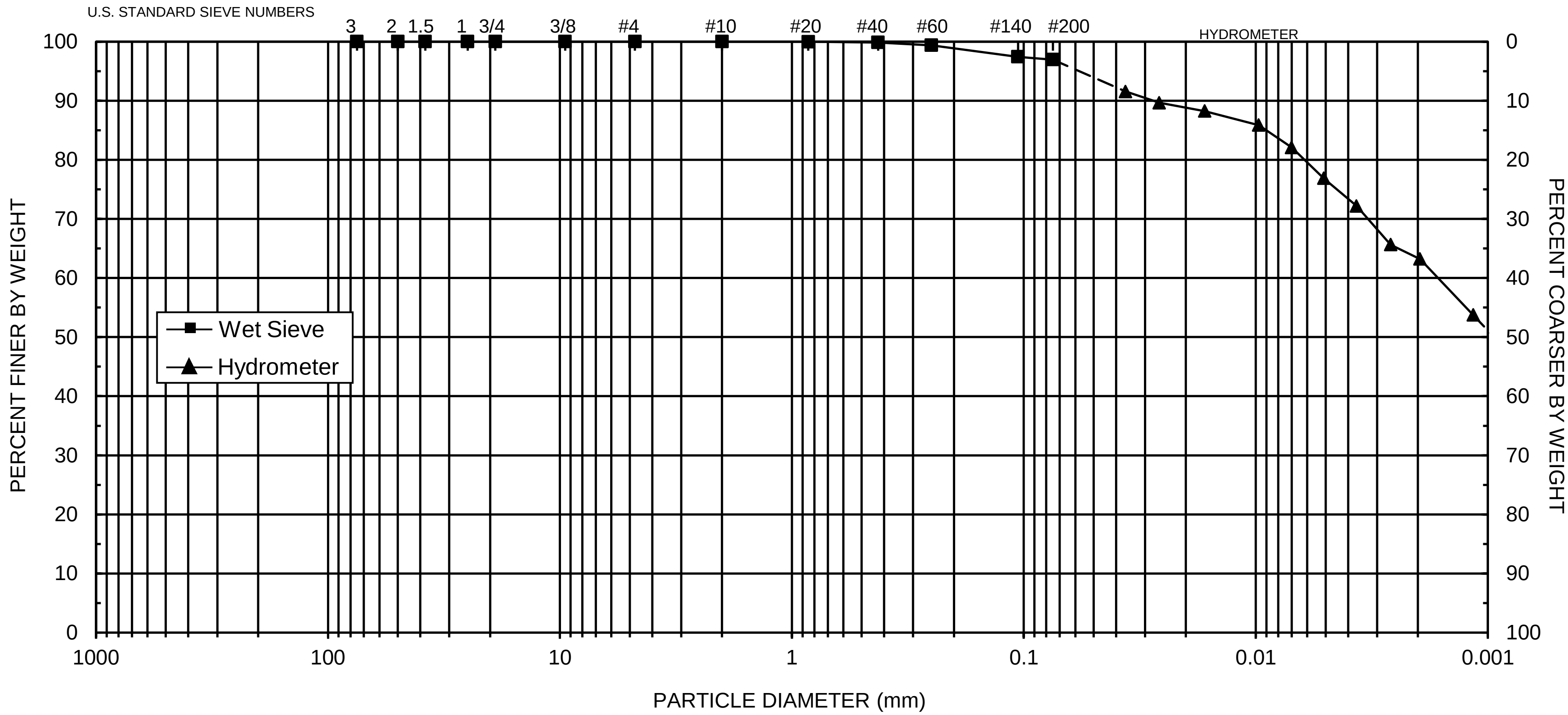
Initial Wt. (g): 52.74
Total Sample Wt. (g): 16363.04
Wt. Passing #10 (g): 16363.04

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	54.0	5.7	48.3	7.4	0.03642	91.6	91.6
	2	21.7	53.0	5.7	47.3	7.6	0.02603	89.7	89.7
	5	21.7	52.3	5.7	46.5	7.7	0.01660	88.2	88.2
	15	21.7	51.0	5.7	45.3	7.9	0.00971	85.9	85.9
	30	21.7	49.0	5.7	43.3	8.3	0.00701	82.1	82.1
	60	21.7	46.3	5.7	40.5	8.7	0.00509	76.9	76.9
	120	21.8	43.8	5.7	38.1	9.1	0.00368	72.2	72.2
	250	22.0	40.3	5.6	34.6	9.7	0.00262	65.6	65.6
	458	21.9	39.0	5.7	33.3	9.9	0.00196	63.2	63.2
26-Sep-19	1426	21.9	34.0	5.7	28.3	10.7	0.00115	53.7	53.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY		
		Coarse	Fine	Coarse	Medium	Fine			
USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00010**	d_{30} = **0.00031**	d_{50} = **0.00094**	d_{60} = **0.0016**	C_u = **16**	C_c = **0.60**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-15	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Alan Kuhn Associates, LLC	*Initial Dry Weight of Sample (g):*	17602.19
Job Number:	DB19.1348.00	*Weight Passing #10 (g):*	17602.19
Sample Number:	Sec12-16	*Weight Retained #10 (g):*	0.00
Date Sampled:	9/17/19 1210	*Weight of Hydrometer Sample (g):*	54.44
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	54.44
Test Date:	27-Sep-19	*Shape:*	Rounded
		Hardness:	Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	17602.19	100.00
	2"	50	0.00	0.00	17602.19	100.00
	1.5"	38.1	0.00	0.00	17602.19	100.00
	1"	25	0.00	0.00	17602.19	100.00
	3/4"	19.0	0.00	0.00	17602.19	100.00
	3/8"	9.5	0.00	0.00	17602.19	100.00
	4	4.75	0.00	0.00	17602.19	100.00
	10	2.00	0.00	0.00	17602.19	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.00	0.00	54.44	100.00
	40	0.425	0.06	0.06	54.38	99.89
	60	0.250	0.36	0.42	54.02	99.23
	140	0.106	1.49	1.91	52.53	96.49
	200	0.075	0.29	2.20	52.24	95.96
	dry pan		0.03	2.23	52.21	
	wet pan			52.21	0.00	

d_{10} (mm):	8.1E-05	d_{50} (mm):	0.00082
d_{16} (mm):	0.00011	d_{60} (mm):	0.0015
d_{30} (mm):	0.00026	d_{84} (mm):	0.0084

Median Particle Diameter --d_{50} (mm): 0.00082

Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 19

Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.56

Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.0031

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)

USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer

Data entered by: A. Albay-Yenney

Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-16
Date Sampled: 9/17/19 1210
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:30

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

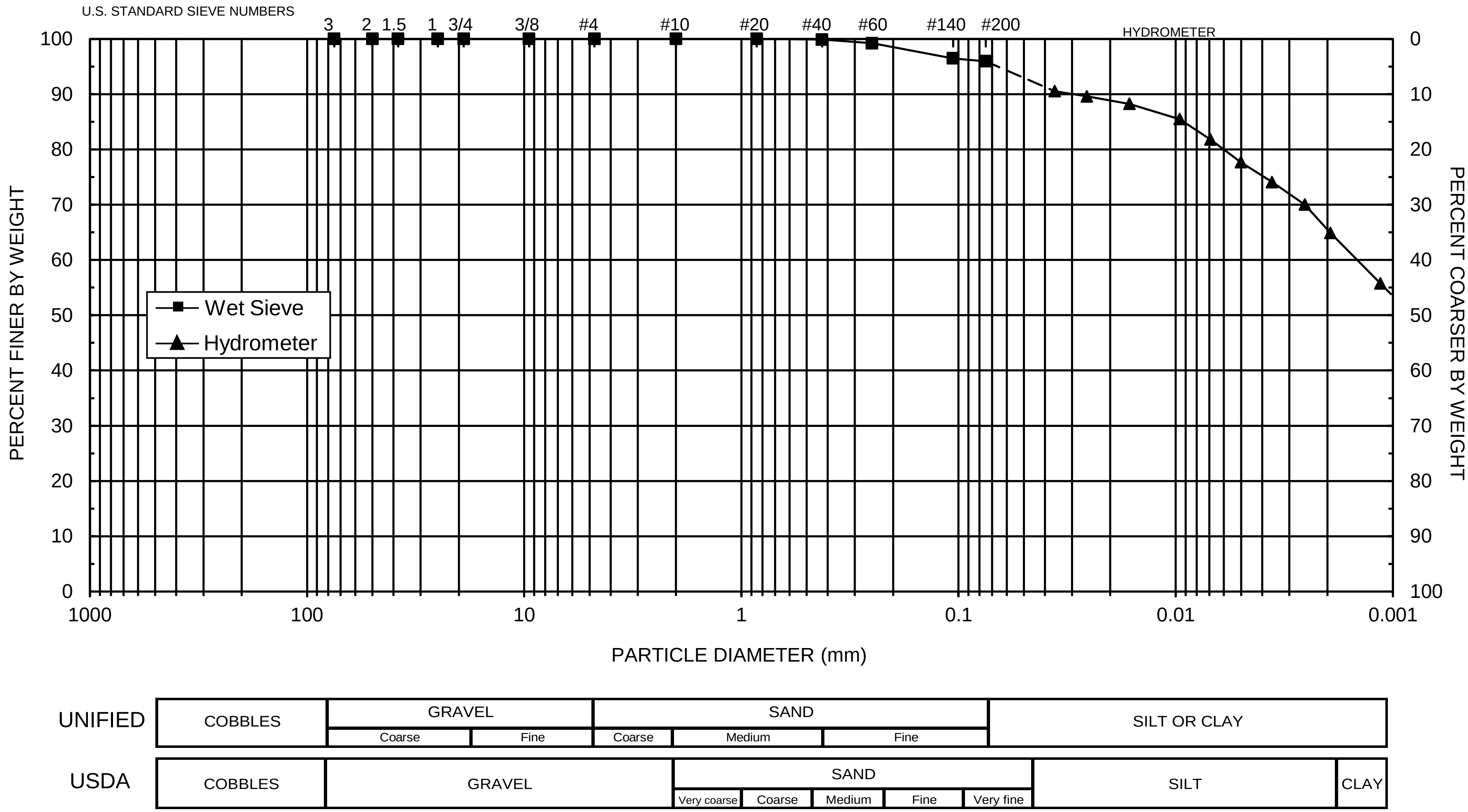
Initial Wt. (g)*:* 54.44
Total Sample Wt. (g)*:* 17602.19
Wt. Passing #10 (g): 17602.19

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	55.0	5.7	49.3	7.3	0.03602	90.5	90.5
	2	21.7	54.5	5.7	48.8	7.4	0.02561	89.6	89.6
	5	21.7	53.8	5.7	48.0	7.5	0.01633	88.2	88.2
	15	21.7	52.3	5.7	46.5	7.7	0.00958	85.5	85.5
	30	21.7	50.3	5.7	44.5	8.1	0.00692	81.8	81.8
	60	21.7	48.0	5.7	42.3	8.4	0.00500	77.7	77.7
	120	21.9	46.0	5.7	40.3	8.8	0.00360	74.1	74.1
	250	22.0	43.8	5.6	38.1	9.1	0.00254	70.0	70.0
	452	21.9	41.0	5.7	35.3	9.6	0.00194	64.9	64.9
26-Sep-19	1420	21.9	36.0	5.7	30.3	10.4	0.00114	55.7	55.7

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **8.1E-05**	d_{30} = **0.00026**	d_{50} = **0.00082**	d_{60} = **0.0015**	C_u = **19**	C_c = **0.56**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-16	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-17
Date Sampled: 9/17/19 1225
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 392.31
Weight Passing #10 (g): 392.31
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 51.82
Calculated Weight of Sieve Sample (g): 51.82

Shape: Rounded
Hardness: Soft

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	392.31	100.00
	2"	50	0.00	0.00	392.31	100.00
	1.5"	38.1	0.00	0.00	392.31	100.00
	1"	25	0.00	0.00	392.31	100.00
	3/4"	19.0	0.00	0.00	392.31	100.00
	3/8"	9.5	0.00	0.00	392.31	100.00
	4	4.75	0.00	0.00	392.31	100.00
	10	2.00	0.00	0.00	392.31	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.00	0.00	51.82	100.00
	40	0.425	0.04	0.04	51.78	99.92
	60	0.250	0.13	0.17	51.65	99.67
	140	0.106	0.42	0.59	51.23	98.86
	200	0.075	0.13	0.72	51.10	98.61
	dry pan		0.05	0.77	51.05	
	wet pan			51.05	0.00	

d_{10} (mm): 5.4E-05
d_{16} (mm): 8.1E-05
d_{30} (mm): 0.00020
d_{50} (mm): 0.00077
d_{60} (mm): 0.0015
d_{84} (mm): 0.0079

Median Particle Diameter --d_{50} (mm): 0.00077
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 28
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.49
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.0029

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-17
Date Sampled: 9/17/19 1225
Depth: NA

Test Date: 23-Sep-19
Start Time: 9:54

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

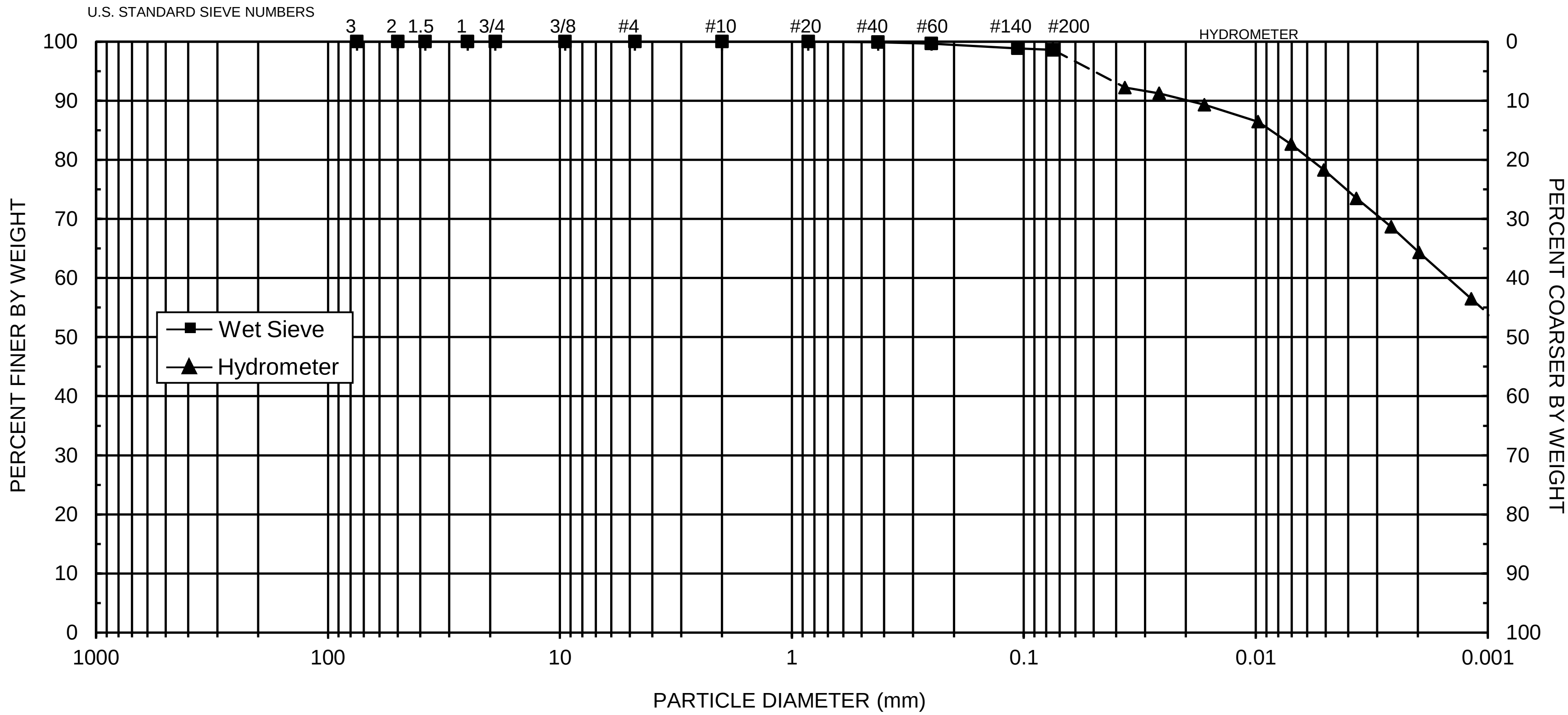
Initial Wt. (g): 51.82
Total Sample Wt. (g): 392.31
Wt. Passing #10 (g): 392.31

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
24-Sep-19	1	21.7	53.5	5.7	47.8	7.5	0.03662	92.2	92.2
	2	21.7	53.0	5.7	47.3	7.6	0.02603	91.3	91.3
	5	21.7	52.0	5.7	46.3	7.8	0.01664	89.3	89.3
	15	21.7	50.5	5.7	44.8	8.0	0.00976	86.4	86.4
	30	21.8	48.5	5.7	42.8	8.3	0.00703	82.6	82.6
	60	21.8	46.3	5.7	40.6	8.7	0.00508	78.3	78.3
	120	21.8	43.8	5.7	38.1	9.1	0.00368	73.5	73.5
	250	21.8	41.3	5.7	35.6	9.5	0.00260	68.6	68.6
	451	21.8	39.0	5.7	33.3	9.9	0.00198	64.3	64.3
25-Sep-19	1360	21.6	35.0	5.7	29.3	10.6	0.00118	56.5	56.5

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine	

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **5.4E-05**	d_{30} = **0.00020**	d_{50} = **0.00077**	d_{60} = **0.0015**	C_u = **28**	C_c = **0.49**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-17	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-18
Date Sampled: 9/17/19 1240
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 430.69
Weight Passing #10 (g): 430.69
Weight Retained #10 (g): 0.00
Weight of Hydrometer Sample (g): 54.37
Calculated Weight of Sieve Sample (g): 54.37

Shape: Rounded
Hardness: Weathered and friable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	430.69	100.00
	2"	50	0.00	0.00	430.69	100.00
	1.5"	38.1	0.00	0.00	430.69	100.00
	1"	25	0.00	0.00	430.69	100.00
	3/4"	19.0	0.00	0.00	430.69	100.00
	3/8"	9.5	0.00	0.00	430.69	100.00
	4	4.75	0.00	0.00	430.69	100.00
	10	2.00	0.00	0.00	430.69	100.00
-10			(Based on calculated sieve wt.)			
	20	0.85	0.01	0.01	54.36	99.98
	40	0.425	0.13	0.14	54.23	99.74
	60	0.250	0.69	0.83	53.54	98.47
	140	0.106	2.09	2.92	51.45	94.63
	200	0.075	0.35	3.27	51.10	93.99
	dry pan		0.05	3.32	51.05	
	wet pan			51.05	0.00	

d_{10} (mm): 9.7E-05 d_{50} (mm): 0.00100
d_{16} (mm): 0.00014 d_{60} (mm): 0.0018
d_{30} (mm): 0.00031 d_{84} (mm): 0.012

Median Particle Diameter --d_{50} (mm): 0.0010
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 19
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.55
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.0044

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-18
Date Sampled: 9/17/19 1240
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:36

Type of Water Used: DISTILLED
Reaction with H_2O_2: NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

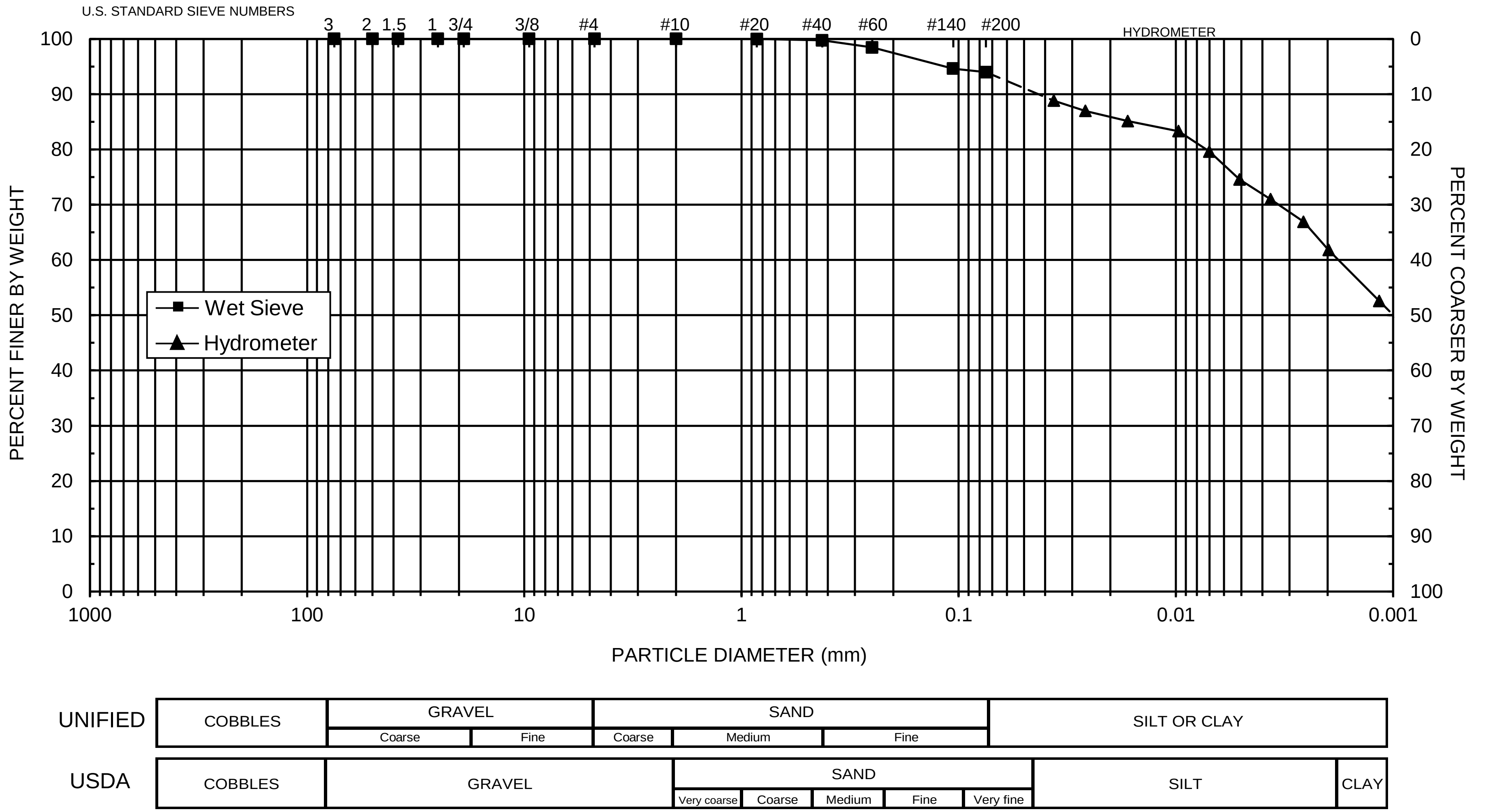
Initial Wt. (g): 54.37
Total Sample Wt. (g): 430.69
Wt. Passing #10 (g): 430.69

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	54.0	5.7	48.3	7.4	0.03642	88.8	88.8
	2	21.7	53.0	5.7	47.3	7.6	0.02603	87.0	87.0
	5	21.7	52.0	5.7	46.3	7.8	0.01664	85.1	85.1
	15	21.7	51.0	5.7	45.3	7.9	0.00971	83.3	83.3
	30	21.7	49.0	5.7	43.3	8.3	0.00701	79.6	79.6
	60	21.7	46.3	5.7	40.5	8.7	0.00509	74.6	74.6
	120	21.9	44.3	5.7	38.6	9.0	0.00366	71.0	71.0
	250	22.0	42.0	5.6	36.4	9.4	0.00258	66.9	66.9
	447	21.9	39.3	5.7	33.6	9.9	0.00198	61.8	61.8
26-Sep-19	1415	21.9	34.3	5.7	28.6	10.7	0.00116	52.6	52.6

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



d_{10} = **9.7E-05**	d_{30} = **0.00031**	d_{50} = **0.0010**	d_{60} = **0.0018**	C_u = **19**	C_c = **0.55**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-18	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name:	Alan Kuhn Associates, LLC	*Initial Dry Weight of Sample (g):*	370.76
Job Number:	DB19.1348.00	*Weight Passing #10 (g):*	370.20
Sample Number:	Sec12-19	*Weight Retained #10 (g):*	0.56
Date Sampled:	9/17/19 1245	*Weight of Hydrometer Sample (g):*	53.72
Depth:	NA	*Calculated Weight of Sieve Sample (g):*	53.80
Test Date:	27-Sep-19	*Shape:*	Angular
		Hardness:	Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	370.76	100.00
	2"	50	0.00	0.00	370.76	100.00
	1.5"	38.1	0.00	0.00	370.76	100.00
	1"	25	0.00	0.00	370.76	100.00
	3/4"	19.0	0.00	0.00	370.76	100.00
	3/8"	9.5	0.00	0.00	370.76	100.00
	4	4.75	0.56	0.56	370.20	99.85
	10	2.00	0.00	0.56	370.20	99.85
-10			(Based on calculated sieve wt.)			
	20	0.85	0.15	0.23	53.57	99.57
	40	0.425	0.51	0.74	53.06	98.62
	60	0.250	1.17	1.91	51.89	96.45
	140	0.106	4.26	6.17	47.63	88.53
	200	0.075	0.89	7.06	46.74	86.88
	dry pan		0.08	7.14	46.66	
	wet pan			46.66	0.00	

d_{10} (mm):	0.00013	d_{50} (mm):	0.0018
d_{16} (mm):	0.00019	d_{60} (mm):	0.0038
d_{30} (mm):	0.00049	d_{84} (mm):	0.059

Median Particle Diameter --d_{50} (mm): 0.0018

Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 29

Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.49

Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.020

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-19
Date Sampled: 9/17/19 1245
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:42

