June 12, 2023

Mr. Yakin Ajayi
Tunista Services, LLC
5015 Business Park Blvd., Suite 3000
Anchorage, AK 99503

Re: **Time Critical Removal Action**
MSSC- Mt Haleakala
Haleakala, Maui County
US Ecology Job # 188705

Dear Mr. Ajayi,

The following correspondence details the results of activities conducted by US Ecology (USE) on February 1, 2023 – February 24, 2023, for Tunista Services, LLC at MSSC- Mt Haleakala in Maui, HI.

Initial Activities
On February 1, 2023, USE received a call to respond to the above-mentioned location to conduct time critical removal action of an approximated 700-gallon Jet A/diesel spill. The USE Project Manager, Jim Riedel, began the process of planning, coordinating, and providing written proposals to Tunista Services, LLC Representative for the oversight of remediation operations.

On February 17-28, 2023, the USE response team began the mobilization of personnel and equipment to the site in preparation for excavation operations.

On March 1, 2023, the response team mobilized to the site to inspect the waste management area. Operations were then halted due to adverse weather conditions.

On March 2, 2023, the response team mobilized to the site after receiving approval, post weather update from Alternate Base Defense Operations Center (ABDOC), to inspect the waste management area. Once on site, the excavator was moved to the Butler Building. All operations were then halted due to adverse weather conditions.

On March 3, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting and discussing operations, hand tools were utilized to excavate to 2-feet below ground within Focus Area 2 (FA2). During this hand excavation a ¼" braded copper grounding wire was exposed. The response team began excavating the impacted soil at the northeast corner of the generator pad. This impacted soil and debris was loaded into three (3) cubic yard boxes. Once the excavation reached a depth of approximately 3-feet below ground, an air monitor, Photo Ionization Detector (PID), was utilized to check the presence of impacts. The results of the air monitoring ranged between 0.6 to 4.7 parts per million (ppm).

On March 4, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting and discussing operations, the response team received approval from Tunista Services, LLC to continue removing impacted soils. Prior to the beginning of excavation operations, the response team re-constructed the waste management containment area. Surveyors then arrived on site to conduct final geological surveys prior to excavation. Once this survey was complete, the response team utilized an excavator and hand tools to begin removing the impacted soil from the northeast end of FA2. During the excavation operations, Tetra Tech personnel entered the excavation to conduct air monitoring

operations with a PID. The results of the analysis for these samples ranged between 600 to 900 parts per million (ppm). This impacted soil was then placed into a total of four (4) cubic yard bags. The bags were then secured and placed into the waste management area. Excavation operations were halted in the early afternoon due to adverse weather conditions and rainfall which began to fill the excavation.

On March 5, 2023, mobilization to the site was delayed due to communications issues. After receiving approval post weather update from ABDOC, the response team arrived on site at 0900. Upon inspection of the site, USE found that there was standing water in the bottom of the excavation. It was determined by Tunista Services, LLC Representative that excavation operations would be halted for the day. The excavation area was uncovered to allow the soil to dry. The response team then reinforced the waste management area to prevent rain from entering the secondary containment.

On March 6, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. A meeting was held to discuss the possible removal of the generator and concrete slab as well as on-site soil treatment. After conducting a site safety meeting and discussing operations, the response team began excavating the impacted soil from the northeast corner of Focus Unit 2. Once the excavation had reached a depth of 4-feet, an air monitor, PID, was utilized to check the presence of impacts. The results of the air monitoring ranged from 7.7 ppm to 2,142 ppm. A total of five (5) cubic yard bags of impacted soil were removed from the impacted areas. The bags were secured and placed into the waste management area. The USE Response Manager then requested approval from Tunista Services, LLC Representative to pothole along the north and south side of the generator pad to determine if the impacts had migrated underneath the concrete generator slab. Two (2) pothole areas were dug to a depth of 5-feet. An air monitor, PID, was utilized during this operation to determine if impacts were present at this depth. Significant impacts ranging from 359 to 959 ppm were identified through air monitoring in these potholes. At 1300 hours, the response team began demobilization operations due to high winds.

On March 7, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. The excavation area was inspected as well as the operational area. USE and Tunista Services, LLC called a meeting to discuss the excavation operations and results of the potholing. Memorandum #2 was then drafted. Due to adverse weather conditions, high winds, the response team demobilized from the site.

On March 8, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. USE and Tunista Services, LLC called a meeting to further discuss on-site operations. The response team then demobilized from the site to do adverse weather conditions, high winds.

On March 9, 2023, USE and Tunista Services, LLC called a meeting with Department of Defense (DOD) to discuss the findings from the excavation operations and potholing. DOD issued a Directive Memorandum for the excavation moving forward. Adverse weather conditions, high winds, halted operations for the day.

On March 10, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. At 0800 hours, the response team arrived on site and conducted a site safety meeting. During the safety meeting it was determined that the winds were too strong and would cause impacted soil to blow across the site during excavation operations. The response team

began excavation operations. Approximately 1/3 of a cubic yard box was filled before excavation operations were halted by Airforce Point of Contact (POC) due to the impacted soil being carried by the wind. The cubic yard box was then secured and staged for filling during further excavation operations. At 1030 hours the response team repaired the tarp on the water truck and secured all stations. Onsite operations were then halted due to adverse weather conditions and high winds. The response team then demobilized from the site.

On March 11, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. Once onsite, USE found that the winds were quite strong and requested a current wind reading. The wind speed was 37 mph. After conducting a site safety meeting and discussing operations, the response team began excavating the impacted soil. The excavation for the day was based on Staff Sergeant Switzer's direction. A total of seven (7) cubic yard bags of impacted soil were removed. The cubic yard bags were then secured and placed into the waste management area.

On March 12, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC, to continue excavation operations. Once on site, the response team was placed on standby due to extremely high winds of 50 to 60 mph. Colonel Reich and Staff Sergeant Switzer halted operations due to the adverse weather conditions. The response team demobilized from the site at 0930 hours.

On March 13, 2023, on site operations were halted due to adverse weather conditions and high winds.

On March 14, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting, the response team met with USAF personnel on site, to consult about the excavation. The response team then utilized the excavator to continue removing impacted soil on the north side of the excavation. This material was placed into a total of seven (7) cubic yard bags. The bags were then secured and placed into the waste management area.

On March 15, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting, the response team began excavation of the impacted soil at the southeast corner. A total of seven (7) cubic yard bags of impacted soil were removed. The cubic yard bags were then secured and placed into the waste management area. Excavation operations were then halted as there was no room left in the upper waste management area to stage the cubic yard bags. The response team then constructed secondary containment #2 in the waste management area. All confirmation samples were completed on the north excavation area.

On March 16, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting and discussing operations, excavation operations continued. The excavation of Focus Area #1 was completed. A total of eight (8) cubic yard bags of impacted soil were removed. The cubic yard bags were then secured and placed into the waste management area. The response team then potholed an additional three (3) spots to further identify the impacted area. Air monitoring operations were conducted with a PID, post excavation operations to determine the levels of impact remaining prior to backfilling operations. Figure 1 below details the readings of these operations:

Figure 1: PID Data from Tetra Tech's Summary Report

PID SOIL SCREENING LOG

Project Name: NRC Diesel — Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (Tt Owned); ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/16/23 Page 2 of 2 — Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1304	Base, 10'W, 6'S	17	2	10	1333	75
1305	South Sidewall, 10'W	18	2	8	1334	65
1322	PH3-4'	PH3-4	4	57	1336	66 No fuel odor, loamy smell
1329	PH3-5'	PH3-5	5	50	1353	53 No fuel odor, loamy smell
1352	PH4-4'	PH4-4	4	2640	1406	68 Strong odor with sheen
1406	PH4-6'	PH4-6	6	1465	1438	34 Fuel odor
1415	PH4-7'	PH4-7	7	3439	1440	53 Strong fuel odor
1455	PH5-4'	PH5-4	4	4.5	1510	88 Clean odor

Notes: Focus Area 1b excavation to 2' bg, south side generator pad, 15' to 30' from East end of pad, from pad edge out 8' wide. Three potholes, PH3 (west) and PH4 (east), in FA1b at topo f downslope; PH5 northwest corner of FA2 at base of upslope.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/16/23 0914 .

On March 17, 2023, the response team did not mobilize to the site as Phase 1 of the excavation was completed. USE personnel completed an updated exploratory excavation map and enhanced thermal conduction informational document, which was submitted to Tunista Services, LLC Representative.

On March 18-19, 2023, the response team was on standby awaiting backfilling equipment.

On March 20, 2023, the response team was on standby awaiting backfilling equipment. A meeting was called with Tunista Services, LLC to discuss Memorandum #4, equipment returns and demobilization. Tunista Services, LLC and Department of Defense then put a halt to the analysis of soil samples that were collected by Tetra Tech. It was requested that the soil samples were returned to the summit as it was sacred soil.

On March 21, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. Approval was received to conduct backfill operations. The response team were on standby while the backfilling equipment was awaiting US Park's inspection. Once approved, the equipment was mobilized to the site. USE personnel lined each excavation with heavy poly sheeting, in accordance to the guidance provided by Tetra Tech's geotechnical engineering group, and backfilling operations were conducted.

On March 22-23, 2023, the response team mobilized to the site after receiving approval post weather update from ABDOC. After conducting a site safety meeting and discussing operations, the response team finalized backfilling operations and began demobilization of equipment from the site. A final inspection was conducted by Tunista Services, LLC and DOD.

On March 24, 2023, the response team demobilized from Maui.

Conclusion and Recommendations

During this response, 41-cubic yard bags of diesel impacted soil was removed from the impacted areas to a depth of 2-5 feet and from potholing operations from a depth of 2-7 feet. This impacted soil was staged and secured in the waste containment area.

Copies of selected photos of response activities are included with this report under Appendix A. Additional photos are available as requested and secured on US Ecology's secure server in the project file.

Additionally, a copy of the Summary of Findings Report, Backup Generator Diesel Spill Initial Response Action, Maui Space Surveillance Complex (MSSC) Haleakala, Maui County, Hawaii that Tetra Tech developed as part of the USE Response Team is attached in Appendix B. This summary of findings report includes information on:

- Pre-Excavation Underground Utility Surveys
- Pre-Excavation Geotechnical Evaluations
- Initial mobilization to the site with delineation and screening of the ground surface in the areas of greatest impact by the spill.
- Initiate excavation in the northeast corner at the presumed edge of petroleum impact.
- Advancement of two "potholes" (i.e.; test pits), to a depth of approximately 5 feet bgs, with soil screening, in an effort to evaluate the vertical extent of petroleum impact to soil.

