



Draft Field Sampling Plans for Santa Susana Field Laboratory

Prepared for
**National Aeronautics and Space Administration
George C. Marshall Space Flight Center**

January 2012

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1.10 Group 2–Liquid Oxygen Plant Area

1.10.1 Sampling Objectives

This section provides references to previous sampling and historical site activities and identifies new information and comments that could affect the proposed sampling for the liquid oxygen (LOX) Plant Area. The objective of additional sampling, as outlined in this sampling approach plan, is to evaluate adequately the nature and extent of COPCs in comparison to available background values for each respective COPC, or RLs of specific compounds that do not have an established background value.

1.10.2 Site History

The LOX Plant Area was located within the northern part of Area I at SSFL, which is approximately 40 acres. The land was owned by NAA, the predecessor to Rockwell International Corporation (RIC) in 1954. In 1955, RIC contracted with Air Products and Chemicals, Inc. (Air Products) to construct and operate the LOX Plant. By 1957, the LOX Plant was operating and providing LOX to each of the six large-engine test areas throughout SSFL, which included the Bowl, Canyon, Alfa, Bravo, Coca, and Delta test areas. In 1958, the LOX Plant Area was deeded to the USAF and had been known as Air Force Plant 64 under USAF ownership (TechLaw, 1990). The LOX Plant was operated from approximately 1955 through 1971 by Air Products, for the USAF (TechLaw, 1990). After 1967, the demand and use of LOX started to decrease because of changing rocket technology. Demolition of the supporting buildings for the LOX Plant began in the early 1970s, and by 1978, the buildings and ASTs were removed from the site. The scale used to weigh trucks transporting LOX is still at the site. On July 15, 1976, the GSA transferred the LOX Plant Area to NASA, which still owns it. Figure 1.10-1 shows the LOX Plant site map.

LOX was produced using a cryogenic process in which air is liquefied and the oxygen is separated from the nitrogen (ICF, 1993). LOX was used at SSFL to supply the six large test stands that were associated with turbo pump and rocket engine testing using petroleum-based fuels and LOX as the oxidizer. LOX was fed into the engine's fuel and oxidizer injector, and the petroleum-based fuel was then pumped through the fuel jacket. The fuel flowed into the injector, where it blended with the LOX. The mixture then passed into the combustion chamber, where it was ignited. LOX usage at SSFL peaked between approximately 1955 and 1967. After 1967, the demand for the production of LOX had been reduced significantly. By 1972, the operations at the LOX Plant had ceased.

Historical (or legacy) documents do not provide detailed descriptions of the purpose or function of each building or feature identified at the LOX Plant Area. Therefore, Air Products was contacted to obtain operational information to assist with relating the process of LOX production to the layout of the former plant. Additionally, a review of the LOX generation process was conducted to assist with understanding the general requirements for a LOX plant. An Air Products' representative confirmed that, in Figure 1.10-2, the general flow process was overlaid with the known arrangement of the buildings and supporting features at the SSFL LOX Plant, and a correlation was observed and illustrated. Although some specific details about the SSFL LOX Plant

could not be confirmed at the time this FSP was prepared, a general description of the LOX production process can be broken down into four main steps. These four steps also discuss the link between the general process and the former buildings and features at the SSFL LOX Plant:

1. **Cryogenic Air Separation:** Air is first taken in and passes through an air filter, then flows through a multi-staged compressor and initially compressed. The compressed air is passed through coolers and the condensed water vapor is removed and placed in a water separator.

Sodium hydroxide was used for the air filters at the LOX Plant to absorb carbon dioxide from the feed air before flowing into the compressors. The air filtration and compression equipment for this first step of the cryogenic process were housed inside the main LOX Plant building.

2. **Removal of Impurities:** The compressed air passes through reversing heat exchangers to remove water, carbon dioxide (CO₂), and hydrocarbons (HCs). Typically, there are two sets of aluminum heat exchangers. As the compressed air enters one end of the heat exchanger, the air is further cooled and the impurities (water and CO₂) freeze to the walls of the heat exchanger and are heated to near ambient temperatures, turning the impurities to gases that are released to the atmosphere. The released gases include nitrogen (GAN) and oxygen (GOX). This process typically uses cold adsorption units to help remove hydrocarbons. Packed tower scrubbers also were used to remove excess moisture and impurities. The air flowed from an inlet near the bottom of the tower and flowed up through the caustic scrubbing towers, which were packed with ceramic saddles. The ceramic saddles, composed mostly of silica, provided high surface area, thus adsorbing impurities and further purifying the compressed air.

Historical photographs showing the assembly of the LOX Plant indicate that the heat exchangers were inside the main building, connected to the compressors and scrubbing towers, also located inside the building.

3. **Cold Boxes and Distillation:** Using two or three distillation columns in series, air is separated into oxygen and nitrogen by fractional distillation, which requires a cryogenic section to liquefy the gas components. Oxygen first separates at the bottom of the column; nitrogen then separates at the top of the column. The distillation columns and cryogenic sections typically are stored inside tall, insulated, cold boxes measuring up to 6 ft wide and 200 ft tall. A review of the aerial photographs confirmed that the cold boxes (likely with distillation columns inside the cold boxes) were on the southern side of the main LOX Plant building. Additionally, the Rocketdyne Archives Web site mentions an ammonia storage support structure. Ammonia is known to be an excellent refrigerant. It is stored as a liquid and its latent heat of evaporation is high, absorbing heat to transfer from a liquid to a gas. Ammonia was likely to have been used as part of the refrigerant for the cold boxes. The location of the ammonia storage support structure has not been identified.
4. **Storage and Distribution:** LOX typically is conveyed from the cold boxes through insulated 4- to 12-inch-diameter piping to insulated storage tanks. Because of the low

temperatures required for cryogenic storage, it is difficult to store LOX over long time periods.

An aerial photograph, which showed the partially dismantled LOX storage and distribution building south of the main LOX Plant building, also showed approximately 10 tank cradles inside the building. The ASTs were approximately 50 to 60 ft long and 10 to 12 ft wide. Tanker trucks would pull up to the southern side of the storage building, which was lower in elevation than the building, and load their tanks with LOX. To the east of the storage building, four large ASTs (Unknown-AT-LX-1 through Unknown-AT-LX-4) were installed between 1962 and 1965. In the 1965 aerial photograph, it appears that the truck loading area and conveyance piping extended to the end of the large ASTs.

Up to five buildings, a sump and clarifier, asbestos and drum disposal area, and four ASTs were associated with the LOX Plant Area. Some of these features are designated as solid waste management units (SWMUs). In the LOX Plant area, the LOX Plant Waste Oil Sump and Clarifier has been designated as SWMU 4.5 and the LOX Asbestos and Drum Disposal Site has been designated as SWMU 4.6. Each SWMU is described as follows:

- **Former LOX Plant Waste Oil Sump and Clarifier (SWMU 4.5):** The waste oil sump and clarifier associated with the LOX Plant process and supporting activities were north of the driveway leading to the LOX Plant and west of the Administration Office building. The former sump was approximately 12 by 5 ft. The sump was attached to a clarifier that was approximately 10 by 2 ft. These features were approximately 10 to 12 ft below grade and were concrete lined (ICF, 1993). The sump and clarifier were used as a collection point for the disposal of liquid wastes containing solvents and fuel, waste oil, and wastewater containing oil. These wastes were derived from LOX Plant equipment cleaning, LOX generation, and supporting plant activities.

Before the implementation of an accelerated cleanup program that included the removal of the sump and clarifier, samples of the sludge from the sump and clarifier were collected before and during removal. The first round of samples was analyzed for halogenated VOCs and oil and grease. TCE, cis-1,2-DCE, and oil and grease were detected at maximum concentrations of 3.1, 0.8, and up to 14 micrograms per liter ($\mu\text{g}/\text{L}$), respectively. Additional characterization samples were analyzed for VOCs, TPH, PCBs, and metals. The analytical results reported total xylenes at 180 $\mu\text{g}/\text{L}$ and several estimated concentrations of other VOC constituents. TPH was detected at 9,000 milligrams per liter (mg/L), copper at 330 mg/L , and lead at 260 mg/L . PCBs were not detected (ICF, RFI WP, 1993).