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

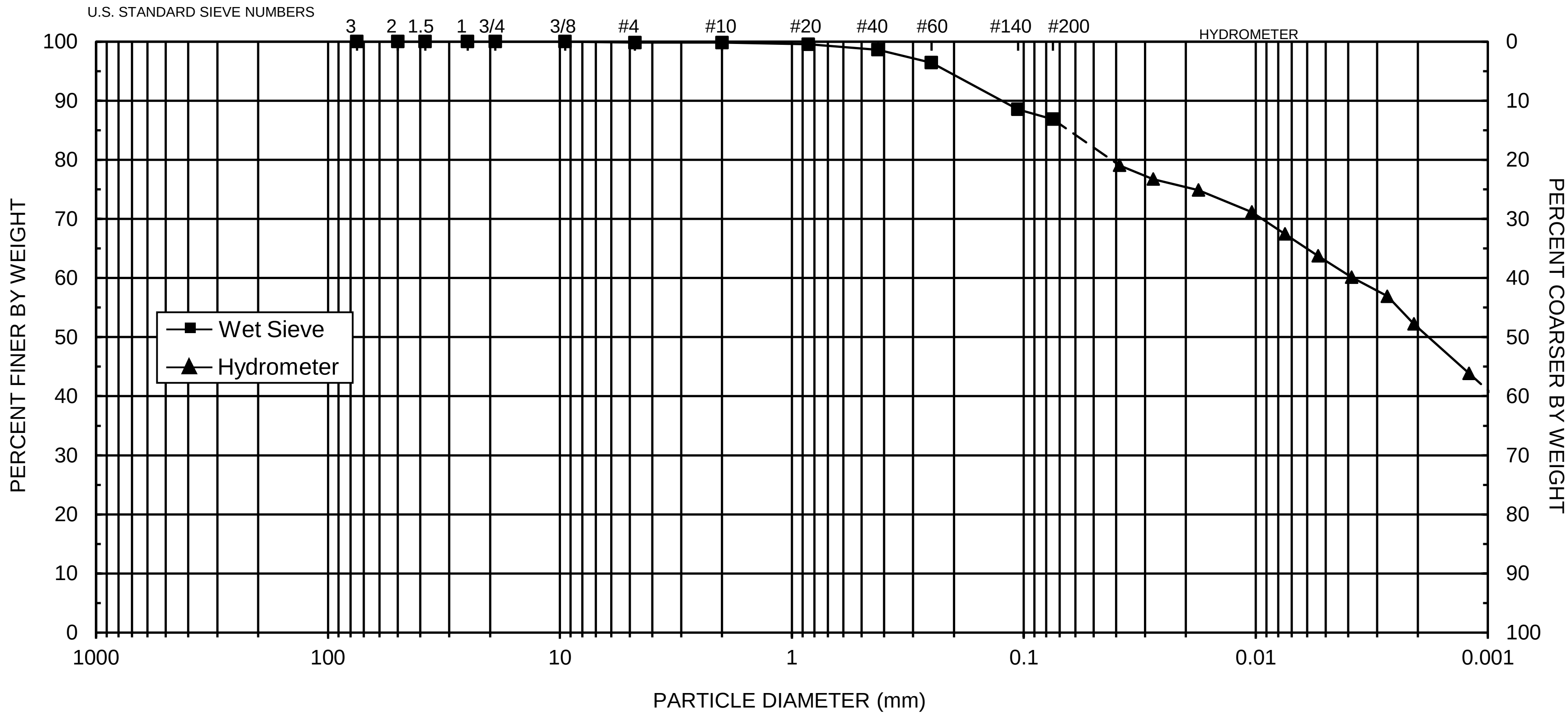
Initial Wt. (g): 53.72
Total Sample Wt. (g): 370.76
Wt. Passing #10 (g): 370.20

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	48.3	5.7	42.5	8.4	0.03866	79.2	79.1
	2	21.7	47.0	5.7	41.3	8.6	0.02767	76.9	76.7
	5	21.7	46.0	5.7	40.3	8.8	0.01766	75.0	74.9
	15	21.7	44.0	5.7	38.3	9.1	0.01039	71.3	71.2
	30	21.7	42.0	5.7	36.3	9.4	0.00748	67.6	67.5
	60	21.7	40.0	5.7	34.3	9.7	0.00538	63.8	63.7
	120	21.9	38.0	5.7	32.3	10.1	0.00386	60.2	60.1
	250	22.0	36.3	5.6	30.6	10.4	0.00271	57.0	56.9
	442	21.9	33.8	5.7	28.1	10.8	0.00208	52.3	52.2
26-Sep-19	1410	21.9	29.3	5.7	23.6	11.5	0.00120	43.9	43.8

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND			SILT OR CLAY			
		Coarse	Fine	Coarse	Medium	Fine				
USDA	COBBLES	GRAVEL	SAND					SILT	CLAY	
			Very coarse	Coarse	Medium	Fine	Very fine			

d_{10} = **0.00013**	d_{30} = **0.00049**	d_{50} = **0.0018**	d_{60} = **0.0038**	C_u = **29**	C_c = **0.49**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-19	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Wet Sieve Data (#10 Split)

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-20
Date Sampled: 9/17/19 1250
Depth: NA

Test Date: 27-Sep-19

Initial Dry Weight of Sample (g): 429.69
Weight Passing #10 (g): 429.65
Weight Retained #10 (g): 0.04
Weight of Hydrometer Sample (g): 55.51
Calculated Weight of Sieve Sample (g): 55.52

Shape: Angular
Hardness: Hard and durable

Test Fraction	Sieve Number	Diameter (mm)	Wt. Retained	Cum Wt. Retained	Wt. Passing	% Passing
+10						
	3"	75	0.00	0.00	429.69	100.00
	2"	50	0.00	0.00	429.69	100.00
	1.5"	38.1	0.00	0.00	429.69	100.00
	1"	25	0.00	0.00	429.69	100.00
	3/4"	19.0	0.00	0.00	429.69	100.00
	3/8"	9.5	0.00	0.00	429.69	100.00
	4	4.75	0.00	0.00	429.69	100.00
	10	2.00	0.04	0.04	429.65	99.99
-10			(Based on calculated sieve wt.)			
	20	0.85	0.11	0.12	55.40	99.79
	40	0.425	0.60	0.72	54.80	98.71
	60	0.250	1.19	1.91	53.61	96.57
	140	0.106	2.96	4.87	50.65	91.24
	200	0.075	0.75	5.62	49.90	89.89
	dry pan		0.09	5.71	49.81	
	wet pan			49.81	0.00	

d_{10} (mm): 0.00012 d_{50} (mm): 0.0014
d_{16} (mm): 0.00018 d_{60} (mm): 0.0026
d_{30} (mm): 0.00041 d_{84} (mm): 0.040

Median Particle Diameter --d_{50} (mm): 0.0014
Uniformity Coefficient, Cu --$[d_{60}/d_{10}]$ (mm): 22
Coefficient of Curvature, Cc --$[(d_{30})^2/(d_{10}*d_{60})]$ (mm): 0.54
Mean Particle Diameter --$[(d_{16}+d_{50}+d_{84})/3]$ (mm): 0.014

Note: Reported values for d_{10}, C_u, C_c, and soil classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Classification of fines: CH

ASTM Soil Classification: Fat clay (CH)
USDA Soil Classification: Clay

Laboratory analysis by: J. Newcomer
Data entered by: A. Albay-Yenney
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Particle Size Analysis
Hydrometer Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-20
Date Sampled: 9/17/19 1250
Depth: NA

Test Date: 24-Sep-19
Start Time: 9:48

Type of Water Used: DISTILLED
Reaction with H_2O_2*:* NA
Dispersant:* $(NaPO_3)_6$
Assumed particle density: 2.65

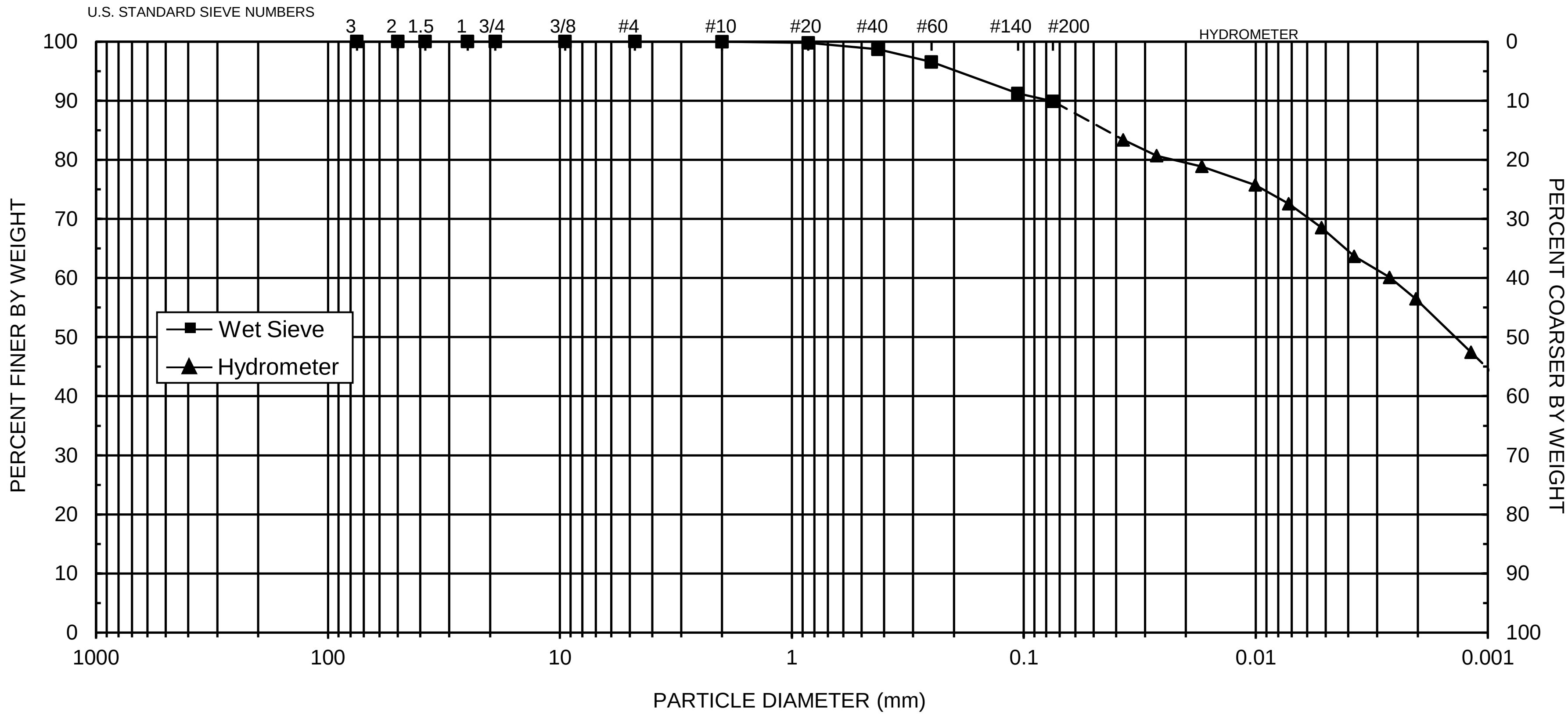
Initial Wt. (g)*:* 55.51
Total Sample Wt. (g)*:* 429.69
Wt. Passing #10 (g): 429.65

Date	Time (min)	Temp (°C)	R (g/L)	R_L (g/L)	R_{corr} (g/L)	L (cm)	D (mm)	P (%)	% Finer
25-Sep-19	1	21.7	52.0	5.7	46.3	7.8	0.03721	83.4	83.4
	2	21.7	50.5	5.7	44.8	8.0	0.02673	80.7	80.7
	5	21.7	49.5	5.7	43.8	8.2	0.01707	78.9	78.9
	15	21.7	47.8	5.7	42.0	8.5	0.01003	75.7	75.7
	30	21.7	46.0	5.7	40.3	8.8	0.00721	72.6	72.6
	60	21.7	43.8	5.7	38.0	9.1	0.00521	68.5	68.5
	120	21.9	41.0	5.7	35.3	9.6	0.00376	63.7	63.7
	250	22.0	39.0	5.6	33.4	9.9	0.00265	60.1	60.1
	437	21.9	37.0	5.7	31.3	10.2	0.00204	56.5	56.5
26-Sep-19	1405	21.9	32.0	5.7	26.3	11.1	0.00118	47.5	47.4

Comments:

* Dispersion device: mechanically operated stirring device

Laboratory analysis by: L. Thurgood
Data entered by: A. Albay-Yenney
Checked by: J. Hines



UNIFIED	COBBLES	GRAVEL		SAND				SILT OR CLAY
		Coarse	Fine	Coarse	Medium	Fine		

USDA	COBBLES	GRAVEL	SAND					SILT	CLAY
			Very coarse	Coarse	Medium	Fine	Very fine		

d_{10} = **0.00012**	d_{30} = **0.00041**	d_{50} = **0.0014**	d_{60} = **0.0026**	C_u = **22**	C_c = **0.54**

SAMPLE NUMBER	DEPTH	ASTM CLASSIFICATION	USDA CLASSIFICATION
Sec12-20	**NA**	**Fat clay (CH)**	**Clay**

Note: Reported values for d_{10}, C_u, C_c, and ASTM classification are estimates, since extrapolation was required to obtain the d_{10} diameter

Daniel B. Stephens & Associates, Inc.

Atterberg Limits/ Identification of Fines

Summary of Atterberg Tests

Sample Number	Liquid Limit	Plastic Limit	Plasticity Index	Classification
Sec12-1	55	24	31	CH
Sec12-2	58	25	33	CH
Sec12-4	52	22	30	CH
Sec12-5	49	21	28	CL
Sec12-6	44	19	25	CL
Sec12-7	40	19	21	CL
Sec12-11	53	25	28	CH
Sec12-12	54	25	29	CH
Sec12-13	61	27	34	CH
Sec12-14	58	24	34	CH
Sec12-15	72	27	45	CH
Sec12-16	68	28	40	CH
Sec12-17	72	27	45	CH
Sec12-18	64	26	38	CH
Sec12-19	51	24	27	CH
Sec12-20	56	23	33	CH

--- = Soil requires visual-manual classification due to non-plasticity

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-1
Date Sampled: 9/17/19 1100
Depth: NA

Test Date: 16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	31	23	15
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	125.82	126.86	127.37
Weight of pan plus dry soil (g)	120.95	121.05	121.76
Weight of pan (g):	111.97	110.58	112.02
Gravimetric moisture content (% g/g):	54.23	55.49	57.60

Liquid Limit: 55

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	120.55	120.27
Weight of pan plus dry soil (g)	119.11	118.94
Weight of pan (g):	113.18	113.39
Gravimetric moisture content (% g/g):	24.28	23.96

Plastic Limit: 24

Results

Percent of Sample Retained on #40 Sieve: See Sieve

Liquid Limit: 55
Plastic Limit: 24
Plasticity Index: 31

Classification: CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-2
Date Sampled:	9/17/19 1120
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	33	26	18
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	128.51	132.00	127.07
Weight of pan plus dry soil (g)	123.56	125.67	121.86
Weight of pan (g):	114.74	114.76	113.22
Gravimetric moisture content (% g/g):	56.12	58.02	60.30
Liquid Limit:	58		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	123.20	123.93
Weight of pan plus dry soil (g)	121.40	122.41
Weight of pan (g):	114.28	116.37
Gravimetric moisture content (% g/g):	25.28	25.17
Plastic Limit:	25	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	58
Plastic Limit:	25
Plasticity Index:	33
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-4
Date Sampled:	9/17/19 1230
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	30	24	16
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	132.73	126.88	137.75
Weight of pan plus dry soil (g)	127.39	122.67	129.44
Weight of pan (g):	116.86	114.56	113.98
Gravimetric moisture content (% g/g):	50.71	51.91	53.75
Liquid Limit:	52		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	129.84	121.72
Weight of pan plus dry soil (g)	128.44	120.15
Weight of pan (g):	122.12	112.97
Gravimetric moisture content (% g/g):	22.15	21.87
Plastic Limit:	22	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	52
Plastic Limit:	22
Plasticity Index:	30
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-5
Date Sampled:	9/17/19 1245
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	30	24	15
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	132.82	129.47	131.86
Weight of pan plus dry soil (g)	126.98	124.68	126.56
Weight of pan (g):	114.77	115.15	116.48
Gravimetric moisture content (% g/g):	47.83	50.26	52.58
Liquid Limit:	49		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	121.97	120.98
Weight of pan plus dry soil (g)	120.23	119.40
Weight of pan (g):	112.09	112.01
Gravimetric moisture content (% g/g):	21.38	21.38
Plastic Limit:	21	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	49
Plastic Limit:	21
Plasticity Index:	28
Classification:	CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-6
Date Sampled:	9/17/19 1330
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	27	20
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	132.58	129.22	131.65
Weight of pan plus dry soil (g)	127.54	124.80	126.62
Weight of pan (g):	115.27	114.76	115.63
Gravimetric moisture content (% g/g):	41.08	44.02	45.77
Liquid Limit:	44		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	124.33	122.57
Weight of pan plus dry soil (g)	122.81	121.05
Weight of pan (g):	114.85	113.02
Gravimetric moisture content (% g/g):	19.10	18.93
Plastic Limit:	19	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	44
Plastic Limit:	19
Plasticity Index:	25
Classification:	CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-7
Date Sampled:	9/17/19 1345
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	31	24	16
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	122.89	131.11	130.77
Weight of pan plus dry soil (g)	119.83	126.92	126.71
Weight of pan (g):	111.88	116.38	116.97
Gravimetric moisture content (% g/g):	38.49	39.75	41.68
Liquid Limit:	40		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	118.56	119.29
Weight of pan plus dry soil (g)	117.46	118.20
Weight of pan (g):	111.62	112.53
Gravimetric moisture content (% g/g):	18.84	19.22
Plastic Limit:	19	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	40
Plastic Limit:	19
Plasticity Index:	21
Classification:	CL

Comments:

--- = Soil requires visual-manual classification due to non-plasticity

* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-11
Date Sampled:	9/17/19 1115
Depth:	NA
Test Date:	17-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	28	21
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	129.17	126.49	123.27
Weight of pan plus dry soil (g)	125.32	122.29	119.79
Weight of pan (g):	117.65	114.20	113.36
Gravimetric moisture content (% g/g):	50.20	51.92	54.12

Liquid Limit: 53

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	120.31	120.44
Weight of pan plus dry soil (g)	118.66	118.75
Weight of pan (g):	111.95	111.97
Gravimetric moisture content (% g/g):	24.59	24.93

Plastic Limit: 25

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	53
Plastic Limit:	25
Plasticity Index:	28
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-12
Date Sampled:	9/17/19 1120
Depth:	NA
Test Date:	17-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	33	25	17
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	126.13	127.65	128.25
Weight of pan plus dry soil (g)	121.38	122.19	122.94
Weight of pan (g):	112.24	112.04	113.45
Gravimetric moisture content (% g/g):	51.97	53.79	55.95
Liquid Limit:	54		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	127.24	121.47
Weight of pan plus dry soil (g)	125.18	119.69
Weight of pan (g):	116.81	112.55
Gravimetric moisture content (% g/g):	24.61	24.93
Plastic Limit:	25	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	54
Plastic Limit:	25
Plasticity Index:	29
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-13
Date Sampled:	9/17/19 1130
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	29	21	15
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	124.96	126.52	129.92
Weight of pan plus dry soil (g)	120.06	122.20	123.75
Weight of pan (g):	111.93	115.15	113.98
Gravimetric moisture content (% g/g):	60.27	61.28	63.15
Liquid Limit:	61		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	123.21	118.92
Weight of pan plus dry soil (g)	121.56	117.42
Weight of pan (g):	115.46	111.79
Gravimetric moisture content (% g/g):	27.05	26.64
Plastic Limit:	27	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	61
Plastic Limit:	27
Plasticity Index:	34
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-14
Date Sampled:	9/17/19 1140
Depth:	NA
Test Date:	17-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	33	27	20
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	124.70	124.35	126.75
Weight of pan plus dry soil (g)	120.40	119.79	121.79
Weight of pan (g):	112.68	111.84	113.46
Gravimetric moisture content (% g/g):	55.70	57.36	59.54
Liquid Limit:	58		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	127.10	124.06
Weight of pan plus dry soil (g)	124.95	122.51
Weight of pan (g):	116.05	116.10
Gravimetric moisture content (% g/g):	24.16	24.18
Plastic Limit:	24	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	58
Plastic Limit:	24
Plasticity Index:	34
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-15
Date Sampled:	9/17/19 1150
Depth:	NA
Test Date:	17-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	29	22
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	132.93	127.42	127.06
Weight of pan plus dry soil (g)	126.41	122.48	120.71
Weight of pan (g):	116.64	115.48	112.00
Gravimetric moisture content (% g/g):	66.73	70.57	72.90
Liquid Limit:	72		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	123.84	120.82
Weight of pan plus dry soil (g)	122.30	119.37
Weight of pan (g):	116.56	114.03
Gravimetric moisture content (% g/g):	26.83	27.15
Plastic Limit:	27	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	72
Plastic Limit:	27
Plasticity Index:	45
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-16
Date Sampled:	9/17/19 1210
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	34	25	17
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	130.88	130.00	127.21
Weight of pan plus dry soil (g)	123.76	124.60	122.04
Weight of pan (g):	112.89	116.66	114.83
Gravimetric moisture content (% g/g):	65.50	68.01	71.71
Liquid Limit:	68		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	120.13	122.13
Weight of pan plus dry soil (g)	118.50	120.48
Weight of pan (g):	112.63	114.59
Gravimetric moisture content (% g/g):	27.77	28.01
Plastic Limit:	28	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	68
Plastic Limit:	28
Plasticity Index:	40
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-17
Date Sampled:	9/17/19 1225
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	28	21
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	126.30	121.68	127.98
Weight of pan plus dry soil (g)	121.55	117.63	122.39
Weight of pan (g):	114.65	111.97	114.74
Gravimetric moisture content (% g/g):	68.84	71.55	73.07
Liquid Limit:	72		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	122.95	125.77
Weight of pan plus dry soil (g)	121.25	124.06
Weight of pan (g):	114.93	117.62
Gravimetric moisture content (% g/g):	26.90	26.55
Plastic Limit:	27	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	72
Plastic Limit:	27
Plasticity Index:	45
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-18
Date Sampled:	9/17/19 1240
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	33	24	16
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	123.37	128.25	122.83
Weight of pan plus dry soil (g)	118.96	123.98	118.72
Weight of pan (g):	111.90	117.39	112.59
Gravimetric moisture content (% g/g):	62.46	64.80	67.05
Liquid Limit:	64		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	121.91	124.69
Weight of pan plus dry soil (g)	119.85	122.46
Weight of pan (g):	111.84	113.71
Gravimetric moisture content (% g/g):	25.72	25.49
Plastic Limit:	26	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	64
Plastic Limit:	26
Plasticity Index:	38
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by:	D. O'Dowd
Data entered by:	D. O'Dowd
Checked by:	J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-19
Date Sampled:	9/17/19 1245
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	35	26	17
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	130.40	132.31	133.60
Weight of pan plus dry soil (g)	124.74	126.74	127.24
Weight of pan (g):	113.18	115.76	115.21
Gravimetric moisture content (% g/g):	48.96	50.73	52.87
Liquid Limit:	51		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	124.16	125.70
Weight of pan plus dry soil (g)	122.54	123.92
Weight of pan (g):	115.73	116.39
Gravimetric moisture content (% g/g):	23.79	23.64
Plastic Limit:	24	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	51
Plastic Limit:	24
Plasticity Index:	27
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity

* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Atterberg Limits

Job Name:	Alan Kuhn Associates, LLC
Job Number:	DB19.1348.00
Sample Number:	Sec12-20
Date Sampled:	9/17/19 1250
Depth:	NA
Test Date:	16-Oct-19

Liquid Limit

	Trial 1	Trial 2	Trial 3
Number of drops:	34	27	19
Pan number:	LL1	LL2	LL3
Weight of pan plus moist soil (g):	130.18	123.31	141.43
Weight of pan plus dry soil (g)	124.08	118.37	133.33
Weight of pan (g):	112.73	109.59	119.32
Gravimetric moisture content (% g/g):	53.74	56.26	57.82
Liquid Limit:	56		

Plastic Limit

	Trial 1	Trial 2
Pan number:	PL1	PL2
Weight of pan plus moist soil (g):	119.94	120.61
Weight of pan plus dry soil (g)	118.55	119.18
Weight of pan (g):	112.62	113.11
Gravimetric moisture content (% g/g):	23.44	23.56
Plastic Limit:	23	

Results

Percent of Sample Retained on #40 Sieve:	See Sieve
Liquid Limit:	56
Plastic Limit:	23
Plasticity Index:	33
Classification:	CH

Comments:

--- = Soil requires visual-manual classification due to non-plasticity
* = 1-point method requested by client

Laboratory analysis by: D. O'Dowd
Data entered by: D. O'Dowd
Checked by: J. Hines

Proctor Compaction

Summary of Proctor Compaction Tests

Sample Number	Measured: Optimum Moisture Content (% g/g)	Measured: Maximum Dry Bulk Density (g/cm^3)	Oversize Corrected: Optimum Moisture Content (% g/g)	Oversize Corrected: Maximum Dry Bulk Density (g/cm^3)
Sec12-11	23.5	1.56	---	---
Sec12-12	24.0	1.52	---	---
Sec12-13	25.8	1.45	---	---
Sec12-14	26.6	1.50	---	---
Sec12-15	26.7	1.50	---	---
Sec12-16	25.0	1.43	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass
NR = Not requested
NA = Not applicable

Proctor Compaction Data

Job Name:	Alan Kuhn Associates, LLC	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB19.1348.00	*Mass of coarse material (g):*	86.99
Sample Number:	Sec12-11	*Mass of fines material (g):*	17571.72
Date Sampled:	9/17/19 1115	*Mold weight (g):*	4196
Depth:	NA	*Mold volume (cm^3):*	941.92
Test Date:	30-Sep-19	*Compaction Method:*	Standard A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5953	1080.32	897.03	271.59	1.44	29.31
2	5867	1038.95	908.36	268.93	1.47	20.42
3	5982	1095.56	946.83	282.25	1.55	22.38
4	6019	1115.79	951.33	284.08	1.55	24.65
5	5997	1129.96	950.43	289.86	1.50	27.18

Soil Fractions

Coarse Fraction (% g/g): 0.5
Fines Fraction (% g/g): 99.5

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65
Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