- Change in scope to excavate petroleum impacted soil only to a depth of 2 feet bgs in three focus areas proximate to the generator pad, and to advance additional "potholes" to a depth of approximately 7 feet bgs, with soil screening to better assess the extent of petroleum impacted soil.
- Analytical sample collection (subsequently cancelled by USAF via Stop Work Directive).
- Excavation Backfill
- Conclusions
- Limitations

US Ecology concurs with Tetra Tech's conclusions and recommendations, as well as the limitations that have been delineated in this report.

All work performed by USE was in strict compliance with all local, state, and federal regulations, with a special emphasis placed on safety and protection to the environment.

Respectfully,

Jim Riedel

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Appendix A
Photo Documentation

Photo 1: Jet A/Diesel impacted soil upon initial inspection. 2/1/23

Photo 2: Jet A/Diesel impacted soil upon initial inspection. 2/1/23

Photo 3: Jet A/Diesel impacted soil upon initial inspection. 2/1/23

Photo 4: Jet A/Diesel impacted soil upon initial inspection. 2/1/23

Photo 5: Jet A/Diesel impacted soil upon initial inspection. 2/1/23

Photo 6: Site inspection. 3/10/23

Photo 7: Site inspection; excavating 2 feet depth from northeast corner of generator pad. 3/10/23

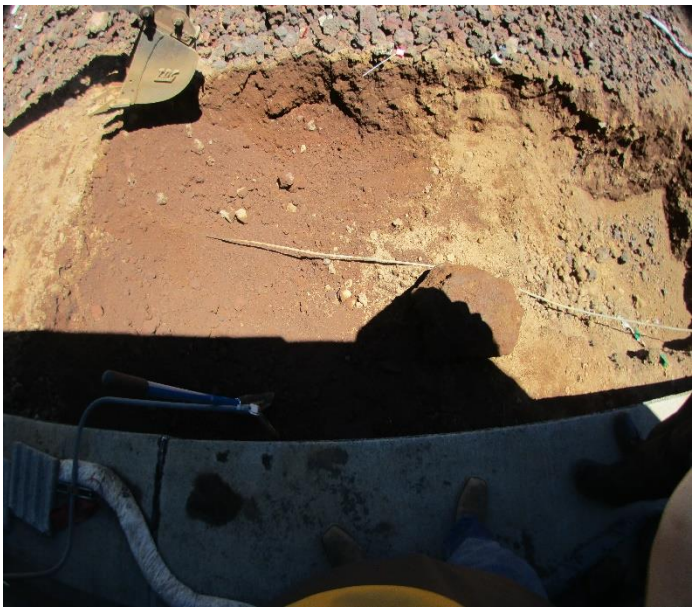

Photo 8: Excavation operations; East end of FA2; Greatest affected surface soil in foreground. 3/10/23

Photo 9: Excavation operations. 3/14/23

Photo 10: Excavation operations; Working around electrical ground handhole; West end of excavation. 3/14/23

Photo 11: Excavation operations; FA1a between switchgear pad and top of slope. 3/15/23

Photo 12: Excavation operations. 3/15/23

Photo 13: Excavation backfilled. 3/21/23

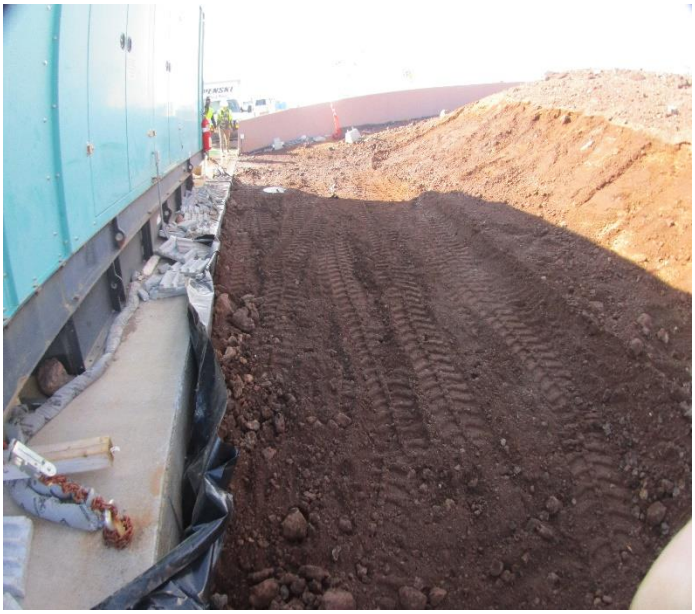

Photo 14: Excavation backfilled. 3/21/23

Photo 15: Excavation backfilled. 3/22/23

Photo 16: Excavation backfilled. 3/22/23

Photo 17: Waste management area upon completion. 3/23/23

Photo 18: Waste management area upon completion. 3/23/23

Photo 19: Waste management area upon completion. 3/23/23

Appendix B
Documentation

REMOVAL ACTION REPORT
BACKUP GENERATOR DIESEL SPILL
INITIAL RESPONSE ACTION
MAUI SPACE SURVEILLANCE COMPLEX (MSSC)

HALEAKALA, MAUI COUNTY, HAWAII

April 26, 2023 (Revised)

Presented to:

NRC/US Ecology
9520 10th Avenue South, Suite 150
Seattle, WA 98108

Presented by:

Tetra Tech Inc.
737 Bishop Street, Suite 2000
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FIGURES

Figure 1: Site Vicinity Map
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Figure 3: Final Excavation and PID Screening

APPENDICES

Attachment A: Utility Surveys
Attachment B: Geotechnical Memoranda
Attachment C: PID Screening Log

1.0 INTRODUCTION

This report summarizes the field response initiated on March 3, 2023 and completed on March 22, 2023, related to the time-critical removal action at the U.S. Air Force (USAF) Maui Space Surveillance Complex (MSSC), Haleakala, Maui County, Hawaii, to mitigate an approximately 700-gallon petroleum release that occurred sometime between January 28 and 30, and noticed on January 30. It was a result of an overfill to the backup generator. As part of the excavation site work, field personnel observed petroleum contaminated soil on the surface on the upslope and downslope sides of the generator pad, as well as evidence of petroleum migration within soil beneath the pad. The USAF focused the excavation activities to 2 feet below grade (bgs) in a directive dated March 9, 2023 (USAF, 2023b). Tetra Tech's understanding is that completion of the removal action will take place in a subsequent phase.

The report is organized chronologically by activities:

- Pre-Excavation Underground Utility Surveys
- Pre-Excavation Geotechnical Evaluations
- Initial mobilization to the site with delineation and screening of the ground surface in the areas of greatest impact by the spill.
- First excavation in the northeast corner at the presumed edge of petroleum impact.
- Advancement of two "potholes" (i.e.; test pits), to a depth of approximately 5 feet bgs , with soil screening, in an effort to evaluate the vertical extent of petroleum impact to soil.
- Change in scope to excavate petroleum impacted soil only to a depth of 2 feet bgs in three focus areas proximate to the generator pad, and to advance additional "potholes" to a depth of approximately 7 feet bgs, with soil screening to better assess the extent of petroleum impacted soil.
- Analytical sample collection (subsequently cancelled by USAF via Stop Work Directive).
- Excavation Backfill

2.0 BACKGROUND

Sometime between January 28 and 30, 2023, approximately 700 gallons of a mixture of Jet Fuel A and diesel fuel (reportedly 60% Jet Fuel A and 40% diesel fuel) spilled on the ground adjacent to a concrete generator pad. Petroleum-impacted soil was observed primarily on the northeast (project "north") and southwest (project "south") sides of the generator pad. The generator is located on a terrace approximately 30 feet wide situated midway along a 2:1 engineered slope (Figure 1). The slope descends from northeast to southwest. The spill itself occurred in bare soil between the concrete pad and the base of the ascending slope to the north, and between the concrete pad and the top of the descending slope to the south.

2.1 GEOLOGY AND HYDROGEOLOGY

MSSC is located near the summit of Haleakala, a volcanic edifice, within the vent deposits of the Hana Volcanics of Quaternary age, according to a published geologic map (Thornberry-Ehrlich, 2011): "Vent deposits (Qhnv) include scoria and spatter in cinder cones.... Unit forms much of the modern surface of the summit areas of Haleakala Volcano and may have spiritual relevance to native Hawaiians. Olivine, clinopyroxene, plagioclase phenocrysts (1 cm [0.5 in.]), ash.... Units

are radiometrically age dated with the oldest emplacements at 120,000 years ago" (Thornberry-Ehrlich, 2011, p. 36).

The generator site is located within the inner slope of a cinder cone on local reworked weakly weathered to unweathered volcanic material, consisting mainly of gray to reddish-brown cinder gravel and sand with basaltic cobbles and boulders to two feet in long dimension, less than 5% silt. Soil encountered during site activities was moist to wet, dense, apparently machine compacted during construction of the terrace for the generator pad.

During an investigation in 1991, a boring called "Boring B-6" was drilled to a depth of 71.5 feet and reported no groundwater encountered. This boring was located at the same elevation as the generator terrace approximately 80 feet to the southeast. It is likely that groundwater conditions are consistent across the site.

3.0 PRE-EXCAVATION ACTIONS

3.1 GEOPHYSICAL UTILITY SURVEYS

A thorough evaluation of utilities proximate to the generator pad was performed by Hawaii Geophysical Services, LLC (HGS) on 19 and 21 February 2023.The utility survey included a combination of ground penetrating radar (GPR) and electromagnetic (EM) locating equipment. HGS stated that for utilities less than 3 feet deep, the depth accuracy is ± 6 to 12 inches. The EM survey was performed first, to provide the approximately location and depth of utilities. The GPR survey was performed to confirm the findings of the EM survey, and refine the estimated depths of utilities. A map with the findings of the February 19/21 utility survey is provided in Attachment A.

On February 25-26, 2023, a second utility survey was performed by HGS. This survey was performed to evaluate the stormwater retention area located south of the generator pad. This area was initially evaluated as a potential source of backfill following proposed remedial excavation activities. A map with the findings of the February 25-26 utility survey is also provided in Attachment A. Because of the extensive utilities in the vicinity of the stormwater retention area, this area was determined to be an unsuitable source for backfill. The USAF ultimately decided to use material from the area upslope (north) of the generator pad based upon accessibility and lack of underground utility concerns, as determined by the February 19/21 utility survey discussed above.

