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FINAL SOIL MANAGEMENT PLAN

Former NPR-1 Closure Project

Elk Hills Oil Field

Elk Hills, California

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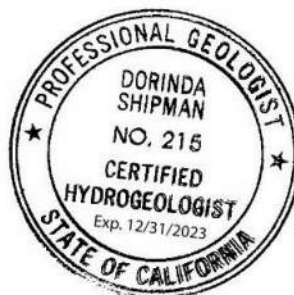
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ABBREVIATIONS

AFSI	Ahtna Facility Services, Inc.
AOC	Area of Concern
BioPAS	Biological pre-activity survey
bgs	Below ground surface
BMP	Best management practice
CCR	California Code of Regulations
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
COC	Chemical of Concern
COPC	Contaminant of Potential Concern
CRC	California Resources Corporation
CREH	California Resources Elk Hills, LLC
CVRWQCB	Central Valley Regional Water Quality Control Board
DCP	Dust Control Plan
DOGGR	California Department of Conservation Division of Oil, Gas, and Geothermal Resources
DOE	United States Department of Energy
CalGEM	California Geologic Energy Management Division
DTSC	California Department of Toxic Substances Control
EHOF	Elk Hills Oil Field
EPA	United States Environmental Protection Agency
FESA	Federal Endangered Species Act
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSE	CRC Health, Safety, and Environmental Department
ICS	Incident Command System
LUC	Land Use Covenant
mg/L	Milligrams per liter
MOU	Memorandum of Understanding
NFA	No further action
NPR-1	Former Naval Petroleum Reserve No. 1
OSHA	Occupational Safety and Health Administration
OVM	Organic vapor meter
PAH	Polycyclic aromatic hydrocarbon
PARAGON	Paragon Professional Services LLC
PID	Photoionization detector
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Agreement

SJVAPCD	San Joaquin Valley Air Pollution Control District
SMP	Soil Management Plan
SPCC	Spill Prevention Control and Countermeasure
SVOC	Semi-volatile organic compound
SWRCB	State Water Resources Control Board
TDS	Total dissolved solids
USFWS	United States Fish and Wildlife Service
USTs	Underground Storage Tanks
VOC	Volatile organic compound

**SOIL MANAGEMENT PLAN
Former Naval Petroleum Reserve-1 Closure Project
Elk Hills Oil Field
Elk Hills, California**

1.0 INTRODUCTION

Langan Engineering and Environmental Services (Langan) has prepared this Soil Management Plan (SMP) for areas of concern (AOCs) at the former Naval Petroleum Reserve No. 1 (NPR-1) at the Elk Hills Oil Field (EHOF). The EHOF is located in the Elk Hills of Kern County, California, about 25 miles southwest of Bakersfield, California (site, Figure 1). The site contains an extensive network of roads, pipelines, oil and gas drilling and production pads, and support facilities that include natural gas processing plants, a co-generation plant, thermoelectric power plant, liquefied petroleum gas loading stations and natural gas shipping points. The site does not include residential areas, commercial outlets, or community support facilities, such as schools or hospitals. Public access to the entire site is restricted by fencing and controlled security gates.

The United States Department of Energy (DOE) is currently investigating and remediating AOCs associated with previous operations at the former NPR-1 at the EHOF. DOE and the California Department of Toxic Substances Control (DTSC) entered into an Agreement for Site Assessment in 1998 that was subsequently amended in 2008. The Corrective Action Consent Agreement (Consent Agreement) was signed in 2008. In the Consent Agreement, DOE agreed to complete the corrective action process at 131 AOCs at former NPR-1. DOE is currently conducting environmental investigations, remediation, and closure activities at these AOCs.

To-date, DTSC has granted regulatory closure, in the form of no further action (NFA) determinations, at 111 AOCs (including AOCs and various subareas). As a result, 20 AOCs are pending NFA designations and/or require additional investigation or remedial actions. One of these AOCs, AOC 130, includes approximately 764 well pads for which closure is ongoing. Langan understands that these well pads will be closed with no residual impacts greater than site cleanup goals remaining in-place (i.e. no residual impacts requiring ongoing or long-term management). Therefore, AOC 130 subareas are not included as part of this SMP. A summary of the remaining 19 AOCs (which include 29 different subareas) currently pending NFAs or requiring additional investigation are provided in Table 1. Table 1 also presents the selected remedy for each AOC pending an NFA designation. Selected remedies include soil excavation to five feet below ground surface (bgs) with backfill of uncompacted material, soil vapor extraction,

and/or institutional controls.

The EHOFF is currently an active oil field owned and operated by California Resources Elk Hills, LLC (CREH). Ongoing EHOFF operations include, but are not limited to, well pad construction, drilling and abandonment activities, maintenance and construction. These activities typically include excavation, removal and/or handling of soil and materials at impacted locations. This SMP is intended to be used by CREH personnel during EHOFF operations, including soil disturbing activities, that may be conducted in AOCs and subareas pending NFA, additional investigation and remediation (as presented in Table 1) and/or subareas that are anticipated to receive NFA with impacts remaining in place above cleanup goals (i.e. areas requiring ongoing monitoring and maintenance under a LUC). The physical area covered by this SMP (SMP Coverage Area) is depicted on Figure 1.

1.1 Purpose and Objective

This SMP has been prepared based on the known conditions at the areas where soil-disturbing activities related to EHOFF operations (e.g., well drilling, well abandonment, infrastructure projects, and pipeline installations) are anticipated to be conducted. The purpose and objectives of the SMP are to:

- protect on-site workers from potential exposure to residual substances that may be associated with previous releases of chemicals or certain former source areas that may be encountered during soil disturbing activities;
- establish requirements for soil management and disposal during EHOFF operations and other activities that might disturb contaminated soil in areas where residual chemical concentrations are currently known to be present or will remain in place above cleanup goals prior to or after regulatory closure is granted (i.e., AOCs with an NFA designation with land use controls (LUCs) or ongoing monitoring/maintenance requirements, sites that have not yet received NFA designation, or sites where cleanup has not yet occurred);
- provide protocols for managing “Unanticipated Conditions” (as defined in Section 3.9 below); and
- describe documentation required for work completed under this SMP (Section 6.0).

1.2 Revisions and Amendments

If needed, and pending DOE’s ongoing activities associated with the Former NPR-1 Closure

Project, CREH may propose revisions or Amendments to this SMP.

2.0 FACILITY

2.1 Geology

The Tulare Formation immediately underlies nearly 90 percent of EHOF. The Tulare Formation is composed of Plio-Pleistocene non-marine deposits, with upper and lower members separated by a clay unit. The Tulare Formation is unsaturated along the crest of the EHOF. In saturated areas outside of the crest, the depth to groundwater ranges from 500 to 800 feet bgs. The California Geologic Energy Management Division (CalGEM) [formerly Division of Oil, Gas and Geothermal Resources (DOGGR)], the State Water Resources Control Board (SWRCB) and the United States Environmental Protection Agency (EPA) approved the exemption of the Lower Tulare Formation, which is located beneath approximately 55 percent of the EHOF, including the western half of the oil field (DOGGR, 2018a and 2018b; EPA, 2018a and 2018b). The portion of the Lower Tulare Formation in these areas is generally characterized by dry air sands or contains concentrations of total dissolved solids (TDS) greater than 10,000 milligrams per liter (mg/L).

2.2 Hydrology

Contaminants of concern (COCs) do not appear to pose a threat to groundwater quality primarily due to the physical properties of the soil, low average precipitation and relatively deep depth of groundwater (which minimizes the potential for COCs to migrate vertically) at EHOF.

Many areas at EHOF have already been evaluated by the EPA and SWRCB and have been found not to contain groundwater that warrants protection, because it is hydrocarbon producing and contains elevated TDS. In 2016, the Central Valley Regional Water Quality Control Board (CVRWQCB) agreed that due to the deep depth of groundwater (or lack of groundwater) in the Tulare Formation, COCs detected in soil beneath much of EHOF do not appear to pose a significant threat to groundwater quality (CVRWQCB, 2016a through 2016f). Additionally, CVRWQCB has stated in multiple correspondences that "it is very likely that the chemicals of potential concern (COPCs) detected in the soils at the various AOCs at the former NPR-1 do not pose a significant threat to groundwater quality because of the relatively great depth (generally greater than 500 ft bgs) to groundwater beneath the former NPR-1. However, this must be determined on a case-by-case basis at each AOC. Soil sampling and chemical analysis at each AOC should be able to define limits of COPC impacts to soil at each AOC and, based upon those findings, conclude that the COPCs do not pose a significant threat to groundwater quality (as

poor as it may be) beneath the former NPR-1" (CVRWQCB, 2016c through 2016f).

2.3 Environmental Conditions

Historical former NPR-1 activities have resulted in chemical contamination in the subsurface (including soil and soil gas) at the EHOFF. COCs include petroleum hydrocarbons, metals (specifically arsenic and chromium), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides (OCPs). COCs were identified by DOE during previous investigations at each AOC. DOE's sample locations (including sample depths) and detected concentrations of COCs are presented in the AOC figures in Appendix A. References for these figures are provided in Appendix A.