In 1993, during the excavation of the sump and clarifier, a suspected leach pit was identified (MWH, 2004). Boeing personnel described the leach pit as being constructed of brick. A depression is apparent in aerial and historical photographs surrounding the sump and clarifier, which might be the leach pit described by Boeing, and presumably was intended to dispose of effluent from the sump and clarifier through infiltration. Additionally, during the removal of the sump and clarifier, VOCs were encountered, along with a feature that might have been the

beginning of a leach field within the leach pit. Although no releases were reported in the vicinity of the leach pit, discolored soil with odors was identified (along with the potential leach field feature). The discolored soil and potential leach field features were removed from the excavation (Rockwell, 1993). Soil samples were collected from the soil bins generated during the removal of the sump, clarifier, leach pit, and new feature identified, and were analyzed for SVOCs, metals, pesticides, and pH. Soil stockpiled from the excavation was analyzed for VOCs. No significant impacts to the soil were identified (Ogden, 1996).

- **LOX Asbestos and Drum Disposal Area (SWMU 4.6):** The LOX Asbestos and Drum Disposal Area was on a hillside to the west of the former LOX Plant. This area was used to temporarily stockpile removed asbestos containing materials (ACMs), construction debris (including miscellaneous metal debris), and soil (affected with ACMs) generated from the LOX Plant site demolition activities in the early 1970s. In August 1990, approximately 75,000 ft² of asbestos-contaminated soils and 900 ft² of asbestos-containing floor tiles were removed and disposed (Airview, 1990). The soil containing the ACM sand construction debris also was removed from the hillside in roll-off containers and properly disposed offsite at Kettleman Hills in Kettleman City, California. The removal was conducted under the direction of the Ventura County Air Pollution Control District. Additionally, approximately 12 to 14 empty, rusted drums previously found in the area were removed from the site (MWH, 2005d). The total depth of the removed stockpile was not available at the time this FSP was generated.

A second large debris pile containing ACMs was generated from the demolition of the LOX Plant in the early 1970s and placed east of the former LOX Plant, in the Sage Ranch property adjacent to the northeastern portion of SSFL. This ACM debris pile, referred to as the Asbestos Extent, is considered to be the eastern portion of SWMU 4.6; it was approximately 0.3 acre. The debris pile contained construction materials including concrete, insulation materials, sheet metal, and rebar. Initial sampling of the debris pile (from February 2001 to May 2007) included metals, inorganics, PCBs, perchlorate, SVOCs, TPHs, and VOCs. Significantly elevated concentrations were not detected from the debris pile samples at this time; however, in the summer of 2007, additional sampling of the debris pile detected elevated levels of antimony and ACMs, resulting in a cleanup order from the DTSC and RWBCB. In November and December 2007, the debris pile was excavated and the soil and ACM materials were disposed offsite, with samples (including radionuclides and the constituents previously mentioned) being collected throughout several phases of the removal. No background exceedances were reported for radionuclides. Following the excavation activities, confirmation sampling indicated that asbestos remained in the soil at one sample location. Additional excavation was conducted in this area, removing an area 6 inches deep, 20 ft wide, and 20 ft long. Subsequent confirmation sampling confirmed the removal of asbestos in the soil. Approximately 2,500 cubic yards (yd³) of soil containing ACM and antimony were removed from the Asbestos Extent. The soil was properly disposed offsite at Kettleman Hills in Kettleman City, California (MWH, 2008).

As mentioned previously, the purpose or function of each building or feature identified at the LOX Plant Area could not be confirmed at the time this FSP was prepared. However, based on information provided in the Rocketdyne Archives website (which calls out the building names), discussing the LOX process with a representative of Air Products and correlating the process with the plant layout and supporting plant features, and reviewing the general LOX generation flow process, buildings for the SSFL LOX Plant were assigned names and presumed functions. The buildings and features associated with the LOX Plant Area, along with their related purposes, are discussed in Section 1.10.4 and/or are briefly described in the following text.

- LOX Generation/Compressor Building:** The LOX Generation/Compressor Building is in the northeastern portion of the site. This building probably supported air filters, multi-staged compressors, heat exchangers, distillation columns, and cold boxes. This building was constructed in 1955 and operated until approximately 1971. The building and supporting components were removed by 1978 and the concrete foundation was removed in 1996. The LOX Plant at SSFL featured four 75-ton-per-day LOX generators. A fifth LOX generating system was maintained in this building and used as a back-up system for the four main production lines.

Additionally, the greatest soil gas VOC concentrations were detected northwest of the primary LOX Plant facility, where a past solvent release had been reported. Supporting documentation providing details of a release in this area was not available.

- LOX Storage and Distribution Building:** The LOX Storage and Distribution Building is south of the LOX Generation Building. There were 10 AST cradles inside the building that might have been used for LOX storage. Adjacent and to the east of the building are four large ASTs that likely stored more LOX and possibly liquid nitrogen (a byproduct of LOX production). An aerial photograph showed conveyance piping along the southern side of the building and ASTs that fed tanker trucks with product. There was a turn-about to the east of the ASTs for the tanker trucks.
- System Controls Building:** The System Controls Building was on the southern side of the entrance into the LOX Plant Area and east of the LOX Storage and Distribution Building. The building's construction date is unknown. The original purpose of this building also is unknown; however, there was a truck scale immediately north of the building. It is likely that the controls for the truck scale were inside of this building. The building was removed by 1977; however, the scales remained and a small shack was constructed adjacent and to the south of the scale to house the truck scale controls (Rockwell, 1992). The truck scale and supporting shack are the only structures on the site today.
- Administration Office Building:** This building is north of the former Systems Control Building and adjacent to the former sump and clarifier. The building's use could not be confirmed; however, parking stalls are to the north, east, and southwest (in dirt area) of this building. The construction date of this building is estimated to have been about 1955 and the building had been removed by 1977.

- **LOX Plant Septic Tank and Leach Field:** A septic tank and leach field associated with the LOX Plant have been identified; however, relatively little documentation could be located regarding their location. A conceptual sewer line and leach field diagram authored by Rockwell in 1992 (HDMSE00372427) indicates that the septic system was in the northwestern portion of the LOX Plant Area and was abandoned. The conceptual diagram is not an as-built representation of the septic locations, so the locations are considered to be approximated. Sitewide, Rocketdyne-authored waste disposal system plans that reflect representative locations of the system, but do not identify the locations of a septic tank, leach field, or sewer line in the vicinity of the former LOX Plant. Therefore, the exact location of the septic system at this site has not been confirmed. Additional Rocketdyne documentation dated November 9, 1956 (HDMSE00359225), addressed to the Regional Water Pollution Board, identifies a septic tank with a 2,709-gallon capacity, which fed a series of three leaching trenches 100 ft long placed on 10-ft centers, for the LOX Plant Area.
- **Northern Drainage:** The Northern Drainage is a natural drainage that starts east of the LOX Plant Area, transects the southern portion of the LOX Plant Area, curves north and continues north outside the SSFL boundaries. Sodium hydroxide residue was identified in the drainage that had originated from activities at the LOX Plant, and clay targets from the shooting range east of the LOX plant were found throughout the drainage. Additionally, a large debris pile containing ACMs was generated from the demolition of the LOX Plant and temporarily placed to the east of the LOX Plant, in the pathway of the Northern Drainage (the eastern portion of SWMU 4.6). Between 2007 and 2010, approximately 10,463 yd³ of soil and debris (ACM and clay target debris) were removed from the Northern Drainage, including approximately 2,500 yd³ of material from the debris pile east of the LOX Plant. Sampling results following these removal efforts indicated that additional sampling within the Northern Drainage might be warranted (see the proposed sample locations in Figure 1.10-3). Following removal of the debris west of the LOX Plant, erosion control measures implemented included placing coconut matting over the disturbed areas and placing hydromulch and/or native bedrock rip-rap, hay bales, and straw waddles in the removal areas.

A small building was identified in an oblique aerial photograph (HDMSPP00043629) northeast of the LOX Generation/Compressor Building. A partially exposed structure in the southern portion of the site is shown in the same photograph. It appears that a retaining wall was constructed along the road that might be a drainage feature for the Northern Drainage. The purposes of these structures could not be determined at the time this FSP was prepared, so these are considered to be Unidentified Structures. Figures 1.10-1 and 1.10-3 show the locations of these structures.