3.2 GEOTECHNICAL EVALUATIONS

Prior to remedial excavation activities, a geotechnical evaluation of the generator pad was performed by Patrick Keefe, CEG (Tetra Tech), on February 24, 2023. The purpose of this evaluation was to ensure safe excavation proximate to the generator pad and associated adjacent upslope to the north and downslope to the south, such that neither the pad, nor the slopes would be adversely impacted or destabilized during excavation related removal actions. Mr. Keefe personally inspected the generator site, including inspection of the concrete pad, confirmation of the concrete pad thickness, and review of the abutting slopes to the north and south. A memorandum, titled *Memorandum No. 1 - Summary of Onsite Observations & Preliminary Geotechnical Recommendations for Temporary Excavations, Generator Pad Diesel Spill Area, U.S. Air Force Haleakala Compound, Maui*, dated February 24, 2023, is provided in Attachment B. This memorandum provides guidance for safe excavation proximate to the generator pad and associated slopes.As previously discussed, based upon the findings of the utility survey performed within the stormwater retention area located south of the generator pad, the USAF requested a geotechnical evaluation of the area upslope (north) of the generator pad as a potential source of backfill for locations where remedial excavation would be performed. Mr. Keefe reviewed available as-built plans for the generator pad vicinity, which included the area upslope of the generator pad, as well as original surface grade contours. Based upon his review, Mr. Keefe generated *Memorandum No.4 - Preliminary Geotechnical Recommendations for Potential Borrow Excavation along Existing Fill Slope, northeast of Generator Pad, Maui Space Surveillance Complex, Mt. Haleakala, Maui County, Maui*, dated March 17, 2023 (Attachment B). Referring to *Memorandum No. 4*, the upslope area was determined to be a viable source of fill material. *Memorandum No. 4* provides guidance for obtaining materials to be utilized to

backfill the remedial excavations by modifying the existing top and toe of the ascending fill slope to the northeast of the generator pad. This plan was utilized to backfill the remedial excavations on March 21-22, 2023, as discussed in Section 4, below.

4.0 TIME-CRITICAL REMOVAL ACTION

4.1 REMOVAL ACTION

Between March 3 and 16, 2023, approximately 30 cubic yards of petroleum contaminated soil was excavated from the spill area and placed into 41 one-cubic-yard sacks. During excavation, a photoionization detector (PID) was used to screen soil at 136 discrete locations: 15 from surface grade; 110 from sidewalls and bases of three excavations; and 11 from five exploratory test pits. The removal action was limited to three focus areas, based upon visual surface staining observed at the time of the release: Focus Area 1a [FA1a], south side of generator pad, immediately south of the electrical switchboard pad; Focus Area 1b [FA1b], south side of the generator pad, west of the electrical switchboard pad; and, Focus Area 2 [FA2], along the north side of the generator pad. The three Focus Areas are indicated on Figure 3. A chronology of removal activities is presented below, with a summary of the excavation and exploratory activities at the end of this section.

March 3 – Excavation (FA2)

Prior to excavation on March 3, 2023, the field geologist observed the area most impacted by the spill and visually estimated the extent of impact in the northeast portion of FA2 (north side of generator pad). Due to site access considerations, this area was selected as the starting point for excavation activities such that the excavation area could be readily accessed from the concrete pad to the west, and the excavation could proceed from east to west, thereby maintaining equipment access for the duration of site excavation activities. As outlined in the Sampling and Analysis Plan (SAP; Tetra Tech, 2023a), a PID was used for real-time screening of volatile organic compound vapors in the soil and near the surface. Surface soil was screened at four points in the area observed to be most impacted by the spill, then at eight (8) points along the east end of the impacted area to delineate the proposed edge of excavation (refer to Attachment C - PID Screening Log).

On March 3, 2023, excavation of petroleum impacted soil commenced at the extreme northeast corner of the generator pad. A 2 feet by 3 feet excavation was advanced to a depth of 3 feet bgs based upon visual and PID evidence of petroleum impact. Eight (8) PID screening samples were collected in this location (refer to Attachment C and Figure 3). PID readings of 167 ppm at the surface and 124 ppm at a depth of 1-foot bgs were consistent with field observations indicating the extent of petroleum impacted soil. After excavation, there was no visual or olfactory evidence of petroleum impact, and PID readings ranged from 0.6 to 4.7 ppm (below the 5.0 ppm action level, per the SAP).

Note that the original intent of excavation was to remove petroleum contaminated soil to the point where there was no visual or olfactory evidence of impact, and PID readings were below 5 ppm, while initially limiting removal actions to a depth of 4 feet bgs based upon preliminary geotechnical considerations. Therefore, initial excavation activities on March 3 and 4 extended to depths of 3 to 4 feet bgs to the north of the northeast corner of the generator pad. However, as will be discussed below, the extent of petroleum contamination was ultimately determined to be greater than originally anticipated, at which point the USAF ultimately limited the depth of excavation to a maximum of 2 feet bgs in the three focus areas, regardless of whether petroleum impact was observed to extend to depths more than 2 feet bgs.

March 4 – Excavation (FA2 continued)

On March 4, 2023, prior to excavation, a PID screening of discrete surface samples collected approximately seven (7) feet north of the northeast corner of the generator pad indicated that soil was not petroleum impacted (PID reading of 0.6 ppm; no visual or olfactory evidence of impact). Excavation resumed in the northeast end of FA2, extending approximately 5 feet west of the east end of the generator pad, approximately 6 feet north of the pad to the base of the slope, and 2 feet bgs. Ten (10) PID screening samples were collected from the sidewalls and base (refer to Attachment C). The excavation base, as well as north and west sidewalls indicated PID readings consistent with observations and strong petroleum odors.

March 6 –Excavation (FA2 continued) and Potholing (PH1 and PH2)

On March 6, 2023, the excavation which was started on March 4, 2023 was advanced from 2 feet bgs to a depth of 4 feet bgs, the maximum depth provided in the work plan, and the practical reach of the mini excavator. Sixteen (16) PID screening samples from the excavation base and sidewalls, ranging from 7.7 to 2,142 ppm confirmed the observations of petroleum impacted soil throughout the excavation. Mr. Adam Teekell, Hawaii Department of Health, arrived at this time, and concurrently used his PID to screen the samples, noting similar values. The field team reported the findings that indicated more extensive lateral and vertical petroleum impact than originally anticipated, including impacted soil extending to the base of the northern slope, and also indicating the likelihood of petroleum impact extending ***beneath*** the generator slab. PID readings consistent with observed petroleum impacted soil were taken at a depth of 4 feet bgs, immediately adjacent to the concrete pad footer (footer extended to a depth of 2 feet bgs).

Based upon the observed petroleum impact in this location, which extended to a depth below the concrete pad footer, two exploratory potholes (i.e., test pits; PH1 and PH2) were advanced at two (2) locations ***immediately*** adjacent to the north and south side of the generator pad to assess the vertical extent of petroleum impact immediately adjacent to the pad (refer to Figure 3). Samples from potholes PH1 and PH2 were screened with the PID, with readings of 395 ppm and 959 ppm, respectively, consistent with visual observations of petroleum-impacted soil to a depth of 5 feet bgs (the maximum reach of the mini excavator) immediately proximate to the generator pad. These findings indicated that the remedial excavation would need to achieve a depth of at least 6 feet bgs, and suggested that petroleum has migrated beneath the generator pad. Neither of these conditions was addressed by the Work Plan.

The conditions identified in PH1 and PH2 were presented in Memorandum No. 2 (Tetra Tech, 2013C), specifically noting that evidence of gross contamination was present at depths greater than

anticipated (at least 5 feet bgs), and that petroleum contamination likely extends beneath the generator pad. Based upon the information presented in Memorandum No. 2, the USAF provided a directive dated March 9, 2023, which limited the work scope to excavation of petroleum impacted soil to a depth of 2 feet bgs in the designated areas immediately proximate to the generator pad (FA1a, FA1b, and FA2), requested additional potholing, and continued soil screening and sampling in accordance with the SAP (USAF, 2023b). The March 9, 2023, directive also included further clarification of several technical aspects (Tetra Tech 2023d, USAF 2023c).

March 11 – Excavation (FA2 continued)

On March 11, 2023, excavation resumed in FA2, advancing an additional 11 feet to the west, along the north side of generator pad. PID screening of 24 samples from the excavation base and sidewalls indicated that all but one (1) sample exceeded the screening value of 5.0 ppm. Samples from the excavation base, at 2 feet bgs, ranged from 71 to 2,511 ppm. The north sidewall at the base of the slope, between 13 and 17 feet west of the east end of the generator

pad, did not appear to be significantly impacted, with no petroleum odor and relatively low PID readings of 3.8, 16, and 17 ppm.

March 14 – Excavation (FA2 continued)

On March 14, 2023, the excavation in FA2 was completed, with the final total length of excavation being 32 feet from the east end of the generator pad. PID screening of 26 samples from the excavation base and sidewalls indicated a significant change in the nature of the impacted soil from east to west. To the east (between 18 to 24 feet west of the east end of the generator pad), soil at the base of the excavation exhibited gross contamination (i.e. oily sheen, strong petroleum odor), with PID readings exceeding 5,000 ppm (the PID's maximum range). To the west (between 24 and 31 feet west of the east end of the generator pad), soil at the base of the excavation did not exhibit visible petroleum staining or odor, with PID readings ranging from 8.7 to 38 ppm.

March 15 - Excavation (FA1a)

On March 15, 2023, excavation activities commenced in FA1 (refer to Figure 3), which was advanced adjacent and to the south of the switchboard pad, with the following dimensions: 15 feet long, 4 feet wide, and 2 feet deep. The middle portion of this excavation encountered a 5-foot wide concrete encased conduit at a depth of 2 feet bgs. Strong petroleum odor and oily sheen were observed along the base of the excavation, as well as the three sidewalls (note: one sidewall was the concrete pad footer, to the north). Ten (10) samples from the excavation base, and south and east sidewalls were screened, with PID readings ranging from 35 to 1,893 ppm, thereby confirming field observations indicating gross contamination.

March 16 – Excavation (FA1b) and Potholing (PH3, PH4, PH5)

On March 16, 2023, excavation in FA1b was completed along the south side of the generator pad, west of the switchboard pad. The FA1b excavation had the following dimensions: 15 feet long, 8 feet wide, and 2 feet deep. Eighteen (18) samples from the excavation base, south sidewall, and west sidewall were screened using the PID, with readings ranging from 8 to 3,646 ppm. The north and east sidewalls were the concrete pad footer; therefore, there was no associated PID data. The PID readings in FA1b were consistent with field observations indicating gross petroleum contamination. Field observations of strong petroleum odor and oily sheen were concentrated in the east half of the excavation toward the switchboard pad and increased to the south (downslope).

With excavation of the three focus areas complete (FA1a, FA1b, FA2), samples from three (3) additional potholes (PH3, PH4, and PH5) were collected for PID screening. Pothole locations are illustrated on Figure 3. Soil from pothole PH3 did not exhibit visual or olfactory evidence of petroleum impact; however, PID readings of 57 ppm and 50 ppm were recorded for samples collected at 4 feet bgs and 5 feet bgs, respectively. This data was consistent with PID readings and visual/olfactory conditions observed in the western portion of excavation FA1b.

Soil from pothole PH4 exhibited a strong petroleum odor and sheen. Samples were collected from three (3) depths in PH4, with the following PID readings: 2,640 ppm at 4 feet bgs; 1,465 ppm at 6 feet bgs; and, 3,439 ppm at 7 feet bgs. The PID readings were consistent with field observations and PID readings from the nearest samples from the eastern portion of excavation FA1b.