3.0 SOIL MANAGEMENT ACTIVITIES

3.1 Pre-Disturbance Activities

Prior to conducting any soil disturbance associated with the ongoing EHOFF activities within the SMP Coverage Area, the following activities should be conducted by CREH personnel.

3.1.1 Health and Safety and Training Requirements

Personnel conducting soil-disturbing activities in the SMP Coverage Area should complete health and safety training. Required health and safety training includes 40-hour Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training, or site-specific training administered by the CREH Health, Safety and Environmental (HSE) Department. Contact the CREH HSE Department for additional information about required training.

Work covered under this SMP may require compliance with additional plans and documentation, such as a traffic control and/or decontamination plans. Contact the CREH HSE Department for additional information on required plans and documentation prior to work being started.

Work covered by this SMP must be conducted in accordance with a site-specific Health and Safety Plan (HASP) or equivalent Job Safety Analysis (JSA). Contact the CREH HSE Department for site-specific requirements.

Subcontractors are responsible for providing and adhering to their own health and safety plan to

address potential health and safety hazards associated with their activities. The subcontractor shall identify a lead individual responsible for H&S compliance for each of their employees and subcontractors, if applicable.

It is the responsibility of the entity performing the work or other person preparing a HASP to review information available regarding site conditions and potential health and safety concerns. It is also the responsibility of the entity performing the work or other person preparing the HASP to verify that the components of the HASP are consistent with applicable OSHA occupational health and safety standards and currently available toxicological information for potential COCs at the work site. Each entity must require its employees who may directly contact native site soil or soil gas to perform all activities in accordance with the HASP. Each entity performing work at the site will assure that its onsite construction workers will have the appropriate level of health and safety training, site-specific training, and will use the appropriate level of personal protective equipment (PPE) as determined in the relevant HASP based upon the evaluated job hazards and monitoring results.

All soil excavation activities shall be performed in accordance with all applicable State of California and federal health and safety regulations. It is possible that unanticipated soil or soil gas contamination or subsurface structures may be encountered during soil intrusive work at the site. If soils are encountered with an unusual odor, coloring or staining indicating the presence of VOCs, petroleum hydrocarbons, or other contamination, or if subsurface structures are encountered, it may constitute an Unanticipated Condition, as defined in Section 3.9. If an Unanticipated Condition is encountered, procedures detailed in Section 3.9 must be followed. Furthermore, any contaminated soils brought to the surface by soil intrusive activities shall be managed in accordance with all applicable provisions of the State of California and/or federal law and the requirements of this SMP.

Several VOCs may be encountered in soil gas during on-site work at select locations as a result of historical activities. Specifically, AOCs 012-004, 070-002, 072, 092, 115-001, and 115-002 are areas with known soil gas impacts above established screening levels. See Appendix A for approximate areas with soil gas impacts. As such, an air monitoring program should be included in the site-specific HASP and implemented while performing excavation activities in these areas. A multi-gas meter capable of detecting VOCs, methane, and hydrogen sulfide shall be used to evaluate action levels, which should be established by CREH or the subcontractor using OSHA permissible exposure limits (PELs) for site COCs and appropriate instrument correction factors prior to commencing field activities. Air monitoring shall be conducted during the excavation and

sampling activities for sites with known soil gas impacts exceeding established screening levels. The HASP shall outline the controls, response actions and necessary level of respiratory protection to be implemented should an exceedance of the air monitoring action levels be triggered. All applicable instruments will be calibrated before each use. Before any field activities commence, the background levels of the Site will be monitored and recorded away from the areas of potential contamination to obtain accurate results. All Site readings should be recorded and instrument action levels for monitored gases should be established.

3.1.2 Worker Safety

If known or possible hazardous conditions are present, a change in conditions occurs, or if work tasks are unclear, any project member may request that site operations be temporarily suspended while the underlying hazard is corrected or controlled. All project members are encouraged to exercise Stop Work Authority (SWA). After the identification of a change in conditions resulting in a SWA request, the following steps must be completed before resuming work:

Stop Work.

Communicate – Identify the hazard or change in condition that needs to be addressed. If the situation is related to emissions, all personnel will be required to stand upwind during operation shutdown to prevent exposure to fugitive emissions.

Mitigation Action – Determine the mitigation action appropriate to address the identified hazard.

Resume Work – Implement any mitigation action determined necessary for the safe implementation of work.

3.1.3 Cultural Resources Protection and Management

Excavation and removal activities will follow the most current version CREH's *Cultural Resource Guideline* as appropriate for individual work areas in order to protect historical significant cultural resources. The *Cultural Resource Guideline* outlines the steps to be taken for the management of cultural resources, including suspected human remains, on CREH properties and complies with applicable state and federal laws and regulatory requirements.

Applicable State of California requirements include, but may not be limited to the following:

- Health and Safety Code (HSC) §7050.5;

- Public Resources Code (PRC) §5097.94 and 5097.8;
- California Environmental Quality Act (CEQA) as amended January 1, 2011;
- PRC, Division 13 (Environmental Quality), Chapters 2.6 §21083.2 (Archaeological Resources) and §21084.1 (Historical Resources);
- State CEQA Guidelines as amended March 18, 2010; and
- California Code of Regulations (CCR) Title 14, Chapter 2, Article 5 §15064.5, Determining the Significance of Impacts on Historical and Unique Archaeological Resources.

In addition, applicable federal requirements (when working on Bureau of Land Management [BLM] leases and other federal projects) include, but may not be limited to the following:

- BLM Cultural Resources Guide, Section 8100 (BLM 2004);
- Section 106, National Historic Preservation Act of 1966 (NHPA) (36 Code of Federal Regulations, Part 800); and
- BLM's Bakersfield Office, Fieldwork Authorization Form 8151-3.

3.2 Waste Segregation

If waste soil is generated from within impacted areas during activities (e.g., drilling at depths greater than five feet bgs at select AOCs) conducted under this SMP, it must be handled according to the most current version of CREH's standard waste management plan guidelines and applicable federal, state, and local regulations. Soil that is known or suspected to contain elevated concentrations of known COCs, or soil that has not been characterized, must be segregated, stockpiled on polyethylene sheeting to prevent contact with the ground surface, and covered with a tarp or additional polyethylene sheeting. Top sheeting must be adequately secured so that all surfaces are covered. Additional information about soil stockpile management procedures is discussed in Section 3.3 below, and waste characterization and disposal is discussed in Section 5.0.

3.3 Soil Stockpile Management

Unimpacted soil (e.g., soil with an unimpacted cover in place per Table 1, soil located outside of identified impacted areas) encountered or excavated during activities does not need to be handled or managed in accordance with this SMP. However, if encountered, stockpiling of impacted (or waste) soils may be necessary on a temporary basis to support the logistical phasing

of soil intrusive or excavation activities. Direct loading of excavated soils is another option that may be used. Alternatively, soil may be placed in roll-away bins with securable lids, if appropriate. The entity performing the work must coordinate with the CREH prior to selecting an appropriate stockpile/bin storage location and will determine whether temporary fencing is appropriate.

Whenever possible, soil stockpiles should be located in close proximity to the work area or the ultimate disposal area. If stockpiling of soil is to be performed, the excavation contractor shall establish appropriate soil stockpile locations on the site to properly segregate, cover, control dust, profile, and appropriately manage the excavated soil.

In general, best management practices (BMPs) should always be implemented for erosion, dust, and sediment control. BMPs include diversion of drainage from the stockpiles, installation of silt fencing/straw bale filter barriers on the down gradient toe of the stockpile slope. Soil stockpiles should be placed on top of at least one layer of 10-mil polyethylene sheeting (or equivalent), such as Visqueen, to prevent contact with the ground surface. When stockpiled soil is not actively being handled, stockpiles should be covered with a tarp or visqueen and top sheeting must be adequately secured so that all surface areas are covered. Additional BMPs for dust control must also be implemented as detailed in approved dust control plans (see Section 3.4).

Additionally, stockpiles must be managed in compliance with storm water runoff regulatory requirements when applicable.

3.4 Dust Control

Excavation activities may create temporary airborne particulate and fugitive dust emissions, however this is anticipated to cease once the specific activities are complete. Dust control should be conducted in accordance with BMPs and/or Dust Control Plans (DCPs) for the site, if appropriate. Dust control BMPs may include, but are not limited to,

- Covering soil stockpiles with plastic sheeting (as mentioned in Section 3.3, above);
- Watering uncovered ground surface at the site; use of water will be limited to prevent runoff;
- Misting or spraying of soil during excavation and loading;
- Emplacement of gravel and/or rubble plates on site access roads as feasible;
- Trucks hauling soil from the site will be covered;

- Visible dust will be monitored during excavation and subsurface demolition;
- The soil drop height from an excavator's bucket onto soil piles or into transport trucks will be minimized;
- Windbreaks will be deployed as necessary; and
- Addition of soil stabilizers and other responses, as needed.

In addition, the San Joaquin Valley Air Pollution Control District (SJVAPCD) requires owners or operators of the site or property to submit DCPs if the project involves the following:

- residential developments of 10 or more acres of disturbed surface area;
- non-residential developments of five or more acres of disturbed surface area; or
- moving, depositing, or relocating of more than 2,500 cubic yards per day of bulk materials on at least three days of the project

Excavation activities at each AOC will be evaluated against the SJVAPCD criteria above. If the project involves one of more of the criteria above, a DCP will be prepared (in addition to the dust control BMPs outlined above). If the project does not meet one or more of the criteria above, a DCP will not be prepared.