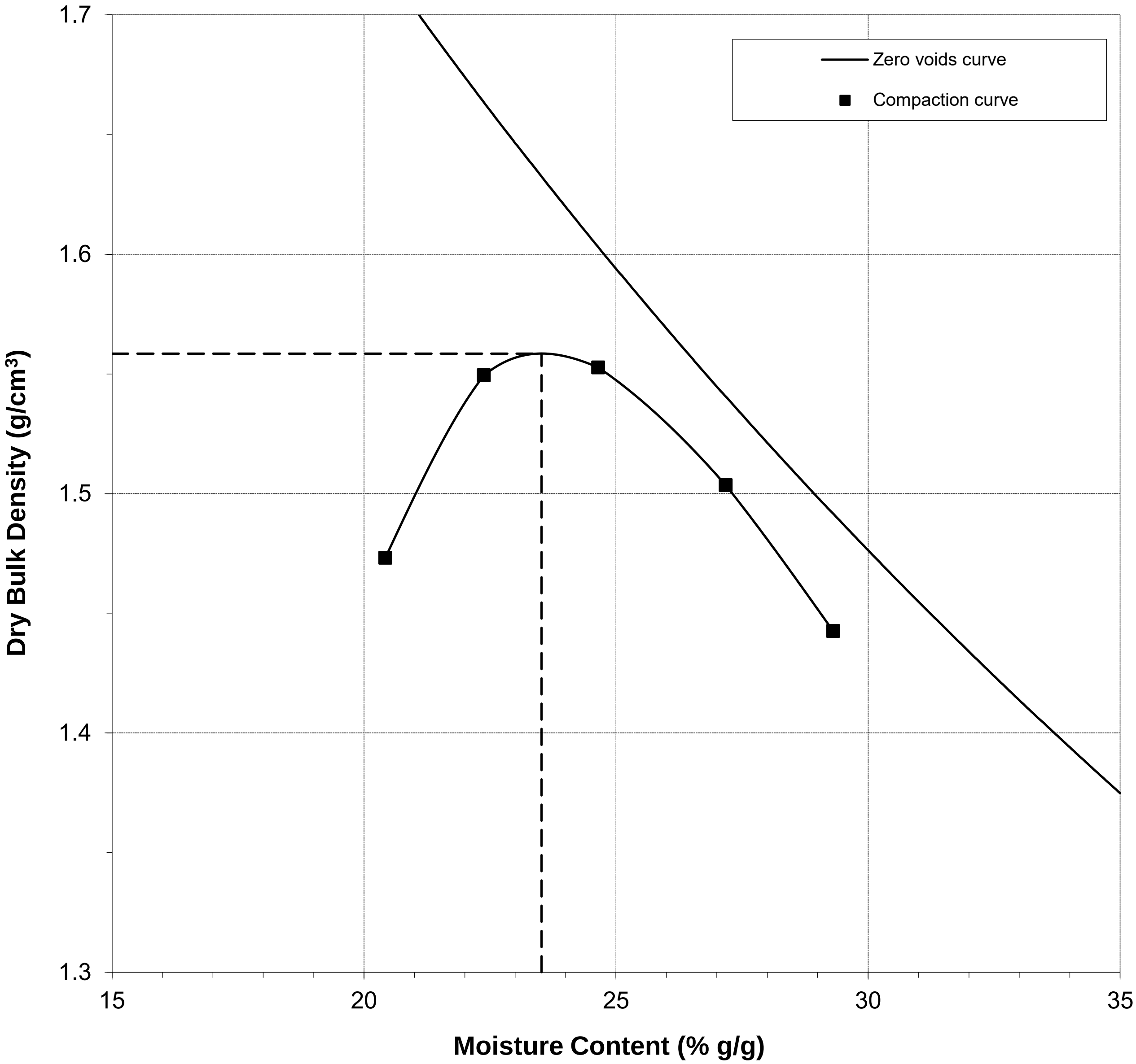
Laboratory analysis by: A.Baldridge
Data entered by: A. Bland
Checked by: J. Hines

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-11

	Measured	Corrected
Optimum Moisture Content (% g/g):	23.5	---
Maximum Dry Bulk Density (g/cm^3):	1.56	---

Test Date: 30-Sep-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A.Baldridge
Data entered by: A. Bland
Checked by: J. Hines

Proctor Compaction Data

Job Name: Alan Kuhn Associates, LLC
Job Number: DB19.1348.00
Sample Number: Sec12-12
Date Sampled: 9/17/19 1120
Depth: NA
Test Date: 27-Sep-19
As Received Moisture Content (% g/g): NA

Split (3/4", 3/8", #4): #4
Mass of coarse material (g): 32.16
Mass of fines material (g): 16924.73
Mold weight (g): 4196
Mold volume (cm^3): 941.92
Compaction Method: Standard A
Preparation Method: Dry
Type of Rammer: Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5780	876.06	781.86	300.29	1.41	19.56
2	5887	1025.16	894.58	283.58	1.48	21.37
3	5967	1144.35	977.43	268.93	1.52	23.56
4	5988	1146.27	971.39	292.87	1.51	25.77
5	5969	999.89	842.66	296.80	1.46	28.80

Soil Fractions

Coarse Fraction (% g/g): 0.2
Fines Fraction (% g/g): 99.8

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65
Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

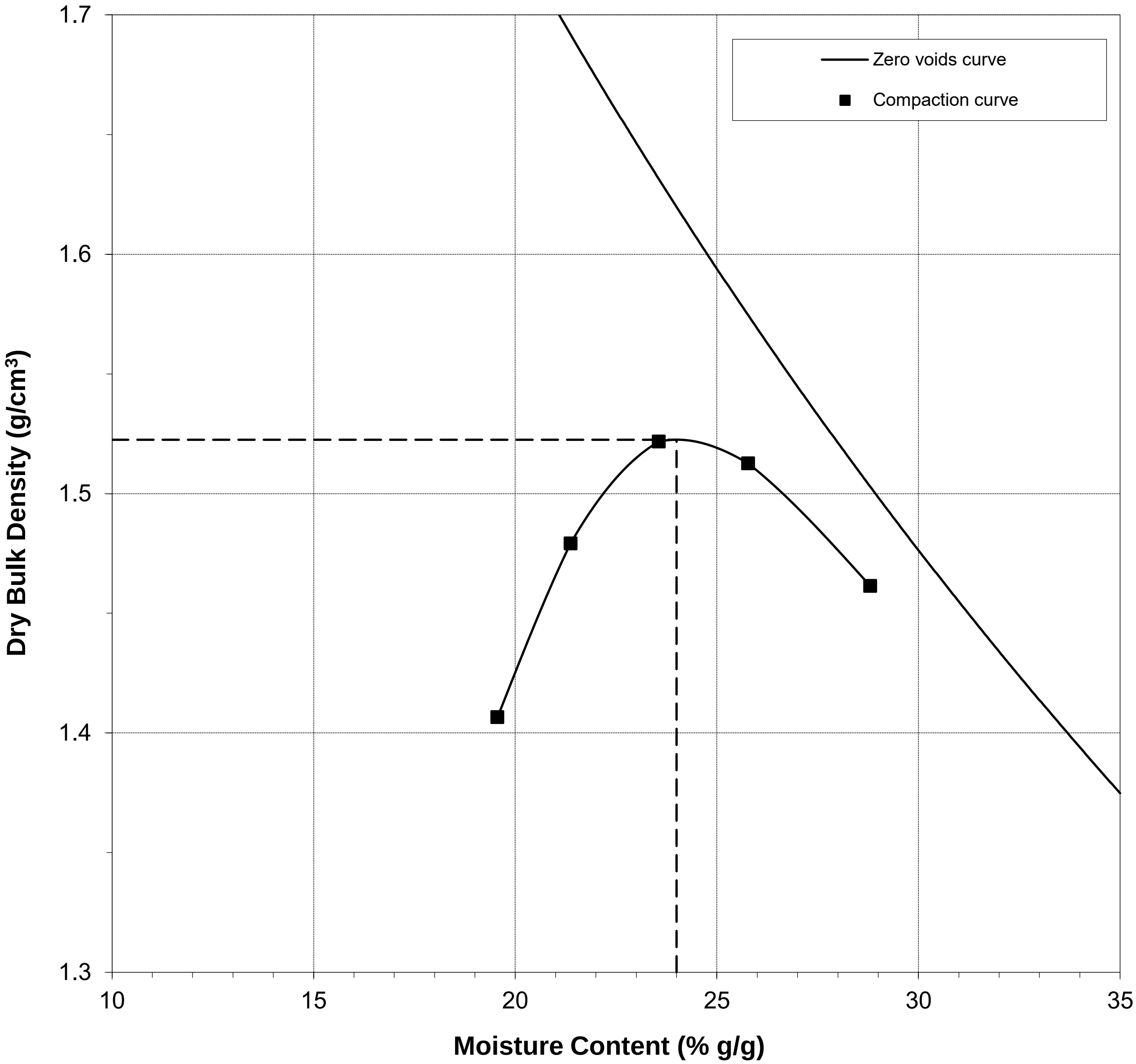
Laboratory analysis by: A. Bland
Data entered by: A. Bland
Checked by: J. Hines

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-12

	Measured	Corrected
Optimum Moisture Content (% g/g):	24.0	---
Maximum Dry Bulk Density (g/cm^3):	1.52	---

Test Date: 27-Sep-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A. Bland
Data entered by: A. Bland
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data

Job Name:	Alan Kuhn Associates, LLC	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB19.1348.00	*Mass of coarse material (g):*	0.00
Sample Number:	Sec12-13	*Mass of fines material (g):*	17602.86
Date Sampled:	9/17/19 1130	*Mold weight (g):*	4196
Depth:	NA	*Mold volume (cm^3):*	941.92
Test Date:	2-Oct-19	*Compaction Method:*	Standard A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5702	980.70	856.59	267.33	1.32	21.06
2	5790	1010.99	874.34	289.23	1.37	23.35
3	5895	1087.84	926.76	284.71	1.44	25.09
4	5917	1040.96	879.52	268.41	1.45	26.42
5	5922	1053.39	864.33	260.79	1.40	31.33

<u>Soil Fractions</u>

Coarse Fraction (% g/g): 0.0

Fines Fraction (% g/g): 100.0

<u>Properties of Coarse Material</u>

Assumed particle density (g/cm^3): 2.65

Assumed Initial Moisture Content (% g/g): 0.0

<u>Oversize Corrected Values for Dry Bulk Density and Moisture Content</u>

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A.Baldridge

Data entered by: A. Bland

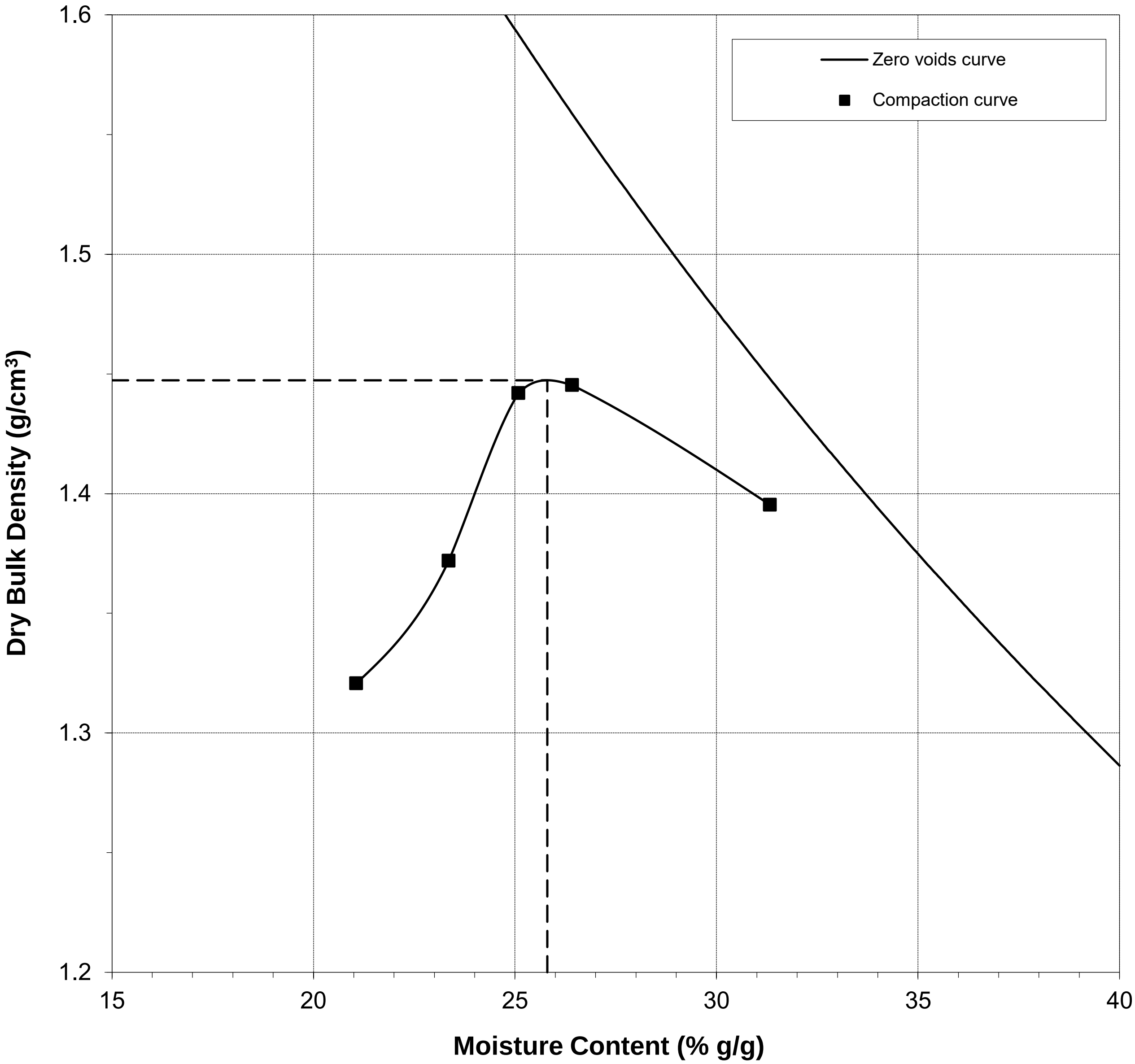
Checked by: J. Hines

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-13

	Measured	Corrected
Optimum Moisture Content (% g/g):	25.8	---
Maximum Dry Bulk Density (g/cm^3):	1.45	---

Test Date: 2-Oct-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A.Baldridge
Data entered by: A. Bland
Checked by: J. Hines

Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data

Job Name:	Alan Kuhn Associates, LLC	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB19.1348.00	*Mass of coarse material (g):*	2.43
Sample Number:	Sec12-14	*Mass of fines material (g):*	17469.23
Date Sampled:	9/17/19 1140	*Mold weight (g):*	4196
Depth:	NA	*Mold volume (cm^3):*	941.92
Test Date:	30-Sep-19	*Compaction Method:*	Standard A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5831	942.73	823.76	284.70	1.42	22.07
2	5880	1014.50	876.12	286.98	1.45	23.49
3	5989	1100.36	929.05	284.28	1.50	26.57
4	5976	1155.26	961.38	288.12	1.47	28.80
5	5934	1062.94	875.17	284.11	1.40	31.77

Soil Fractions

Coarse Fraction (% g/g): 0.0

Fines Fraction (% g/g): 100.0

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65

Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A. Baldridge

Data entered by: A. Bland

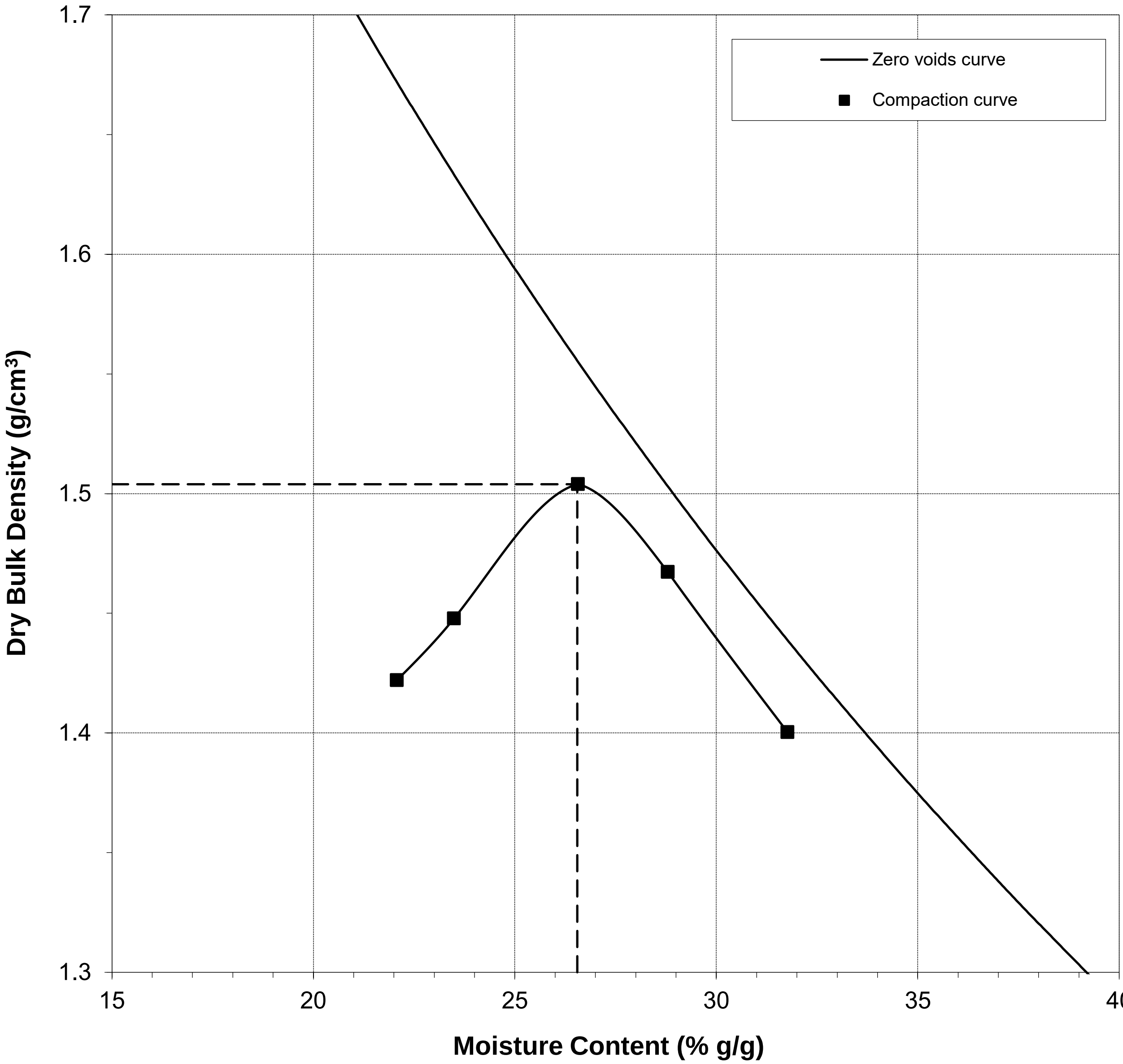
Checked by: J. Hines

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-14

	Measured	Corrected
Optimum Moisture Content (% g/g):	26.6	---
Maximum Dry Bulk Density (g/cm^3):	1.50	---

Test Date: 30-Sep-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A. Baldridge
Data entered by: A. Bland
Checked by: J. Hines

Proctor Compaction Data

Job Name:	Alan Kuhn Associates, LLC	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB19.1348.00	*Mass of coarse material* (g):	0.00
Sample Number:	Sec12-15	*Mass of fines material* (g):	16363.04
Date Sampled:	9/17/19 1150	*Mold weight (g):*	4196
Depth:	NA	*Mold volume* (cm^3):	941.92
Test Date:	27-Sep-19	*Compaction Method:*	Standard A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5793	1143.32	990.37	291.65	1.39	21.89
2	5867	943.75	818.57	298.94	1.43	24.09
3	5990	1248.51	1045.25	290.46	1.50	26.93
4	5949	1106.95	926.25	283.79	1.45	28.13
5	5957	1129.75	927.13	270.18	1.43	30.84

Soil Fractions

Coarse Fraction (% g/g): 0.0
Fines Fraction (% g/g): 100.0

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65
Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A. Bland
Data entered by: A. Bland
Checked by: J. Hines

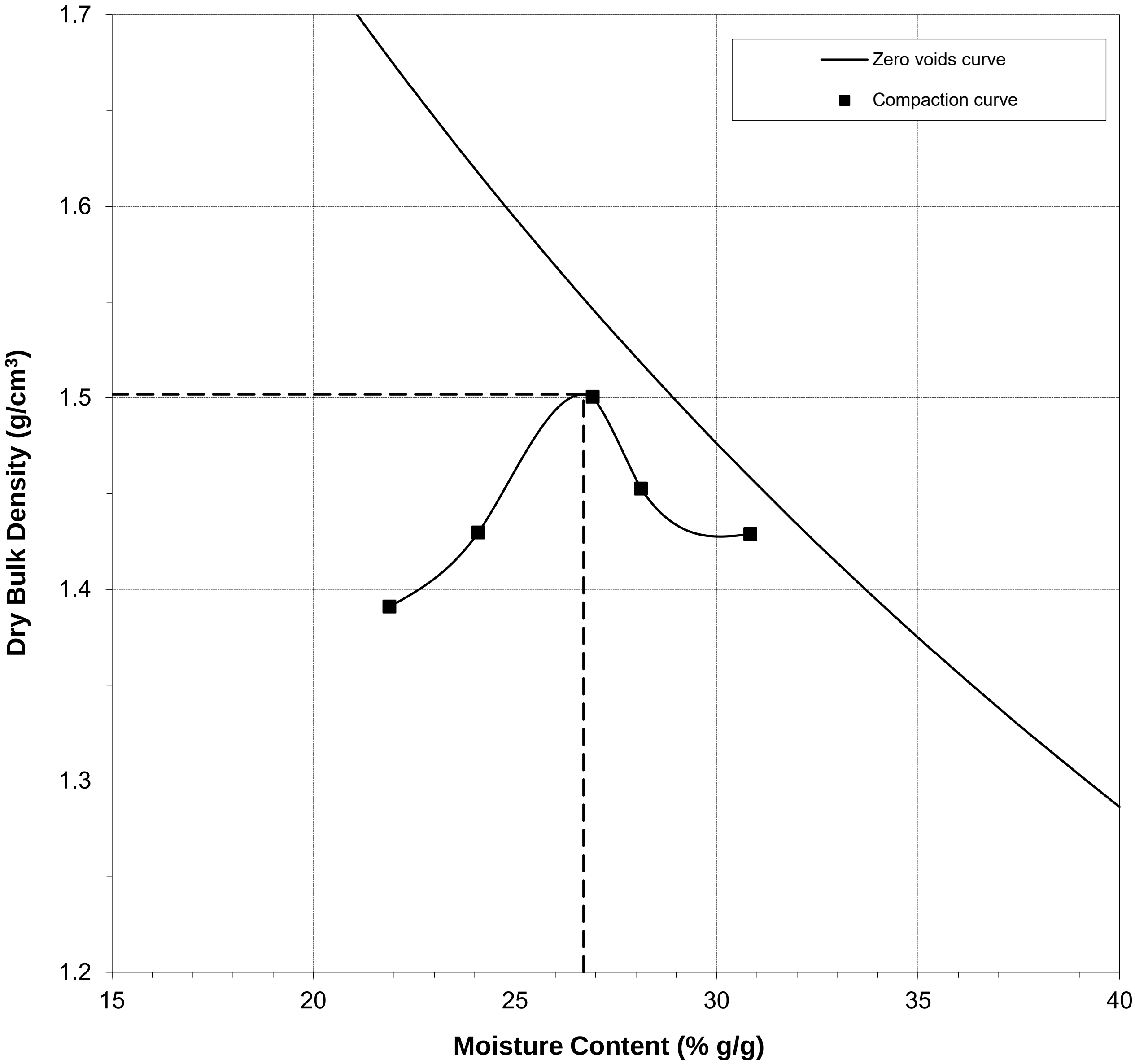
Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-15

	Measured	Corrected
Optimum Moisture Content (% g/g):	26.7	---
Maximum Dry Bulk Density (g/cm^3):	1.50	---

Test Date: 27-Sep-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A. Bland
Data entered by: A. Bland
Checked by: J. Hines

Proctor Compaction Data

Job Name:	Alan Kuhn Associates, LLC	*Split (3/4", 3/8", #4):*	#4
Job Number:	DB19.1348.00	*Mass of coarse material* (g):	0.00
Sample Number:	Sec12-16	*Mass of fines material* (g):	17602.19
Date Sampled:	9/17/19 1210	*Mold weight (g):*	4196
Depth:	NA	*Mold volume* (cm^3):	941.92
Test Date:	30-Sep-19	*Compaction Method:*	Standard A
		Preparation Method:	Dry
As Received Moisture Content (% g/g):	NA	*Type of Rammer:*	Mechanical

Trial	Weight of Mold and Compacted Soil (g)	Weight of Container and Wet Soil (g)	Weight of Container and Dry Soil (g)	Weight of Container (g)	Dry Bulk Density (g/cm^3)	Moisture Content (% g/g)
1	5727	930.56	813.38	297.05	1.32	22.69
2	5827	1119.92	962.69	301.49	1.40	23.78
3	5879	1082.60	922.89	284.33	1.43	25.01
4	5841	1034.07	876.87	295.99	1.37	27.06
5	5824	1055.58	881.80	268.12	1.35	28.32

Soil Fractions

Coarse Fraction (% g/g): 0.0
Fines Fraction (% g/g): 100.0

Properties of Coarse Material

Assumed particle density (g/cm^3): 2.65
Assumed Initial Moisture Content (% g/g): 0.0

Oversize Corrected Values for Dry Bulk Density and Moisture Content

Trial	Dry Bulk Density of Composite (g/cm^3)	Moisture Content of Composite (% g/g)
1	---	---
2	---	---
3	---	---
4	---	---
5	---	---

--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A.Baldridge
Data entered by: A. Bland
Checked by: J. Hines

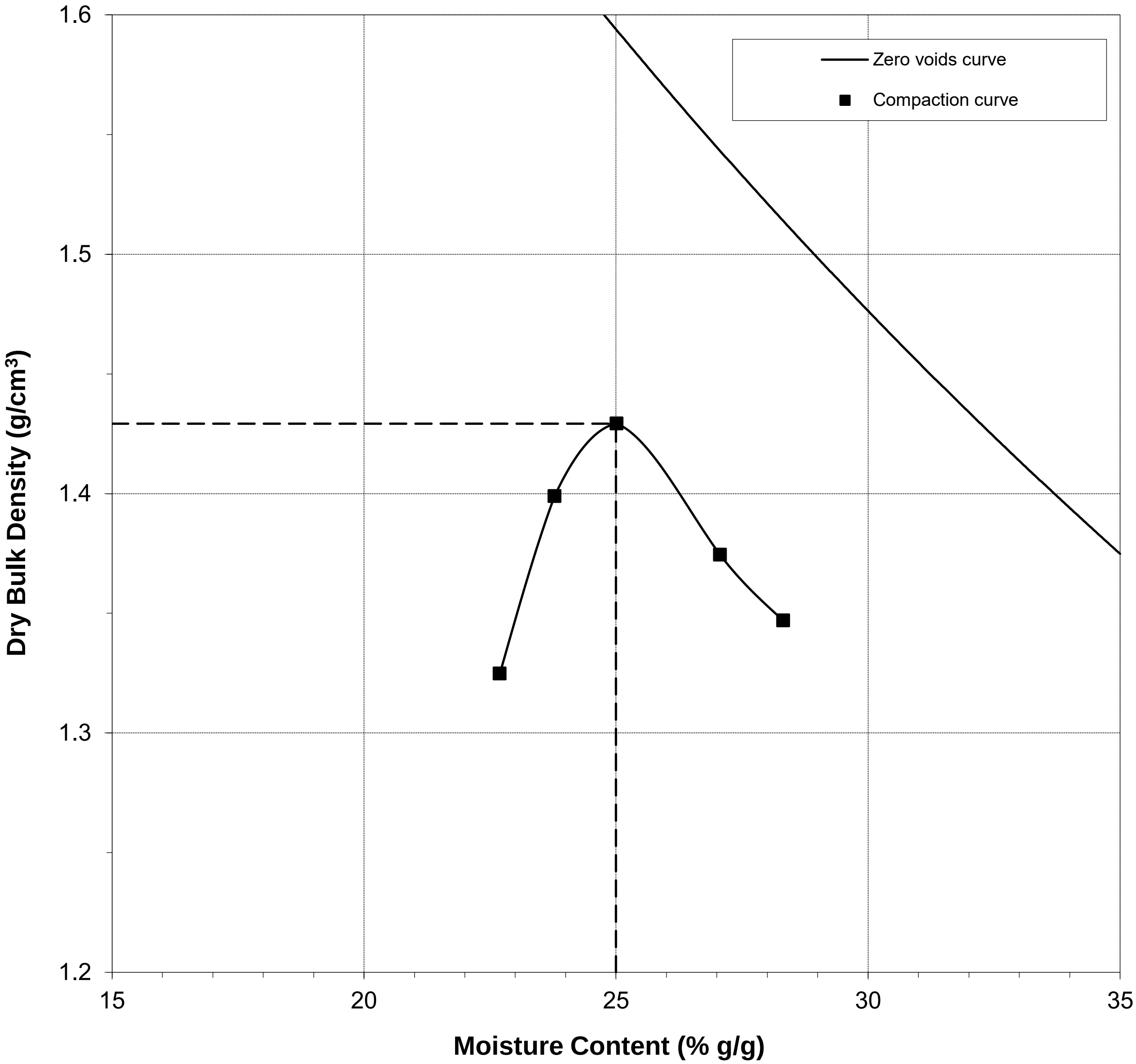
Daniel B. Stephens & Associates, Inc.