Soil from pothole PH5 (proximate to the northwest corner of FA2) did not exhibit visual or olfactory evidence of petroleum impact, with a PID reading of 4.5 ppm at 4 feet bgs. This is consistent with excavation data observed in the northwestern portion of FA2.

Excavation Summary

The exploratory potholes show the presence of petroleum contaminated soil at depths of at least 5 feet bgs along the north and south sides of the generator pad and greater than 7 feet bgs 12 feet southwest of the generator pad at the top of the slope. The presence of petroleum contamination appears to diminish to the west and east on both sides of generator pad.

In summary, petroleum contamination is present in the majority of each of the three excavations, as illustrated by the PID data on Figure 3 and listed below.

EXCAVATION	PETROLEUM CONTAMINATION PRESENT
FA1a	At least 15×4 feet area to >2 feet bgs, south of the electrical switchboard
FA1b	At least 9×12 feet area to >7 feet bgs, west of the electrical switchboard
FA2	At least 25×6 feet area from 2-4 ft to >6 feet bgs, from east corner of generator pad

4.2 BACKFILL OF REMEDIAL EXCAVATIONS

On March 21 and 22, 2023, NRC/US Ecology lined each of the excavations with heavy poly sheeting and backfilled the excavations with soil obtained from the ascending fill slope to the north in accordance with guidance provided by Tetra Tech's geotechnical engineering group in Memoranda No. 1 and 4 (Attachment B; Tetra Tech 2023b, 2023e), and per direction received from USAF on March 21, 2023 (USAF 2023d). Approximately 50 cy of fill was required to backfill the remedial excavations. The upslope surface grade was returned to original slope gradient condition, with the final surface completion reviewed and approved by the Department of the Air Force during a site closure inspection, performed on March 22, 2023.

4.3 WASTE MANAGEMENT

A total of 41 cubic yards of soil were removed from the spill site. The soil was contained in one-cubic-yard sacks each lined internally with plastic, and individually secured. Two containment areas were utilized in the locations shown on Figure 1. Each containment area was bermed and lined with plastic sheeting. Following placement of the sacks, the containment areas were covered with plastic sheeting secured with tie-downs.

5.0 ANALYTICAL SAMPLING

On March 15, 2023, four (4) DU-MIS samples were collected from excavation FA2: one (1) from the base and one (1) each from the east, north, and west sidewalls. The south sidewall was the face of the concrete generator pad footer.

On March 16, 2023, four (4) DU-MIS samples were collected from excavation FA1a: one (1) from the base; and one (1) each from the east, west, and south sidewalls. The north sidewall was the face of the concrete pad footer for the switchboard. Five (5) DU-MIS samples were collected from excavation FA1b: three (3) from the base; and one (1)

each from the west and south sidewalls. The east sidewall was the face of the concrete pad footer for the switchboard, and the north sidewall was the face of the concrete generator pad footer. In accordance with the SAP, two (2) replicate samples were collected from the excavation base.

For each sample, the following subsamples were collected: 75 approximately 5-gram subsamples collected on an evenly spaced grid were placed in a Ziploc bag; and 30 5-gram subsamples were collected in individual ESS Lock N'Load soil syringes on a separate evenly spaced grid. Samples were placed on ice, transferred to a freezer, and shipped the following morning under chain-of-custody protocol by common carrier to their respective analytical laboratories. For all analyses, the composited 75 subsamples were sent overnight via FedEx to Torrent Laboratory in Milpitas, California. For volatile analysis, the 30 5-gram aliquots collected for each sample were sent same day via air cargo to Advanced Analytical Laboratory in Honolulu, Hawaii, to perform a time-sensitive extraction for the volatile organic compound (VOC) analyses, with the extract subsequently forwarded to Torrent Laboratory for analytical testing.

On March 20, 2023, a USAF directive *ordered cancellation of all sample analysis* and return of the soil samples to the site. The laboratory was immediately notified, and no samples were analyzed. Return of the soil samples is currently being coordinated, working with the United States Department of Agriculture (USDA) and the Hawaii Department of Agriculture for soil import requirements. All samples will be returned upon confirmation of the appropriate protocols, and coordination with the USAF. Please note that all samples collected have, at this time, exceeded holding times for any analysis.

6.0 CONCLUSIONS

Excavations performed during the time-critical removal action reached a depth of 2 feet bgs, except for an area of approximately 5 feet by 5 feet, immediately north of the northeast corner of the generator pad, which extended to a depth of 3 to 4 feet bgs. This location was excavated prior to the USAF directive to limit the removal action to a depth of 2 feet bgs within each of the three (3) focus areas. Field screening data (via PID), in conjunction with visual and olfactory observations, indicate that contaminated soil remains on-site at depths greater than 7 feet bgs along the north and south sides of the generator pad, in soil beneath the generator pad, and beyond the sides of the excavations in both the upslope and downslope directions.

7.0 LIMITATIONS

Environmental services described in this report have been conducted in general accordance with regulatory guidelines and the standard-of-care exercised by environmental consultants performing similar work in the project area. No warranty, expressed or implied, is made regarding the professional opinions presented in this report. Variations in site conditions may exist and conditions not observed or described in this report may be encountered during subsequent activities.

Tetra Tech's opinions and recommendations regarding environmental conditions, as presented in this report, are based on limited subsurface investigations and PID screening results. Further investigation of potential environmental impacts from historical on-site diesel generator release may be performed by conducting a more comprehensive subsurface investigation.

Our conclusions and recommendations are based on recent Tetra Tech investigation activities and available data. It should be recognized that the conditions of a site could change as a result of natural processes or the activities at the site or nearby properties. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8.0 REFERENCES

Akamai Land Surveying, Inc., 2023, Topographic Survey of Maui Space Surveillance Complex, Haleakala Observatory Site, Scale 1" = 10', March 15.

NRC/US Ecology, 2023, Work Plan, MSSC, Haleakala, Maui County, HI, February 23.

Tetra Tech, 2023a, Sampling and Analysis Plan, Revision 3, Maui Space Surveillance Complex (MSSC), Haleakala, Maui County, Hawaii, February 23.

Tetra Tech, 2023b, Memorandum No. 1, Summary of Onsite Observations & Preliminary Geotechnical Recommendations for Temporary Excavations, Generator Pad Diesel Spill Area, USAF Haleakala Compound, Maui, February 24.

Tetra Tech, 2023c, Memorandum No. 2, Draft Interim Findings, Conclusions, and Recommendations, Diesel Generator Spill Soil Remediation, MSSC Haleakala, Maui County, Hawaii, March 7.

Tetra Tech, 2023d, Memorandum No. 3, Request for clarification on Directive on excavation for Work Order 18095, dated 9 March 2023, MSSC Haleakala, Maui County, Hawaii, March 10.

Tetra Tech, 2023e, Memorandum No. 4, Preliminary Geotechnical Recommendations for Potential Borrow Excavation along Existing Fill Slope, northeast of Generator Pad, Maui Space Surveillance Complex, Mt. Haleakala, Maui County, Maui, March 17.

Thornberry-Ehrlich, T., 2011, Haleakala National Park: geologic resources inventory report. Natural Resource Report NPS/ NRSS/GRD/NRR—2011/453. National Park Service, Ft. Collins, Colorado.

USAF, 2023a, Spill Location and Boring B-1 (1980) & B-6 (1994) sent to EPA-HEER 13Feb23.pdf [10 pages of illustrations with annotations, including site vicinity topographic map, Google aerial image, spill location map, as-built topographic map, driveway profile, and engineering details, Boring 6 log dated 10-10-1991, and Boring B-1 log (1980)].

USAF, 2023b, Directive on excavation for Work Order 18095, Memorandum from 766th Enterprise Sourcing Squadron to Tunista Services LLC March 9.

USAF, 2023c, Responses to Memorandum No. 3, Request for clarification on Directive on excavation for Work Order 18095, dated 9 March 2023, MSSC Haleakala, Maui County, Hawaii, via email March 13.

USAF, 2023d, Response to Memorandum No. 4, Approval of Request to Utilize On-Site Backfill per Geotech Backfilling Recommendation Memorandum 4, to Tunista Services LLC, via email March 21.

FIGURES

FIGURE 1: SITE VICINITY MAP

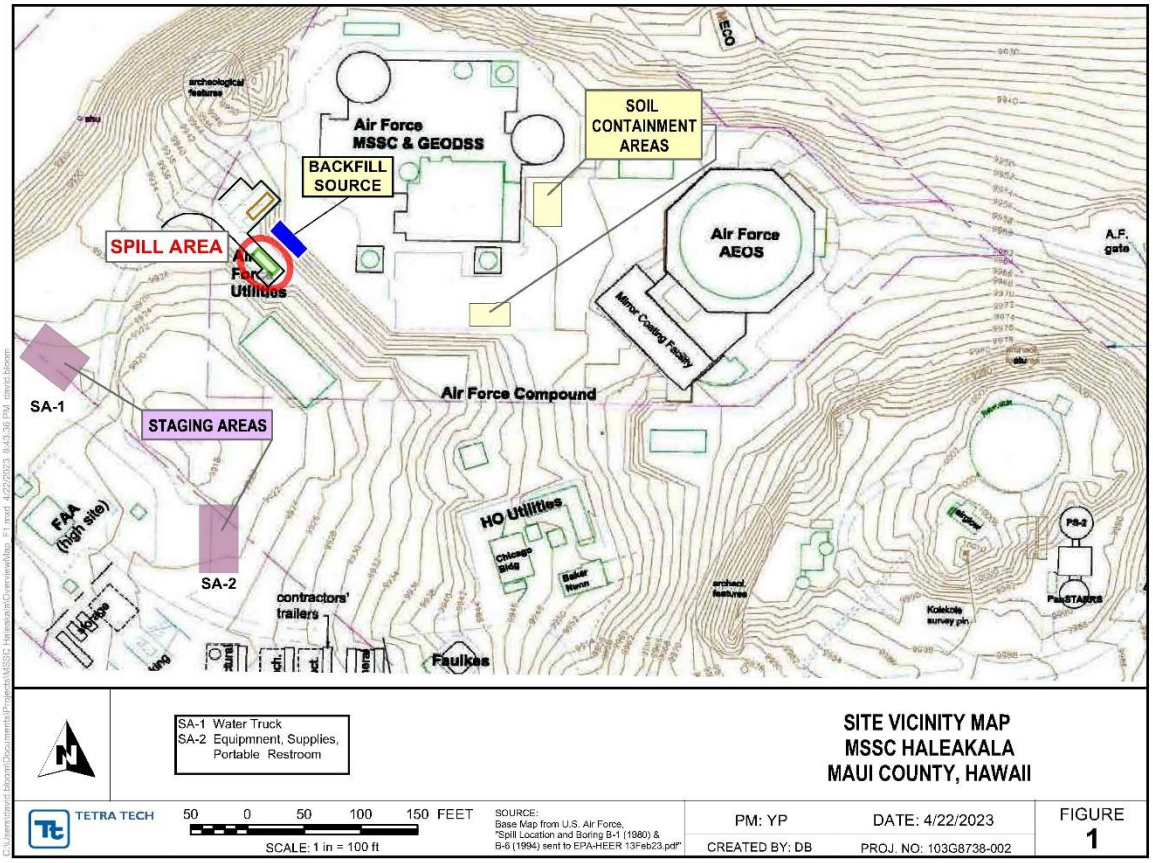

Air Force
MSSC & GEODSS
BACKFILL
SOURCE
SOIL
CONTAINMENT
AREAS
SPILL AREA
Air Force
AEOS
Mirror Coating Facility
A.F.
gate
Air Force Compound
SA-1
STAGING AREAS
FAA
(high site)
SA-2
contractors'
trailers
HQ Utilities
Faulkes
SA-1 Water Truck
SA-2 Equipmnent, Supplies,
Portable Restroom
SITE VICINITY MAP
MSSC HALEAKALA
MAUI COUNTY, HAWAII
TETRA TECH
50 0 50 100 150 FEET
SCALE: 1 in = 100 ft
SOURCE:
Base Map from U.S. Air Force,
"Spill Location and Boring B-1 (1980) &
B-6 (1994) sent to EPA-HEER 13Feb23.pdf"
PM: YP
DATE: 4/22/2023
CREATED BY: DB
PROJ. NO: 103G8738-002
FIGURE
1