DCPs, if required, must be reviewed and approved by the SJVAPCD pursuant to section 6.3 of Rule 8021 – Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities and applicable rules under Regulation VIII Fugitive PM10 Provisions apply. A DCP identifies the measures that will be taken to reduce particulate emissions during demolition of existing structures, grading, soil handling and stockpiling, vehicle loading, utility work, truck traffic, and construction of site infrastructure. DCPs must incorporate existing state and local regulations applicable to maintenance, construction, and redevelopment activities. Per DTSC request, DCPs will also include procedures for dust monitoring (PM-10) and dust action levels.

3.5 Ecological Protection

Well abandonment activities should be conducted in accordance with CREH's HSE guidelines. Below are several examples of ecological BMPs implemented by CREH to limit adverse effects to the environment:

- Vehicle speed shall be limited to 25 mph on oil field roadways unless otherwise posted.

- Leaks and spills shall be promptly repaired or cleaned up. Clean-up shall proceed under the direction of a qualified biologist.
- Oil field wastes, including oil, water, chemicals, mud and cement shall be handled in a manner as not to cause damage to wildlife or plants and in accordance with state and local regulations.
- New construction shall be designed and implemented to minimize surface site disturbance to the extent practicable for site safety and operation. Construction shall utilize existing disturbed sites and/or facilities wherever practicable.

3.5.1 Biological Pre-Activity Survey Program

CREH's biological pre-activity survey (Bio-PAS) program was developed to minimize or eliminate impacts of oil related activities on listed species and their habitat on all CREH properties. All actions that will cause soil disturbance or vegetation removal (grading, digging, vehicle usage off roadway, etc.) shall have a Bio-PAS completed prior to beginning work, and a biological monitor must be present during the activity to monitor the area for listed species and their signs. The surveys must be completed no more than 30 days prior to the start of work. Coordinate surveys and monitoring with the CREH biological contractor and the CREH HSE Department.

3.5.2 Incidental Take Statement

The Federal Endangered Species Act (FESA) prohibits any taking (i.e., to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed fish and wildlife species without special exemption. Under FESA, the United States Fish and Wildlife Service (USFWS) may permit, under certain terms and conditions, the incidental take of listed species that may occur pursuant to an otherwise lawful activity.

"Incidental take" is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. Under the terms of Sections 10(a) (1), Section 7(b)(4), and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

California Endangered Species Act (CESA) – requires compliance with CESA MOU/2081 Permit for State-listed species. The Memorandum of Understanding (MOU) incorporates the USFWS Biological Opinion, with the inclusion of a more stringent requirement "No Take" for the blunt-nosed leopard lizard. Additionally, the MOU adds the protection of a state listed San Joaquin

antelope ground squirrel.

Additional information about ecological protection and incidental take can be obtained from CREH HSE.

3.6 Surface Water Protection

Soil disturbing activities should be conducted according to water quality guidelines in accordance with CREH's standard environmental procedures. Water quality guidelines for surface water protection are summarized briefly below.

3.6.1 Spill Prevention, Control and Countermeasure Plan Overview

Spill Prevention Control and Countermeasure (SPCC) regulations are to protect waters of the United States from contamination caused by the unplanned release of petroleum and other regulated oils. Generally, facilities that store and/or handle hazardous liquids (including crude oil, produced water, natural gas liquids, and lube oil) are required to have an SPCC plan.

The CREH SPCC Plans describe regulated activities and facilities, procedures, methods and equipment to prevent oil discharges from occurring. The Plans also prepare CREH to respond in an event of a discharge in a safe, effective, and timely manner in order to minimize the impacts to the environment. The CREH SPCC Plans have been prepared to comply with 40 CFR Part 112 requirements, which therefore comply with 14 California Code of Regulations (CCR) 1774 (CalGEM Regulations).

SPCC requires personnel training, emergency response, and notification procedures. The SPCC Plan shall be reviewed and certified by a Registered Professional Engineer. Changes to the design, content, and/or storage capacity of a facility, as well as any changes to the secondary containment, requires a recertification of the SPCC Plan. Certification of a new oil storage facility is required prior to initial startup. Notwithstanding any modifications, the SPCC Plan shall be reviewed for accuracy at least every five years; this review may not require a Professional Engineer's recertification. Contact the CREH HSE Department before altering an oil storage facility in any way.

3.6.2 Stormwater Pollution Prevention Plan

If required, industry standard sediment control BMPs will be implemented during activities covered under this SMP to prevent sediment-laden runoff from leaving the worksite during storm

events. Insight Environmental Consultants, on behalf of CRC, prepared an Industrial Storm Water No Discharge Non-Applicability (NONA) Technical Report dated 17 June 2015, which concluded that the Elk Hills oil field was eligible to file “no discharge” under the General Permit for Storm Water Discharges Associated with Industrial Activity (Industrial General Permit), based on a lack of hydrologic connectivity to navigable waters, BMPs in place to eliminate the potential for stormwater contamination, and limited annual rainfall (approximately 6 inches). CREH received a notice of non-applicability (NONA) for the Industrial General Permit from the California Water Boards dated 27 February 2019. Therefore, preparation of a Storm Water Pollution Prevention Plan (SWPPP) for work conducted under this SMP is not required.

3.7 Soil Backfill

Backfill activities should be conducted in accordance CREH’s standard environmental procedures to prevent adverse effects to the environment. Contact the CREH HSE Department for additional guidance.

3.7.1 Backfill with Native Soil

If native soil is proposed for use as backfill, a BioPAS survey will be completed at the proposed borrow site at least three days before beginning soil moving and backfill activities. Alternatively, native soil may be used as backfill from established, pre-approved borrow areas designated by HSE without the need for a BioPas survey. Contact the CREH HSE Department for information about pre-approved borrow sites.

Per DTSC request, sampling must be conducted to verify that native soil is free of contamination. Native backfill material will be sampled in accordance with the DTSC *Information Advisory, Clean Imported Fill Material* (DTSC, 2001), or other applicable regulatory guidelines, prior to placement.

3.7.2 Backfill with Imported Soil

If an off-site borrow area is proposed for use as backfill, sampling must be conducted to verify that borrow soil is free of contamination. Soil sampling will be conducted according to the DTSC *Information Advisory, Clean Imported Fill Material* (DTSC, 2001), or other applicable regulatory guidelines.

In general, off-site fill source areas should be located in nonindustrial areas, and not from sites undergoing an environmental cleanup. Nonindustrial sites include those that were previously undeveloped, or used solely for residential or agricultural purposes. If the source is from an

agricultural area, care should be taken to ensure that the fill does not include former agricultural waste process byproducts such as manure or other decomposed organic material. Undesirable sources of fill material include industrial and/or commercial sites where hazardous materials were used, handled, or stored as part of the business operations, or unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil. Alternatives to using fill from construction sites include the use of fill material obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. However, care should be taken that those materials are also uncontaminated (DTSC, 2001).

When possible, representative samples should be collected at the borrow area while the potential fill material is still in place, and analyzed prior to removal from the borrow area. In addition to performing the appropriate analyses of the fill material, an appropriate number of samples should also be determined based on the approximate volume or area of soil to be used as fill material (DTSC, 2001).

3.8 Equipment Decontamination

If any contamination not related to native soil is encountered during well drilling and/or abandonment activities, equipment that comes into contact with contaminated material must be properly decontaminated before the equipment leaves the site. Contaminated equipment should be placed on bermed, sloped polyethylene (Visqueen) wash pads and washed using a steam cleaner or a solution of phosphate-free detergent and water. Wastewater from washing activities should be pumped into drums or tanks and stored on site pending characterization and disposal. Contaminated material must be removed from truck and equipment wheels to prevent track out.

3.9 Unanticipated Conditions

Unanticipated soil or soil gas contamination or subsurface structures may be encountered in areas of the site during work such as well drilling, well abandonment, pipeline installations, or infrastructure projects. If an unanticipated condition (as defined below) is encountered, the entity performing the work should stop work immediately, contact the CREH HSE Department, and obtain clearance before proceeding.

The following conditions, if encountered, at the site, shall be considered an Unanticipated Condition and may require additional assessment:

- soil containing unusual coloring or staining, which may indicate the presence of VOCs or petroleum hydrocarbons;

- soil exhibiting strong or unusual odors, which may indicate the presence of VOCs or petroleum hydrocarbons;
- oily or shiny soil or soil saturated with free-phase petroleum product;
- groundwater odor, sheen or free-phase globules (if groundwater or perched groundwater is encountered);
- oil or other petroleum hydrocarbon materials;
- unknown or unidentified liquids; and
- buried structures, such as but not limited to former underground storage tanks (USTs), drums, pipelines, sumps, and/or vaults that may potentially contain hazardous materials.

Encountering an Unanticipated Condition during well decommissioning activities on site may present a health and safety exposure concern, depending on the nature and extent of hazardous substances that may be associated with the encountered condition.