Additionally, 12 identified debris piles were associated with the LOX Plant Area:

- **ND-2:** 2-gallon metal drum (dirt filled)
- **ND-5:** Car battery
- **ND-18:** Four canisters (paint thinner-style cans, rusted out)
- **ND-19:** Pieces of concrete debris in drainage

- **ND-48:** Asphalt debris
- **ND-49:** Asphalt debris, clay pipe section, two 10-ft sections of corrugated steel with fence posts, 4-ft section of black hose
- **ND-50:** Several broken sections of clay pipe, asphalt debris, steel cable
- **ND-51:** Rusted metal (disintegrating), several 12-inch by 4-inch-diameter cans (rusted), metal sheet (bent), plastic bottle (printer toner)
- **ND-52:** asphalt/concrete debris, trace black foam, steel wheel
- **MWH-G1A-1004:** Approximately 4-ft length of telephone pole, burned and exposed
- **MWH-G1A-1006:** 1-inch-diameter rusted steep pipe
- **MWH-G1A-1007:** 4-inch-diameter rusted steel pipe, protruding from concrete debris

The LOX Plant Area currently is inactive. The only structure that remains at the LOX Plant Area is a full-sized truck scale and a small structure that houses the scale controls. The area was graded after the foundations and aboveground concrete supports were removed in 1996, and the site has been re-graded to conform to natural topography (MWH, 2005d).

Following the submittal of the Group 2 RFI Report, in 2009 and 2010, samples were collected as part of the interim source removal action (ISRA) activities. NASA is implementing ISRA in response to a Consent Order (issued by the Regional Water Quality Control Board), which is a short-term action used to prevent or mitigate risks to human health or the environment before a final CERCLA remediation remedy is selected. The ISRA is designed to remove potential sources of contaminants and to control releases of COCs to storm water within areas of the Outfalls 008 and 009 watersheds associated with SSFL. Storm water from the NASA property discharges through Outfall 009, within the Northern Drainage area, to receiving surface waters. The data collected for the ISRA activities have been used to evaluate the extent of the removal in the LOX Plant Area. A significant portion of preliminary remediation area (PRA) LOX-15 is included as part of the ISRA area. The average depth of excavation in the LOX Plant Area is approximately 2 ft bgs.

1.10.2.1 LOX Tank and Pipeline Cleaning

As discussed previously, LOX was used to oxidize fuel (RP-1 or Liquid Hydrogen [LH2]) in rocket engines. Because LOX is a strong oxidizer, the tanks and pipelines used to store or transport LOX required cleaning. NASA had developed a “LOX clean” standard for tanks and pipelines that allows virtually no oils or grease to be present on the metal. TCE (and/or potentially Freon) is used to clean tanks and pipelines to meet the LOX clean standard. The LOX clean standard was developed for testing LOX and RP-1 engines at NASA’s MSFC. There were no SSFL-specific LOX cleaning standards or procedures identified in the currently available historical documents. Although the LOX clean standard described in the following text is specific to LOX storage and usage at test stands, it is assumed that the same standard was implemented for the equipment, storage ASTs, and conveyance piping at the LOX Plant.

TCE was used during the build up or construction phase of the test stands and the LOX plant to clean the LOX systems. The LOX tanks were cleaned once by spraying inside with TCE and hand wiping the inside surfaces. The LOX piping was cleaned by pumping or gravity feeding TCE through the pipelines. The amount of TCE used to clean the storage tanks and pipelines varies depending on the size of the tanks and pipelines. The LOX pipelines are constructed of thick stainless steel and connected using flange fittings. The pipelines are designed to transport LOX at more than 3,000 pounds per square inch; therefore, it is not expected that TCE would leak from the pipeline fittings.

The LOX required for engine testing was loaded into trucks and transported to each test stand from the LOX Plant on an as-needed basis. Therefore, there was not an extensive LOX distribution system at SSFL and each test stand operated independently with regard to the storage and use of LOX for engine testing purposes. The LOX was unloaded from the trucks into the LOX storage tank adjacent to the test stand.

Currently, the locations of the LOX Plant Area storage tanks and associated piping cannot be confirmed. It is unknown how frequently the tanks, piping and equipment at the LOX Plant were cleaned using this cleaning standard

1.10.3 Chemical Use Areas

This subsection provides a summary of the five individual CUAs identified at the LOX Plant Area. These areas were designated based on locations where chemicals were reported to be or were used, stored, spilled, or discharged. The CUA list has been revised since the submittal of the Group 2 RI Report in 2008 based on additional information found during historical information research and site reconnaissance efforts. The following subsections provide summaries of the individual CUAs. The accompanying Table 1.10-1 highlights these CUAs and the analytical groups of concern within each CUA.

1: The LOX Plant

Small quantities of solvents reportedly were used at the site for equipment cleaning (SAIC, 1994). Because large multi-staged compressors were used at the LOX Generation/ Compressor Building, waste oil and waste fuels also would have resulted. The air filters were documented to use sodium hydroxide to absorb carbon dioxide and glass and ceramic beads to also filter the feed air, before the air flowed through the compressors. A septic tank and leach field also existed in this CUA. The refrigerants used for operating the cold boxes would have been Freon, ammonia, or both.

2: The Former Sump and Clarifier

The former sump and clarifier were used to dispose of liquid wastes containing solvents, fuel, waste oil, and wastewater containing oil from the LOX Plant operations. There were no reported releases from this SWMU, but soil staining around the sump and clarifier was observed during the excavation activities (SAIC, 1994). Additionally, a depression around the sump and clarifier (previously reported as a leach pit) has been reported and observed in a historical photograph of the LOX Plant. Details regarding the purpose and function of the depression are not available; however, it is presumed that

the discharge from the LOX process operations flowed into the depression and ultimately into the sump and clarifier.

3: LOX Western Debris Area and Asbestos Extent

When the LOX Plant (including supporting structures) was demolished in the 1970s, the debris was temporarily stockpiled on the western portion of the site. The debris included scrap metal, a 15-gallon drum, four 55-gallon drums, a hot water heater, and glass and ceramic beads approximately 1 to 2 centimeters in diameter (possibly used for the air filters from the LOX Generation/Compressor Building). Although the debris pile was removed in 2007, the glass and ceramic beads were scattered throughout the area and were not removed. Additionally, the debris pile also contained ACMs from the LOX Plant demolition. The ACMs and soil were removed in 2009.

A second debris pile containing ACMs from the demolition of the LOX Plant was generated and temporarily placed to the east of the LOX Plant, in the pathway of the Northern Drainage (referenced as the "Asbestos Extent" pile in Figure 1.10-3). This debris pile is separate from the LOX Western Debris Area, although it is included as part of SWMU 4.6. Additionally, the Northern Drainage contained clay target debris from the Rocketdyne-Atomics International Rifle and Pistol Club, Inc., shooting range on the Sage Ranch property, northeast of SSFL. The debris pile and clay targets were removed and disposed offsite in 2007.

4: LOX Demolition Air Dispersion Area

The LOX Demolition Air Dispersion Area is on the northern side of the LOX Plant Area. The 70-percent probability line, as modeled in December 2010, represents the anticipated deposition of 70 percent of the maximum concentration of COPCs projected. A confirmation historical document search did not yield a demolition approach used during the deconstruction of the LOX Plant site. The sampling suite for this area will include metals and PCBs.

1.10.4 Historical Aerial Photograph Review Findings Summary

In response to DTSC's sitewide comments, NASA conducted a historical aerial photograph review of the various reporting sites, including the LOX Plant Area. The objective of the aerial photography review was to identify features that were not discussed at the time the RFI report was submitted. During the aerial photograph review, additional historical information identified buildings, ASTs, unidentified features, and portions of dirt roads that had not been geo-referenced, and that potentially could require additional investigation.

A review of the 1957 aerial photograph identified four new buildings (two of which were associated with the main plant operations) and five vertical ASTs. The largest and primary building identified is in the northern portion of the site and is approximately 300 ft long (east to west) by 60 ft wide. As described previously this building is the LOX Generation/Compressor Building. Five features and possibly associated conveyance piping, were located on the southern wall of the building and are identified as cold boxes with distillation columns. Along the northern side of the building, five cooling

towers were identified that appear to be aligned with the cold boxes on the southern side of the building.

Approximately 75 ft south of the LOX Generation Building is a second building, about 125 ft long (east to west) by 60 ft wide. This building is the LOX Storage and Distribution Building. An oblique aerial photograph (February 14, 1985) (following decommissioning of the LOX Plant) showed approximately 10 tank cradles within the footprint of this building. The contents of the tanks have not been confirmed.

The last two buildings identified in the 1957 aerial photograph are to the west of the LOX Plant, on each side of the entrance from Service Area Road. The building on the north side of the entrance is 55 ft by 35 ft and is assumed to have been the Administration Building. Behind this building and to the west was the former sump and clarifier. The building on the south side of the entrance is approximately 50 ft by 30 ft and was the System Controls Building. This building housed the controls for the truck scale, which is adjacent and to the north of the building.