FIGURE 2: SITE PLAN

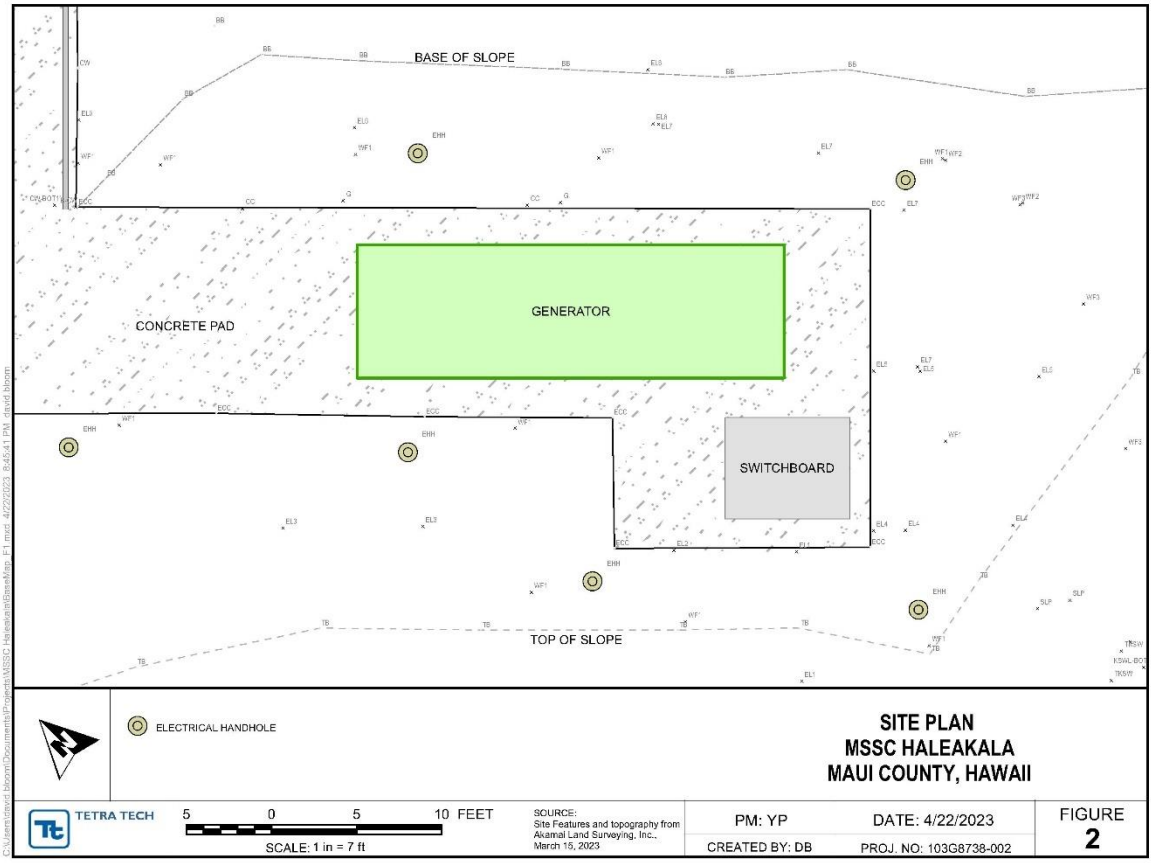
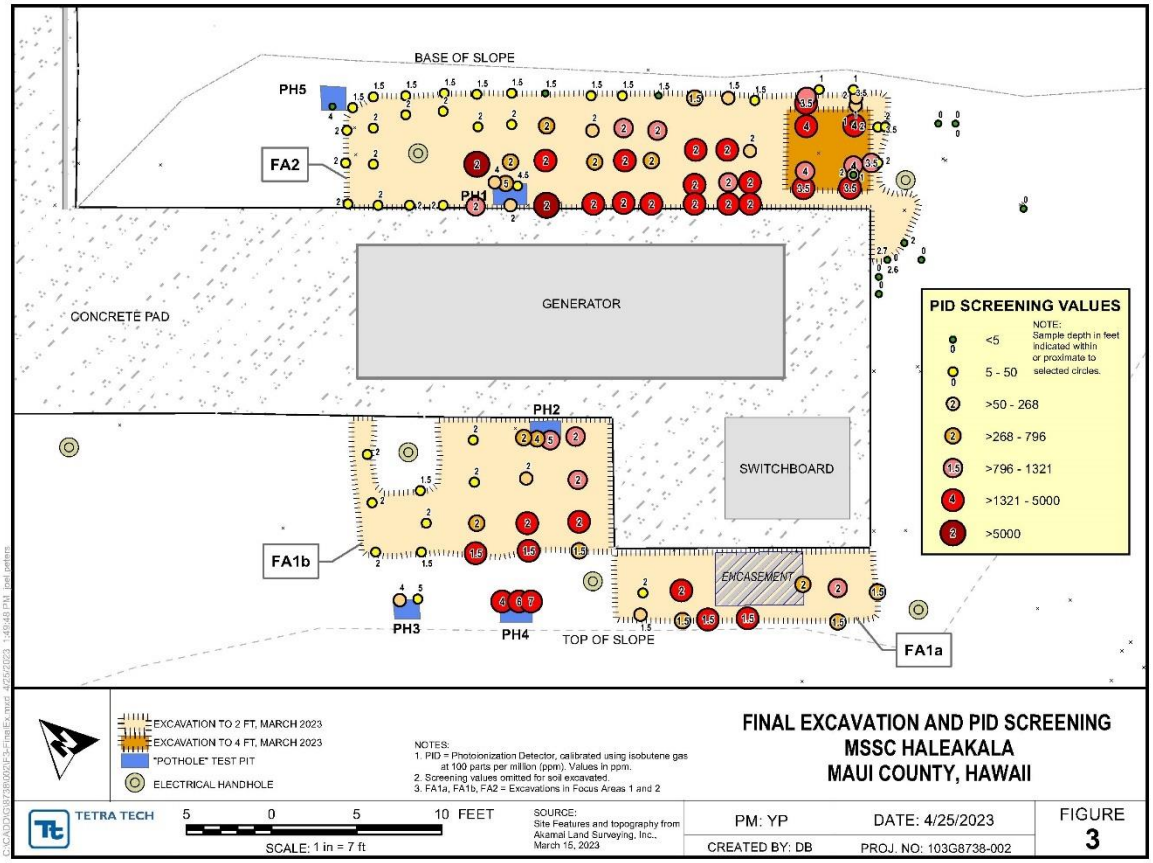

BASE OF SLOPE
GENERATOR
CONCRETE PAD
SWITCHBOARD
TOP OF SLOPE
ELECTRICAL HANDHOLE
SITE PLAN
MSSC HALEAKALA
MAUI COUNTY, HAWAII
TETRA TECH
5 0 5 10 FEET
SCALE: 1 in = 7 ft
SOURCE:
Site Features and topography from Akamai Land Surveying, Inc., March 15, 2023
PM: YP
DATE: 4/22/2023
CREATED BY: DB
PROJ. NO: 103G8738-002
FIGURE
2

FIGURE 3: FINAL EXCAVATION AND PID SCREENING


BASE OF SLOPE
PH5
FA2
PH1
GENERATOR
CONCRETE PAD
PID SCREENING VALUES
NOTE:
Sample depth in feet indicated within or proximate to selected circles.
<5
5 - 50
>50 - 268
>268 - 796
>796 - 1321
>1321 - 5000
>5000
PH2
SWITCHBOARD
FA1b
EXCAVATION TO 2 FT, MARCH 2023
EXCAVATION TO 4 FT, MARCH 2023
"POTHOLE" TEST PIT
ELECTRICAL HANDHOLE
PH3
PH4
TOP OF SLOPE
EXCASEMENT
FA1a
NOTES:
1. PID = Photoionization Detector, calibrated using isobutene gas at 100 parts per million (ppm). Values in ppm.
2. Screening values omitted for soil excavated.
3. FA1a, FA1b, FA2 = Excavations in Focus Areas 1 and 2
FINAL EXCAVATION AND PID SCREENING
MSSC HALEAKALA
MAUI COUNTY, HAWAII
TETRA TECH
5 0 5 10 FEET
SCALE: 1 in = 7 ft
SOURCE:
Site Features and topography from Akamai Land Surveying, Inc., March 15, 2023
PM: YP
DATE: 4/25/2023
CREATED BY: DB
PROJ. NO: 103G8738-002
FIGURE
3