The following procedures must be implemented if an Unanticipated Condition is encountered or identified:

- Stop work in a minimum 25- by 25-foot or larger area surrounding the location where the Unanticipated Condition is encountered and, if appropriate, cover the suspect material with plastic sheeting.
- Cordon off the area using caution tape, rope, temporary fencing or other suitable materials and treat the area as an "exclusion zone" and contact the CREH HSE Department to determine actions to be completed prior to work continuing in the area.
- Only persons trained in accordance with Section 1910.120 of 29 Code of Federal Regulations (HAZWOPER requirements) will be allowed to enter the exclusion zone until all chemically-impacted soil or other subsurface features have been assessed and removed or appropriately mitigated. The handling of impacted materials will be conducted by persons who are HAZWOPER trained.
- A representative of the CREH HSE Department shall:
 - 1) Hire a qualified environmental professional to confirm the identity of and assess the Unanticipated Condition.
 - 2) Notify the appropriate parties (e.g., regulatory agencies), as necessary. Appropriate parties or regulatory agencies having jurisdiction based on the

nature of the condition will be notified as applicable. Notified agencies may include but are not limited to DTSC, Kern County, CVRWQCB, SWRCB, EPA, or SJVAPCD.

- 3) Determine what, if any, appropriate testing and mitigation activities may be required.
- 4) Determine what, if any, additional Health and Safety measures are needed.

An organic vapor meter (OVM) or photoionization detector (PID) may be necessary to confirm the presence of soil or soil gas contamination. Upon completion of excavation activities associated with the unanticipated condition, confirmation samples of the soil remaining in place beneath the unanticipated condition, as well as the excavation sidewalls, must be collected and analyzed using appropriate analytical laboratory methods to confirm that remaining soil meets applicable regulatory cleanup standards, if any.

4.0 SOIL MANAGEMENT DURING EMERGENCY WORK

Respond as needed to stabilize emergency and minimize direct contact with soils. Concurrently determine soil management requirements and implement as soon as practical for duration of associated work (as outlined above in Section 3.9. If an emergency arises during work covered by this SMP, ensure that potential hazards to the environment or to personnel health and safety are appropriately controlled. Refer to appropriate SPCCs, if applicable, for guidance on managing emergency oil spills. Contact the CREH HSE Department immediately in the event of an oil spill meeting criteria for internal notification procedures or for reportable quantity spills.

After controlling potential risks to human health and safety and stopping any degradation to the environment, evaluate the emergency site for compliance or repair. The procedures listed below should be followed during cleanup and disposal of oil spills:

- All spills and releases shall be addressed in a timely manner with a high priority placed on reducing exposure to the public and to environmentally sensitive receptors such as habitat, surface waters, and groundwater.
- Cleanup shall include restoration of the impacted area to pre-spill condition (confirmation samples will be compared to applicable environmental screening levels and/or background arsenic levels).
- Oil soaked dirt and vegetation may require sampling before disposal or bioremediation can take place. Consult with the CREH HSE Department to ensure that the impacted

media (soil or contaminated materials) is handled and disposed of according to the applicable local, state, and/or federal regulations.

- Confirmation samples will be collected following cleanup activities and results compared to the applicable environmental screening levels.
- For oil spills that exceed the normal work force response capability, HAZWOPER and Incident Command System (ICS) regulations may apply. Contact the CREH HSE Department for support.

Contact CREH HSE Department for additional information regarding spill prevention, control and reporting procedures.

5.0 CHARACTERIZATION AND DISPOSAL OF EXCAVATED WASTE

Characterization and disposal of excavated waste will be handled according to CREH's standard Waste Management Plan, which requires each subsidiary that generates waste to manage that waste in accordance with applicable federal, state, and local laws and regulations. Waste sampling and characterization will be in accordance with US EPA "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (i.e., SW-846). The CREH HSE Department will guide the waste characterization and disposal process. It should be noted that this section is applicable to the SMP Coverage Area, including AOCs presented in Table 1.

6.0 DOCUMENTATION

The following subsections summarize reporting requirements for AOCs and AOC subareas with regulatory closure with impacts remaining in place and managed under a LUC.

In addition, for AOCs that do not have current regulatory closure (i.e. an NFA) with or without a LUC, CREH shall work with entities performing the work and/or regulatory agencies to correct any problem(s) discovered. Additionally, CREH shall cooperate with the agencies during the performance of their inspection and enforcement responsibilities.

6.1 Recordkeeping

Following completion of any soil improvement, excavation, handling, or grading activity, a completion report may be required from CREH for submittal to DTSC, upon request by DTSC. CREH must prepare a completion report when Unanticipated Conditions are encountered during soil intrusive work.

The purpose of a completion report is to document the activity and, if necessary, any corrective actions implemented in the event the activity had an unforeseen impact. A completion report should include the following components, as appropriate:

- a description of the activity or condition that triggered the notification, together with appropriate exhibits to illustrate the location and/or issue that is the subject of the notification;
- description of notification protocols followed, including approval from applicable regulatory agencies;
- references to work plans prepared to perform activities;
- description of activities performed;
- boring logs;
- laboratory analytical reports;
- waste disposal manifests;
- description of final site conditions and/or as-built drawings;
- verification that all activities were conducted in conformance with the requirements of this SMP (signed by a California licensed Professional licensed in the technical area representative of the work); and
- other appropriate documentation or components as specified as a condition of undertaking the subject activity or as required by applicable regulatory agencies.

The waste generator is required to keep copies of the following documents for a minimum of three years:

- Copies of all completed manifests for all wastes sent off-site
- Copies of all Bills of Lading for wastes sent off-site
- Copies of the Biennial Hazardous Waste Report
- Photographic log
- Dust monitoring results (if a DCP, that includes dust monitoring, is prepared)
- Test results, waste analyses, or other determinations for all wastes transported off-site or on-site for disposal, recycling, or treatment.

Contact the CREH HSE Department for additional information about required recordkeeping for waste generators.

6.2 Annual Inspection Reports

Per this SMP, CREH will conduct annual inspections and submit Annual Inspection Reports to DTSC regarding work conducted within the SMP Coverage Area that disturbs potentially impacted soil at AOCs discussed in the SMP. If CREH discovers any actions or conditions inconsistent with the SMP at any time, including during the annual site inspection, CREH will prepare a written explanation indicating the specific SMP deficiencies and what efforts or measures CREH has taken or will take to correct those deficiencies. CREH shall provide the written explanation to DTSC within 15 working days of CREH's discovery.

REFERENCES

Ahtna Facilities Services, Inc. (AFSI), 2012. Pre-Decisional Project Approach, 27R Waste Management Complex Areas of Concern, dated 7 May 2012.

AFSI, 2014. Removal Action Work Plan, AOC 073, dated 18 August 2014.

AFSI, 2014. Confirmatory Investigation/Preliminary RCRA Facility Investigation, AOC 072, AOC 073, and AOC 074, dated 18 November 2014.

AFSI, 2015. AOC 130 Sampling Plan, Supplement to Confirmatory Investigation/Preliminary RCRA Facility Investigation Work Plan, AOC 117, AOC 119, AOC 127, and AOC 130, dated 12 January 2015.

American Technologies, Inc. (ATI), 1997. Naval Petroleum Reserve No. 1 (NPR-1) Phase I Environmental Site Assessment Contract No. DE-AC01-97FE6454, dated 3 June 1997

California Environmental Protection Agency Department of Toxic Substances Control (DTSC), 1998. RCRA Facility Assessment (RFA) for the Former Naval Petroleum Reserve No.1 (NPR-1).

DTSC, 2001. *Information Advisory Clean Imported Fill Material*. October.

United States Department of Energy (DOE), 2013. Response to Correspondence Dated September 27, 2012: Review of Report Dated June 9, 2012 and Titled "Pre-Decisional Project Approach; AOC 130 – Well Pads/Arsenic Sites; Former Naval Petroleum Reserve No. 1 Closure Project, Elk Hills, California.

Langan Engineering and Environmental Services (Langan), 2011. Site Assessment Report – Former Naval Petroleum Reserve No. 1 – 27R Landfarm, Mudlanes, Drainage Sump, Truck Washout Sump and Triangular Sump AOCs 70 and 73, Draft, dated 14 November 2011.

The Mark Group, Engineers and Geologists Inc. (Mark Group), 1987. Vertical and Lateral Extent of Waste Constituents Bechtel Petroleum Operations, Inc. 27R Waste Management Facility Tupman, California 87-01147.28.