In the 1959 aerial photograph, one new building and four unidentified features were noted. The building, approximately 20 ft by 20 ft, was approximately 110 ft north of the former LOX sump and clarifier and approximately 90 ft east of the LOX Generation/Compressor Building. The building's purpose is unknown. Additionally, four unidentifiable features were observed in the vicinity of the of the LOX Generation/Compressor Building. The purposes and functions of these features are unknown.

In many of the aerial photographs, dirt paths were identified leading to and from various locations throughout the LOX plant. With the exception of a couple of dirt paths, none of the newly identified features currently exist at this site. In the 1977 aerial photograph, the two main plant buildings and four ASTs (associated with the LOX Storage and Distribution Building) appear to be the only features at the LOX plant. In the 1978 aerial photograph, all buildings, ASTs, and features appear to have been razed. The dirt roads identified are mostly used today for travel in and around the former LOX Plant site.

1.10.5 Groundwater Contribution to VOC Contamination

VOCs detected in the soil (soil samples and soil vapor samples) at this site are not likely to be related to groundwater contamination. The LOX Plant Area is above a groundwater plume; however, the groundwater in this area is approximately 150 ft deep and the soil gas samples decrease in concentration in the deeper subsurface. Additionally, the greatest soil gas VOC concentrations were encountered northwest of the LOX Generation/Compressor Building, where a previous solvent release had been reported.

1.10.6 Sample Locations

Figure 1.10-3 shows the individual proposed sampling locations for the LOX Plant Area. The rationale for these samples is provided in Table 1.10-2, the Data Quality Objectives Table.

The vertical profiling default depth of 5 ft bgs is based on previous sampling efforts and general site knowledge. Conditions in the field ultimately will determine the depth of subsurface soil samples, which might vary from the 5 ft bgs reported in Table 1.10-2. As a generalized guidance, field personnel will take the following steps in establishing subsurface soil sample intervals:

- If refusal (top-of-rock) is encountered deeper than 2 ft bgs, but shallower than 5 ft bgs, a subsurface soil sample will be collected at the depth of refusal.
- If refusal (top-of-rock) is encountered deeper than 5 ft bgs, but shallower than 7 ft bgs, a subsurface soil sample will be collected at the depth of refusal and replace the 5 ft bgs sample.
- If refusal is not encountered, field personnel will note such and the station will be identified as a potential candidate for additional subsurface soil sampling, if warranted.

The current samples will be reevaluated on a site-by-site basis, using maps in which site features are mapped with the appropriate detail to assess the adequacy of the samples. If data gaps are identified during the reevaluation of the site characterization, additional samples will be collected using a site-specific strategy to address the identified data gaps.

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1.11 Group 2–Area II Landfill Area

1.11.1 Sampling Objectives

This subsection provides references to previous sampling and historical site activities and identifies new information and comments that could affect the proposed sampling for the Area II Landfill (A2LF) Area. The objective of additional sampling, as outlined in this sampling approach plan, is to adequately evaluate the nature and extent of COPCs in comparison to available background values for each respective COPC, or RLs of specific compounds that do not have established background values.

1.11.2. Solid Waste Management Units and Areas of Concern

The Area II Landfill has been identified as SWMU 5.1 and is the only SWMU or AOC associated with the site. As part of the VCEHD landfill program, the Area II Landfill has been designated a “closed landfill” (MWH, 2003). The location of this SWMU is shown in Figure 1.11-1.

1.11.3. Site History

The Area II Landfill was acquired by NASA in 1973, along with the remaining Area II property (known as USAF Plant 57 under USAF ownership). The 3.6-acre landfill, which measured 500 ft wide by 150 ft deep by 50 ft across, is located in the northern portions of Areas I and II (SAIC, 1994). The estimated total fill volume and distribution of fill thickness is unknown. The landfill was active from approximately 1955 to 1980, but the years of primary use were between 1965 and 1978 (NASA, 2008). Debris was removed from the landfill prior to September 1989 (Rockwell, 1989).

The October 2003 *RFI Workplan Addendum Amendment* (MWH, 2003) contains the following information:

There was no visible disturbance at the site in 1953. Use of the landfill is visible in the 1957 photograph, which shows an area disturbed north of the Area II Road along an east-west landfill access road that parallels the southern edge of the landfill area. The 1965 photograph shows some natural re-growth of the area with visible disturbance along the westernmost portion of the access road, northward into the canyon. The photographs appear to indicate primary activity between 1965 and 1978 based on what appears to be landfill-type activities. The greatest extent of the landfill boundary for these time periods is during 1978. Later aerial photographs from 1988 and 1995 show near-total re-vegetation of the disturbed areas.

The Area II Landfill received unused fill materials, vegetation, some drums of unknown content, and construction debris. Previous Visual Site Inspections (VSIs) at the landfill reported that the visible waste appeared to consist of construction debris such as asphalt pieces, timber, vegetation, piping, cement, glass, and steel. The original content of the rusted drums is unknown. Drums were identified on the landfill face during a VSI (NASA, 2008), although the specific location of the drums was not indicated. The drums were not found to be leaking upon removal; soil samples taken from the area beneath where the drums were located confirmed that they had not leaked. Specific drum sample locations have not been identified. However, all historic sample locations and analytical results have been used to determine proposed sampling locations and analytical suites. At the time this FSP was written, the document describing the drum removal action could not be located.

A geophysical survey completed in 2003 by Utility Locating Services, Inc., identified several metal mass anomalies near the eastern and western ends of the site (MWH, 2003). These anomalies can be seen on Figure 1.11-1. Historic and proposed samples are scattered throughout the anomaly areas.

An investigation by MWH followed the geophysical survey and included 13 trench locations, 15 hand auger sample locations, and 33 test pits. Trench locations are shown on Figure 1-11.2. Specific hand auger and test pit locations are not indicated, but all historic sample locations and analytical results have been used to determine proposed sampling locations and analytical suites. The results were not published, but in 2004, the Area II Landfill was approved by the County of Ventura Environmental Health Division (CVEHD, 2004) for trench backfilling following the investigation.

The activities and previous sampling at the A2LF Area are summarized in the Group 2 RFI Report (NASA, 2008). Additional samples were collected in 2009 and 2010 after the RFI was submitted as part of the ISRA activities. The ISRA sampling approach is described in the *Preliminary Interim Source Removal Action Work Plan* (MWH, 2009b) and *Final Interim Source Removal Action Work Plan* (MWH, 2009c). The data from these additional sampling efforts are included in the sampling approach evaluation, as discussed in this document. In response to DTSC's sitewide comments, NASA conducted a historical aerial photograph review of the various RFI reporting sites, including the A2LF Area. The objective of the aerial photography review was to identify features that were not discussed at the time the RFI report was submitted.

Multiple debris points were identified by MWH in 2007 within the northern drainage. The points are clay pigeon fragments, concrete debris, tires or tubes, and asphalt. Samples have not been proposed at these points because while most debris was weathered, it was not buried or original to that specific ground surface. Debris has been removed.

Within the A2LF Area, additional features were identified during the aerial photography review. In the southeastern portion of the Area II landfill, additional features identified include existing roads and former roads. The additional roads probably were created by onsite personnel and serve for access into and around the Area II landfill; however, they do not advance to any vegetative areas or locations with smooth topography that might warrant sampling. Figure 1.11-1 shows the features identified during the 2010 aerial photography review.

1.11.4 Chemical Use Areas

This section provides a summary of chemical use areas (CUAs) identified at the A2LF Area. The accompanying Table 1.11-1 highlights these CUAs and the analytical groups of concern within each CUA.

1: Area II Landfill (SWMU 5.1)

The Area II Landfill is located in the northern portions of Areas I and II. It was active from approximately 1955 to 1980, but the years of primary use were between 1965 and 1978 (MWH, 2005d). The Area II Landfill received unused fill materials, vegetation, some drums of unknown content, and construction debris. As part of the VCEHD landfill program, the Area II Landfill has been designated a "closed landfill" (MWH, 2003).

There have been no documented releases from the Area II Landfill (ICF, 1993). There is no evidence of release controls at the Landfill.