Proctor Compaction Data Points with Fitted Curve

Sample Number: Sec12-16

	Measured	Corrected
Optimum Moisture Content (% g/g):	25.0	---
Maximum Dry Bulk Density (g/cm^3):	1.43	---

Test Date: 30-Sep-19



--- = Oversize correction is unnecessary since coarse fraction < 5% of composite mass

Laboratory analysis by: A.Baldridge
Data entered by: A. Bland
Checked by: J. Hines

Laboratory Tests and Methods

Tests and Methods

Particle Size Analysis:	ASTM D422
USCS (ASTM) Classification:	ASTM D4318, ASTM D422, ASTM D2487
USDA Classification:	ASTM D422, USDA Soil Textural Triangle
Atterberg Limits:	ASTM D4318
Standard Proctor Compaction:	ASTM D698

NV5

4374 Alexander Boulevard NE, Ste K
Albuquerque, New Mexico 87107
Phone: 505-344-7373 / Fax: 505-344-1711

February 15, 2019

Alan Kuhn Associates, LLC
13212 Manitoba Dr. NE
Albuquerque, NM 87111

Attn: Mr. Alan Kuhn

Project: Sectum 12 Mine - Ambrosia Lake, McKinley County
NV5 Project No. 444319-4580000.00

Dear Sir or Madam:

Attached are copies of the Proctor Test Results for the subject project.

Should you have any questions regarding this data, please do not hesitate to call.

Sincerely,

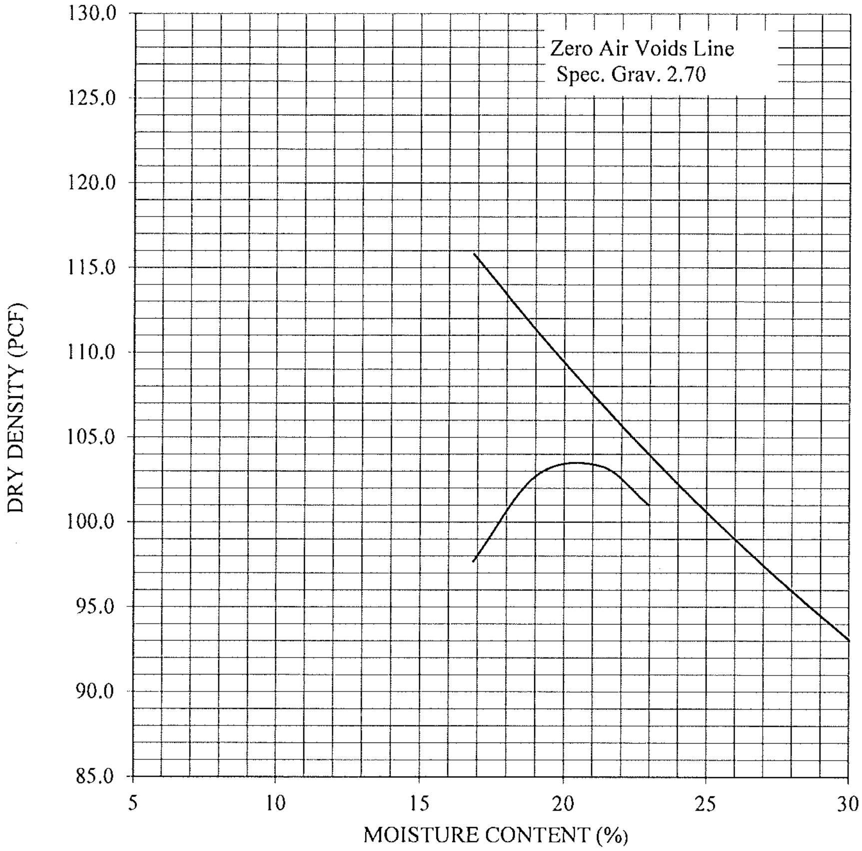
Robert K. Abeyta, S.E.T.

Attachment: Figure No's.: 1 & 2

cc: Addressee: (Email)

cm

PROCTOR TEST RESULTS



Max Dry Density= 103.5 PCF

Optimum Moist.= 20.5 %

Test Method : ASTM D698-A

Method: Manual Hammer

NV5 Project No.: 444319-4580000.00

COA Number:

Project Title : Sectum 12 Mine - Ambrosia Lake, McKinley County

Date Sampled : 2/6/19

Sample No. : 16

Sample Location : SWR1

Sieve Analysis ASTM C-136

Sieve	mm	% Passing	Spec.
3"	75.0		
2"	50.0		
1 1/2"	37.5		
1"	25.0		
3/4"	19.0		
1/2"	12.5		
3/8"	9.5		
No. 4	4.75	100	
No. 8	2.36	99	
No. 10	2.00	99	
No. 16	1.18	98	
No. 30	0.60	94	
No. 40	0.425	89	
No. 50	0.300	84	
No. 80	0.180	75	
No. 100	0.150	72	
No. 200	0.075	67	

Atterberg Limits ASTM D4318

	Results	Spec.
LIQUID LIMIT	41	
PLASTIC LIMIT	18	
PLASTICITY INDEX	23	

ASTM D2487 USCS: CL (Sandy lean CLAY.)

AASHTO M145 CLASS.: A-7-6

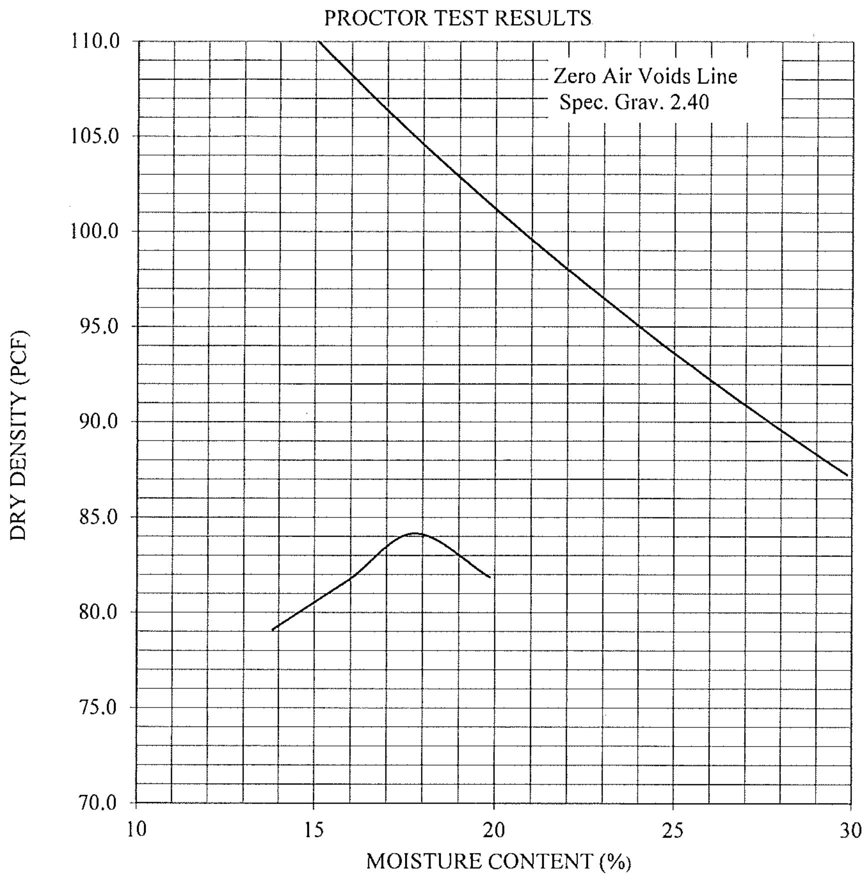
EST. R-VALUE: 6

(Based on NMSHTD 97 Charts)

Specification Used : None

Figure: 1

Revision 6/1/2016



Max Dry Density= 84.1 PCF

Optimum Moist.= 17.8 %

Test Method : ASTM D698-A

Method: Manual Hammer

NV5 Project No.: **444319-4580000.00** **COA Number:**

Project Title : **Sectum 12 Mine - Ambrosia Lake, McKinley County**

Date Sampled : **2/6/19** **Sample No. :** **18**

Sample Location : **SWR3**

Sieve Analysis ASTM C-136

Sieve	mm	% Passing	Spec.
3"	75.0		
2"	50.0		
1 1/2"	37.5		
1"	25.0		
3/4"	19.0		
1/2"	12.5		
3/8"	9.5		
No. 4	4.75		
No. 8	2.36		
No. 10	2.00		
No. 16	1.18		
No. 30	0.60		
No. 40	0.425	100	
No. 50	0.300	99	
No. 80	0.180	98	
No. 100	0.150	96	
No. 200	0.075	95	

Atterberg Limits ASTM D4318

	Results	Spec.
LIQUID LIMIT	66	
PLASTIC LIMIT	23	
PLASTICITY INDEX	43	

ASTM D2487 USCS: **CH** **(Fat CLAY with sand.)**

AASHTO M145 CLASS.: **A-7-6**

EST. R-VALUE: **2**
(Based on NMSHTD 97 Charts)

Specification Used : **None**

Figure: 2

NV5

4374 Alexander Boulevard NE, Ste K
Albuquerque, New Mexico 87107
Phone: 505-344-7373 / Fax: 505-344-1711

February 15, 2019

Alan Kuhn Associates, LLC
13212 Manitoba Dr. NE
Albuquerque, NM 87111

Attn: Mr. Alan Kuhn

Project: Sectum 12 Mine - Ambrosia Lake, McKinley County
NV5 Project No. 444319-4580000.00

Dear Sir or Madam:

Attached are copies of the Sieve Analysis Test Results for the subject project.

Should you have any questions regarding this data, please do not hesitate to call.

Sincerely,

Robert K. Abeyta, S.E.T.

Attachment: Data Sheets (2)

cc: Addressee: (Email)

cm

Client: Alan Kuhn Associates, LLC

Project Number: 444319-4580000.00

Project: Sectum 12 Mine - Ambrosia Lake, McKinley County

Date Sampled: 2/6/19 Sample Number: 17

Location: SWR2

Sieve Analysis Test Results

ASTM D422

Sieve Size	**% Passing By Weight**	**Specs**	**Specs**
3"			
2"	100		
1 1/2"	85		
1"	85		
3/4"	81		
1/2"	81		
3/8"	79		
#4	77		
#8	76		
#10	75		
#16	73		
#30	69		
#40	62		
#50	51		
#80	34		
#100	28		
#200	17.6		
Specs			

ASTM D 4318 LL: NV
PI: NP

ASTM D2487 Unified Classification: SM g

AASHTO M145 Classification: A-2-4

Revision 11/21/12

Client: Alan Kuhn Associates, LLC

Project Number: 444319-4580000.00

Project: Sectum 12 Mine - Ambrosia Lake, McKinley County

Date Sampled: 2/6/19 Sample Number: 19

Location: SWR4

Sieve Analysis Test Results

ASTM D422

Sieve Size	% Passing By Weight	Specs	Specs
3"			
2"			
1 1/2"			
1"			
3/4"			
1/2"			
3/8"			
#4			
#8	100		
#10	100		
#16	100		
#30	100		
#40	100		
#50	100		
#80	99		
#100	99		
#200	98.7		
Specs			

ASTM D 4318 LL: 72
PI: 46

ASTM D2487 Unified Classification: CH

AASHTO M145 Classification: A-7-6

Revision 11/21/12

APPENDIX F

RADON MODEL FILES

SECTION 12 MINE

MODEL #1 – 2.0 FEET CLAY, 2.0 FEET LOAM

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)
1	4.57	1.5	.35	.47	27	.85
2	3.048	17.3	.35	.43	5.5	.5
3	.6096	6.5	.35	.47	27	.85
4	.6096	6.5	.35	.45	11.7	.37

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-1.61	9.180E3
2	3.048	0.699	20.77E3
3	0.610	1.277	1.266E3
4	0.610	**4.805**	0E0

MODEL #2 – 1.0 FEET CLAY, 2.0 FEET LOAM

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)
1	4.57	1.5	.35	.47	27	.85
2	3.048	17.3	.35	.43	5.5	.5
3	.3048	6.5	.35	.47	27	.85
4	.6096	6.5	.35	.45	11.7	.37

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-1.61	9.152E3
2	3.048	1.180	20.31E3
3	0.305	1.589	1.383E3
4	0.610	**5.057**	0E0

MODEL #3 – 0.5 FEET CLAY LAYER, 2.0 FEET LOAM

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)
1	4.57	1.5	.35	.47	27	.85
2	3.048	17.3	.35	.43	5.5	.5
3	.155	6.5	.35	.47	27	.85
4	.6096	6.5	.35	.45	11.7	.37

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-1.59	9.094E3
2	3.048	2.167	19.36E3
3	0.15	2.401	1.689E3
4	0.610	**5.714**	0E0

MODEL #4 – NO CLAY LAYER

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)
1	4.57	1.5	.35	.47	27	.85
2	3.048	17.3	.35	.43	5.5	.5
3	.001	6.5	.35	.47	27	.85
4	.6096	6.5	.35	.45	11.7	.37

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-1.49	8.590E3
2	3.048	10.79	11.09E3
3	0.001	10.79	4.849E3
4	0.610	**12.50**	0E0

MODEL #5 – 1.0 FEET CLAY LAYER, 370 pCi/g Ra 226 IN WASTE ROCK

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	370	.35	.43	5.5	.5	
3	.3048	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-40.4	191.8E3
2	3.048	43.81	415.7E3
3	0.305	19.85	8.262E3
4	0.610	**19.8**4	0E0

MODEL #6 – NO CLAY LAYER, 30 pCi/g Ra 226 IN WASTE ROCK

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	30	.35	.43	5.5	.5	
3	.001	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	

-------- Results of Radon Diffusion Calculation --------

Layer No.	Thickness [m]	Exit Flux [pCi/m2s]	Exit Conc. [pCi/L]
1	4.57	-2.80	14.75E3
2	3.048	19.38	18.55E3
3	0.001	19.38	8.084E3
4	0.610	19.45	0E0

Uranium Mill Tailings Cover Calculator

(last updated 21 Mar 2011)
Requires Netscape 3.0, Internet Explorer 3.0 or higher. JavaScript must be enabled.
For educational purposes only. No warranty.

Determine the radon flux through a multi-layer soil cover of an uranium mill tailings pile and/or optimize the cover for a given flux.

(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (•) pCi ( ) Bq

Sample Data **Input Data**

Layer Data HELP

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	17.3	.35	.43	5.5	.5	
3	.6096	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options HELP

Entrance Radon flux to Layer 1 [pCi/m^2s] *)
Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^{2}s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate Reset Form **HELP**

Results

```
----------------  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L
 Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture  Diff Coeff
 No.      [m]    [pCi/g]  Fract            [dry wt_%]  [m2/s]
  1    4.57      1.5      .35      0.47      27         97.47E-9
  2    3.048     17.3     .35      0.43      5.5        2.845E-6
  3    0.610     6.5      .35      0.47      27         97.47E-9
  4    0.610     6.5      .35      0.45      11.7       1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

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Uranium Mill Tailings Cover Calculator

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Determine the radon flux through a multi-layer soil cover of an uranium mill tailings pile and/or optimize the cover for a given flux.

(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (•) pCi ( ) Bq

Sample Data **Input Data**

Layer Data **HELP**

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	17.3	.35	.43	5.5	.5	
3	.3048	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options **HELP**

Entrance Radon flux to Layer 1 [pCi/m^2s] *)
Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^{2}s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate | Reset Form | **HELP**

Results

```
----------------  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L
 Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture  Diff Coeff
 No.      [m]    [pCi/g]  Fract            [dry wt_%]  [m2/s]
  1    4.57      1.5      .35      0.47      27         97.47E-9
  2    3.048     17.3     .35      0.43      5.5        2.845E-6
  3    0.305     6.5      .35      0.47      27         97.47E-9
  4    0.610     6.5      .35      0.45      11.7       1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

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Determine the radon flux through a multi-layer soil cover of an uranium mill tailings pile and/or optimize the cover for a given flux.

(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (•) pCi ( ) Bq

Sample Data

Input Data

Layer Data HELP

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	17.3	.35	.43	5.5	.5	
3	.155	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options HELP

Entrance Radon flux to Layer 1 [pCi/m^2s] *)
Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^2s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate | Reset Form | **HELP**

Results

```
----------------  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L
 Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture   Diff Coeff
 No.      [m]    [pCi/g]  Fract             [dry wt_%]  [m2/s]
  1    4.57     1.5      .35      0.47      27         97.47E-9
  2    3.048    17.3     .35      0.43      5.5        2.845E-6
  3    0.155    6.5      .35      0.47      27         97.47E-9
  4    0.610    6.5      .35      0.45      11.7       1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

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Uranium Mill Tailings Cover Calculator

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Determine the radon flux through a multi-layer soil cover of an uranium mill tailings pile and/or optimize the cover for a given flux.

(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (•) pCi ( ) Bq

Sample Data **Input Data**

Layer Data **HELP**

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	17.3	.35	.43	5.5	.5	
3	.001	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options **HELP**

Entrance Radon flux to Layer 1 [pCi/m^2s] *)
Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^{2}s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate Reset Form HELP

Results

```
-------------- Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture  Diff Coeff
 No.      [m]     [pCi/g]  Fract            [dry wt_%]  [m2/s]
--  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L

  1    4.57     1.5      .35     0.47     27        97.47E-9
  2    3.048    17.3     .35     0.43     5.5       2.845E-6
  3    0.001    6.5      .35     0.47     27        97.47E-9
  4    0.610    6.5      .35     0.45     11.7      1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

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(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (●) pCi ( ) Bq

Sample Data **Input Data**

Layer Data HELP

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	370	.35	.43	5.5	.5	
3	.3048	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options HELP

[ ] Entrance Radon flux to Layer 1 [pCi/m^2s] *)
[ ] Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^{2}s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate Reset Form **HELP**

Results

```
----------------  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L
 Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture  Diff Coeff
 No.      [m]    [pCi/g]  Fract             [dry wt_%]  [m2/s]
  1     4.57     1.5      .35      0.47      27         97.47E-9
  2     3.048    370      .35      0.43      5.5        2.845E-6
  3     0.305    6.5      .35      0.47      27         97.47E-9
  4     0.610    6.5      .35      0.45      11.7       1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

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Determine the radon flux through a multi-layer soil cover of an uranium mill tailings pile and/or optimize the cover for a given flux.

(For calculating radon flux from bare and/or water covered tailings, see the Uranium Mill Tailings Radon Flux Calculator)

Select activity unit first, then enter the parameters and click the "Calculate" button below. **HELP**
Layer 1 is the tailings layer.
Numbers can be entered in exponential notation: $5 \cdot 10^{-6}$ = 5e-6

Activity unit: (•) pCi ( ) Bq

Sample Data

Input Data

Layer Data HELP

Layer No.	Thickness [m]	Ra-226 Activity Conc. [pCi/g]	Rn-222 Emanation Fraction	Porosity	Moisture Cont. [dry wt_%]	Fraction Passing #200 Mesh (75 µm) *)	Rn-222 Eff. Diff.Coeff *) [m^2/s]
1	4.57	1.5	.35	.47	27	.85	
2	3.048	30	.35	.43	5.5	.5	
3	.001	6.5	.35	.47	27	.85	
4	.6096	6.5	.35	.45	11.7	.37	
5							
6							
7							
8							

Options HELP

Entrance Radon flux to Layer 1 [pCi/m^2s] *)
Surface Radon conc. at top of system [pCi/L] *)

	Layer No. to be optimized *)
	Surface flux constraint for optimization [pCi/m^{2}s] *)
	Surface flux convergence criterion (fraction) *)
	Annual Precipitation [cm] *)
	Annual Lake Evaporation [cm] *)
	Depth to Water Table [m] *)

*) optional

Calculate Reset Form **HELP**

Results

```
----------------  Input Parameters  ----------------

 Number of Layers:  4
 Radon Flux into Layer 1:  0 pCi/m2s
 Surface Radon Concentration:  0 pCi/L
 Bare Source Flux (Jo) from Layer 1:  0.340 pCi/m2s
 Specific Bare Source Flux from Layer 1:  0.227 pCi/m2s per
pCi_Ra-226/g