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TABLE

Table 1
AOC Summary
Elk Hills Oil Field
Elk Hills, California

Langan 700040402
November 2022

	Subject AOCs ¹	Selected Remedial Alternative	Unimpacted Cover in Place	Current Beginning Depth of COCs > commercial / industrial cleanup levels (feet bgs)
1	AOC 012-004	Institutional Controls	Yes	5.5
2	AOC 020-002	Institutional Controls	Yes	5.5
3	AOC 028	Excavate impacts to a depth of 5 ft bgs and backfill	No	2.5
4	AOC 029	Excavate impacts to a depth of 5 ft bgs and backfill	No	0
5	AOC 030-001	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
6	AOC 030-003	Excavate impacts to a depth of 5 ft bgs and backfill	No	7
7	AOC 038-002	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
8	AOC 038-003	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
9	AOC 044-001	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
10	AOC 044-002	Excavate impacts to a depth of 5 ft bgs and backfill	No	1.5
11	AOC 044-003	Excavate impacts to a depth of 5 ft bgs and backfill	No	0
12	AOC 044-004	Excavate impacts to a depth of 5 ft bgs and backfill	No	0
13	AOC 044-005	Excavate impacts to a depth of 5 ft bgs and backfill	No	0
14	AOC 047-001	Institutional Controls	Yes	5.5
15	AOC 052	Excavate impacts to a depth of 5 ft bgs and backfill	No	0
16	AOC 053	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
17	AOC 070-001	Institutional Controls	Yes	0
18	AOC 072	Excavate impacts to 5 ft bgs with SVE and Institutional Controls	No	0
19	AOC 073-001	Excavate impacts to a depth of 5 ft bgs and backfill	No	6
20	AOC 073-002	Excavate impacts to a depth of 5 ft bgs and backfill	No	5.5
21	AOC 074-002	Institutional Controls	Yes	9.5
22	AOC 074-003	Institutional Controls	Yes	5.5
23	AOC 082-002	Institutional Controls	Yes	5.5
24	AOC 092	Excavate impacts to a depth of 5 ft bgs and backfill	No	2.5
25	AOC 115-001	Excavate impacts to 5 ft bgs with SVE and Institutional Controls	No	5
26	AOC 115-002	Excavate impacts to a depth of 5 ft bgs and backfill	No	2.5
27	AOC 119-005	Institutional Controls	Yes	NA
28	AOC 119-018	Institutional Controls	Yes	NA
29	AOC 125-001	Institutional Controls	Yes	2.5
30	AOC 125-016	Institutional Controls	Yes	12.5

Notes:

AOC - Area of Concern

COC - chemical of concern

feet bgs - feet below ground surface

NA - not applicable; identified COCs do not exceed the commercial/industrial cleanup levels

Remedial alternatives presented in this table are as presented in the AOC's remedial decision document prepared by DOE. References for each AOC remedial decision document are provided in the flysheets in Appendix A

¹Subject AOCs summarized in this table as presented in Exhibit A of the *Third Amendment to Asset Sale and Purchase Agreement* dated 28 May 2021.

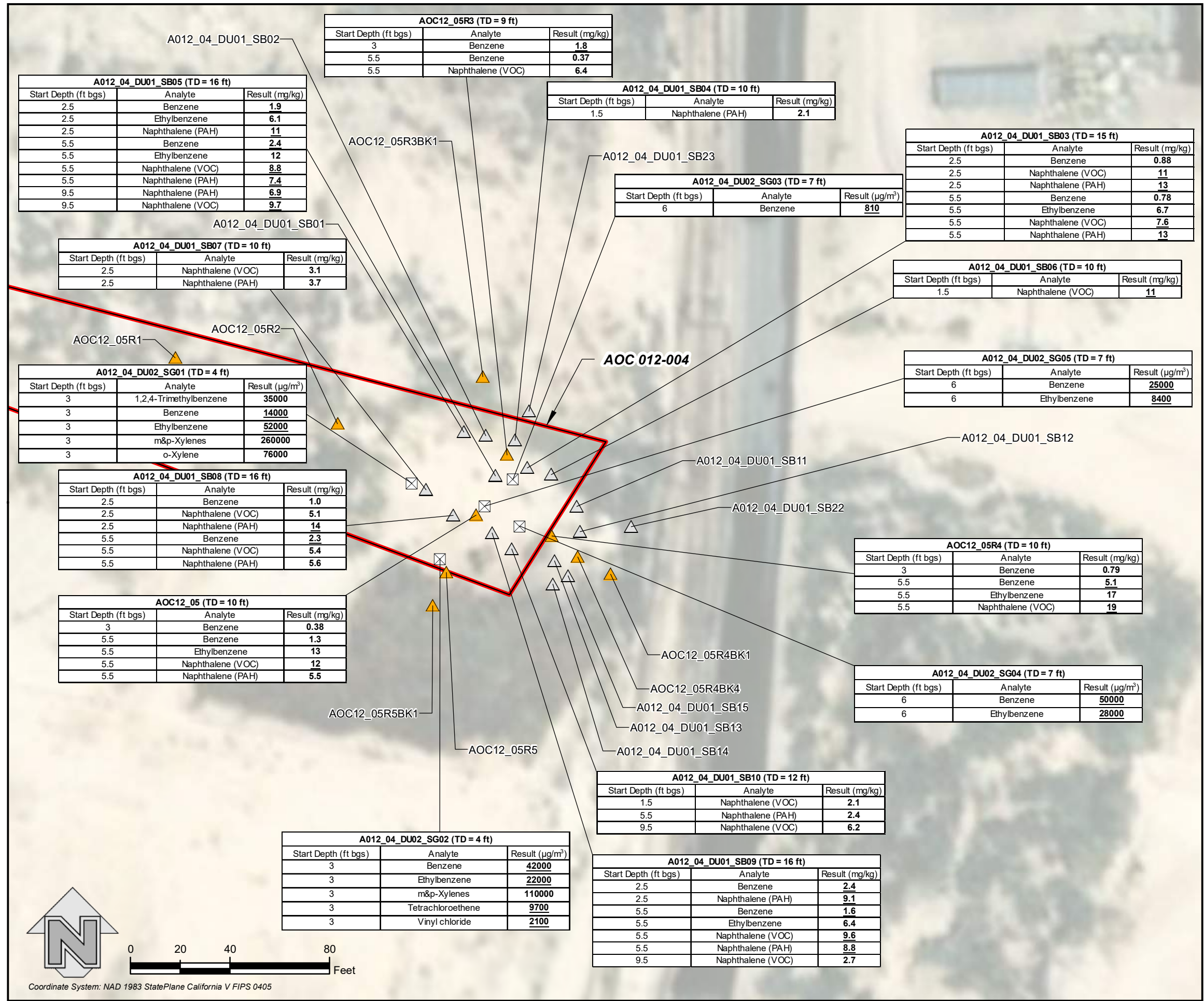
FIGURE

APPENDIX A
AOC FIGURES

AOC 012-004

Reference

Ahtna, 2020. *Draft Interim Measures/ Removal Action Work Plan AOC012-004*. 6 November.



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△

Soil Boring (2017)

⊠

Soil Gas Sample (2017)

▲

Soil Boring (Langan)

●

Well

Preliminary Area of Concern Boundary

Soil Screening Levels

Analyte	Residential (mg/kg)	Commercial/Industrial (mg/kg)
Benzene	0.33	1.4
Ethylbenzene	5.8	25
Naphthalene	2.0	6.5

Soil Gas Screening Levels

Analyte	Residential (µg/m³)	Commercial/Industrial (µg/m³)
1,2,4-Trimethylbenzene	31500	260000
Benzene	49	420
Ethylbenzene	550	4900
m&p-Xylenes	50000	440000
o-Xylene	50000	440000
Tetrachloroethene	230	2000
Vinyl chloride	4.8	160