Operations in Area II during the period of the Landfill use were petroleum-based liquid fuel rocket testing, component testing, maintenance facilities, and peace-keeper missile loading. The chemicals associated with these operations include the following:

- Liquid rocket test fuels such as kerosene (RP-1), jet fuel (JP-4), monomethyl hydrazine (MMH), hydrazine derivatives, and liquid hydrogen (LH2)
- Oxidizers such as LOX and nitrogen tetroxide (NTO)
- Fluoride compounds and inhibited red fuming nitric acid (IRFNA)
- Solvents such as TCE, 1,1,1-trichloroethane (TCA), and Freon 113
- Energetic materials such as perchlorate (this perchlorate is completely combusted during testing and is not exposed to the environment)
- Various chemicals associated with laboratory operations, waste oils, incinerator ash, and construction debris

2: NASA-352 Debris Area

This debris area was surveyed in February 2006. It was described as metal debris, and the debris has been removed. Multiple sample clusters have been collected along the stream in this vicinity. Review of sample analytical results indicates that there have been no detections or exceeded screening criteria in this area. Therefore, confirmation and extent samples are not proposed specific to this Chemical Use Area.

1.11.5 Historical Aerial Photograph Review Findings Summary

Subsequent to the RFI document submittal, no additional site historical use information was found during a review of newly identified documents and aerial photographs.

1.11.6 Sample Locations

Site groundwater is treated as a potential source of drinking water and risk associated with the direct groundwater pathway is presented in the risk assessment. Direct exposure risks are also presented.

Figure 1.11-2 shows the individual proposed sampling locations for the Alfa Area. The rationale for these samples is provided in Table 1.11-2, the Data Quality Objectives Table.

The vertical profiling default depth of 5 ft bgs is based on previous sampling efforts and general site knowledge. Conditions in the field will ultimately determine the depth of subsurface soil samples, and will likely vary from the 5 ft bgs reported in the DQO table. As a generalized

guidance, field personnel will follow the following steps in determining subsurface soil sampling intervals:

- If refusal (top-of-rock) is encountered deeper than 2 ft bgs, but shallower than 5 ft bgs, a subsurface soil sample will be collected at the depth of refusal.
- If refusal (top-of-rock) is encountered deeper than 5 ft bgs, but shallower than 7 ft bgs, a subsurface soil sample will be collected at the depth of refusal and replace the 5 ft bgs sample.
- If refusal is not encountered, field personnel will note such and the station is to be identified as a potential candidate for additional subsurface soil sampling if warranted.

1.12 Group 2-Expendable Launch Vehicle

1.12.1 Sampling Objectives

This subsection provides references to previous sampling and historical site activities and identifies new information and comments that could affect the proposed sampling for the ELV Area site. The objective of additional sampling, as outlined in this sampling approach plan, is to evaluate the nature and extent of COPCs adequately in comparison to available background values for each respective COPC, or to RLs of specific compounds that do not have an established background value.

1.12.2 Site History

The ELV Area primarily consists of buildings that had a variety of uses; most of these buildings were constructed in the mid- to late-1950s. Nine buildings, two former USTs, and a former PCB storage facility are associated with the ELV Area. Some of the features are designated as SWMUs or AOCs. Two SWMUs have been designated within the ELV Area. Additionally, SWMU 5.29 is the RD-51 watershed, but SWMU 5.29 is not listed in the Consent Order as an RFI site and sampling does not indicate the basis for a SWMU. Therefore, this SWMU will not be discussed in this FSP. Details regarding each SWMU in the ELV Area are as follows:

- **ELV Final Assembly Building 2206 (SWMU 5.2):** Building 2206 was built in 1956 to test rocket engine components using petroleum-based fuels (RP-1 and JP-4) and LOX. The building originally was called the Component Test Laboratory (CTL) and was last used as the ELV Final Assembly Building. According to a calibration and test building plan (NAA, date unknown) for Building 2206, a cooling tower was planned outside the west wall of the building. Four small test bays are on the southern side of the building. A long sump runs the length of the building along the south wall. A historical document discussed modifications for the installation of a 12,000-gallon LOX tank in Bay 2 of Building 2206. No detailed information regarding the tank was available and it is unknown if the tank was installed.

Drums of product chemicals were stored outside on the southern side of the building in a fenced drum storage area. TCE originally was used to wipe clean component parts; later, TCA was used instead. From 1989 on, engine components were cleaned with TCA, Freon, and/or acetone wipes. Some TCE rinsing operations also might have occurred in the test bays (MWH, 2005d). A small earthen catchment pond southwest of Building 2206 was used to contain testing operations wastes. In the late 1950s, operational wastes included approximately 10 gallons of kerosene per day, a small amount of solvents, lubricating oils, and 13 pounds of each of caustic soda and sulfuric acid that were used in the regeneration of a deionizer. A pipe was visible exiting the hillside above the catchment pond, leading down from Building 2206. Detailed information regarding what the pipeline contained was not available. A concrete vault, 12 ft by 18 ft by 8 ft deep, is on the southern side of Building 2206. The vault's purpose is unknown, but it might have been associated with the test bays and catchment pond for Building 2206. The vault is still in place and piping infrastructure can be seen on the top of the vault, but the infrastructure does not suggest a specific possible use. Detailed information regarding the vault, piping, and drainages was not available.

From 1978 to 1989, the building also housed a machine and welding shop that used lubricating oils and compressed gas. From 1989 to 2006, Building 2206 was used as engine assembly, chemical storage, and office space. Operations in the building included rocket engine component testing, engine component cleaning, machining of components, welding, brazing, engine assembly, painting, hazardous materials storage, heat treating, chemical processing, cleaning, vapor degreasing, phosphate treatment, ductile nickel plating, gold plating, copper plating, cadmium plating, titanium plating, zinc chromate plating, hard anodizing aluminum alloys, electroplating, electro-milling and anodizing, hard chromium chromic acid and sulfuric acid anodizing of aluminum alloys, applying chemical films to aluminum, and cleaning and passivating of corrosion-resistant alloys, as well as many other alloys (Macfarlane, 1989; Rockwell, 1989, 1995).

The Building 2206 Diesel UST (UT-51) was removed in 1987 and classified as closed by VCEDH in 1996. There is also a former unknown diesel UST at Building 2206 reported to be adjacent to UT-51. The exact location of the former tank is unknown, but the tank was removed in 1987. Soil samples were not required by Ventura County inspectors during the removal. Several ASTs formerly were located on the southern side of Building 2206; only the concrete supports and secondary containment remain. A drainage hole was observed in the secondary containment used for the ASTs, but that might have been added after the ASTs were removed to limit rainwater accumulation.

There has been one documented release of 4 to 6 gallons of hydraulic oil inside the building (Ogden, 1996b). There was a reported spill of 0.1 gallon of battery acid in front of the building, as well as 0.1 gallon of RP-1. There was a recorded release of 1 gallon of diesel in the maintenance lot, and 1 gallon of an unknown liquid in the oil yard. Five gallons of oil and water reportedly were released from the reservoir on a pipe cutter trailer. There also has been a documented release of less than 1 quart of methyl n-amyl ketone (MAK) at Building 2206 (ICF, 1993).

Other buildings included within the SWMU boundary are 2201, 2202, 2203, 2211, 2231, and 2232.

- **PCB Storage Facility Building 2231 (SWMU 5.3):** The Building 2231 storage facility is a bermed area within the concrete floor of a metal building. Waste PCBs, usually contained in capacitors, were stored in the storage facility before being disposed offsite from 1984 until an unknown date. The building, constructed in 1956 adjacent to Building 2206 on the southwestern side, is now used for storage.

According to the DOE's *Environmental Survey Preliminary Report* (February 1989), some PCBs from Area IV were placed in the PCB storage facility as part of a 1986-1987 program to retrofit equipment that contained PCBs. PCB items were retrofitted or removed by an outside contractor before the close of the 1987 calendar year. The contractor sampled and analyzed the retrofitted transformers after 90 days of operation. If the fluid concentration was found to contain more than 5 parts per million (ppm) of PCBs, the fluid was removed and the transformer was rinsed and then refilled with the non-PCB coolant fluid. This process was continued until the PCB concentration in the fluid remained below 5 ppm. The waste PCB fluids and rinsates were disposed (incinerated) by Rollins Environmental, the capacitors were shredded and incinerated by U.S. Ecology Corporation, and the transformers that were removed were triple rinsed and then landfilled. There was no

indication in the DOE report that the material stored in Building 2231 might contain radiologic contamination, and not all materials from Area IV were associated with nuclear research. Detailed information regarding the source and use of the material prior to its storage at the ELV was not available. The former PCB Storage Facility was closed by DTSC in 1998.