ATTACHMENT A: UTILITY SURVEYS

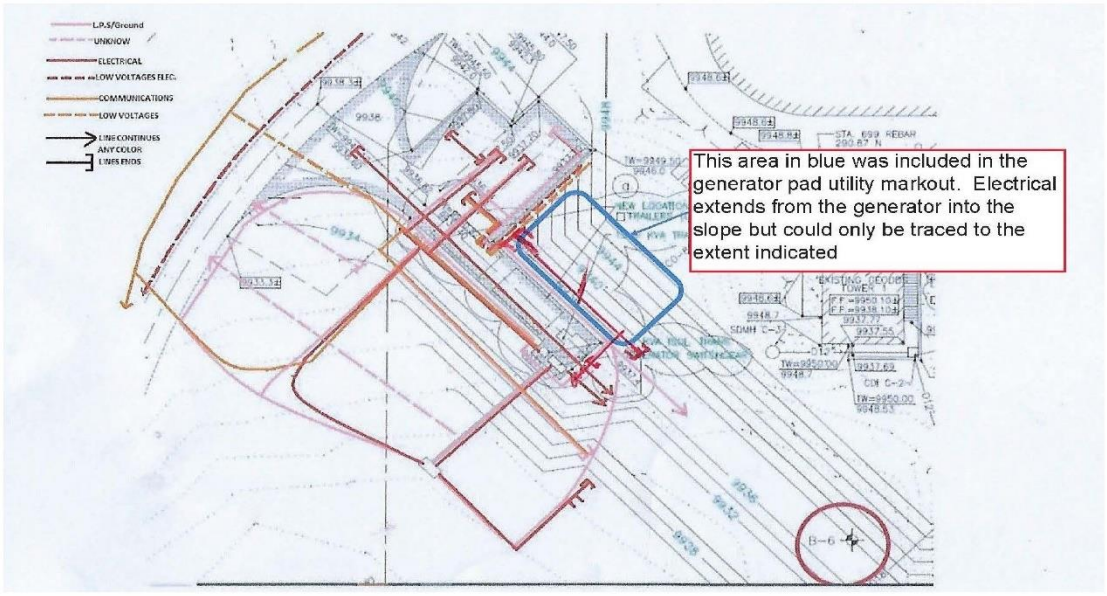


FIGURE A-1 – GENERATOR PAD FOCUS AREA UTILITY SURVEY
Maui Space Surveillance Complex (MSSC)
Mt. Haleakala, Maui Co., Maui

- **Communications (Comms = signature indicative of Cat5/fiberoptic/telecom type lines): Comms lines were found at approximately 2' depth; however depths of 1' 8" were located in some areas**
- **Low voltage Comms: low voltage Comms line did not tone very well I was and depth could not be recorded. This would include any fiber optic lines.**
- **Lightning Protection System (LPS)/ Ground: The LPS System returned a generally constant depth of approximately 1'10"; but also was located at depths of approximately 12".**
- **Electric: Electric lines returned depths of 3' to 6'**
- **Low voltage Electric: Low voltage electric lines did not tone very well and did not return any accurate depths.**

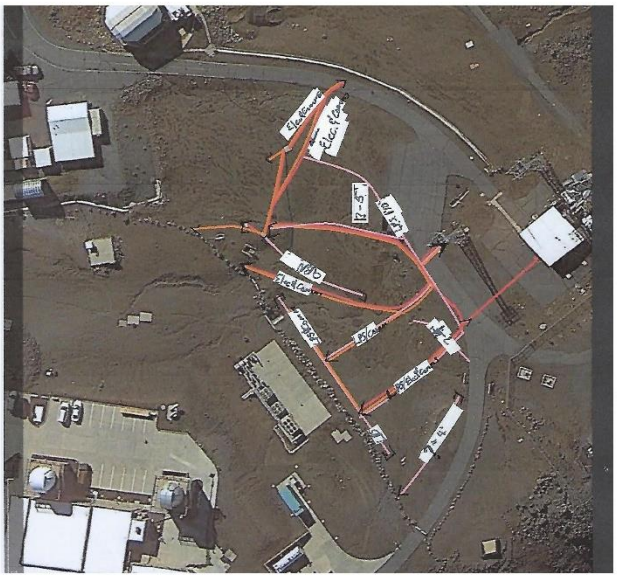


FIGURE A-2 – STORMWATER RETENAION AREA UTILITY SURVEY
Maui Space Surveillance Complex (MSSC)
Mt. Haleakala, Maui Co., Maui

ATTACHMENT B: GEOTECHNICAL MEMORANDA

TETRA TECH

Memorandum No.1

TO:	COMPANY:	DATE:
Jim Riedel	**US Ecology**	**February 24, 2023**
FROM:	PROJECT NUMBER:	PHONE NUMBER:
Patrick Keefe CEG	TET 22-251E	(909) 860-7777

RE:

Summary of Onsite Observations & Preliminary Geotechnical Recommendations for Temporary Excavations, Generator Pad Diesel Spill Area, US Airforce Haleakala Compound, Maui.

The undersigned Engineering Geologist visited the site today to observe current conditions at the subject generator pad and its surrounding vicinity. Based on my observations, the generator pad appears to be positioned on graded fill pad comprised primarily of reddish-brown silty fine- to coarse-grained sand with basaltic gravel- and cobble-sized clasts up to about 6 inches in diameter. No excavation work has been conducted at the time of my visit, therefore, soil description summarized above are reflective of near surface conditions only.

The generator pad is bounded to the northeast by an ascending 2:1 (H:V) graded fill slope about 15 feet in height. A 2:1 to 2.5:1 (H:V) fill slope descends to the southwest on the opposite side of the generator pad. The concrete slab supporting the generator was field measured at about 38 feet in length and 12 feet in width. Approximately 9 feet of level unimproved ground separates the edge of the concrete slab from the toe of the ascending fill slope to the northeast. The distance from the edge of slab to the top of the descending fill slope to the southwest was measured at roughly 13 to 14 feet.

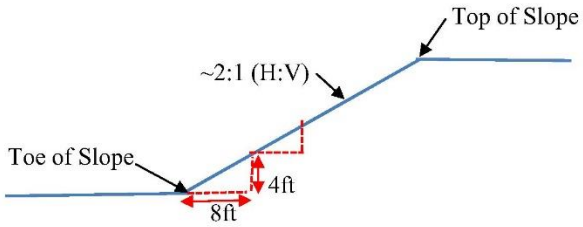
The soil and perimeter edge of the concrete slab was assessed utilizing a steel probe. Through probing, the perimeter of the concrete slab was determined to be a minimum of 18-inches thick before encountering refusal due to cobbles at depth.

Based on the findings of today's site visit and on a cursory review of client provided as-built construction drawings and soil boring logs by others, the following *Preliminary Temporary Excavation Recommendations* are presented for your consideration:

- Temporary excavations within the toe of the ascending fill slope to the northeast and beyond the top of the descending fill slope to the southwest of the generator pad may be cut vertical to depths no greater than 4 feet below the slope face. The excavation should extend no more than 8 horizontal feet in length (See Diagram A). If excavations warrant a vertical depth greater than 4 feet, this office should be contacted in advance for additional recommendations. No limitations are warranted to the width of the temporary excavation parallel to the toe of slope.

21700 Copley Drive Suite 200 * Diamond Bar, CA 91765 * Tel: 909-860-7777

DIAGRAM A



- Any temporary excavation immediately adjacent or within a 2-feet of the concrete slab may be excavated vertical to a depth of 4 feet but should be limited to a horizontal width of 5 feet. To extend the excavation width in either direction, AB slot cutting techniques should be utilized by the contractor. A detail schematic of AB slot cutting can be provided by Tetra Tech upon request.

- No excavations should undermine the existing concrete slab of the generator or appurtenant structures at this time. Further analyses is required by this office to assess potential excavations beneath the concrete slab. Supplemental recommendation regarding excavations beneath the slab can be provided by Tetra Tech upon request.

- Plastic sheet slope protection of the entire slope face above any excavation should be implemented if excavations are to be left open overnight, particularly during rainfall events, in order to control erosion and sloughing of the soil in the excavtion.

- If soil conditions very from those described herein, or if sloughing or caving soils are encountered, this office should be notified immediately.

- All excavations shall comply with OSHA excavation requirements.

CLOSURE

We appreciate the opportunity to provide our professional services on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
Tetra Tech BAS, Inc.

Patrick M. Keefe, CEG
Supervising Engineering Geologist

Filename: 2023-02-24 US Airforce Haleakala, Maui.docx

TETRA TECH

Memorandum No.4

TO:	COMPANY:	DATE:
Jim Riedel	**US Ecology**	**March 17, 2023**
FROM:	PROJECT NUMBER:	PHONE NUMBER:
Patrick Keefe CEG	TET 22-251E	(909) 860-7777

RE:

Preliminary Geotechnical Recommendations for Potential Borrow Excavation along Existing Fill Slope, Northeast of Generator Pad, Maui Space Surveillance Complex, Mt. Haleakala, Maui County, Maui.

Environmentally impacted soils have recently been excavated to a depth of approximately 2 feet below grade in the vicinity of the subject generator pad (see Illustration 1). The impacted soils have been transported to temporary stockpile areas within the base for subsequent treatment. At this time, US Ecology has been directed to place plastic sheeting along the bottoms of the excavations and backfill the lined excavations with non-impacted on-site soil. We understand that approximately 50 cubic yards of replacement soil will be required to backfill the lined excavations.

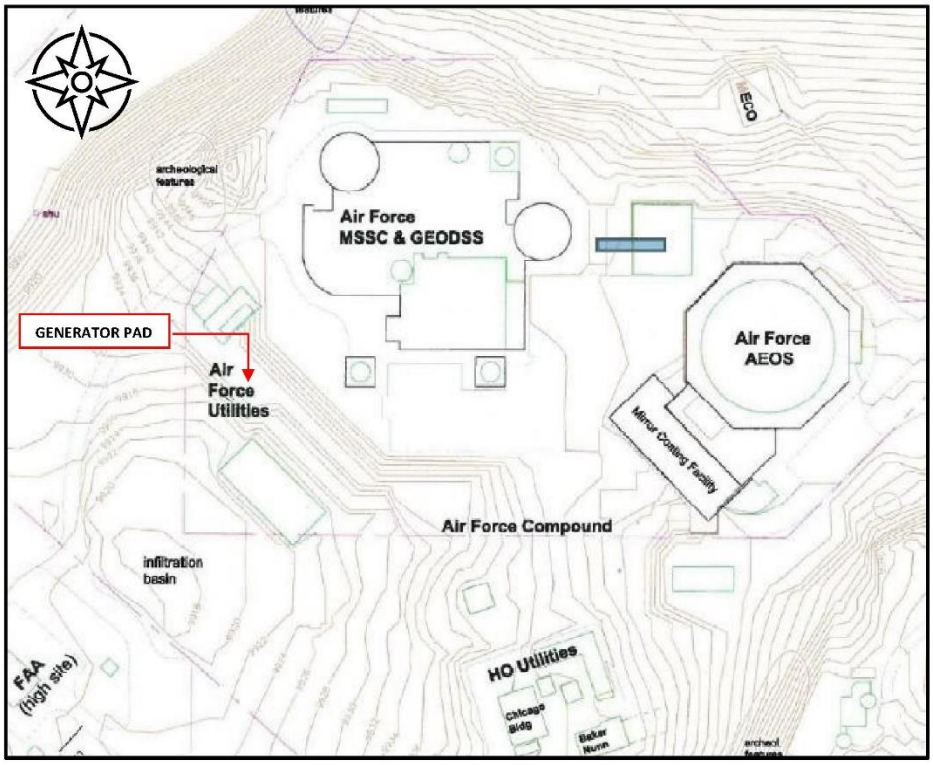


Illustration 1: Location Map

To generate approximately 50 cubic yards of soil for backfill material, the undersigned was tasked with assessing potential borrow sites within the base that are relatively close to the current excavation area. As part of this assessment, the undesigned has visited the site and has reviewed 1994 as-built construction drawings that were provided for review by the client. These as-built plans were particularly useful in that they showed pre-development and post-development contours of the ground surface beneath and around the subject generator pad facilities (see Illustration 2).