Notes

1. Aerial photography provided by Kern County, CA, 2011.

2. Survey data provided by DOE, 2011.

3. Soil samples located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

4. Soil boring locations provided by Langan, 2014 and AFSI, 2019.

5. AOC 012-004 boundary is preliminary and subject to change.

6. TPH exceedances are provided in Table 3.3-1.

7. TD = total depth of soil boring below ground surface.

COC RESULTS EXCEEDING SCREENING LEVELS

FORMER NAVAL PETROLEUM RESERVE NO.1

KERN COUNTY, CALIFORNIA

Location

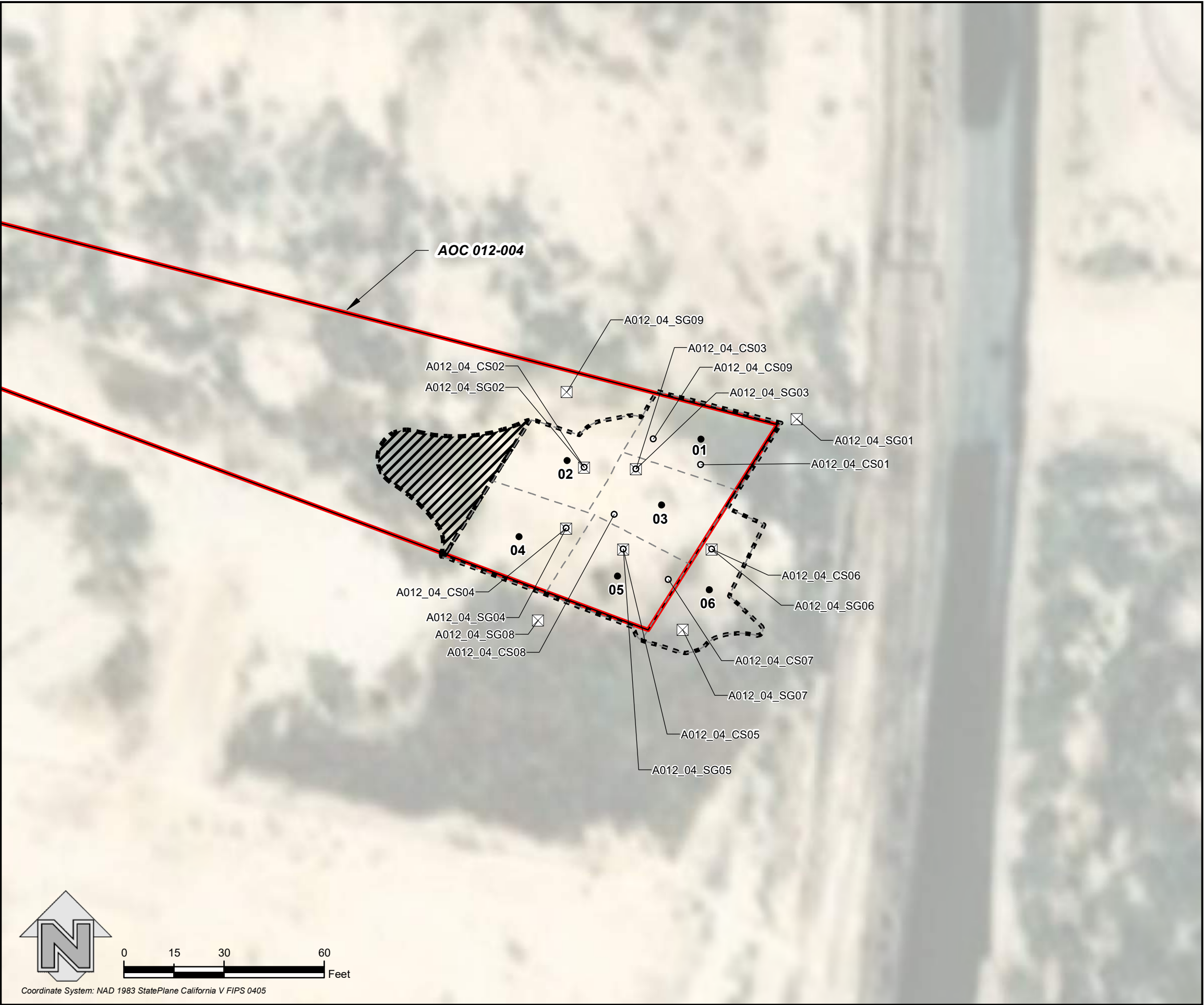
Section Designator

Figure No.

AOC 012-004

3G

3.0-1



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Legend

●

Sample Reference Point

○

Discrete VOC Confirmation Sample

⊠

Soil Gas Confirmation Sample

●

Well

▨

Access Ramp

⋯

Limit of Excavation

⋯

Confirmation Sample Area

▭

Preliminary Area of Concern Boundary

Notes

1. Aerial photography provided by Kern County, CA, 2011.

2. Survey data provided by DOE, 2011.

3. Soil samples located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

4. AOC 012-004 boundary is preliminary and subject to change.

5. Refer to Table 6.2-2 for the sample reference point coordinates, provided in NAD 83 California State Plane Zone 5 US Feet.