The following two AOCs were associated with the ELV Area:

- **Building 2206 Diesel UST (UT-51):** UST UT-51 was a 1,500-gallon-capacity tank that held diesel. The UST was at the northeastern corner of Building 2206. The tank was removed in August 1987 under VCEHD permit number 698. There was no evidence of leaking at the time of tank removal. No further action was recommended by VCEHD in 1996, and the tank was closed. A tank inventory and closure reports have been submitted as part of the submittal of the responses to the sitewide comments.
- **Building 2207 UST (UT-53):** UST UT-53 was a 1,500-gallon-capacity tank that held diesel fuel oil for the automotive services building. The UST was on the northern side of Building 2207. The tank was removed in July 1988 under VCEHD permit number 986. No further action was recommended by VCEHD in 1996, and the tank was closed. A tank inventory and closure reports have been submitted as part of the submittal of the responses to the sitewide comments.

The buildings and facilities associated with the ELV Area, along with their related purposes, are described in the following text.

Building 2201: Building 2201 was constructed in 1956 and, according to a 1965 master plan, was used for engineering offices, and once was used as an Operations Building, but it is unknown what specific activities occurred in the building during this time. There was a former work area that used liquid nitrogen in the southeastern corner of the building. A plot plan dated March 25, 1955, delineated a 7,500-gallon AST on the eastern side of Building 2201. This AST (Unknown-AT-EV-9) contained fuel oil and serviced Buildings 2202 and 2211. In 1985, electrical assembly operations were moved into the building and included activities such as soldering of the electrical harnesses of SSME using tin-lead solder, thermo-bond welding, encapsulation of electrical connectors, and bonding of connectors with epoxy. IPA and TCA were used in addition to TCE, before TCE use was discontinued.

Building 2202: Building 2202, constructed in 1956, formerly served as a cafeteria and contained a photo laboratory and wastewater treatment clarifier. The kitchen was on the eastern side of the building and the clarifier was outside the southwestern corner. There is a vault at the location of the clarifier but it is unknown if the clarifier is in the vault, because the vault lid could not be lifted. There is no surface infrastructure for piping outside the building, and piping likely went directly from the interior of Building 2202 to the clarifier underground. The former photo laboratory was in the western portion of the building and a photo lab neutralizing tank was located in the same place as the clarifier. The clarifier previously was cleaned out and wipe samples reportedly were collected. The wipe sample data are not available and were not used in site characterization, although soil sampling was used for site characterization in this area. Detailed information was not available regarding what chemicals were associated with the clarifier or about the disposition of the sludge and liquid waste from the clarifier.

There was a former oil storage area on concrete north of Building 2202. The area was identified during an interview conducted in 2005. A septic tank (Unknown-UT-EV-3) is on the eastern side of Building 2202. The tank capacity is 225 gallons; the tank has been abandoned. A historical document (internal letter from NAA, October 22, 1965) indicated there were three 32-cubic-foot high-pressure gaseous nitrogen bottles at Building 2202. More detailed information regarding the tanks was not available. The building most recently was used for Laser and Electro-Optical System (LEOS) storage. In 1994, an excavation of approximately 3,000 yd³ of mercury-contaminated soil was conducted north of Buildings 2202 and 2203. A surface water retention pond to the northwest of Building 2202 captures runoff from Buildings 2202 and 2203. The hillside leading down to the pond has been paved partially with concrete, and the area is an NPDES sampling location (Outfall 010).

Building 2203: Building 2203, constructed in 1954, was last used as a Lasers Lab Facility by LEOS and but formerly used as an Instrument Laboratory and Service Building. According to a 1965 Master Plan, Building 2203 was once used as a Service Building. Various pieces of machinery including a lead tinning machine, a vapor degreaser, and a boring mill were used in locations throughout the building. Activities such as sand blasting and welding also might have occurred in, or just outside, Building 2203. There was a former oil storage area on asphalt north of Building 2203. The area was identified during an interview conducted in 2005.

Approximately 1 pound of mercury was spilled inside Building 2203 as a result of a broken power conversion unit (Rockwell, 1988). Adjacent to Building 2203 on the eastern side was former Building 2932, referred to as a Compressor Shelter and Materials Preparation Shelter. In 1994, an excavation of approximately 3,000 yd³ of mercury-contaminated soil was conducted north of Buildings 2202 and 2203. An equipment cleaning area used to clean parts with solvents was located between Buildings 2202 and 2203. A surface water retention pond to the northwest of Building 2202 captures runoff from Buildings 2202 and 2203. The hillside leading down to the pond has been paved partially with concrete; the area is an NPDES sampling location (Outfall 010).

Building 2206: Refer to the previous section regarding SWMU 5.2 for more information about Building 2206.

Building 2207: Building 2207, constructed in 1956, is the Protective Services Building and is used as the SSFL Fire Station. There was formerly a drum storage area, but the location of the area is unknown. An internal Rockwell International letter indicated that a radiation badge at Building 2207 was exposed after an employee had terminated employment. There has been no documentation of a radiation source at Building 2207. Detailed information regarding this incident was not available.

There also was a former UST (UT-53) at Building 2207. The 1,500-gallon diesel UST, constructed of steel, was removed in 1988. The UST was an Area II AOC and was closed by VCEDH in 1996. Vehicle washing activities previously occurred in the driveway area of Building 2207 and rinse water flowed to a storm drain to the southeast of the building.

Building 2211: Building 2211 was constructed in 1958 and was once used as an Operations Building, according to a 1965 Master Plan. The building also was used for furniture storage. On the northern side of the building, a partially buried pipeline was discovered leading toward the northern ravine. This pipe conveyed nitrogen gas from Building 2211 to a storage and filling station down the hill. Detailed information regarding the storage and filling station was not

available. There is an area of staining on the northern side of the floor in Building 2211. The source of the staining is unknown. There is an Area II AOC for the Building 2211 Leach Field, but the AOC is included with the Area II Ash Pile and STP area because of its proximity to and relationship with the STP.

Building 2231: Refer to the previous section regarding SWMU 5.3 for more information about Building 2231.

Building 2232: Building 2232, constructed in 1956, formerly was used as the LOX Tank Control Building, while Building 2206 was operating as a test facility. The building was later used for storage. Chemical use was not required to control LOX flows or for storage.

Building 2932: Building 2932, a former Compressor Shelter and a Material Preparations Shelter, was on the eastern side of Building 2203, according to a Rocketdyne Santa Susana Facility Number Assignment Plan (October 1, 1963). A former paint booth that also served as paint storage adjacent to Building 2206 on the southwestern corner was referred to as Building 2932, as well. There is no record of a paint booth or of painting activities at or near Building 2203. The source of information that placed Building 2932 adjacent to Building 2206 could not be located. The building located on the eastern side of Building 2203 was designated as Building 2932.

A historical figure indicated that an unidentified feature in the figure, about 400 ft east of Building 2205, was the location of Building 332, identified as the "Optical Building." This historical document, HDMSP1736630 (referenced by DTSC) could not be located. This building was not identified during the 2010 aerial photograph investigation and no further evidence of this building was available. The same historical document indicated that Building 230 (Security Control) previously existed northwest of the northwestern corner of Building 2206. This building was not identified during the 2010 aerial photograph investigation and no further evidence of this building was available.

Portions of the ELV Area currently are active, such as offices in Building 2203. Most of the buildings have been closed or are vacant, but are still intact and standing.

The legacy GIS data for the western boundary of SWMU 5.2 only includes parts of Buildings 2201 and 2211. The SWMU 5.2 boundary has been revised to include both buildings in their entirety.

Several tanks were located at the ELV, including three septic tanks, all of which have been abandoned. Unknown-UT-EV-1 was east of Building 2211, Unknown UT-EV-2 was east of Building 2202, and Unknown UT-EV-3 was south of Building 2202. The ELV Area had three USTs—two of them are AOCs (UT-51 and UT-53). The third was Unknown-UT-ELV-1, reportedly adjacent to UT-51 near Building 2206, but the exact location is unknown. The tank was removed in 1987.