Layer Thickness  Ra-226   Emanat  Porosity  Moisture  Diff Coeff
 No.      [m]    [pCi/g]  Fract            [dry wt_%]  [m2/s]
  1    4.57     1.5      .35      0.47      27        97.47E-9
  2    3.048    30       .35      0.43      5.5       2.845E-6
  3    0.001    6.5      .35      0.47      27        97.47E-9
  4    0.610    6.5      .35      0.45      11.7      1.719E-6
```

> See also:

- Unit Converter
- Uranium Mill Tailings Radon Flux Calculator
- Uranium Radiation Properties · Uranium Radiation Exposure
- Uranium Decay Calculator
- Radon Individual Dose Calculator
- Uranium in Soil and Building Material Individual Dose Calculator
- Uranium Mine and Mill Resident Individual Dose Calculator
- Nuclear Fuel Population Health Risk Calculator (collective dose)

APPENDIX G

EARTHWORK SPECIFICATION

SECTION 12 MINE RECLAMATION

CONSTRUCTION DRAWINGS ARE REFERENCED BY NUMBER IN THIS SPECIFICATION.

DRAWINGS WILL BE PREPARED FOR BID AND CONSTRUCTION UPON APPROVAL OF THE RECLAMATION PLAN. FIGURES INCLUDED IN THE RECLAMATION PLAN CONTAIN THE GRAPHIC INFORMATION NEEDED FOR REGULATORY REVIEW, AND THIS INFORMATION WILL BE CONTAINED IN THE CONSTRUCTION DRAWINGS

SPECIFICATION No. SEC12-01

EARTHWORK

FOR MINE RECLAMATION

SECTION 12 MINE

MCKINLEY COUNTY, NEW MEXICO

SOUTHWEST RESOURCES INC.

REVISION 0

JULY, 2020

Prepared by

Alan Kuhn Associates, LLC

1 Project Description

The Section 12 Mine is located at 35° 27’ 17”N, 107° 51’ 01”W in T14N, Rl0W, SW 1/4 of Section 12, McKinley County, New Mexico. This underground uranium mine was developed by Cobb Resources, and it operated intermittently in 1959 and 1962 then from approximately 1974 to the early 1982; the mine is currently inactive and owned by Southwest Resources Inc. (SRI). The mine surface consists of an access road, a shaft collar and headframe, an office/ dry building, a hoist house, a pump house with water storage tank, a vent shaft, and remnants of fencing and assorted materials of the bone yard.

SRI is under an Order of Abatement on Consent from the Director of the New Mexico Mining and Minerals Division (MMD) to conduct reclamation of the mine in accordance with the requirements in Part 5 of the New Mexico Act, NMAC 19.10.5.506 and the environmental standards of the MMD/ NMED Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico. In compliance with that Order, SRI submitted a Final Reclamation Plan (RP) on December 16, 2019 by MMD and signed by Empire Trust Inc. on January 14, 2020 that requires Southwest Resources Inc. to reclaim the mine. The Order requires a Reclamation Plan that satisfies requirements for a closeout plan under NMAC 19.10.5.506 and the environmental standards of the MMD/ NMED *Joint Guidance for the Cleanup and Reclamation of Existing Uranium Mining Operations in New Mexico*.

This specification addresses the earthwork and related demolition required to satisfy the requirements of the Order of Abatement on Consent. The RP includes removal of all mine-related structures, relocation of all waste rock to an on-site repository, re-grading and re-vegetation of disturbed areas.

2 Included Scope of Work

The scope of work addressed by this specification includes:

1. Site Preparation, including runoff and erosion controls, and stripping and burning of vegetation from contaminated areas and borrow areas,
2. Demolition of concrete foundations to clean surface grade, including collection and removal or burial of all debris remaining on site after demolition of above-ground mine structures,
3. Backfilling of the shaft with waste rock, broken concrete, and contaminated soil.
4. Excavation, loading, hauling, dumping and spreading of waste rock and contaminated soil in lifts in the designated waste repository location,
5. Excavation, loading, hauling, placing, spreading and compacting of cover soil on the waste repository, and
6. Final grading to the specified gradients.

Vegetation is addressed in a separate document. See Appendix D.

Work to be performed by others includes:

- Demolition and removal of buildings and headframe,
- Collection and removal of re-cyclable materials and equipment, including the hoist, and
- Re-vegetation

3 Responsibilities

Southwest Resources Inc., as represented by Empire Trust Inc., the “Owner”, will evaluate bids and award all contracts for the Included Scope of Work and work performed by others, will provide controlled access to the work site, and will approve and make payment for work performed under this specification.

Alan Kuhn Associates (AKA), the “Engineer”, will review or inspect and advise the Owner on the acceptance of the Included Work.

Contractor shall provide all equipment, materials, water, portable toilets, shelter, labor and supplies and perform all work necessary to accomplish the Included Work. Contractor shall be responsible for the safety of its job site and of all personnel and equipment that it employs on the job site, including conformance with the requirements of the Health and Safety Plan (HASP).

Quality Control Contractor (QCC) contracted by the Owner will observe, measure, sample and perform soil tests to document the Contractor’s compliance with this specification and the drawings. The Owner will establish local ground control for the Contractor to use in achieving the required lines, grades, and dimensions of the work.

The Radiological Consultant, an independent contractor to the Owner, will provide radiological survey and worker radiological health and safety support during the demolition and earthwork.

Drawings listed on the attached table “LIST OF DRAWINGS” are incorporated into this specification by reference.

4 Execution

The Contractor may employ the numbers and types of equipment to choses to perform the required scope of work. The Contractor’s equipment shall be sufficient to satisfy the requirements of the scope of work in accordance with this specification and the approved project schedule. The equipment shall include those materials necessary for performing the work safely in accordance with the Health And Safety Plan, recognizing that there are no existing facilities on the mine site for worker comfort or hygiene. Execution shall be in accordance with this specification, the drawings, and the instructions of the Owner and its representatives. The following table is a preliminary list of drawings.

TABLE OF CONSTRUCTION DRAWINGS - SECTION 12 MINE RECLAMATION

SHEET NUMBER	Drawing Number	Title Sheet	Comments
CL00	GS00-GC100-00	Cover Sheet Drawing Index	Site Location Map and Drawing list
CL01	GS00-GC101-00	Existing Mine Features and Borrow Areas	Shows the mine features, existing topo, and potential borrow areas.
CL02	GS00-GC103-00	Gamma and Soil Radium Sample Locations	Shows locations of soil samples and radiological contamination.
CL03	GS00-GC104-00	Facility Disposition Plan	Shows the buildings to be removed, and the concrete pads
CL04	GS00-GC105-00	Vent Closure Plan and Section	Shows the bat access detail.
CL05	GS00-GC106-00	Shaft Backfill and Closure	Section view of conceptual backfill
CL06	GS00-GC107-00	Initial Repository-area Grading	Shows the initial grading to divert runoff around the perimeter of the repository.
CL07	GS00-GC108-00	Final Repository Grading Plan	Shows the maximum footprint and final contours and shape of the pile.
CL08	GS00-GC109-00	Repository N/S section	Describes the overall pile cross section
CL09	GS00-GC110-00	Repository E/W sections	Describes the overall pile cross section
CL10	GS00-GC111-00	Mine Debris Disposal Cell Plan and Section	Shows the disposal cell (s) for mine debris.
CL11	GS00-GC112-00	Final Grading plan	Shows the whole site after all excavation is complete.

The estimated quantities of materials will be listed on the drawings and on the Bid Schedule, Rev. 0.

The Contractor shall perform the following work:

4.1 Site Preparation

The Contractor shall remove vegetation and foreign material from the contractor's support area and areas of excavation and fill, as shown on the drawings, and dispose of non-salvaged material in the designated disposal area as directed by the Owner. Vegetation removed from the contaminated area ("clean-up area") may be placed on bare ground and burned provided that the Contractor notifies the local fire department in advance, monitors the burn at all times, secures the burn at the end of the day, and follows the state air quality rules and local ordinances. During burn events, the Contractor shall maintain fire suppression resources (e.g.; water tank with house, fire extinguishers, shovels) on site that are sufficiently manned to spot and extinguish fires.

The contractor may use a portion of the area to be excavated for laydown and equipment service. Any pieces of foreign material that are too small to be individually handled by earthmoving equipment shall be removed by hand or excavated with the surrounding soil and placed in a designated pit or trench location within the repository area.

4.2 Earthwork Quality Control

The Contractor shall take the measures necessary to achieve all requirements of this specification. These measures shall include, at a minimum, the following:

4.2.1 Supervision

During all times that the Contractor's equipment or personnel are performing Included Work on the job site, a Contractor supervisor shall be present to direct the work. The supervisor shall have experience, satisfactory to the Owner's Site Supervisor, the Site Reclamation Manager (SRM), in the type of work being executed. The Contractor supervisor shall have on-hand at all times a copy of the current revision of this specification and the drawings relevant to the work. The Contractor supervisor shall have the authority to make decisions for the Contractor in all matters related to this specification.

4.2.2 Line and Grade Control

The Contractor shall determine that the specified lines and grades have been achieved in accordance within the limits established in this specification and the construction drawings. Measurement of line and grade is referenced to established benchmarks and other control points on the Owner's property. Elevations, alignments and gradients shall be surveyed as often as necessary to control excavation and fill placement.

When the Contractor reports to the Owner that all Included Work has been completed, the Owner will perform an acceptance survey to determine if line and grade requirements have been satisfied. The Owner may survey the alignments and elevations and the slope gradients at intervals selected by the Owner.

4.2.3 Earthwork Field and Laboratory Testing

On-site sources of waste repository cover soils have been identified and tested during site characterization investigations, and ample quantities of clay and loam soils have been classified as CH, CL, SC with some minor amounts of other soils.

During construction, testing of soil materials for in-place density and moisture will be performed by a qualified materials testing service contracted by the Owner. Field density of compacted cover soil shall be measured not less than once per 2000 c.y. either by 1) nuclear methods for density (ASTM D 2922) and moisture (ASTM D 3017) calibrated against not fewer than 10 tests per ASTM D1556 – 07, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method, or 2) directly by ASTM D1556-07. The fill material will be tested for moisture-density relationships and gradation/classification per ASTM D-698 at least once per 5,000 c.y. of borrow soil. Additional tests may be required if the soil classification is uncertain, lift thickness is greater than was specified, if the fill material does not meet moisture content specifications, if the degree of compaction is questionable, or during adverse weather conditions.

If a defect is found in the compacted soil, a person from the Contractor’s quality department shall determine the extent of the deficient area through additional testing, observations, record review, or other appropriate means. The Contractor shall correct the deficiency of the cover soil.

5 EARTHWORK DOCUMENTATION

5.1 Documentation by Contractor

The Contractor shall record and report, in a format acceptable to the Owner, the following information:

- Daily journal containing a list of equipment and materials used.
- Daily Work Summary listing all pay items and quantities. Submit by the start of the next working day.
- Survey notes for line and grade control (verbally report results immediately, and submit copy to the Owner within 24 hours).
- Written notifications to the Owner of unexpected conditions, conditions that prevent conformance with specifications, or disputes over acceptance of Contractor’s work. Verbally notify the Owner immediately upon discovery or identification, submit in writing within 24 hours.
- Written notification to the Owner of any lost-time injury of Contractor or subcontractor personnel.

Documentation by the Owner

The Owner will create and maintain the following documentation that relates to the Included Work:

- Field inspection notes of Contractor's performance, work accomplished, and variances from the specifications observed by the Owner.
- Records of all field and laboratory tests performed by the Owner and its testing service.
- Photographic and video records of the Included Work.
- Chronological record of notifications to the Contractor of variances from specifications, unacceptable work performance, discrepancies in payment quantities claimed by the Contractor, and all related resolutions thereto.
- Survey notes and calculations of the acceptance survey.
- As-built drawings of completed work.

APPENDIX H

SITE HEALTH AND SAFETY PLAN (HASP)
SECTION 12 MINE

Site Health and Safety Plan

SECTION 12 MINE RECLAMATION

SOUTHWEST RESOURCES INC.

PREPARED BY:

Alan Kuhn Associates, LLC

February 2020

Site Health and Safety Plan Acknowledgments

Site Health and Safety Plan Acknowledgments

I have read this Site Health and Safety Plan (HASP), I understand the contents, and I agree to abide by its requirements. I also have been properly trained for the work that I am to perform. Documentation will be placed in the Project Records.

Date	Name (Printed)	Signature	Agency/ Company Represented

1 Introduction

1.1 Site Characteristics

This project involves reclamation of the Section 12 Uranium Mine located in the SW ¼ of Section 12, Township 14 North, Range 10 West, McKinley County, New Mexico. The mine is a room-and-pillar underground mine with workings at approximately 700 feet below ground surface. The mine surface is located on the east side of Ambrosia Lake, an ephemeral lake in a shallow deflation basin (bolson). The mine was operated by Cobb Resources, the predecessor operator to SRI from 1974 to 1982. Current features at the site include mine buildings (hoist house, office building, and pump shed), a main shaft and headframe, a vent shaft, and waste piles. The presently-impacted surface footprint of the mine is approximately 58 acres.

1.2 Site Hazards

Hazards commonly associated with demolition of structures and machinery, operation of heavy equipment and vehicles, poisonous snakes and insects, excavation and movement of soil, lifting of heavy objects, handling of sharp tools and materials, and trips and fall exist at the Section 12 Mine. In addition, hazards specific to the Section 12 Mine include:

1.2.1 Exposure to Radiological Materials

The site has radiological contamination resulting from mining of uranium ore and waste rock. The ore was removed from the site during mining operations, and only scattered remnants of ore remain on the site. The waste rock covers much of the mine footprint, and during reclamation it will be excavated as necessary and moved to a repository location on the mine site. Some surface structures and materials may have residues of dust, paint, rust and grease that include low concentrations of radionuclides, especially radium. Both exposure to low-level gamma radiation and inhalation of dust containing radionuclides are hazards to worker health during reclamation.

Sixteen drums of ion exchange resin loaded with uranium reside in the hoist house. Before the hoist house is removed, these drums will be removed from the mine site and shipped to a licensed recovery or disposal facility. After removal of the drums, no significant residue of resin should remain in the hoist house.

1.2.2 Open Shafts

The mine has two shafts. The main shaft is 14 feet diameter, 700 feet deep, and protected from entry by a temporary timber and sheet metal cover. The cover must be opened initially to allow a camera to be lowered to full depth for a video survey of the shaft, then covered again until the shaft is backfilled for final closure. Protective equipment and procedures will be required for all working within 10 feet of the shaft.

A vent shaft, 5.0 feet diameter and 700± feet deep with a steel casing extending 4.0 feet above ground, is open to full depth. It is covered with a steel grating that prevents casual entry.

1.2.3 Buildings and Headframe

Two steel-frame and metal-siding buildings exist on the site. Each has had frequent use by rodents. Both have trash that will be removed, and the hoist house contains a double drum hoist, hoist motors, and electric controls that will be removed. These buildings contain dust and animal matter that may be harmful if inhaled.

During demolition, hazards from falling objects will exist, requiring protection while disconnecting, picking up, swinging, and lowering building and headframe components.

Electrical service has been disconnected from the mine site, so there are no electrical hazards related to the previous service.

2 Plan Objectives

The objective of this Site Health and Safety Plan (HASP) is to provide procedures and guidelines for establishing safe working conditions and practices at the site. The safety organization, procedures, and protective equipment have been established based upon an analysis of potential hazards. Specific hazard control methodologies have been evaluated and selected to minimize the potential of accident or injury.

This HASP prescribes the procedures that must be followed during referenced site activities. Operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager.

The provisions of this plan are mandatory for all personnel and contractors assigned to the project. All visitors to the work site must abide by the requirements of this plan.

3 References

This HASP complies with applicable Mine Safety and Health Administration (MSHA), Environmental Protection Agency (EPA), and US Army Corps of Engineers policies and procedures. This plan follows the guidelines established in applicable parts of the following:

- 30 CFR Subchapter K, Subpart 57 — Safety and Health Standards - Underground Metal and Non-Metal Mines
- Engineer Manual (EM) 385-1-1 Safety and Health Requirements Manual
- Site Safety and Health Plan, Restoration of Abandoned Mines (RAMS) Project, Upper Slate River, U.S. Army Corps of Engineers, Albuquerque District, July 2002
- Standard Operating Safety Guides, EPA (Publication 9285.1-03, June 1992).

4 Responsibilities

4.1 All Personnel

All personnel must adhere to these health and safety procedures during the performance of their work. Each person is responsible for completing tasks safely, and reporting any unsafe acts or conditions to his or her immediate supervisor, the Site Health and Safety Officer (SHSO), or to the Site Supervisor. No person may work in a manner that conflicts with the letter or the intent of, or the safety and environmental precautions expressed in, these procedures. After due warnings, the Project Manager will dismiss from the site any person who violates safety procedures.

All on-site personnel will receive training in accordance with this HASP and will be familiar with the requirements and procedures contained in this document.

4.2 Health and Safety Manager

The Health and Safety Manager (HSM) is responsible for technical health and safety aspects of the project, including preparation of this HASP. Inquiries regarding project procedures, and other technical or regulatory issues related to health and safety should be addressed to this individual. The HSM for this project is TBD.

4.3 Project Manager