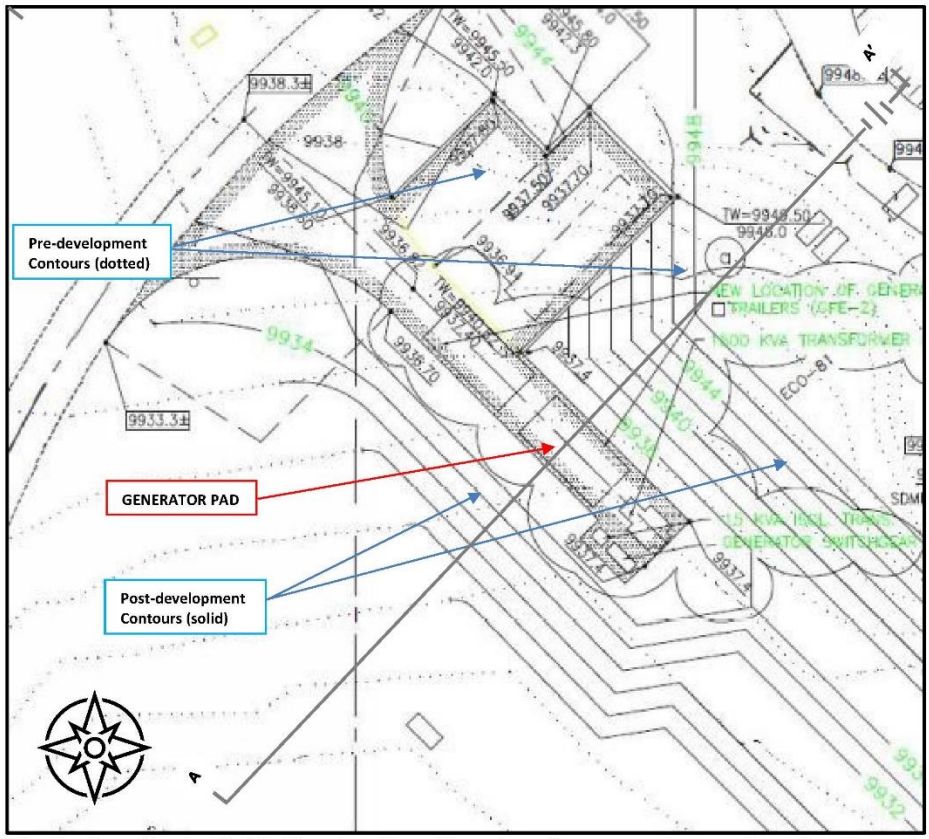


Illustration 2: As-Built Construction Drawing for generator pad and adjacent improvements (Holmes Sabatini Associates, 1994).

As shown in Cross-Section A – A' (Illustration 3), the generator pad and adjacent ± 14 feet high ascending slope is comprised of a moderate thickness of artificial fill that was placed to create the level pad and slope areas on either side of the level pad.

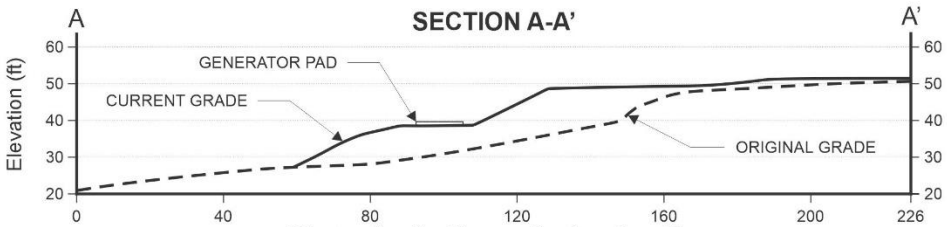


Illustration 3: Cross – Section A – A'

Assuming all underground and surface improvements are cleared from the area, a borrow excavation to generate fill materials to be utilized to backfill the environmental excavations could be created by modifying the existing top and toe of the ascending fill slope to the northeast of the generator pad, as detailed in the schematic diagram shown in Illustration 4 below.

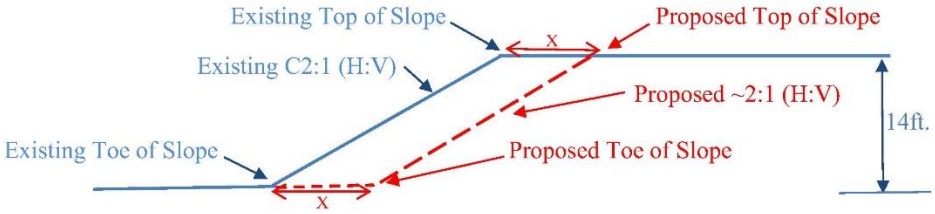


Illustration 4: Schematic diagram of modified of proposed borrow excavation.

Assuming 50 cubic yards of on-site soil is required to backfill the environmental excavations, the following modified slope configuration can be created directly northeast of the subject generator pad to produce roughly 50 cubic yards of on-site fill material:

- Slope height (H) = 14 feet
- Horizontal distance perpendicular to top and toe of slope (X) = 4 feet
- Length of excavation parallel to top and toe of slope (L) = 24 feet

Where;

H * X (L) / 27cu ft/cu. yd. = Volume of soil generated

or

14ft * 4ft (24ft) / 27 cu. ft./cu. yd = ~ 50 cu. yds. of soil

The adjustments to the existing slope along the northeast margin of the generator pad assume no conflict with underground or above ground improvements, protected wildlife or fauna. The information presented at this time is intended for informational purposes only. If the proposed slope modifications summarized herein are determined to be an acceptable option, the actual limits of the ground surface modifications should be reviewed in the field and documented on scaled drawings prior to commencement of work.

CLOSURE

We appreciate the opportunity to provide our professional services on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
Tetra Tech BAS, Inc.

Patrick M. Keefe, CEG
Supervising Engineering Geologist

Filename: 2023-03-17 US Airforce Haleakala, Maui.docx

ATTACHMENT C: PID SCREENING LOGS

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Model: MiniRAE Lite PGM 3000 Serial No.: 590-000641

Date 3/3/2023 Page 1 of 1 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1000	FA2. 13 ft W, 0.5 ft N	1	0	738	1013	Near daylighted electrical conduit Sample warmed in vehicle (temp not recorded)
1005	FA2. 13 ft W, 3 ft N	2	0	875	1018	Sample warmed in vehicle (temp not recorded)
1007	FA2. 30 ft W, 0.5 ft N	3	0	22.3	1021	Sample warmed in vehicle (temp not recorded)
1008	FA2. 30 ft W, 3 ft N	4	0	5.4	1025	Near grounding monument
1120	FA2. 1 ft E, 0 ft S	5	0	2.1	1131	Samples 5 through 12 all collected near east end of generator pad. Samples warmed in vehicle (temp not recorded)
1121	FA2. 3 ft E, 0 ft S	6	0	2.5	1133	
1123	FA2. 0.5 ft E, 3 ft S	7	0	37.3	1135	
1125	FA2. 3 ft E, 3 ft S	8	0	4.2	1140	
1127	FA2. 9 ft E, 0 ft S	9	0	4.1	1142	
1153	FA2. 0.5 ft E, 5 ft S	10	0	1.6	1200	
1155	FA2. 0.5 ft E, 4 ft S	11	0	3.2	1202	
1158	FA2. 1 ft E, 3 ft S	12	0	2.5	1203	
1208	FA2. 0.5 ft E, 3 ft S	13	1	124	1216	Samples 13 through 20 collected in the initial excavation roughly 3 feet by 2 feet to a depth of 3 feet immediately east of the east end of the generator pad. Sample warmed in vehicle (temp not recorded)
1210	FA2. 4 ft E, 5 ft N	14	0	2.9	1214	
1213	FA2. 3 ft W, 3 ft N	15	0	167	1220	
1240	FA2. 1 ft E, 3 ft S	16	2	46	1245	
1242	FA2. 1 ft E, 0 ft S	17	1.5	25	1248	
1303	FA2. 1 ft E, 3 ft S	18	2.7	4.7	1307	
1312	FA2. 1 ft E, 3 ft S	19	2.6	4.4	1315	
1313	FA2. 2 ft E, 2 ft S	20	2	0.6	1317	

Note: Focus Area 2 (FA2) location takeoffs in feet from point of origin, the northeast corner of concrete generator pad.

ppm = parts per million, based on calibration using: 100 ppm isobutylene gas on 3/3/23 at 0930

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Model: MiniRAE Lite PGM 3000 Serial No.: 590-000641

Date 3/4/2023 Page 1 of 1 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1030	7 ft NE of NE slab corner	-5\5\0	0	0.6 / 1.5*	1035 / 1319*	Surface sample 7 feet diagonal off slab corner Sample warmed in vehicle (temp not recorded)
1150	Base, SE quadrant	1\2\2	2	80.6 / 73.1*	1214 / 1308*	Sample warmed in vehicle (temp not recorded)
1151	East Sidewall, S sector	1\2\1	1	2.6 / 2.6*	1215 / 1310*	Sample warmed in vehicle (temp not recorded)
1153	East Sidewall, N sector	1\5\1	1	2.2 / 2.4*	1216 / 1311*	Sample warmed in vehicle (temp not recorded)
1155	Base, NE quadrant	1\5\2	2	4.8 / 3.7*	1219 / 1314*	Sample warmed in vehicle (temp not recorded)
1156	North Sidewall, E sector	1\7\1	1	13.1	1237	Sample warmed in vehicle (temp not recorded)
1158	Base, SW quadrant	3\2\2	2	889	1236	Sample warmed in vehicle (temp not recorded)
1200	Base, NW quadrant	3\5\2	2	240	1242	Sample warmed in vehicle (temp not recorded)
1201	North Sidewall, W sector	3\7\1	1	35.2	1234	Sample warmed in vehicle (temp not recorded)
1204	West Sidewall, S sector	7\2\1	1	1590	1239	Sample warmed in vehicle (temp not recorded)
1206	West Sidewall, N sector	7\5\1	1	53	1243	Sample warmed in vehicle (temp not recorded)

Notes: All samples from Focus Area 2 (FA2), with sample IDs indicating location in feet from point of origin, the northeast corner of generator pad.
Subsurface samples collected from 5 foot by 5 foot excavation to a depth of 2 feet below ground surface: Four samples from base, and 2 samples each from north, east, and west sidewalls.
* = first value from sample warmed in the sun; second value from same sample later warmed in vehicle
ppm = parts per million, based on calibration using: 100 ppm isobutylene gas on 3/3/23 at 0930