The ELV Area also had 33 ASTs. Unknown-AT-EV-1, east of Building 2201, contained liquid nitrogen and is still present, but inactive. Unknown-AT-EV-2, east of Building 2232 contained well water; it is still present, but inactive. Unknown-AT-EV-3 was a gasoline tank somewhere near Building 2206 and has been removed. Unknown-AT-EV-4, Unknown-AT-EV-5, and Unknown-AT-EV-6 were at Building 2203; they contained gaseous nitrogen and have been removed. Unknown-AT-EV-7, at Building 2206, contained gaseous helium and was removed. Unknown-AT-EV-8, at Building 2206, was part of a bank of 23 gaseous nitrogen bottles and has

been removed. Unknown AT-EV-9, east of Building 2201, contained fuel oil to service Buildings 2211 and 2202 and has been removed. Unknown-AT-EV-10, Unknown-AT-EV-11, Unknown-AT-EV-12, Unknown-AT-EV-13, Unknown-AT-EV-14, Unknown-AT-EV-15, Unknown-AT-EV-16, Unknown-AT-EV-17, Unknown-AT-EV-18, Unknown-AT-EV-19, Unknown-AT-EV-20, Unknown-AT-EV-21, Unknown-AT-EV-22, Unknown-AT-EV-23, and Unknown-AT-EV-25 were south of Building 2206 and have been removed. TSC-227451, TSC-20401, TSC-217401, and TSC-217499, which contained liquid nitrogen, were south of Building 2206 and have been removed. TSC-20402 contained gaseous helium; it was south of Building 2206 and has been removed. TSC-227451, which contained liquid nitrogen, and somewhere west of Building 2206, although the exact location is unknown; the tank has been removed. V-643, which contained gaseous nitrogen, is on the northeastern side of Building 2206; it is still present, but inactive. V-644, which contained gaseous helium, is on the northeastern side of Building 2206; it is still present, but inactive. A chilled water treatment tank was identified on the southeastern corner of Building 2203. It is present, but inactive. There also is one unknown tank, Unknown-Tank-EV-1, which has an unknown location, unknown contents, and has been removed.

The activities and previous sampling at the ELV Area are summarized in the Group 2 RFI Report (NASA, 2008). Additional samples were collected in 2008, 2009, and 2010 after submittal of the RFI to further evaluate potential releases identified after the initial RFI was completed. In the fall of 2008 and spring of 2009, samples were collected adjacent to and within buildings at locations of potential concern, as based on building inspections. Samples also were collected at sewer manholes and along the sewer pipelines to investigate potential releases from cracks and/or ruptures in the sewer line.

Following the submittal of the Group 2 RFI Report, in 2009 and 2010, samples were collected as part of the ISRA activities. NASA is implementing an ISRA in response to a Consent Order issued by the Regional Water Quality Control Board; the ISRA is a short-term action used to prevent or mitigate risks to human health or the environment before a final CERCLA remediation remedy is selected. The ISRA is designed to remove potential sources of contaminants and to control COC releases to storm water within areas of SSFL Outfalls 008 and 009 watersheds. Stormwater from the NASA property discharges through Outfall 009, within the Northern Drainage area, to receiving surface waters. The data collected for the ISRA activities have been used to evaluate the extent of the removal needed in the ELV Area. A significant portion of preliminary remediation area (PRA) ELV-9 is included as part of the ISRA area. The average depth of the excavation in the ELV Area is approximately 1 ft bgs. The ISRA sampling approach is described in the *Preliminary Interim Source Removal Action Work Plan* (MWH, 2009b) and *Final Interim Source Removal Action Work Plan* (MWH, 2009c).

Additionally, samples have been collected from an identified debris pile outside the ELV Area, and at four debris points inside and outside the ELV area. The debris pile was northwest of the ELV, straddling the border of SSFL, and contained an empty 55-gallon drum, an empty 35-gallon drum, 5-gallon metal buckets, a pile of metal pipe, a pipe valve, and electrical conduit. The first debris point was northeast of Building 2203 and contained two empty 5-gallon metal buckets. The second debris point was southeast of Building 2201 and contained an empty 5-gallon metal bucket. The third debris point was south of Building 2206, north of Service Area Road, and contained two empty 2-gallon metal buckets. The fourth debris point was south of the ELV catchment pond and contained an empty 2-gallon metal bucket. Each of these areas

will be sampled further to evaluate the debris areas. Four additional debris points in the vicinity of the ELV Area also will be evaluated. The fifth debris point was north of Building 2206 and contained a soil pile (approximately 6 ft by 3 ft by 1.5 ft) intermixed with asphalt, various metal debris, and broken glass. The sixth debris point was southwest of Building 2206 and contained an empty 3-gallon metal can and pieces of asphalt next to the paved roadway. The seventh debris pile was south of Building 2206 and contained two soil piles (approximately 5 ft by 7 ft by 4 ft, and 2 ft by 3 ft by 1 ft) intermixed with asphalt and small-diameter metal pipe. The eighth debris point was east of the ELV Area, and contained an empty 8-inch by 8-inch metal can.

1.12.3 Chemical Use Areas

This subsection provides a summary of the three individual CUAs identified at the ELV Area. These areas were designated based on locations at which chemicals were reported to be or were used, stored, spilled, or discharged. The individual CUAs are described in the following text. The accompanying Table 1.12-1 highlights these CUAs and the analytical groups of concern within each CUA.

1: ELV-Northwestern Portion

The northwestern portion of the ELV Area, consisting of Buildings 2211, 2201, 2202, 2203, and 2932, is bound physically by a steep embankment of rock outcrop directly to the west and north of Building 2211. Extent sampling through and/or over this embankment is not proposed because the preferential pathways for contaminant migration are elsewhere within the site. Three PRAs are associated with this subarea:

- PRA ELV-1 (Buildings 2201, 2202, and 2203)
- PRA ELV-2 (Building 2211)
- PRA ELV-6 (an isolated TPH exceedance north of Building 2203)

Additional sampling to the south, east, and west of the current sample location suite is proposed to further evaluate PRA ELV-1. Each parameter group was detected in this area at levels exceeding the current screening criteria and requires additional sampling in all directions. The existing sampling locations also could be resampled using lower detection limits before additional extent samples are collected. Additional sampling to the south of the current sample location suite is proposed to further evaluate PRA ELV-2. Additional TPH samples are proposed concentrically from the soil exceedance associated with PRA ELV-6.

2: ELV-Southeastern Portion and PCB Storage

The southeastern portion of the ELV Area consists of Building 2206, the ELV catchment pond, and two large parking areas. Seven PRAs are associated with this subarea:

- PRA ELV-4 (an isolated sample with metals, PAHs, and TPH exceedances between Buildings 2206 and 2207)
- PRA ELV-5 (south of ELV, near Service Area Road)
- PRA ELV-7 (an isolated sample with exceedances of TPH and VOCs southeast of Building 2206, east of Parking Lot Road)
- PRA ELV-8 (eastern parking area)

- PRA ELV-9 (ELV catchment pond area)
- PRA ELV-10 (Building 2206 and Building 2231)
- PRA ELV-11 (at the intersection of Parking Lot Road and Service Area Road)

The PCB Storage Facility is grouped with this area because of its proximity to Building 2206. The buildings share a PRA.

Dioxins are prevalent in the PRA ELV-9, but were not detected at concentrations above background levels in other PRAs where they were sampled. Metals were detected in all but one of the PRAs. PCBs were detected at concentrations above the current screening criteria only at PRA ELV-10. TPHs and SVOCs were detected at levels above the current screening criteria in PRA ELV-8, PRA ELV-9, and PRA ELV-10. Additional sampling is proposed for these parameters in all directions from the PRAs with which they are associated. The existing sampling locations also could be resampled using lower detection limits before additional extent samples are collected.

3: Building 2207

SVOCs, TPHs, metals, and energetics were detected in this area at levels exceeding the current screening criteria. Additional sampling of these parameter groups is suggested concentrically from the current sampling location suite to further evaluate this subarea (PRA ELV-3). Neither PCBs nor dioxins were sampled for Building 2207. However, to address the DQOs, both PCBs and dioxins will be added to the pre-remediation sampling suite for this PRA. The existing sampling locations also could be resampled using lower detection limits before additional extent samples are collected.

1.12.4 Historical Aerial Photograph Review Findings Summary

In response to DTSC's sitewide comments, NASA conducted a historical aerial photograph review of the various reporting sites, including the ELV Area. The objective of the aerial photography review was to identify features that had not been discussed at the time the RFI report was submitted. During the aerial photograph review, additional site historical use information identified several new features.