PROPOSED SAMPLING

FORMER NAVAL PETROLEUM RESERVE NO.1

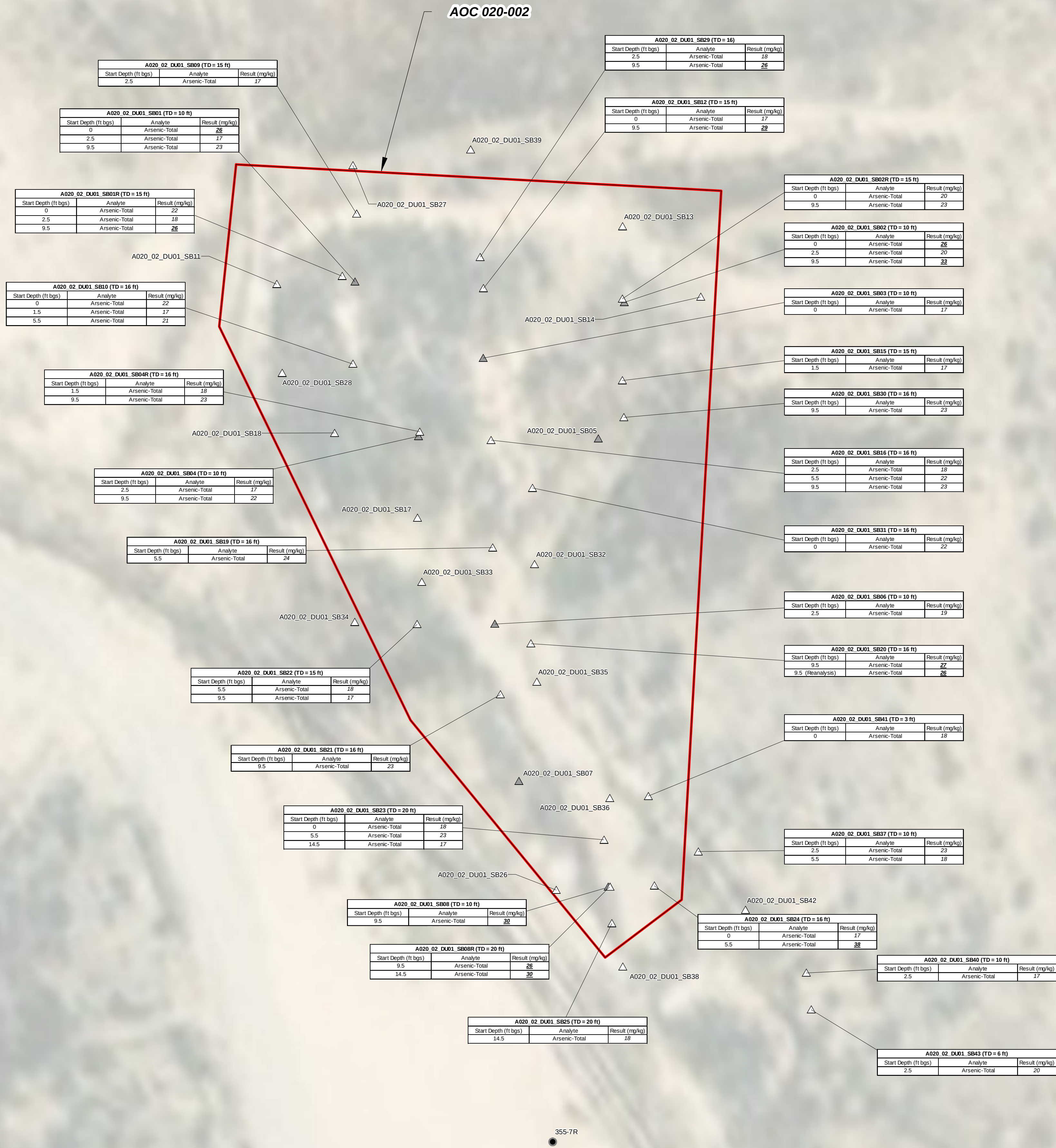
KERN COUNTY, CALIFORNIA

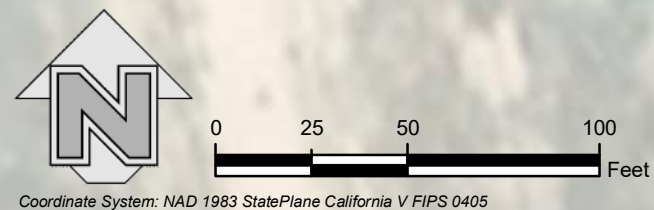
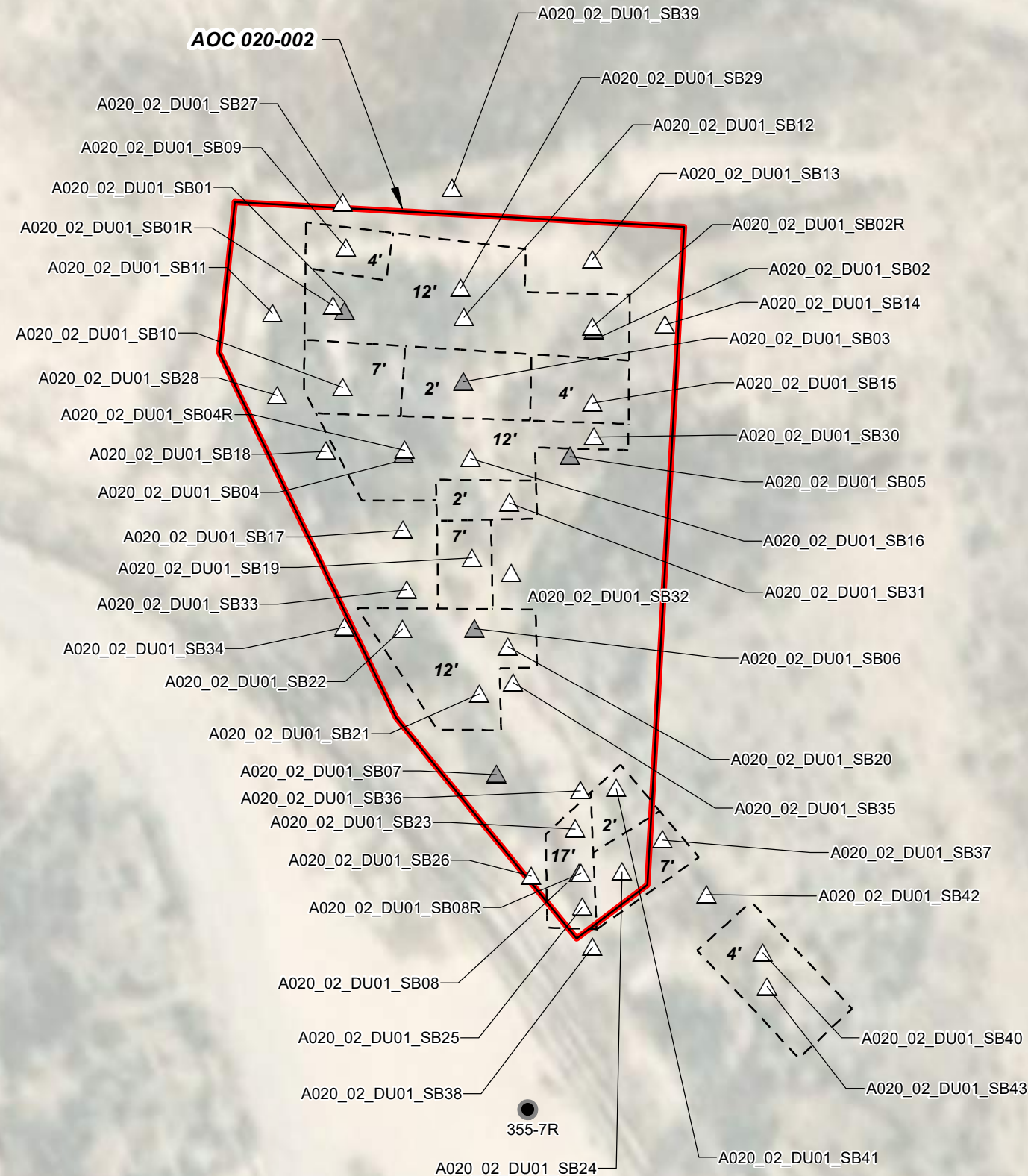
Location	Section Designator	Figure No.
AOC 012-004	3G	6.2-1

AOC 020-002

Reference

Ahtna, 2020. *Draft Interim Measures/ Removal Action Work Plan AOC020-002*. 28 February





Legend

- 2' Depth of Impacted Soil
- △ Soil Boring (2019)
- ▲ Soil Boring (2017)
- Well
- - - Impacted Area
- ▭ Preliminary Area of Concern Boundary

Notes

1. Aerial photography provided by Kern County, CA, 2011.
2. Survey data provided by DOE, 2011.
3. AOC 020-002 boundary is preliminary and subject to change.
4. Soil borings located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

AREA EXCEEDING CLEANUP GOAL

FORMER NAVAL PETROLEUM RESERVE NO.1

KERN COUNTY, CALIFORNIA

Location	Section Designator	Figure No.
AOC 020-002	7R	4.3-1

AOC 028

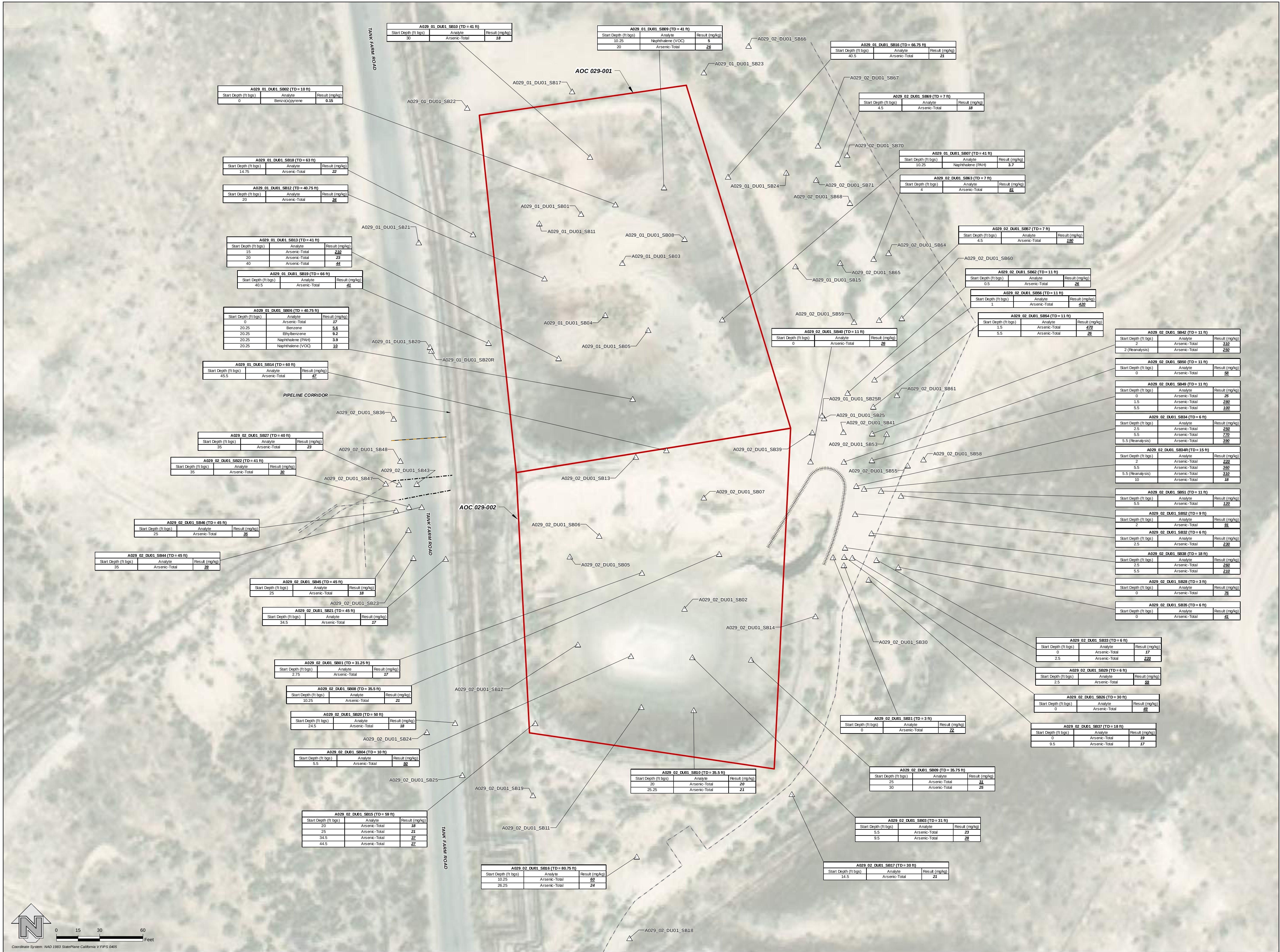
Reference

Ahtna, 2020. *Draft Remedy Selection and Statement of Basis AOC 028*. 25 November.

AOC 029

Reference

Ahtna, 2021. *Draft Remedy Selection and Statement of Basis AOC 029*. 6 January.



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63-10G

AOC 029-001

AOC 029-002

Legend

Well

Soil Boring

Washout

Aboveground Pipeline

Overhead Powerline

Underground Pipeline

Preliminary Area of Concern Boundary

Screening Levels

Analyte	Background (mg/kg)	Action Level (mg/kg)
Arsenic	16	26
Benzene	0.33	1.4
Ethylbenzene	1.8	25
Naphthalene	2.0	6.5