The Project Manager is ultimately responsible for ensuring that all project activities are completed in accordance with the requirements and procedures in this plan. The Project Manager for this site is TBD. .

4.4 Site Supervisor/ Site Health and Safety Officer

The Site Supervisor is also the Site Health and Safety Officer. The Site Supervisor is responsible for implementation of the HASP, including communication of site requirements to all on-site project personnel (including contractors). The Site Supervisor will be responsible for identifying any changes in the work plan or procedures so that those changes may be addressed in the HASP. The Health and Safety Manager or his designee must approve any changes to the HASP. Other Site Supervisor responsibilities include:

- Ensuring the conduct of a daily tailgate safety meeting to include all personnel on site,
- Ensuring that all personnel present on the site are equipped with, and are wearing, Level D Personal Protection Equipment (PPE),
- Stopping work, as required, to ensure personal safety and protection of property, or in cases of life or property-threatening safety noncompliance,
- Determining and posting routes to medical facilities and emergency telephone numbers, and arranging emergency transportation to medical facilities,
- Notifying local public emergency officers of the nature of the site operations, and posting of their telephone numbers in an appropriate location,
- Observing on-site project personnel for signs of injury or physical trauma,
- Ensuring that all site personnel have met applicable training requirements and have training documentation available, as necessary.

4.5 Contractors

On-site contractors and their personnel must understand and comply with the site requirements established in this HASP. Contractors must attend and participate in the daily Tailgate Safety Meetings and all other site safety meetings.

4.6 On-Site Personnel and Visitors

All personnel must read and acknowledge their understanding of this HASP, abide by the requirements of the plan, and cooperate with site supervision in ensuring a safe and healthful work site. Visitors to the site must sign in with the Site Supervisor or its representative and must be equipped with appropriate Level D PPE. Site personnel will immediately report any of the following to the Site Supervisor:

- Accidents and injuries, no matter how minor,
- Unexpected or uncontrolled release of chemical or radiological substances,
- Symptoms of chemical or radiological exposure,

- Unsafe or malfunctioning equipment,
- Changes in site conditions that may affect the health and safety of project personnel. In particular, changes in ground elevations or shape around the main shaft, ground cracks, and isolated vertical openings.

5 Project Hazard Control Procedures

5.1 Scope of Work

Site activities are expected to include:

- Land and topographic surveying,
- Sampling of soil, waste rock, and man-made materials,
- Demolition and/or dis-assembling of equipment and structures,
- Scanning for radiological contamination of soil, personnel, buildings, equipment, and demolition debris,
- Removal or suitable burial of radiological materials,
- Radiological de-contamination of personnel, materials, and equipment,
- Excavation, hauling, placing, and compaction of waste rock, contaminated soil, and clean soil,
- Hauling and spraying of water for dust control and soil-moisture conditioning,
- Various welding and cutting of steel using acetylene torches and saws,
- Fueling and maintenance of vehicles and heavy equipment.

5.2 Job Hazard Assessment

A job hazard assessment is necessary to identify potential safety, health, and environmental hazards associated with each type of field activity. Supervisors will continually inspect the work site to identify hazards that may harm site personnel, the community, or the environment. The Site Supervisor must be aware of these changing conditions whenever these changes impact the health, safety, or performance of the project. The Site Supervisor will keep contractors informed of the changing conditions and will write addenda to change Job Hazard Analyses and associated hazard controls as necessary. Site- specific Job Hazard Assessments are in the following sections.

5.3 Field Activities, Hazards, and Control Procedures

5.3.1 Mobilization/Site Preparation/Demobilization

Site mobilization will include establishing active work areas and separate areas for maintenance, work breaks, and administrative purposes. Mobilization may involve clearing areas for the support zones and access. During this initial phase, project personnel will walk the site to observe and identify safety issues prior to entering the site with trucks or other heavy equipment.

The hazards of this phase of activity are associated with heavy equipment movement, manual materials handling, and manual site preparation. Manual materials handling and manual site preparation may cause blisters, sore muscles, and joint and skeletal injuries; and may present eye, contusion and laceration hazards. The work area presents slip, trip and fall hazards from scattered debris and irregular walking surfaces. Freezing- weather hazards include frozen, slick and irregular walking surfaces. Wet weather may cause wet, muddy, slick walking surfaces.

Potential environmental hazards include venomous snakes and arthropods (i.e., insects, spiders, ticks, scorpions, and centipedes) and other pests such as rats, mice, ants, fleas, mosquitoes, and wasps; weather, such as sunburn, lightning, rain, snow, ice, heat and cold; pathogens, such as bubonic plague and Hantavirus, and rabies from bats who inhabit many abandoned mines.

5.3.2 Handling of TENORM Materials

Pieces of uranium ore as well as a large volume of waste rock containing small amounts of uranium exist across approximately 11 acres of the mine site. These materials, called Technologically Enhanced Naturally Occurring Radioactive Material or TENORM, contain levels of uranium and radium above background, as determined by radium levels exceeding 5 pCi/g above background, that will require removal to a repository to be constructed on site. During excavation, hauling, and placement of TENORM in the repository, dust will be generated that could be inhaled by personnel in the area. If necessary, airborne dust will be controlled by application of water to the TENORM and to travel surfaces. If airborne dust is not adequately controlled by water application, workers in the area will be required to wear dust masks.

5.3.3 Source Material

Radiological source material (uranium-loaded resin) has been stored in 16 steel drums in the hoist house. The drums will be removed from the site and shipped to a licensed facility for processing or disposal before other work is performed in the hoist house. Consequently, no resin should remain on site when reclamation work begins, and no radiological hazard from the source material should remain.

5.3.4 Demolition

All above-ground facilities and structures at the mine will be either dismantled for removal from the site for subsequent use elsewhere or demolished. Equipment will be sold for re-use or scrapped. Demolition will involve risks from cutting or disconnecting steel and concrete structural components, then lowering, lifting, and carrying them to load-out or burial locations. Hazards include impact from falling or swinging heavy objects, projectiles of unrestrained debris, burns from hot engines and acetylene torches, and impacts from moving trucks and heavy equipment.

When loads are lifted, swung, lowered, and placed a spotter will observe the activity and warn both the operator and people in the vicinity of potential hazards.

5.3.5 Activity around the Shaft and Vent

Both the main shaft and the east vent shaft are open to approximately 700 feet. Each shaft poses risk of falling and death if the existing covers are breached or structurally compromised. The fence around the main shaft and the temporary cover over the shaft shall remain in place and undisturbed until permanent reclamation measures are undertaken. Before any component of the shaft cover is disturbed for this purpose, personnel inside of the shaft fence shall be attached by safety belt or harness to a rope tethered securely to a steel structural member of the shaft headframe. Once the cover is disturbed, no person not secured in this manner may enter the fenced area of the shaft.

At all times when not opened for authorized entry, the shaft fence shall remain in place and locked. After the shaft headframe is dismantled or demolished, the shaft fence and cover may be replaced with a temporary barrier consisting of chain-link fencing (salvaged from the shaft fence) supported on a steel frame at least 16 feet by 16 feet. The chain-link barrier shall be placed over the shaft at all times that the shaft is not being actively backfilled. In at least four locations, in quadrants around the shaft, signs shall be installed and maintained until backfilling of the shaft is complete. The signs shall be not less than 2 feet by 2 feet and display the warning “DANGER – OPEN SHAFT. KEEP OUT “ in letters at least 3 inches high.

The shaft will be backfilled with waste rock. The earthwork contractor will provide a curb or other positive obstruction to prevent the backfilling equipment from approaching too closely to the shaft. The contractor shall submit its proposed method to assure safe backfilling to the Site Supervisor for approval before start of backfilling. While the draft is being backfilled, no person shall be within 10 feet of the shaft without being securely tethered as described above.

5.3.6 Excavation, Hauling, and Placement of Earth Materials

Excavation, hauling, and placement of earth materials (soil and rock), including TENORM, involves heavy construction equipment such as dozers, excavators, compactors, graders, backhoes, and trucks. Operation of this equipment poses risk of collision and rollover, injury to people, and release of fuels and lubricant. All such equipment will be equipped with back-up alarms. The Site Supervisor will determine that equipment operators and truck drivers have the necessary training and experience for operating their assigned equipment and will oversee equipment operations to enforce safety rules.

Personnel working on the ground in manual tasks and supervision of equipment operations will be exposed to hazards associated with manual materials handling, working with hand tools, directing equipment, performing sampling or testing, and providing line and grade control. Manual materials handling and manually working with tools may cause blisters, sore muscles, and joint and skeletal injuries. All of these tasks pose risk of injury from insect and snakes bites and from contact with moving equipment and from slip, trip and fall hazards from scattered debris, instability of the ground, and irregular walking surfaces.

Freezing weather hazards expose all personnel to frozen, slick and irregular walking surfaces. Wet weather may cause wet, muddy, slick walking surfaces. Some tasks may involve manual digging but it is not anticipated that excavations requiring protective systems (greater than five feet in depth) will be necessary.

5.3.7 De-contamination of Personnel, Materials, and Equipment

Personnel, materials, and equipment may be scanned for radiological contamination prior to departure from the site. Contamination exceeding the release levels, to be determined prior to reclamation, must be removed before departure from the site. De-contamination may be by whatever means is available and suited to the amount and physical form of the contaminant. This may include washing, scraping, or brushing at a location where the contaminants are contained and later buried in the repository.

Personnel involved in decontamination activities may be exposed to skin or eye contact with water spray or steam, contaminated soil, volatile emissions from heavily contaminated vehicles and equipment, and noise. A personal de-contamination station will be maintained on site until contaminant sources have been eliminated.

5.3.8 Fueling and maintenance of vehicles and heavy equipment

The risks of fueling and maintenance of vehicles and heavy equipment on site included leaks and spills that increase the potential for fire and for environmental contamination. The earthwork contractor may establish and maintain a location on site for fueling and maintenance of vehicles and heavy equipment used for site reclamation. Spills of fuels, solvents, or lubricants must be immediately picked up and placed in steel drums for off-site disposal.

Above-ground fuel tanks are required to be located in a diked area that will contain 110% of the largest tank's capacity. All containment devices should be inspected regularly (at least monthly) to identify and correct potential problems, such as cracks, punctures, leaks, and rain water. The ground surface of the fueling and maintenance location must be entirely above the maximum water elevation of Ambrosia Lake, even when the lake contains no standing water, and cleared of all vegetation and other flammable material for not less than 30 feet around any storage device.

5.3.9 Fire

Fire presents risks for personnel, equipment and materials located on site. Fire can start from lightning, from downed electrical power lines, sparks from the nearby railroad and other causes both on and off site. To reduce the risk of fire from smoking on site, smoking cigarettes will be permitted only in the designated break area. Motorized equipment and vehicles should not stop over standing brush or grass to minimize the chance of fire started by catalytic converters. Open flames and welding activities should be observed closely until all ignition sources are out, and a fire extinguisher should be kept at that work location until all sources are eliminated.

The contractor shall equip every vehicle and piece of heavy equipment with a Class ABC fire extinguisher, minimum 5 lb. capacity.

5.3.10 Land and Topographic Surveying

The primary hazards associated with the land and topographic surveys include slip/trip/fall; operation of vehicles in the area, particularly backing up of support vehicles; sharp objects and spiny plants (if removal of these objects is necessary) and contact with rodents, snakes and other poisonous plants or animals. The work area presents slip, trip and fall hazards from heavy equipment, scattered debris and irregular walking surfaces. Freezing weather hazards include frozen, slick and irregular walking surfaces. Wet weather may cause wet, muddy, slick walking surfaces.

5.3.11 Soil and Rock Sampling

Field sampling operations will consist of the collection of bulk soil and rock samples for subsequent analysis and evaluation. The physical hazards of this operation are primarily associated with the sample collection methods and equipment.

Samples may be collected by shovel, backhoe, or other method. The primary hazards associated with these specific soil sampling procedures are generally limited to strains/sprains resulting from bending and lifting, travels over rough terrain, or carrying sample buckets. Hand tools used for sampling may also cause injury from cuts or drops.

In addition to the safety hazards specific to soil and rock sampling operations, hazards associated with the operation of vehicles, particularly large vehicles, in a small area will be a concern. Of particular concern will be the backing up of trucks and other support vehicles.

5.3.12 Exposure

Exposure to extreme weather conditions should be avoided when possible. Freezing weather hazards include frozen, slick and irregular walking surfaces. Wet weather may cause wet, muddy, slick walking surfaces. Ergonomic hazards; i.e. strains, sprains during all phases of work, can be aggravated by extreme weather. Hazards associated with weather during performance of specific tasks are discussed in other sections of this HASP.

Personnel on site should have access to drinking water and shelter when needed.

Protective clothing and sun screen should be used to protect against ultraviolet radiation during all seasons.

6 General Hazards and Control Procedures

At least one copy of this plan must be at the project site, in a location readily available to all personnel. All personnel must read and understand the requirements in this plan before beginning work. All site personnel must use the buddy system (working in pairs or teams). Visitors to the site must be instructed to stay outside exclusion zones and must remain with contractor or SRI escort while on site.

Exclusion zones are defined as areas where work related to mine reclamation is being performed. The extent of an exclusion zone may vary during the course of reclamation and shall be determined by the Site Supervisor in consultation with the contractor(s) working on site.

6.1 Chemical Hazards

No significant inhalation health hazards from chemical contaminants are anticipated for any of the phases. The chemical hazards associated with site operations are related to skin contact with potential site contaminants and chemicals associated with site operations. These site operations include handling of surface and subsurface soil and rock, equipment operations, and demolition. The office building contains insulation that might include asbestos. The site contaminant materials of interest include diesel fuel, gasoline (including benzene component), lubricants, motor oil, concentrations of metals, and possibly asbestos.

Uranium is classified as a radioactive element but its concentration in ore and waste rock is relatively low, making its radioactivity quite low, as well. Uranium is considered more hazardous as a chemical contaminant, but only dissolved uranium is chemically toxic.

6.2 Radiological Hazards

Radiation is emitted primarily by Radium-226 in ore and waste rock in the form of gamma and secondarily by alpha radiation emitted by inhaled Radon-222 gas. The concentration of Ra-226 is highest in portions of the waste rock, for which the clean-up standard is 6.4 pCi/g Ra-226, predicted in the field by a gamma exposure rate of 22.1 μR/h. Normal hygiene practices will be protective of worker health, and these include:

- Wearing long sleeve shirts and long pants (no shorts),
- No eating or smoking in the work areas,
- Washing hands before eating, and
- Wearing dust masks or other breathing protection during dusty conditions.

None of the radiological materials existing at the mine surface are expected to pose a significant health hazard.

6.3 Sunburn/Ultraviolet and Heat Exposure

6.3.1 Sunburn

Overexposure to ultraviolet (UV) radiation may damage the skin and cause sunburn. Chronic exposure to sunlight, especially the UV-B component, accelerates skin aging and increases the risk of skin cancer. Fair-skinned individuals are very prone to this effect; however, increased skin pigmentation reduces the skin sensitivity by as much as a factor of 10.

Sunburn also increases an individual's susceptibility to other forms of heat stress. Any worker with sunburn must pay extra attention to the prevention of heat cramps, heat exhaustion, and/or heat stroke.

The following methods can be used to avoid overexposure to UV rays from the sun:

- Minimize exposure to the sun between 10:00 a.m. and 2:00 p.m. because rays are the most powerful during this period.
- Wear protective clothing (long sleeves, hats with protective brims, long pants) that provides the most coverage, consistent with the job to be performed.
- Protect eyes during sun exposure with UV-absorbing sunglasses or tinted safety glasses. Ophthalmologists recommend lenses that have UV absorption .
- Use a commercial sun screen (minimum SPF-30).

Sunscreen should be applied 15 to 30 minutes before exposure to the sun and reapplied often (every 60 to 90 minutes). It is best to use a sunscreen that claims to protect against both UV-B and UV-A rays (some offer only UV-B protection).

6.3.2 Heat Stress

Wearing PPE may put site personnel at increased risk of heat stress. Heat stress effects range from transient heat fatigue to serious illness and death. Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is one of the most common and potentially serious illnesses during field operations, alertness to the symptoms and knowledge of preventive measures are vital.