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Model: MiniRAE Lite PGM 3000 Serial No.: 590-000641

Date 3/6/2023 Page 1 of 1 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1125	Base, NW quadrant	B1	4	2142	1143	Temperature of all samples approximately 75 F as measured by site visitor Mr. Adam Teekell, Hawaii Department of Health.
1125	Base, NE quadrant	B2	4	1870	1144	
1125	Base, SW quadrant	B3	4	1233	1147	same
1125	Base, SE quadrant	B4	4	916	1148	same
1126	North Sidewall, W sector	N1	3.5	1453	1150	same
1126	North Sidewall, E sector	N2	3.5	132	1152	same
1127	North Sidewall, W sector	N3	2	870	1153	same
1127	North Sidewall, E sector	N4	2	202	1154	same
1126	East Sidewall, N sector	E1	3.5	42	1155	same
1126	East Sidewall, S sector	E2	3.5	936	1156	same
1127	East Sidewall, N sector	E3	2	14	1157	same
1127	East Sidewall, S sector	E4	2	7.7	1158	same
1128	South Sidewall, E sector	S1	3.5	1566	1159	same
1128	South Sidewall, W sector	S2	3.5	1763	1201	same
1129	West Sidewall, S sector	W1	2	436	1203	same
1129	West Sidewall, N sector	W2	2	78.5	1204	same

Note: All screening samples from Focus Area 2, approximately 5x5 foot excavation to 4 ft depth, east end of north side of generator pad to rising slope.

ppm = parts per million, based on calibration using: 100 ppm isobutylene gas on 3/6/23 at 0951

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Model: MiniRAE Lite PGM 3000 Serial No.: 590-000641

Date 3/6/2023 Page 1 of 1 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1214	FA2, Pothole 1 North side of generator slab, 20'-22' west of east end	PH1-4'	4	216	1218	Collected from excavator bucket Sample warmed in vehicle (temp not recorded)
1227		PH1-5'	5	395	1236	Collected from excavator bucket Sample warmed in vehicle (temp not recorded)
1229		PH1-4.5'	4.5	15.1	1237	Collected from excavator bucket Sample warmed in vehicle (temp not recorded)
1257	FA1, Pothole 2 South side of generator slab, 18'-20' west of east end	PH2-4'	4	727	1307	Collected from excavator bucket Sample warmed in vehicle (temp not recorded)
1304		PH2-5'	5	959	1312	Collected from excavator bucket Sample warmed in vehicle (temp not recorded)

ppm = parts per million, based on calibration using: 100 ppm isobutylene gas on 3/6/23 at 0951

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/11/23 Page 1 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1142	North Sidewall, W Sector	1	1.5	447	1159	57°F Readings taken after samples warmed in sun.
1143	North Sidewall, Center Sector	2	1.5	174	1200	55°F
1144	North Sidewall, E Sector	3	1.5	9	1203	57°F
1145	Base, NW Sector	4	2	1433	1204	49°F
1146	Base, North Center Sector	5	2	1516	1206	52°F
1147	Base, NE Sector	6	2	71	1210	52°F
1148	Base, SW Sector	7	2	1722	1211	62°F
1148	Base, South Center Sector	8	2	1185	1214	61°F
1148	Base, SE Sector	9	2	2404	1217	64°F
1149	Base at slab, W Sector	10	2	2286	1221	66°F
1149	Base at slab, Center Sector	11	2	2270	1226	68°F
1150	Base at slab, E Sector	12	2	1492	1230	65°F

Notes: Focus Area 2. 6'-11' W of NE corner of Generator pad, between pad and slope toe (approximately 7' wide).

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/10/23 0835

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☐ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☑ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/11/23 Page 2 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature
1347	North Sidewall, W Sector	1	1.5	17	1420	54°F Readings taken from samples in heated vehicle.
1348	North Sidewall, Center Sector	2	1.5	16	1421	57°F
1349	North Sidewall, E Sector	3	1.5	3.8	1422	57°F
1350	Base, NW Sector	4	2	146	1424	56°F
1351	Base, North Center Sector	5	2	909	1425	56°F
1351	Base, NE Sector	6	2	1070	1426	55°F
1352	Base, SW Sector	7	2	389	1428	56°F
1353	Base, South Center Sector	8	2	1622	1429	56°F
1354	Base, SE Sector	9	2	428	1432	57°F
1355	Base at slab, W Sector	10	2	1388	1433	54°F
1356	Base at slab, Center Sector	11	2	2284	1435	54°F
1356	Base at slab, E Sector	12	2	2511	1436	59°F

Notes: Focus Area 2. 13'-17' W of NE corner of Generator pad, between pad and slope toe (approximately 7' wide).

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other_____ on *(date/time)* 3/11/23 1414 .

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/14/23 Page 1 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1247	North Sidewall, 19' W	1	1.5	4.4	1306	60
1247	Base, 19'W, 5'N	2	2	398	1307	72
1248	Base, 19'W, 3'N	3	2	1752	1309	61
1249	Base, 19'W, 0'N	4	2	>5000	1310	61
1249	North Sidewall, 21' W	5	1.5	19.5	1315	56
1250	Base, 21'W, 5'N	6	2	34.1	1316	54
1250	Base, 21'W, 3'N	7	2	509	1318	48
1251	Base, 21'W, 0'N	8	2	185	1322	51
1252	North Sidewall, 23' W	9	1.5	17.6	1324	58
1252	Base, 23'W, 5'N	10	2	17.3	1325	54
1253	Base, 23'W, 3'N	11	2	>5000	1326	68
1253	Base, 23'W, 0'N	12	2	886	1332	64
1355	North Sidewall, 25' W	13	1.5	10.1	1419	74
1356	Base, 25'W, 5'N	14	2	8.5	1420	69
1357	Base, 25'W, 0'N	15	2	38	1421	72
1358	North Sidewall, 27' W	16	1.5	9.8	1424	66

Notes: Focus Area 2 Excavation to 2' bg, 19' to 31' west of NE corner of Generator pad, 6.5' -7.0' between pad and slope toe.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/14/23 0935

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/14/23 Page 2 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1359	Base, 27'W, 5'N	17	2	11	1422	65
1400	Base, 27'W, 0'N	18	2	21	1425	72
1401	North Sidewall, 29' W	19	1.5	24	1427	81
1402	Base, 29'W, 5'N	20	2	11	1428	57
1403	Base, 29'W, 3'N	21	2	8.7	1429	76
1404	Base, 29'W, 0'N	22	2	11	1430	73
1405	North Sidewall, 31' W	23	1.5	12	1431	75
1406	Base, 31'W, 5'N	24	2	12	1432	83
1407	Base, 31'W, 3'N	25	2	12	1433	72
1408	Base, 31'W, 0'N	26	2	10	1434	83

Notes: Focus Area 2 Excavation to 2' bg, 19' to 31' west of NE corner of Generator pad, 6.5' -7.0' between pad and slope toe.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/14/23 0935 .

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/15/23 Page 1 of 1 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1037	East Sidewall	1	1.5	301	1047	78
1038	South Sidewall, 2'W	2	1.5	416	1058	76
1039	Base, 2'W	3	2	1005	1101	75
1040	Base, 4'W	4	2	413	1106	76
1252	South Sidewall, 7'W	5	1.5	1540	1301	88
1252	South Sidewall, 9'W	6	1.5	1517	1303	67
1253	South Sidewall, 10'W	7	1.5	577	1323	65
1254	South Sidewall, 14'W	8	1.5	149	1326	69
1254	Base, 11'W	9	2	1893	1328	72
1255	Base, 14'W	10	2	35	1329	72

Notes: Focus Area 1a excavation to 2' bg, from SE corner Switchboard pad to top of slope, 15' along S side of pad.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/15/23 0901

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (T: Owned)
☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/16/23 Page 1 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1209	Base, 1'W, 2'S	1	2	1169	1247	91
1209	Base, 1'W, 4'S	2	2	1070	1249	89
1210	Base, 1'W, 6'S	3	2	2135	1250	86
1210	South Sidewall, 1'W	4	1.5	665	1252	78
1212	Base, 4'W, 2'S	5	2	701	1253	81
1213	Base, 4'W, 4'S	6	2	118	1254	79
1214	Base, 4'W, 6'S	7	2	3646	1257	87
1215	South Sidewall, 4'W	8	1.5	3235	1257	88
1300	Base, 7'W, 2'S	9	2	18	1317	54
1300	Base, 7'W, 4'S	10	2	19	1318	65
1300	Base, 7'W, 6'S	11	2	717	1320	58
1301	South Sidewall, 7'W	12	1.5	1381	1321	65
1301	North Sidewall, 10'W, 5'S	13	1.5	13	1324	71
1302	Base, 10'W, 6'S	14	2	12	1325	53
1302	South Sidewall, 10'W	15	1.5	17	1326	62
1303	Base, 14'W, 4'S	16	2	12	1327	80

Notes: Focus Area 1b excavation to 2' bg, south side generator pad, 15' to 30' from East end of pad, from pad edge out 8' wide.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/16/23 0914

PID SOIL SCREENING LOG

Project Name: NRC Diesel Site Name: MSSC Haleakala

PID Manufacturer/Name/Mode/Serial No.: ☑ MiniRAE Lite PGM3000, S/N: 590-000641 (TI Owned) ☐ MiniRAE PGM7320, S/N: 592-913990 (Rental)

Date 3/16/23 Page 2 of 2 Sampler Dave Bloom

Time Collected	Location	Sample ID	Depth (ft bgs)	Meter Reading (ppm)	Time Measured	Comments, Temperature (°F)
1304	Base, 10'W, 6'S	17	2	10	1333	75
1305	South Sidewall, 10'W	18	2	8	1334	65
1322	PH3-4'	PH3-4	4	57	1336	66 No fuel odor, loamy smell
1329	PH3-5'	PH3-5	5	50	1353	53 No fuel odor, loamy smell
1352	PH4-4'	PH4-4	4	2640	1406	68 Strong odor with sheen
1406	PH4-6'	PH4-6	6	1465	1438	34 Fuel odor
1415	PH4-7'	PH4-7	7	3439	1440	53 Strong fuel odor
1455	PH5-4'	PH5-4	4	4.5	1510	88 Clean odor

Notes: Focus Area 1b excavation to 2' bg, south side generator pad, 15' to 30' from East end of pad, from pad edge out 8' wide. Three potholes, PH3 (west) and PH4 (east), in FA1b at topo ∫ downslope; PH5 northwest corner of FA2 at base of upslope.

ppm = parts per million, based on calibration using: ☑ 100 ppm isobutylene gas ☐ Other _____ on *(date/time)* 3/16/23 0914