Notes

1. Aerial photography provided by Esri Online World Imagery, accessed December 2020.

2. Survey data provided by DOE, 2011.

3. Soil borings located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

4. AOC 029-001 and AOC 029-002 boundaries are preliminary and subject to change.

5. TD = total depth of soil boring below ground surface.

COC RESULTS EXCEEDING SCREENING LEVELS

FORMER NAVAL PETROLEUM RESERVE NO.1

KERN COUNTY, CALIFORNIA

Location

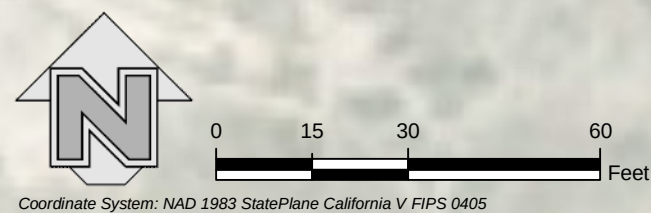
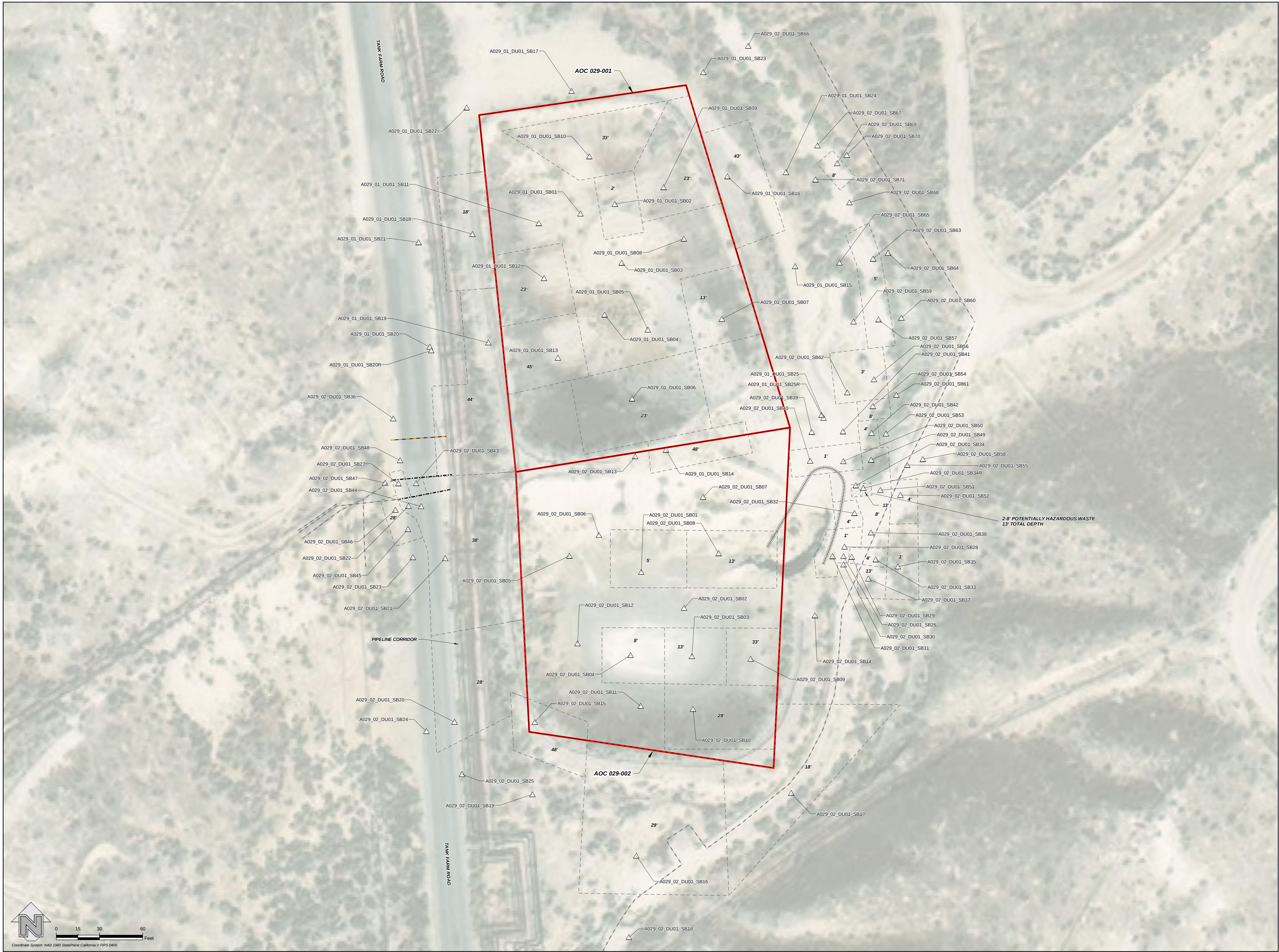
AOC 029-001
& AOC 029-002

Section Designator

10G

Figure No.

3.0-1



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AOC 029-001

AOC 029-002

Legend

1'

Depth of Impacted Soil (ft bgs)

△

Soil Boring

●

Well

Aboveground Pipeline

Overhead Powerline

Underground Pipeline

|||||

Washout

|||||

Impacted Area (Potentially Hazardous Waste)

|||||

Impacted Area (Non-Hazardous Waste)

□

Preliminary Area of Concern Boundary

Notes

1. Aerial photography provided by Esri Online World Imagery, accessed December 2020.

2. Survey data provided by DOE, 2011.

3. Soil borings located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

4. AOC 029-001 and AOC 029-002 boundaries are preliminary and subject to change.

AREAS EXCEEDING SCREENING LEVELS

FORMER NAVAL PETROLEUM RESERVE NO.1

KERN COUNTY, CALIFORNIA

Location AOC 029-001 & AOC 029-002

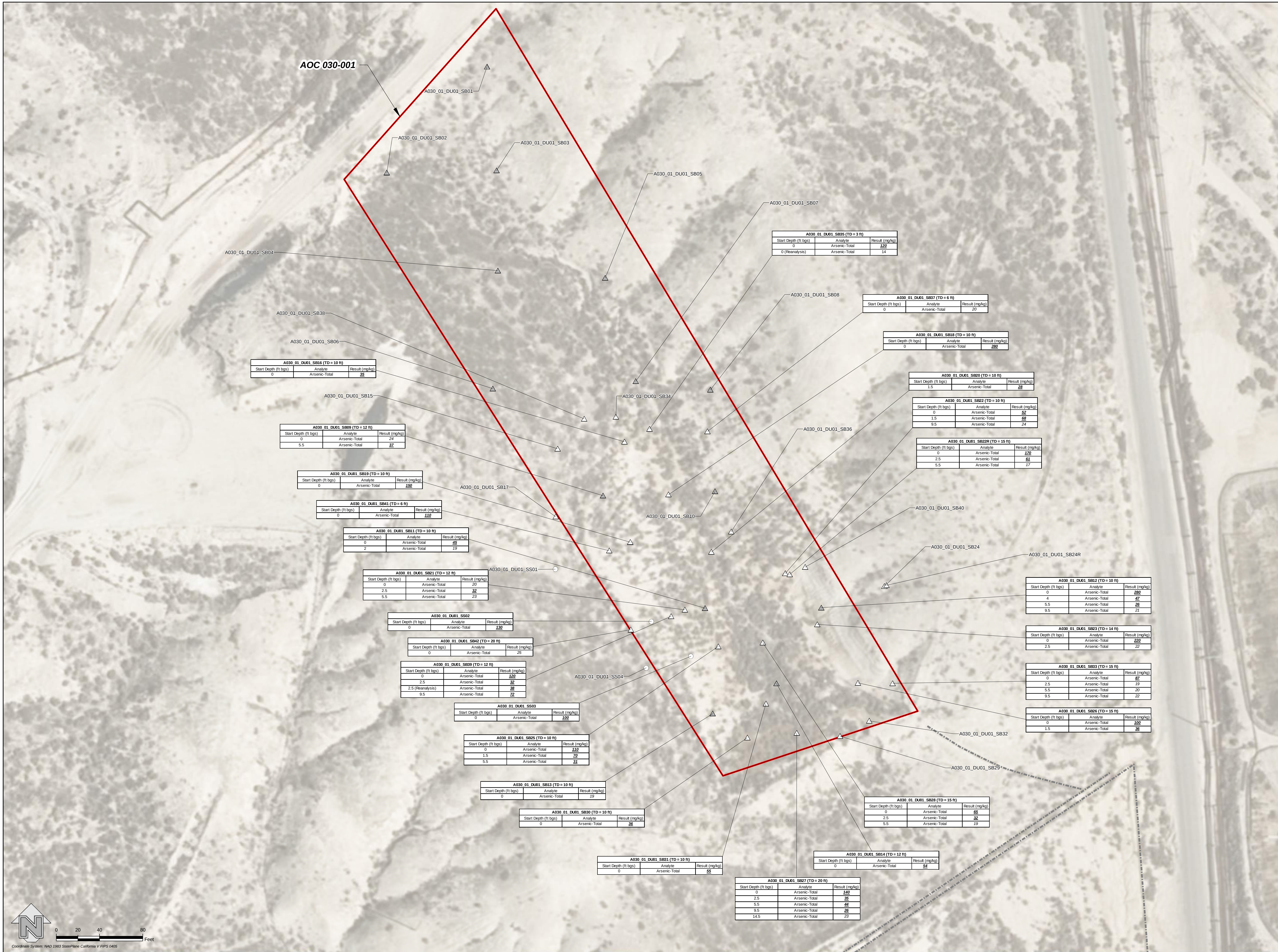
Section Designator 10G

Figure No. 4.4-1

AOC 030-001

Reference

Ahtna, 2019. *Draft Remedy Selection and Statement of Basis AOC 030-001*. 2 December.



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Legend

○ Surface Sample (2018)

△ Soil Boring (2018)

▲ Soil Boring (2016)

== Pipeline

Red outline Preliminary Area of Concern Boundary

Screening Levels

Analyte	Background (mg/kg)	Action Level (mg/kg)
Arsenic-Total	16	26

Notes

1. Aerial photography provided by Kern County, CA, 2011.

2. Survey data provided by DOE, 2011.

3. AOC 030-001 boundary is preliminary and subject to change.

4. Soil borings located using Trimble GeoXH receiver with Virtual Reference Station real-time data correction.

5. TD = total depth of soil boring below ground surface.

AOC 030-001 SAMPLE RESULTS

EXCEEDING SCREENING LEVELS

FORMER NAVAL PETROLEUM RESERVE NO.1

KERN COUNTY, CALIFORNIA

Location

Section Designator

Figure No.

AOC 030-001

10G

1

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