Heat stress monitoring should commence when personnel are wearing impermeable PPE and the ambient temperature exceeds 78 degrees Fahrenheit (°F). If impermeable garments are not worn, heat stress monitoring should commence at 90 F. On-site personnel will monitor each other, via the buddy system, for signs of heat stress such as faintness, elevated heart rate, flushed dry skin, and nausea.

One or more of the following control measures can be used to help control heat stress and are mandatory if any site worker has a heart rate (measure as early as possible during rest period) exceeding 75 percent of the calculated maximum heart rate (MHR = 200 - age) or an oral temperature of 99.6 °F:

- Site workers will be encouraged to drink plenty of water and electrolyte replacement fluids throughout the day.
- On-site drinking water will be kept cool (50 to 60 °F) to encourage personnel to drink frequently.
- A work regimen that will provide adequate rest periods for cooling down will be established, as required, but generally a one-third-work shift reduction until sustained heart rate is below 75 percent of their calculated maximum heart rate and oral temperatures are kept at or below 99.6 °F. Workers shall not be allowed to return to work if their sustained heart rate is above the 75 percent calculated maximum OR if their oral temperature exceeds 100.4 °F.
- All personnel will be advised of the dangers and symptoms of heat stroke, heat exhaustion, and heat cramps.
- Cooling devices such as vortex tubes or cooling vests should be used when personnel must wear impermeable clothing in conditions of extreme heat.

- Employees should be instructed to monitor themselves and co-workers for signs of heat stress and to take additional breaks as necessary.
- A shaded rest area, such as a truck cab, canopy or tree, must be provided by the contractor or the site supervisor, whoever is the senior person on site. All breaks should take place in the shaded rest area.
- Employees must not be assigned to other tasks during breaks.
- Employees must remove impermeable garments during rest periods.
- All employees must be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress disorders.

Heat Cramps: heavy sweating and inadequate electrolyte replacement cause heat cramps. Signs and symptoms include muscle spasms and pain in the hands, feet, and abdomen.

Heat Exhaustion: Heat exhaustion occurs from increased stress on various body organs. Signs and symptoms include pale, cool, moist skin; heavy sweating; dizziness; nausea; and fainting.

Heat Stroke: Heat stroke is the most serious form of heat stress and should always be treated as a medical emergency. The body's temperature regulation system fails, and the body temperature rapidly rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Signs and symptoms of heat stroke include red, hot, usually dry skin; lack of, or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse and confusion; and coma.

6.4 Cold Stress

Cold and/or wet environmental conditions can place workers at risk of a cold-related illness. Hypothermia can occur whenever temperatures are below 45 °F, and is most common during wet, windy conditions, with temperatures between 30 to 40 °F. The principal cause of hypothermia in these conditions is loss of insulating properties of clothing due to moisture, coupled with heat loss due to wind and evaporation of moisture on the skin.

Frostbite, the other illness associated with cold exposure, is the freezing of body tissue, which ranges from superficial freezing of surface skin layers to deep freezing of underlying tissue. Frostbite will only occur when ambient temperatures are below 32 °F. The risk of frostbite increases as the temperature drops and wind speed increases.

Most cold-related worker fatalities have resulted from failure to escape low environmental air temperatures or from immersion in low temperature water. The single most important aspect of life-threatening hypothermia is a fall in the deep core temperature of the body.

Site workers should be protected from exposure to cold so that the deep core temperature does not fall below 96.8 °F. Lower body temperatures will very likely result in reduced mental alertness, reduction in rational decision- making, or loss of consciousness with the threat of fatal consequences. To prevent such occurrence, the following measures will be implemented:

- Site workers must wear warm clothing such as gloves, heavy socks, etc., when the air temperature is below 45 °F. Protective clothing, such as Tyvek or other disposable coveralls, may be used to shield employees from the wind.
- When the air temperature is below 35 °F, employees must wear clothing for warmth. This will include:
  - Insulated suits, such as whole body thermal underwear,
  - Wool socks or polypropylene socks to keep moisture off the feet,

  - Insulated gloves,
  - Insulated boots,
  - Insulated head cover such as hard hat, winter liner, or knit cap,
  - Insulated jacket, with wind and water-resistant outer layer.
- At air temperatures below 35 °F, the following work practices must be implemented:
  - If the clothing of a site worker might become wet on the job site, the outer layer of clothing must be water impermeable.
  - If a site worker's underclothing becomes wet in any way, the worker must change into dry clothing immediately. If the clothing becomes wet from sweating (and the employee is not uncomfortable), the employee may finish the task at hand prior to changing into dry clothing.
  - Site workers must have a warm (65 °F or above) break area, provided or arranged by the site supervisor.
  - Hot liquids such as soups or warm, sweet drinks must be provided in the break area by the site supervisor, or in his absence the senior person on site each day. The intake of coffee and tea should be limited, due to their circulatory and diuretic effects.
  - The buddy system must be practiced at all times on site. Any site worker observed with severe shivering must leave the work area immediately.
  - Site workers should dress in layers, with thinner lighter clothing worn next to the body.
  - Site workers should avoid overdressing when going into warm areas or when performing strenuous activities.

6.5 Biological Hazards

Biological hazards may include venomous arthropods (i.e., insects, spiders, ticks scorpions, and centipedes), snakes and other pests such as ants, fleas, mosquitoes, and wasps; pathogens such as bubonic plague and Hantavirus and rabies from bats that may frequent abandoned mines.

Exposure to blood-borne pathogens may result from contact with blood or other fluids during administration of first-aid.

Venomous snakes and arthropods, including insects, spiders, ticks, scorpions, centipedes, and others, create a hazard when their habitats are disturbed. Wasp and bee stings account for a number of fatalities each year. In the United States, snakebites rarely kill because effective treatments have been developed. The best defense is to understand where these creatures may be found and to avoid them before they can cause harm. Should a bite or sting occur, first aid should be applied immediately and medical treatment sought as follows:

Black Widow Spider (Latrodectus spp.) is a sedentary web spider found in most warm parts of the world. Only the females bite and then only if threatened or molested. The spider's perception of a threat may be different from your intent. The bite may go unnoticed and may not hurt, but the subsequent severe abdominal pain from a black widow's bite resembles appendicitis. There is pain also in muscles and in the soles of the feet but usually no swelling at the site of the bite. Alternately, the saliva flows freely, then the mouth is dry. The bite victim sweats profusely. The eyelids are swollen. The patient usually recovers after several days of agony. Physicians can relieve the severe pain by injection of calcium gluconate. Antivenin is available; however, there is no first-aid treatment for any spider bite. Black widows are common throughout New Mexico, except perhaps at high altitudes.

Brown Spider (also known as brown recluse spider, violin spider) (Loxosceles spp.) commonly lives in houses or on the floor or behind furniture. Bites occur when a spider rests in clothing or in a towel. There may be no harm at all. In very severe cases, a red zone appears around the bite, then a crust forms and falls off. The wound grows deeper and does not heal for several months. The spider's venom may cause destruction of red blood cells and other blood changes. The victim may develop chills, fever, joint pains, nausea, and vomiting. In some cases, a generalized rash develops one to two days after the bite. A victim should consult a physician as soon as signs of illness appear. Brown recluse bites and suspected bites have been reported from various parts of New Mexico, especially the southeastern part of the state.

Scorpions of the family Vejovidae are common throughout the desert regions of the southwestern United States and southern California. Vejovid scorpions rarely exceed 3 inches in length. Scorpions feed at night on insects and spiders, catching them with their pincers and sometimes stinging them. The stinger is in the tip of the tail. Vejovid scorpions burrow in the earth and are sometimes found under rocks and other objects lying on the ground. Scorpions sting in self-defense. Most stings are not serious but may produce excruciating pain at the site of the sting. The victim may develop nausea, vomiting, and severe abdominal pain. First aid consists of applying cold to the site of the sting and possibly a soothing lotion, such as calamine.

Black Scorpions, Centruroides exilacauda (once known as Centruroides sculpturatus) of the Buthidae family, is found along the Colorado River and the pine forests in Arizona and southwestern New Mexico. It is the only dangerous scorpion found in the continental United States. They are typically only an inch in length and their color is similar to translucent straw. Its poison affects the nerves, causing severe pain. The sting from this scorpion has been responsible for deaths of small children.

Ticks (suborder Ioxdides) are external parasites of reptiles, birds, and mammals. Most drop off their host after feeding. They molt and then wait on the tips of leaves, forelegs outstretched, ready to attach to any animal brushing past. The bites of some soft-bodied ticks may cause mild paralysis to man. Ticks transmit many diseases, most important, Rocky Mountain spotted fever and Lyme Disease. Ticks attach themselves to the host only with their mouth parts and feed on blood. In removing a tick, take care not to leave mouth parts behind. Ticks are best removed by pulling them off with steady, gentle pressure. The pull must be light enough to not injure the tick. It may take more than 10 minutes of pulling to remove the tick. Be patient! After tick is removed, wash area thoroughly with soap and water, gently scrubbing the area of the tick bite.

Fleas (order Siphonaptera) can be carriers of bubonic plague. The plague is usually limited to rodent populations, including squirrels and various species of wild mice and rats. The fleas that parasitize rodents will rarely parasitize people; however, contact with freshly dead or ill animals should be avoided.

Ants, bees, wasps, hornets, and yellow jackets (order Hymenoptera) occasionally cause death. Death from the sting of such creatures is almost always due to acute allergic reaction. The stinging apparatus and venom sac sometimes remain at the site of the sting and must be removed. Some relief from the pain can be obtained by applying cold. Soothing lotions, such as calamine, may reduce itching.

IMPORTANT NOTE: If an individual has a history of allergic reactions to insect bites or is subject to attacks of hay fever or asthma, or if they are not promptly relieved of symptoms, call a physician or seek immediate emergency medical treatment. In a highly sensitive person, do not wait for symptoms to appear, since delay can be fatal. Any individual with a known allergy to wasps and bees must notify the Site Supervisor and/or Project manager/Leader prior to working at the project site.

Rattlesnakes are common in the project area. Rattlesnakes belong to the family of pit vipers (Crotalinae). These snakes have a pit between the eye and nostril on each side of the head, elliptical pupils, from one to six fangs (but usually two well-developed fangs), and one row of plates beneath the tail. The head is wider than the neck and body. The venom of these snakes affects the circulatory system. All reactions from snakebite are aggravated by acute fear and anxiety. Nonpoisonous snakes have two round pupils, no fangs or pit, a double row of plates beneath the tail, and the head is not wider than the neck and body. The pit viper rattlesnakes are the primary poisonous snakes found in New Mexico.

Controlling Exposure to Venomous Snakes and Arthropods. To minimize the threat of snakebites and insect hazards, all on-site personnel must be made aware (during training) of the potential for encountering snakes and will avoid actions potentiating encounters, such as turning over logs, etc. When working around brush, grass, and stationary debris, site personnel are advised to wear thick leather boots and gaiters that extend from the tops of the boot to the knee. If snakebite occurs, an attempt should be made to kill the snake for identification. The victim should be transported to the nearest hospital within 30 minutes. First aid consists of applying a constriction band, washing the area around the wound to remove any unabsorbed venom.

6.6 Pathogens

Individuals should be aware that bubonic plague is found throughout the Southwest. The plague is an illness that is caused by bacteria and is most often transmitted to humans by the fleas of rodents. The recommendations provided above for controlling exposures to rodent populations should be followed, and all dead rodents, including rabbits and squirrels, should be avoided.

Table 6.6.1 First Aid Procedures (Reference American Red Cross Standard First Aid 1993)

Type	Signals	Care
Insect Bite	Stinger may be present, pain, swelling, and possible allergic reaction.	Remove stinger by scraping it away or by pulling with tweezers. Wash wound Cover with a sterile bandage. Apply a cold pack.
Spider/Scorpion Bite/Sting	Bite mark, swelling, pain, nausea and vomiting, difficulty breathing or swallowing.	Wash wound. Apply a cold pack. Get medical care to receive antivenin. Call local emergency number, if necessary.
Venomous Snake Bite	Bite mark and pain	Wash wound. Keep bite area still and lower than heart. Call local emergency number.
Animal Bite	Bite mark, pain, and bleeding	If bleeding is minor—wash wound and control bleeding. Apply antibiotic ointment and cover. If bleeding is severe—get medical attention If you suspect the animal has rabies. call local emergency number/animal control personnel

6.6.1 Hantavirus

The Hantavirus Pulmonary Syndrome illness is a respiratory disease that is a serious often deadly respiratory disease that has been found in rural areas of the western United States. It is also known as the Sin Nombre (No-Name) illness. Preliminary evidence has shown that the illness is caused by a Hantavirus that may be carried in the urine, saliva, and feces of rodents (particularly rats and mice). There is no current evidence to indicate that illness is transmitted by biting insects (ticks, fleas, mosquitoes), or by person-to-person contact. Cats and dogs are not known to be reservoir hosts of hantaviruses in the United States, however, these domestic animals may bring infected rodents into contact with humans.

Be aware of the presence of any rodents and to take precautions where rodents may have been. These precautions include avoiding rodents, rodent bedding or nests, and rodent droppings. Notify the Site Supervisor if any signs of rodents are encountered.

6.6.2 Bats and Rabies Exposure

Rabies is a fatal viral disease transmitted to humans by the bite of infected bats. Bats may frequent abandoned mines and thus there is always the risk for contact with bats at some of the sites. Wash any wound from an animal thoroughly with soap and water and seek medical attention immediately. Additional information is available from the Centers for Disease Control (CDC) on rabies transmission by bats, preventive measures, and procedures to follow if bitten by a bat.

6.7 Noise

Exposure to noise over the OSHA action level can cause temporary impairment of hearing; prolonged and repeated exposure can cause permanent damage to hearing. The risk and severity of hearing loss increases with the intensity and duration of exposure to noise. In addition to damaging hearing, noise can impair voice communication, thereby increasing the risk of accidents on site.

All personnel must wear hearing protection during the operation of noise producing machinery when noise levels exceed 85 dBA, or at the discretion of the SHSO.

6.8 Buddy System

All on-site personnel must use the buddy system. Visual contact must be maintained between crew members at all times. Team members must also be aware of potential exposure to possible safety hazards, unsafe acts, or noncompliance with safety procedures. If protective equipment or noise levels impair communications, prearranged hand signals must be used for communication. Personnel must stay within line of sight of another team member.

6.9 Lockout/Tagout Procedures

Maintenance procedures on vehicles and heavy equipment will be performed only by individuals who are familiar with lockout/tagout procedures. Lockout is the placement of a device that uses a positive means such as a lock to hold an energy or material isolating device or system ensuring that the equipment cannot be operated until the lockout device is removed. If a device cannot be locked out, a tagout system will be used. Tagout is the placement of a warning tag on an energy or material isolating device indicating that the equipment controlled may not be operated until the tag is removed. Lockout/tagout procedures will be used during required repairs to the equipment that may cause injury in the event of accidental start- up.

6.10 Sanitation

There are no on-site facilities for washing before eating, drinking, or smoking. The earthwork contractor will provide and maintain at least one portable toilet for the duration of the contract.

Trash generated by site activities must be collected and removed from the site for disposal in trash receptacles.

6.11 Electrical Hazards

Electricity may pose a particular hazard to site workers due to the use of portable generators and electrical equipment, as needed. There is no longer any electrical service to the site.

General electrical safety requirements include:

- All electrical wiring and equipment must be a type listed by Underwriters Laboratories, Inc., (UL), Factory Mutual Engineering & Research (FM), or other recognized testing or listing agency.
- All installations must comply with the National Electrical Safety Code, the National Electrical Code, or USCG regulations.
- Portable and semi portable tools and equipment must be grounded by a multiconductor cord having an identified grounding conductor and a multicontact polarized plug- in receptacle.
- Tools protected by an approved system of double insulation, or its equivalent, need not be grounded. Double insulated tools must be distinctly marked and listed by UL or FM.
- Live parts of wiring or equipment must be guarded to prevent persons or objects from touching them.
- Electric wire or flexible cord passing through work areas must be covered or elevated to protect it from damage by foot traffic, vehicles, sharp corners, projections, or pinching.
- All circuits must be protected from overload.
- Temporary power lines, switch boxes, receptacle boxes, metal cabinets, and enclosures around equipment must be marked to indicate the maximum operating voltage.
- Plugs and receptacles must be kept out of water unless of an approved submersible construction.
- All extension outlets must be equipped with GFCIs.
- Attachment plugs or other connectors must be equipped with a cord grip and be constructed to endure rough treatment.
- Extension cords or cables must not be fastened with staples, hung from nails, or suspended by bare wire.
- Flexible cords must be used only in continuous lengths without splice, with the exception of molded or vulcanized splices made by a qualified electrician.

6.12 Lifting Hazards

Using proper lifting techniques may prevent back strain or injury. The fundamentals of proper lifting include:

- Consider the size, shape, and weight of the object to be lifted. Two persons must lift an object if it cannot be lifted safely alone (e.g., >60 pounds).
- The hands and the object should be free of dirt or grease that could prevent a firm grip.
- Gloves must be used, and the object inspected for metal slivers, jagged edges, burrs, rough or slippery surfaces.
- Fingers must be kept away from points that could crush or pinch them, especially when putting an object down.

- Feet must be placed far enough apart for balance. The footing should be solid and the intended pathway should be clear.
- The load should be kept as low as possible, close to the body with the knees bent.
- To lift the load, grip firmly and lift with the legs, keeping the back as straight as possible.
- A worker should not carry a load that he or she cannot see around or over.
- When putting an object down, the stance and position are identical to that for lifting; the legs are bent at the knees, and the back is straight as the object is lowered.

6.13 Dust Control

Dust will be controlled at all times with emphasis on times when individuals may be exposed to airborne dust with known radiological content; i.e., dust from waste rock. Dust will be controlled through the use of sprayed water or dust capture devices. In addition, field personnel will remain upwind of any intrusive or dust-creating activity. If dust control measures are not adequate to suppress airborne dust, work will stop and not continue until appropriate dust control measures are employed. Respirators or dust masks will be provided to workers if dust suppression is not able to control inhalable dust due to dry, windy conditions.

7 Personal Protective Equipment

Personal protective equipment (PPE) is required to safeguard site personnel from various hazards.

7.1 Level D Protection

The level of protection that will be required during site operations will be Level D, which will be worn as the protection level for site operations involving demolition or construction activities equipment:

- Work clothing appropriate for the weather and covering the torso and limbs.
- Reflective (Hi-vis) vests
- Safety toe work boots, American National Standards Institute (ANSI) approved
- Safety glasses or goggles, ANSI approved (if potential eye hazard is apparent)
- Hard hat, ANSI approved
- Hearing protection (If noise levels are expected to exceed 85 dBA)

Dust masks or other respiration protection will be provided by the contractor when airborne dust becomes visibly apparent and is not controlled adequately by dust suppression measures (Section 6.13).

7.2 Using PPE

All people entering an exclusion zone must put on the required PPE in accordance with the requirements of this plan. When leaving the exclusion zone, PPE may be removed.

8 Site Control

8.1 Authorization to Enter

Only project personnel who have Level D PPE and have read this HASP may enter the exclusion zone. The Site Supervisor will maintain a list of authorized persons; only personnel on the authorized persons list will be allowed within the exclusion zone.

8.2 Hazard Briefing

No person will be allowed in the exclusion zone during site operations without first being given a site hazard briefing. In general, the briefing will consist of a review of the Tailgate Safety Meeting. All people on the site, including visitors, must sign the site-specific tailgate safety meeting form. Tailgate Safety Meetings will be held at the beginning of each shift. The Site Supervisor or his designee will conduct the tailgate meeting.

8.3 Field Activity Daily Log

The Field Activity Daily Log will be used for project documentation and record keeping. This log will include the names of individuals who have visited the site and those who had authorization to enter the exclusion zone.

8.4 Emergency Entry and Exit

People who must enter the site on an emergency basis will be briefed of the hazards by the Site Supervisor. All hazardous activities will cease in the event of an emergency and any sources of emissions will be controlled, if possible.

People exiting the site because of an emergency will gather in a safe area for a head count. The Site Supervisor is responsible for ensuring that all people who entered the exclusion zone area have exited in the event of an emergency. The safe area is the road entry to the site at the south edge of the SW ¼ of Section 12.

9 Emergency Procedures

9.1 Emergency Response

See Table 9.6.1 for emergency service contacts.

At least one operating cell phone must be on site at all times that project personnel are present. All people on site must be aware of the phone location. The site supervisor is responsible for ensuring that a cell phone is on site. If an incident occurs, the following procedures will be used:

- The Site Supervisor will evaluate the incident and assess the need for assistance,
- The Site Supervisor will call for outside assistance as needed,
- The Site Supervisor will act as liaison between outside agencies and on-site personnel,
- The Site Supervisor will ensure the Project Manager is notified promptly of the incident,
- The Site Supervisor will take appropriate measures to stabilize the incident scene.

9.2 Fire Response

In the case of a fire on the site, the Site Supervisor will assess the situation and direct fire-fighting activities. The Site Supervisor will ensure that the client site representative (as appropriate) is immediately notified of any fires. Site personnel will attempt to extinguish the fire with available extinguishers, if safe to do so. In the event of a fire that site personnel are unable to safely extinguish, the local fire department will be summoned via 911 or other number. The Site Supervisor will notify the fire department after-the- fact regarding fires successfully extinguished.

9.3 Medical Emergency

All employee injuries must be promptly reported to the Site Supervisor. The Site Supervisor will:

- Ensure that the injured employee receives prompt first aid and medical attention,
- Ensure that the Project Manager is promptly notified of the incident,
- Initiate an investigation of the incident.

9.4 First Aid—General

Survey the scene. Determine if it is safe to proceed. Protect yourself from exposure before attempting to rescue the victim.

Do a primary survey of the victim. Check for airway obstruction, breathlessness, and pulse. Assess likely routes of chemical exposure by examining the eyes, mouth, nose, and skin of the victim for symptoms.

Phone Emergency Medical Services (EMS). Give the location, telephone number used, caller's name, what happened, number of victims, victims' condition, and help being given.

Perform rescue breathing as necessary.

Perform CPR as necessary, and if qualified.

Do a secondary survey of the victim. Check vital signs and do a head-to-toe exam.

Treat other conditions as necessary. If the victim can be moved, take him to a location away from the work area where EMS can gain access.

9.5 Reporting Injuries and Illnesses

All injuries and illnesses, however minor, will be reported to the Site Supervisor immediately. The Site Supervisor will complete an injury report and submit it to the SHSO within 24 hours.

9.6 Emergency Information

Local public response agencies will be reviewed in the Tailgate Safety Meeting. (See Table 9.6.1 of emergency information).

Table 9.6.1 Emergency Contacts

Contact Name	Phone Number
McKinley County Fire and Rescue	911 505-863-3839
Ambulance	911
Cibola General Hospital 1016 E Roosevelt Ave, Grants, NM	(505) 287-4446
Lobo Canyon Fire District #10	505-285-2558 505-876-5485
McKinley County Sheriff	505-863-1410 911
New Mexico State Police District 6, Grants	Emergencies - 911 Non Emergencies (505) 287-4377
(Explosives**)** New Mexico Department of Public Safety **–** Gallup,	505-863-9353
Poison Control	(800) 222-1222
AKA Project Manager: Alan Kuhn	(505) 350 9188
Site Supervisor : TBD	

Figure 1 -- Site Location Map

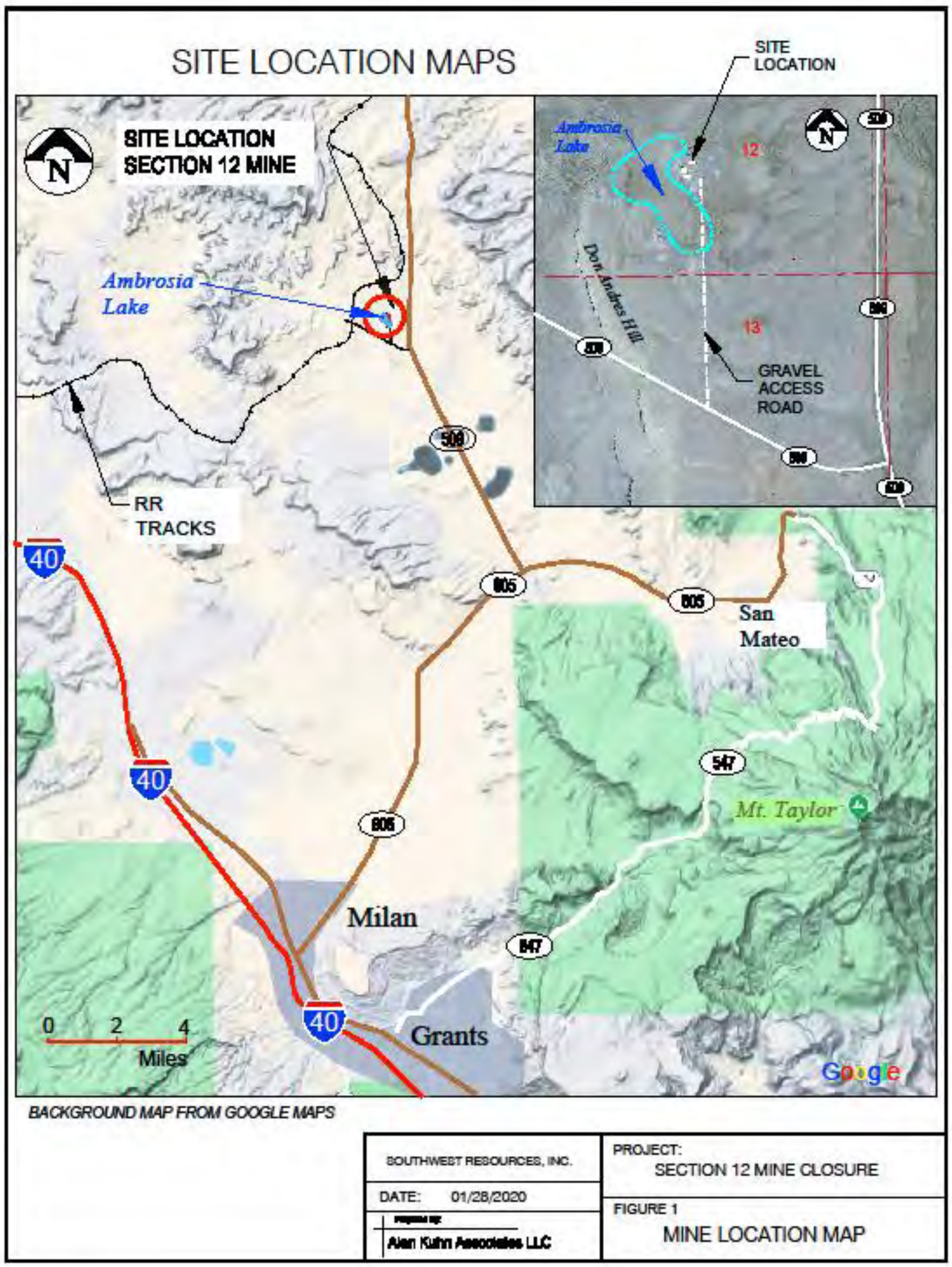
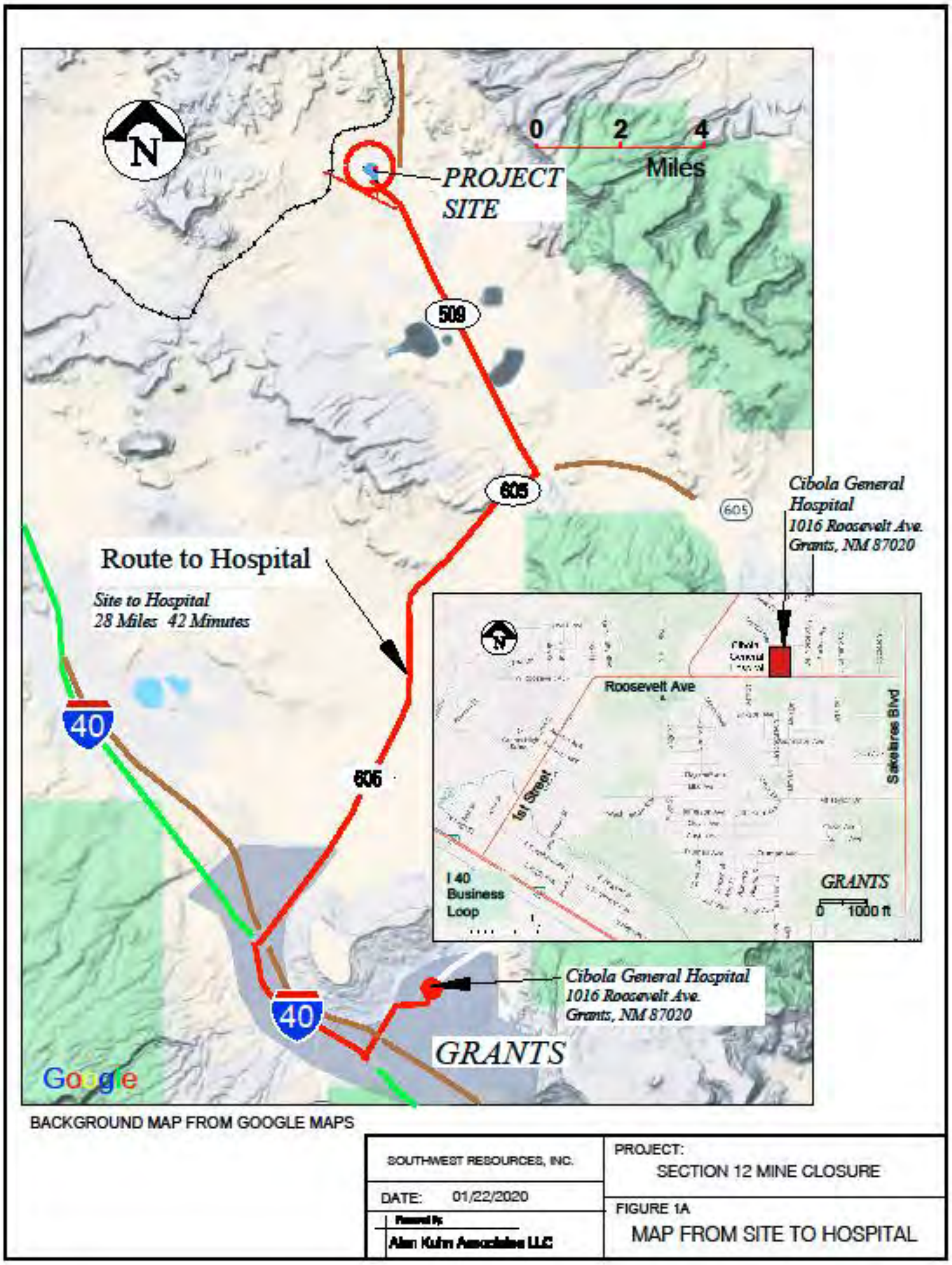


Figure 1A -- Route to the Hospital



Emergency Services Contacts

Cibola General Hospital
1016 E Roosevelt Ave, Grants, NM 87020
(505) 287-4446

Grants Fire and Rescue

(505) 876-2245

NM State Police, Grants

(505) 287-4141

Tailgate Safety Meeting Documentation

Topic(s) ____

____

Date ________________ Presenter ______________________________

Name	Organization

NOTES:

APPENDIX I

CONSTRUCTION QUALITY MANAGEMENT PLAN
SECTION 12 MINE

CONSTRUCTION QUALITY MANAGEMENT PLAN
SECTION 12 MINE RECLAMATION
REV. 0, 2/13/2020

SOUTHWEST RESOURCES INC. (SRI) will implement a Construction Quality Management Plan (CQMP) for mine reclamation construction at its Section 12 Mine at Ambrosia Lake, NM. The CQMP incorporates relevant elements of quality control (QC) and quality assurance (QA).

CQMP Scope

SRI's CQMP defines the processes, practices, and procedures implemented to ensure that the project's quality requirements, as defined in the project construction specifications and industry standards, are met or exceeded. The CQMP has two elements - quality control and quality assurance.

Quality control (QC) defines how the project quality will be managed during construction of the project. It defines who is responsible for achieving the quality standards and how this is to be accomplished. It establishes a framework with defined procedures and practices to ensure that the completed product meets or exceeds the project specified quality requirements. QC includes visual observations, sampling and testing of earth materials, as well as measurements to ensure compliance with specifications and drawings.

Quality assurance (QA) is the process or procedure used to document that the required quality of the project is achieved through QC. This process includes inspections, records, and reporting requirements as well as who is to receive and review them, and it also describes how corrective actions will be taken. QA includes assurance of personnel qualifications, documentation and record-keeping, management and technical inspections, chain of authority and reporting, and implementation of relevant standards.

Standards and Practices

The standards and practices required for mine reclamation construction are described in the specifications and drawings that are submitted in an appendix to the RP.

Two specifications will be prepared, one for earthwork and the other for re-vegetation. Both will include:

- Description of responsibilities of project participants,
- List of publicly-available industry standards for contractor reference (e.g., ASTM),
- List of relevant construction drawings,
- Detailed descriptions of all materials,
- Detailed descriptions of procedures, or the performance standards applicable, for each task in the execution of the work scope,
- Quality Control requirements, and
- Documentation requirements.

The drawings relevant to each task are identified in the specification that directs that task.

Copies of all construction drawings will be submitted to MMD before being issued for bid and construction. The drawings will describe the areas of the subject work, areas of contaminated soil and waste rock, areas of borrow soil to be used in the repository, the repository configuration, details of the repository cover, the final grading plan, and disturbed areas to be re-vegetated. As with any mine reclamation, the actual areas and dimensions will differ somewhat from those expected as described in the drawings, requiring field-fit. Those differences will be described later in as-built documentation in the reclamation completion report.

The drawings include references to the relevant specification(s). Where appropriate, drawings also include reference to industry standards or specific products that satisfy the relevant standard. Drawings are revised as necessary, and each revision is identified in numerical sequence.

Quality Control Procedures and Oversight

QC procedures are identified in each specification. Contractors must comply with the requirements of the specification, and this compliance is observed and confirmed by:

- The QC contractor under contract directly to SRI. At least one qualified QC inspector is on site during all construction activity performed under specification. The QC inspector reports directly to the SRI Facilities Manager.
- Professional engineer oversight (Alan Kuhn Associates LLC, or AKA), under contract to SRI for oversight of construction to support the SRI Facilities Manager in determining compliance with design, troubleshooting, and documentation and reporting.
- SRI Site Reclamation Manager (SRM), the Owner's Project Manager, responsible for direction of all contractors and QA oversight.
- Radiological Technician (RT), under contract to SRI, will be perform or oversee gamma scanning activities and equipment as described in Section 6 of the Reclamation Plan and additional written instructions.

Documentation

SRI's SRM has responsibility for documenting the performance of all construction work. Documentation is submitted to SRI either in electronic format (e.g.; PDF or WORD format) or in hard copy that is then scanned into PDF format. As directed by the SRM, AKA will review QC records to assess compliance with drawings and specifications. The QC contractor provides daily journal reports on field inspections and compliance with drawings and specifications. QC field and laboratory test results are submitted to SRI and AKA as they are completed, typically within one week time of testing. Failing results are reported immediately to SRI and the construction contractor for corrective action.

Reporting

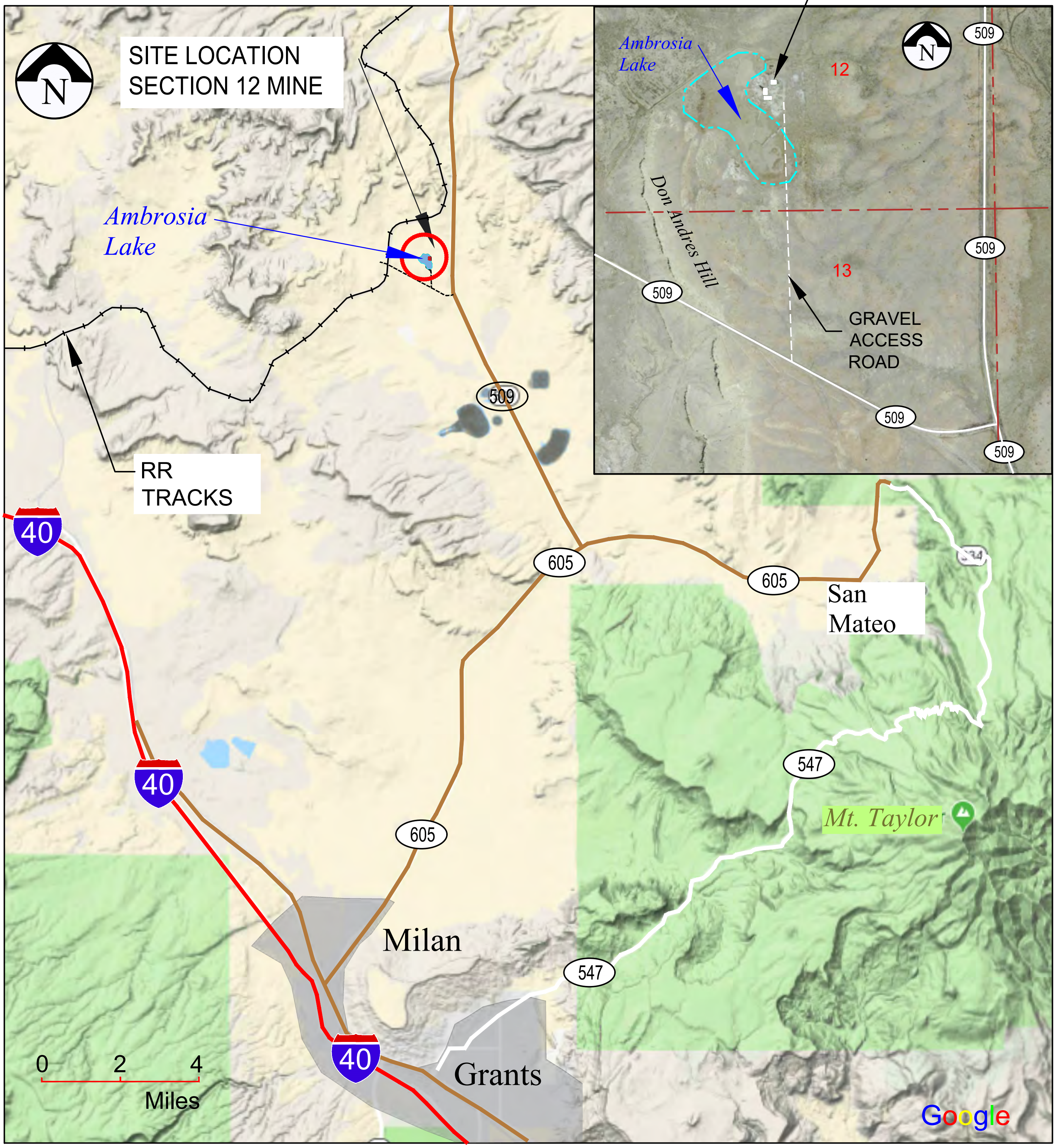
Upon completion of mine reclamation construction, all project documentation will be compiled in the Completion Report. This report will include:

- Time-based summary of construction activities,

- Summary of QC data (complete data file appended to the report),
- Problems encountered and corrective actions taken,
- Design changes and variances, if any,
- Evaluation of completed project, and
- Appendices with as-built drawings, data files, photographs.

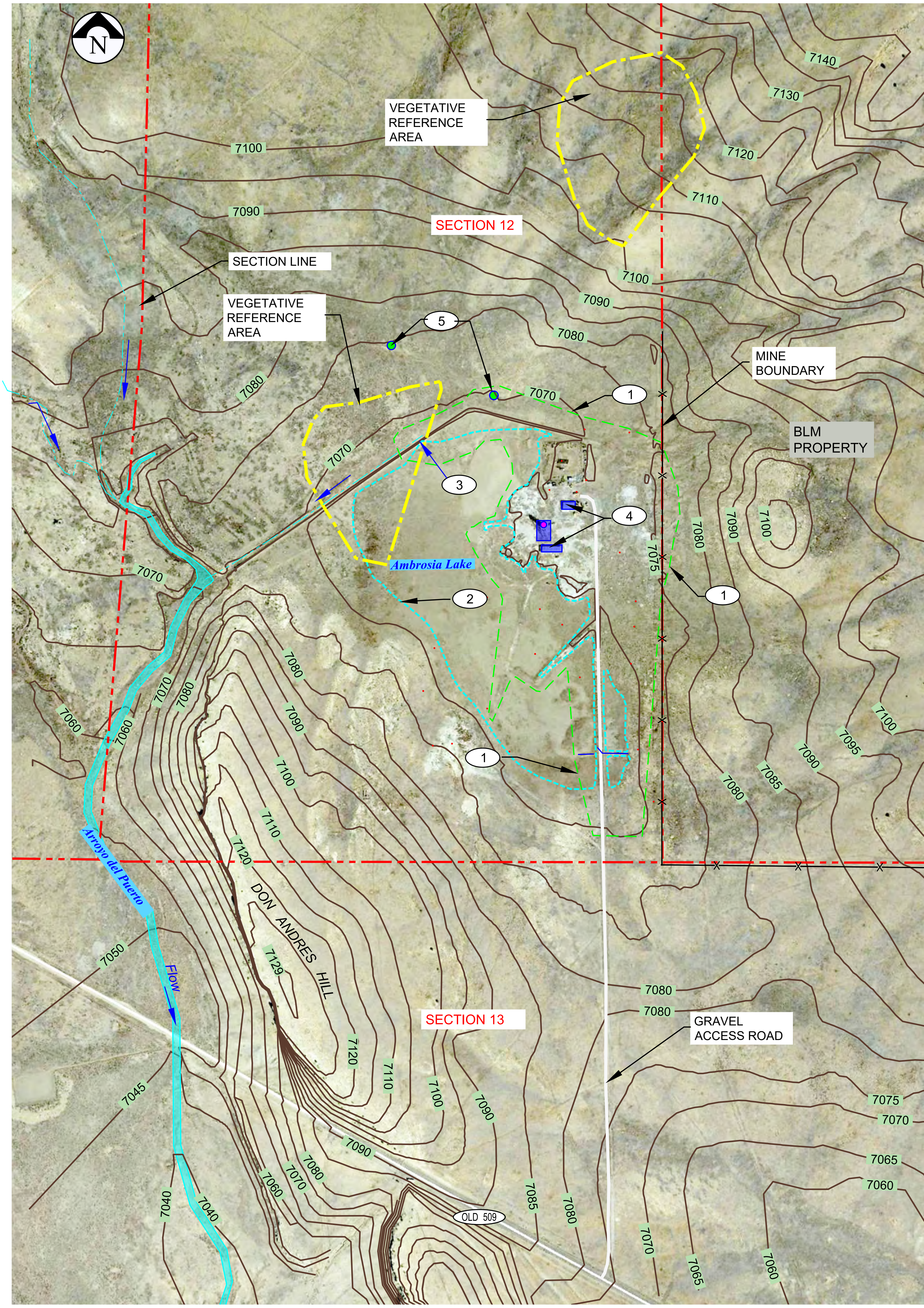
The Construction Completion Report will be submitted to MMD and NMED within 60 days of project completion.

SITE LOCATION MAPS



BACKGROUND MAP FROM GOOGLE MAPS

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE CLOSURE
DATE: 01/28/2020	FIGURE 1
Prepared By: Alan Kuhn Associates LLC	MINE LOCATION MAP



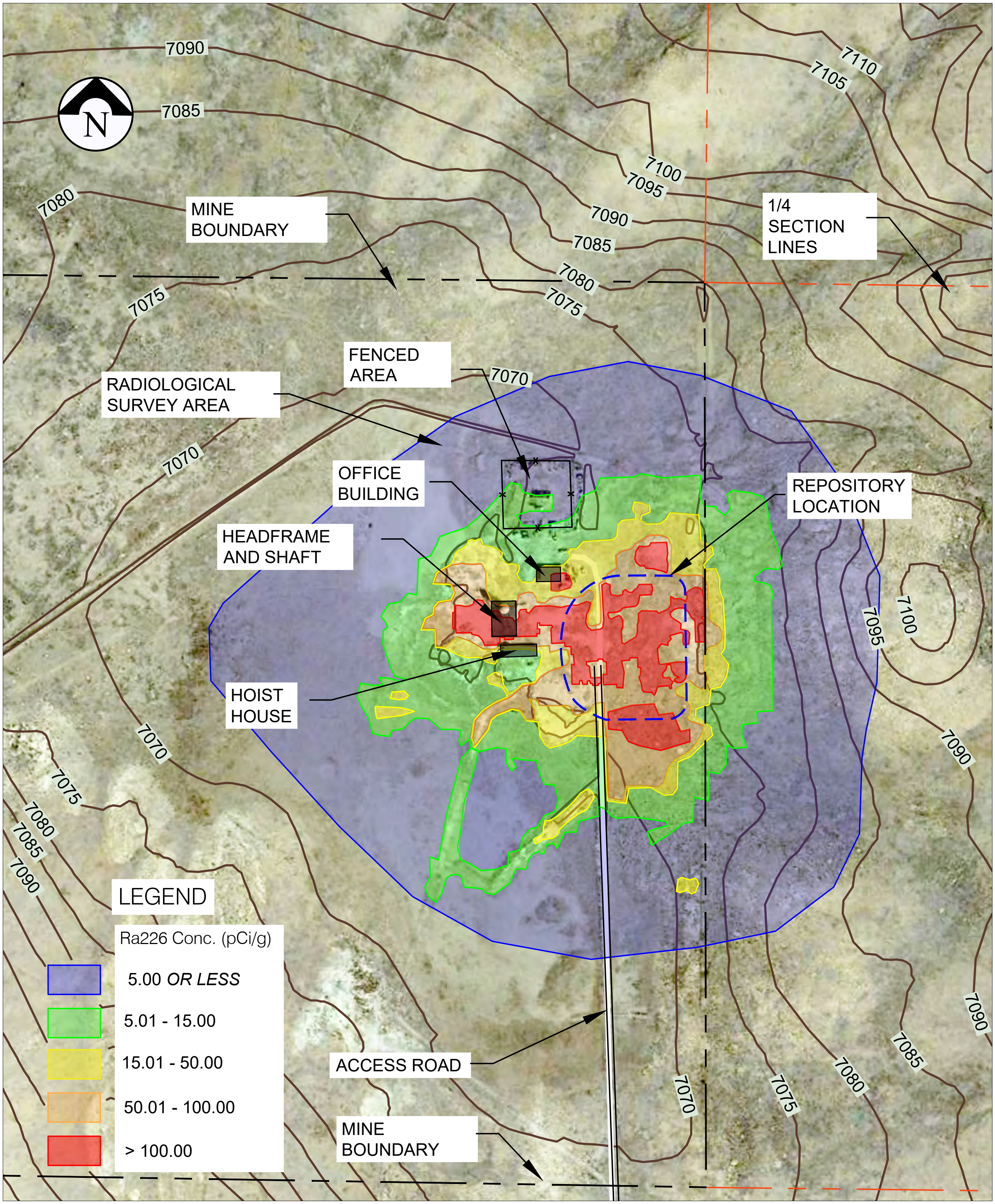
NOTES

1. AREA DISTURBED BY MINE OPERATIONS = 39 ACRES
2. AMBROSIA LAKE - LAKE HIGH WATER LEVEL = 7068.5'
3. LAKE DRAINAGE POINT = ELEVATION 7068.5'
4. MINE FACILITIES (SEE FIGURE 5)
5. MINE VENTS (SEE FIGURE 5)

0 250 500 750 1000 FT

GRAPHIC SCALE

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION
DATE: 07 / 10 / 2020	
Prepared By: Alan Kuhn Associates LLC	FIGURE 2 EXISTING SITE TOPOGRAPHY



0 200 400 600 800 FT

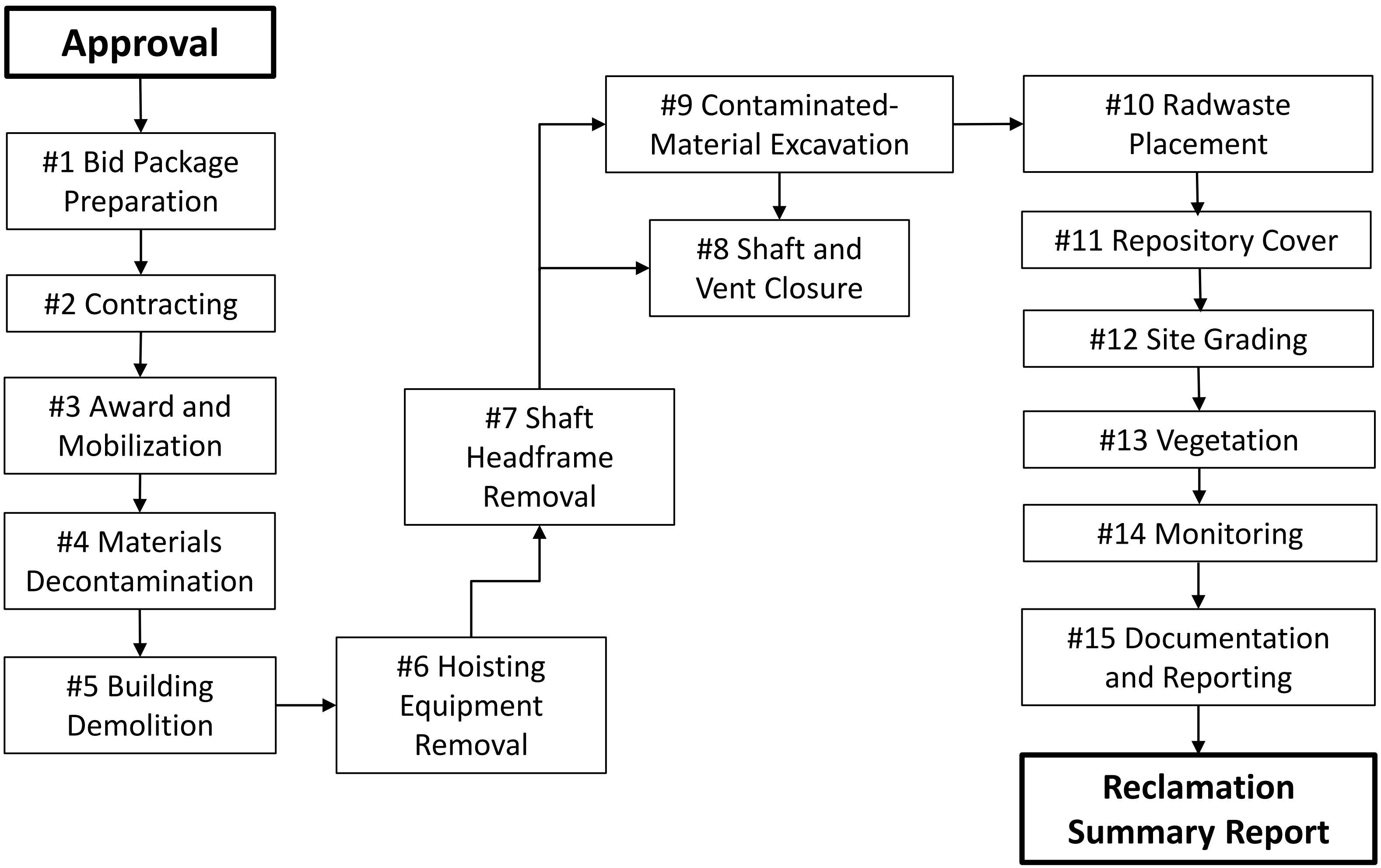
GRAPHIC SCALE

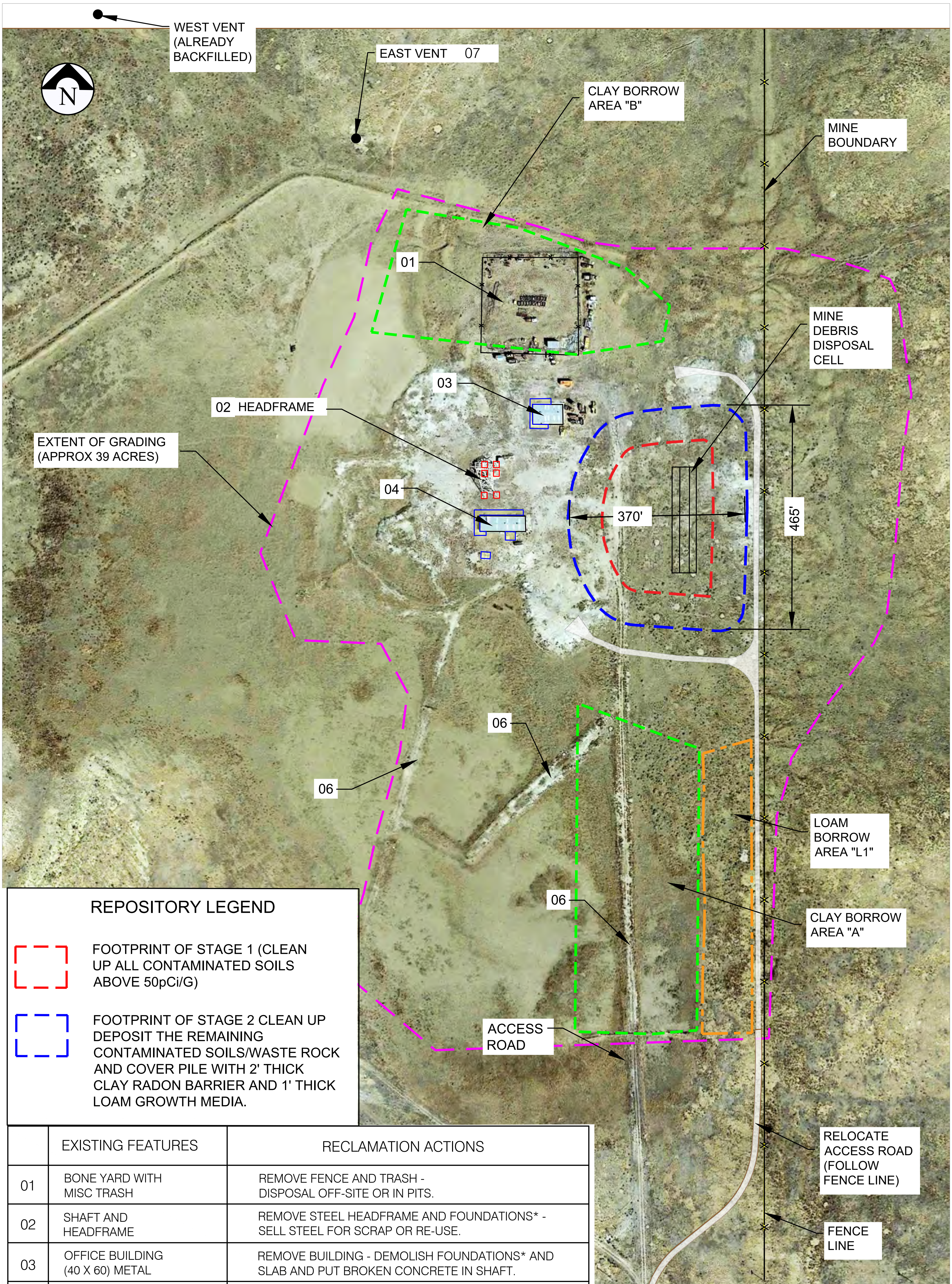
NOTE: FIGURE DEVELOPED FROM FIGURE 4.2 IN ERG BASELINE RADIOLOGICAL REPORT DATED JANUARY 2017.

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION
DATE: 07 / 10 / 2020	FIGURE 3 — PREDICTED CONCENTRATIONS OF RADIUM 226
Prepared By: Alan Kuhn Associates LLC	

Figure 4 - RECLAMATION ACTIVITIES FLOW CHART

See Table 5, Proposed Reclamation Schedule, for task numbers





REPOSITORY LEGEND

- FOOTPRINT OF STAGE 1 (CLEAN UP ALL CONTAMINATED SOILS ABOVE 50pCi/G)
- FOOTPRINT OF STAGE 2 CLEAN UP DEPOSIT THE REMAINING CONTAMINATED SOILS/WASTE ROCK AND COVER PILE WITH 2' THICK CLAY RADON BARRIER AND 1' THICK LOAM GROWTH MEDIA.

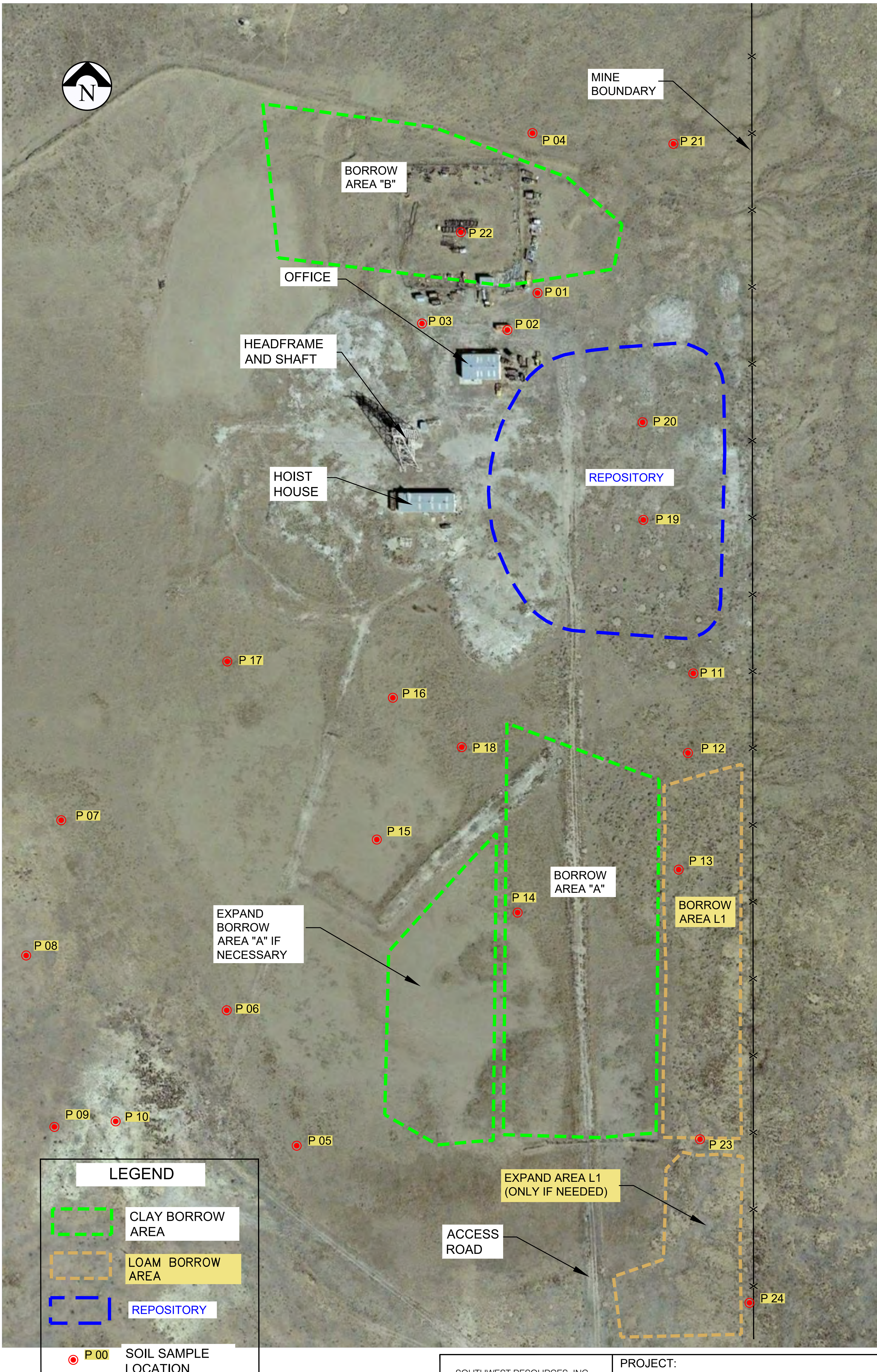
	EXISTING FEATURES	RECLAMATION ACTIONS
01	BONE YARD WITH MISC TRASH	REMOVE FENCE AND TRASH - DISPOSAL OFF-SITE OR IN PITS.
02	SHAFT AND HEADFRAME	REMOVE STEEL HEADFRAME AND FOUNDATIONS* - SELL STEEL FOR SCRAP OR RE-USE.
03	OFFICE BUILDING (40 X 60) METAL	REMOVE BUILDING - DEMOLISH FOUNDATIONS* AND SLAB AND PUT BROKEN CONCRETE IN SHAFT.
04	HOIST HOUSE (30 X 90) METAL	REMOVE BUILDING - DEMOLISH FOUNDATIONS* AND SLAB AND PUT BROKEN CONCRETE IN SHAFT.
05	WASTE ROCK PILES	REMOVE AND PLACE IN REPOSITORY OR SHAFT.
06	EXISTING SERVICE ROADS	EXISTING ROADS WITHIN THE AREA TO BE REGRADED WILL BE REMOVED. CONTAMINATED SOILS TO BE PLACED IN THE REPOSITORY OR SHAFT.
07	EAST VENT	INSTALL BAT-COMPATIBLE COVER.

0 100 200 300 400 FT
GRAPHIC SCALE

GENERAL NOTE:
THE EXTENT OF GRADING BOUNDARY SHOWN ON THIS PLAN BASED ON ERG REPORT FIGURE 4-2. (SEE FIGURE 3)

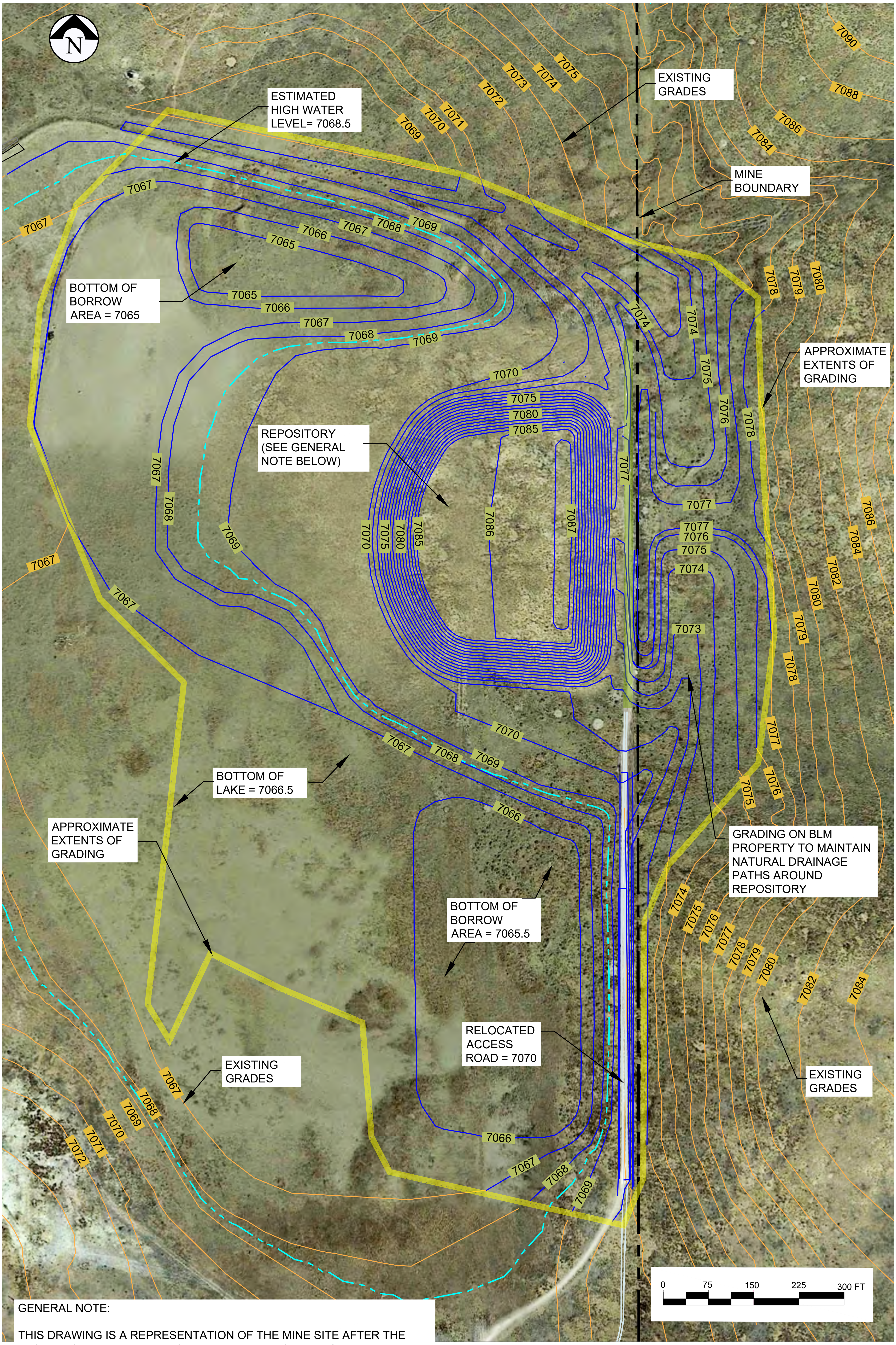
* CONCRETE SLABS AND FOUNDATIONS WILL BE REMOVED TO POST-EXCAVATION SURFACE GRADE. CONCRETE BELOW THAT GRADE WILL BE LEFT IN PLACE AND COVERED WITH CLEAN SOIL.

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION	
DATE: 7 / 10 / 2020	FIGURE 5	REMEDIAL EARTHWORK AND REPOSITORY PLAN
Prepared By: Alan Kuhn Associates LLC		



NOTE: BOUNDARY AREAS SHOWN ON THIS PLAN ARE APPROXIMATE

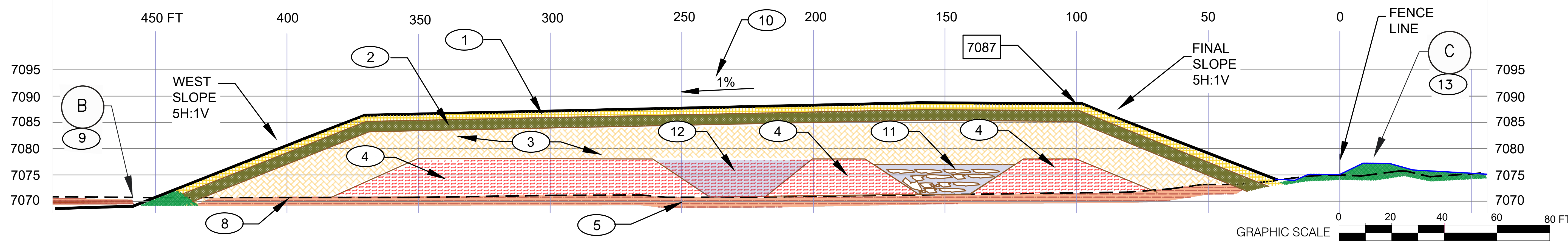
SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION	
DATE: 07 / 09 / 2020	FIGURE 6	SOIL SAMPLING AND BORROW LOCATIONS
Prepared By: Alan Kuhn Associates LLC		



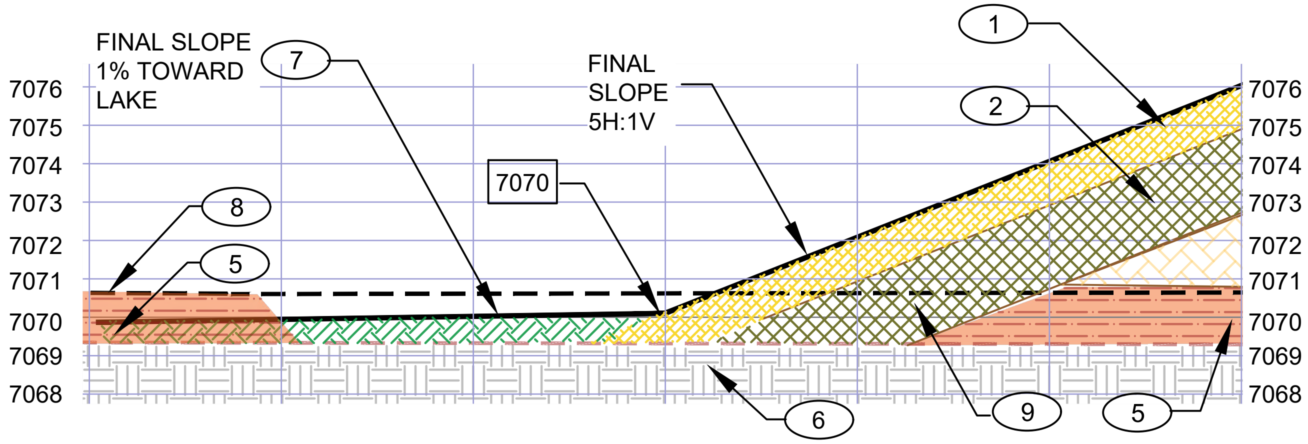
GENERAL NOTE:

THIS DRAWING IS A REPRESENTATION OF THE MINE SITE AFTER THE FACILITIES HAVE BEEN REMOVED, THE RADWASTE PLACED IN THE REPOSITORY, BORROW SOILS EXCAVATED AND PLACED ON THE REPOSITORY, AND THE FINAL GRADING HAS BEEN COMPLETED. THE HEIGHT AND FOOTPRINT OF THE REPOSITORY AND THE FINAL GRADES AROUND THE POND DEPEND ON THE AMOUNT OF RADWASTE AND BORROW SOILS THAT ARE REMOVED.

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION
DATE: 07 / 10 / 2020	
Prepared By: Alan Kuhn Associates LLC	FIGURE 7 — EXPECTED POST-RECLAMATION TERRAIN



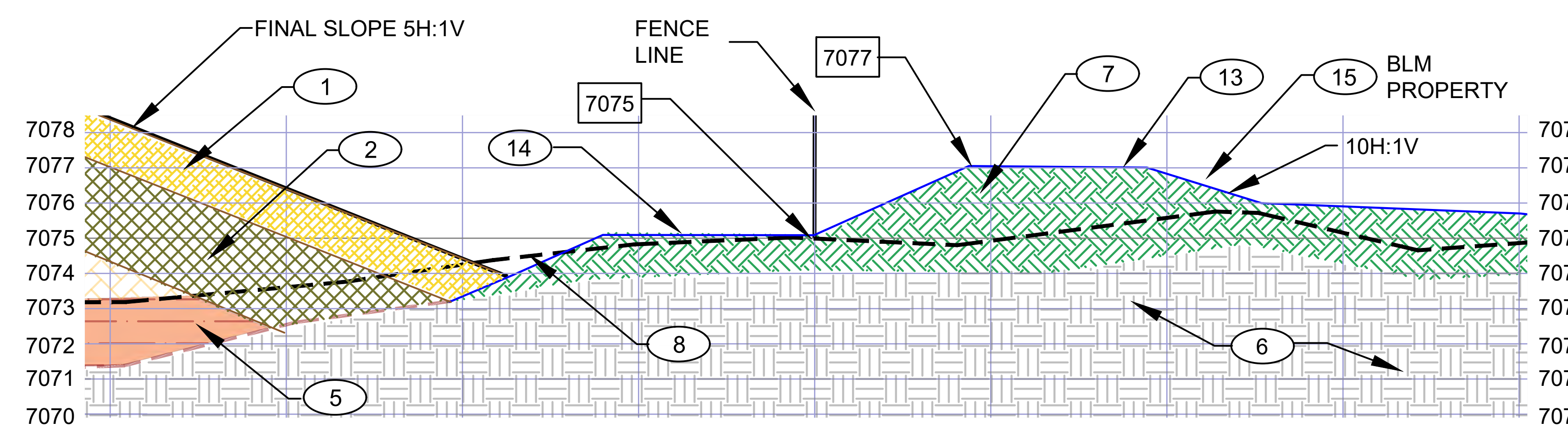
A EAST/WEST SECTION THROUGH REPOSITORY



B TOE OF SLOPE DETAIL (NORTH, SOUTH AND WEST SIDES)

GRAPHIC SCALE 0 5 10 15 20 FT

VERTICAL SCALE 2X HORIZONTAL



C TOE OF SLOPE DETAIL (EAST SIDE/BLM PROPERTY)

GRAPHIC SCALE 0 5 10 15 20 FT

VERTICAL SCALE 2X HORIZONTAL

NOTES AND LEGEND

1. GROWTH MEDIA SOILS (LOAM) 12" THICK
2. RADON BARRIER COVER SOILS 12" - 24" THICK
3. RADWASTE FILL (5-50 pCi/g) (THICKNESS AS NEEDED - PLACE IN UPPER LEVELS OF THE REPOSITORY)
4. RADWASTE FILL (51 - 100 pCi/g) (THICKNESS AS NEEDED - PLACE AT THE BOTTOM OF THE REPOSITORY)
5. EXISTING BELOW GRADE RADWASTE (ESTIMATED DEPTH = 1.5' THICK) (OUTSIDE OF REPOSITORY- REMOVE AND PLACE IN THE SHAFT OR REPOSITORY.) (INSIDE OF REPOSITORY FOOTPRINT - LEAVE IN PLACE.)
6. EXISTING UNCONTAMINATED SOILS
7. CLEAN SOIL FILL AS NEEDED TO ACHIEVE FINAL GRADES.
8. EXISTING GRADES
9. TOE-OF-SLOPE DETAIL FOR NORTH, SOUTH, AND WEST SIDES OF REPOSITORY. THE EXISTING RADWASTE TO BE REMOVED AND REPLACED WITH CLAY RADON BARRIER AND GROWTH MEDIA SOILS. CLEAN FILL TO BE USED FOR ESTABLISHING THE FINAL GRADES.
10. SLOPE TOP OF REPOSITORY 1% TO THE WEST
11. MINE DEBRIS DISPOSAL CELL. (SIZED AS NEEDED)
12. SECONDARY MINE DEBRIS DISPOSAL CELL. (ONLY IF REQUIRED)
13. EAST TOE-OF-SLOPE DETAIL. PROMOTES NATURAL DRAINAGE FROM BLM LAND AWAY FROM REPOSITORY.
14. NEW 12' WIDE SERVICE ROAD.
15. REMOVE RADWASTE FROM BLM PROPERTY AND REGRADE TO PROMOTE NATURAL FLOW AWAY FROM REPOSITORY.

GENERAL NOTE:

THE ACTUAL HEIGHT OF THE VARIOUS LAYERS IN THE REPOSITORY WILL DEPEND ON THE QUANTITY OF CONTAMINATED SOILS ENCOUNTERED DURING THE CLEANUP.

SOUTHWEST RESOURCES, INC.	PROJECT: SECTION 12 MINE RECLAMATION
DATE: 07 / 13 / 2020	
Prepared By: Alan Kuhn Associates LLC	FIGURE 8 — TYPICAL REPOSITORY SECTIONS