Two portions of aboveground piping were identified at this site. There is an approximately 900-ft section of piping that runs north-northwest from the area to the north of Building 2211. This pipe contained nitrogen and is connected to the Praxair station in Area III. There is also an approximately 20-ft-long section of piping to the southwest of Building 2203. The purpose of this pipeline is unknown. Three former awnings were identified on the southern side of Building 2211 and one on the southern side of Building 2206. These awnings potentially could have served as covered storage areas for chemicals or other hazardous materials that might have been released to the environment. Three former buildings were identified during the photograph review. One building, which was adjacent to the current Building 2932, was identified in photographs from 1999 to 2005; it is unlikely that activities of an environmental concern were conducted at this building during that period. Two adjacent former buildings south of Building 2201 were first identified in 1965. The eastern building appeared only in 1965, while the western building was last identified in 1967 aerial photographs. The uses of these buildings are unknown and the areas adjacent to them will be investigated further. A cleared

vegetation area also was identified to north of the ELV Area on the edge of the undeveloped area.

Sampling approaches for the newly identified features are as follows:

- **Awnings:** Three new awnings were identified south of Building 2211 during the aerial photograph review. It is unknown what operations occurred under the awnings, but they potentially could have been covered storage areas for chemicals or other hazardous material that might have been released to the environment. Some sampling previously was conducted around the buildings; however, additional sampling will be proposed in the area around the former awnings, because they were outside the PRA boundaries.
- **Buildings:** Three new buildings were identified during the aerial photograph review. It is unknown what operations occurred in the buildings, and sampling previously has not been conducted around the buildings. Sampling will be proposed in the area around the buildings, because they are outside the PRA boundaries.
- **Cleared Vegetation Area:** A cleared vegetation area was identified during the aerial photograph review. It is unknown what use this area might have had, and only a few samples have been collected in the area previously. Sampling will be proposed in the area of the cleared vegetation.
- **Pipelines:** Because the use of one pipeline has yet to be confirmed, field verification of the construction and condition of piping used to transfer potentially contaminated cooling water or fuel is proposed. Samples will be collected near visually apparent leaking portions of the piping, including both deteriorated portions of the piping and physical couplings and flanges, and analyzed for TAL/TCL, TPH, and dioxin parameters. This analytical approach is consistent with previous sampling efforts within this site.
- **Tanks:** Tanks identified during the 2010 aerial photograph review have been removed from the ELV Area. One tank is outside the PRA boundaries. The contents of the tanks are unknown. There are no new COCs associated with these tanks because the contents are unknown. Sampling will be proposed near the former tank.

In addition to the 2010 aerial photograph review, a review of the storage tanks at various sites in SSFL, including the ELV, was conducted. Two removed ASTs were identified, but their contents could not be confirmed. Figure 1.12-1 shows the features identified during the 2010 aerial photography review.

1.12.5 Groundwater Contribution to VOC Contamination

There is one possible location within the ELV Area where detected VOC concentrations in the soil might be related to groundwater contamination. Historical VOC samples collected at the ELV Area had elevated concentrations of VOCs reported in the deep subsurface samples. As described in the 2009 Draft Site-Wide Groundwater Remedial Investigation Report, a TCE groundwater plume is located beneath the ELV Area (MWH, 2009). VOCs, specifically TCE, also have been detected in the groundwater at concentrations exceeding the screening criteria at this site.

Because the VOC exceedances in the ELV Area are likely to be related to groundwater contamination, characterization and planning for the soil VOC remedial action in this area will

be addressed as part of the groundwater RI/FS. These areas are shown in yellow in Figure 1.12-2. However, to address DTSC's requirements to evaluate other potential solvent impacts outside of these known release areas, additional VOC samples have been proposed at selected locations within the ELV Area.

1.12.6 Sample Locations

Figure 1.12-2 shows the individual proposed sampling locations for the ELV Area. The rationale for these samples is provided in Table 1.12-2, the Data Quality Objectives Table.

The vertical profiling default depth of 5 ft bgs is based on previous sampling efforts and general site knowledge. Conditions in the field ultimately will mandate the depth of subsurface soil samples, which might vary from the 5 ft bgs reported in Table 1.12-2. As a generalized guidance, field personnel will take the following steps in evaluating subsurface soil sampling intervals:

- If refusal (top-of-rock) is encountered deeper than 2 ft bgs, but shallower than 5 ft bgs, a subsurface soil sample will be collected at the depth of refusal.
- If refusal (top-of-rock) is encountered deeper than 5 ft bgs, but shallower than 7 ft bgs, a subsurface soil sample will be collected at the depth of refusal to the 5 ft bgs sample.
- If refusal is not encountered, field personnel will note such and the station will be identified as a potential candidate for additional subsurface soil sampling, if warranted.

Tables

TABLE 1.10-1

Chemical Use Areas at the LOX Plant Area

NASA SSFL Field Sampling Plan

Chemical Use Area Types and Typical Target Analytical Suites							
Chemical Use Area Name	Petroleum Fuels / Solvents	PAHs ² and SVOCs	Energetic Constituents / Propellants	Transformers	Oil-Related Materials and Debris	Dioxins	Pesticides
	TPH, VOCs ¹		Hydrazine, NDMA, UDMH, MMH, NTO, Formaldehyde, Metals	PCBs	SVOCs, PAHs ² , TPH, PCBs, Metals		
1 - LOX Plant	X				X	X	
2 - Former Sump and Clarifier	X	X	X	X	X	X	
3 - LOX Western Debris Area and Asbestos Extent	X		X		X	X	
4 - LOX Demolition Air Dispersion Area					X	X	

Notes:

MMH = monomethyl hydrazine
 NDMA = n-nitrosodimethylamine
 NTO = nitrogen tetroxide
 PAH = polycyclic aromatic
 PCB = polychlorinated biphenyl
 SVOC = semivolatile organic compound
 TPH = total petroleum hydrocarbons
 UDMH = unsymmetrical dimethyl hydrazine
 VOC = volatile organic compound

¹. VOCs are a COPC for TPH-gasoline.
². SVOCs and PAHs are COPCs for TPH-diesel.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	1	SS	0				X									Extent evaluation of PRA LOX-1 and west of sample LXBS1000, which had reported exceedances of PAHs. Sample is adjacent to a rock outcrop. COPCs include PAHs.
		SO	5				H									
	2	SS	0				X									Extent evaluation of PRA LOX-1 and south of sample LXBS1000, which had reported exceedances of PAHs. COPCs include PAHs.
		SO	5				H									
	3	SS	0			X	X									Extent evaluation of PRA LOX-1 and southwest of sample LXBS1001, which had reported exceedances of PAHs in surface samples and ND in excess of applicable RLs for PAHs in subsurface samples. COPCs include SVOC/PAHs.
		SO	5			H	H									
	4	SS	0			X	X									Extent evaluation of PRA LOX-1, east of sample LXBS1001 and PRA LOX-2, northwest of sample NDBS0128, which had reported exceedances of PAHs in surface samples and ND in excess of applicable RLs for SVOC/PAHs in subsurface samples. COPCs include SVOC/PAHs.
		SO	5			H	H									
	5	SS	0		X					X			X			Extent evaluation of PRA LOX-2 and west of sample ENBS0024, which had reported and exceedances of metals and TPH in the surface sample and ND in excess of applicable RLs for VOCs in the subsurface. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	6	SS	0		X					X			X			Extent evaluation of PRA LOX-2 and east of sample ENBS0024, which had reported exceedances of metals and TPH in the surface sample and ND in excess of applicable RLs for VOCs in the subsurface. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	7	SS	0		X		X									Extent evaluation of PRA LOX-2, east of sample NDBS0128, which had reported exceedances of PAHs in surface samples. Additional analysis will address the data gap identified along the natural drainage where exceedances of VOCs were reported ND in excess of applicable RLs. COPCs include VOCs and PAHs.
		SO	5		X		H									
	8	SS	0		X	X	X			X	X					Extent evaluation of PRA LOX-3, west of sample LXBS0064, which had reported phthalate exceedances and ND in excess of applicable RLs for VOCs, SVOC/PAHs, TPH, and PCBs in the subsurface. Sample will also address the data gap identified along the natural drainage where exceedances of VOCs were reported ND in excess of applicable RLs. COPCs include VOCs, SVOC/PAHs, TPH, and PCBs.
		SO	5		X	H	H			X	H					
	9	SS	0		X	X	X			X	X					Extent evaluation of PRA LOX-3, northeast of sample LXBS0064, which had reported phthalate exceedances and ND in excess of applicable RLs for VOCs, SVOC/PAHs, TPH, and PCBs in the subsurface. COPCs include VOCs, SVOC/PAHs, TPH, and PCBs.
		SO	5		X	H	H			X	H					
	10	SS	0		X	X	X			X	X					Extent evaluation of PRA LOX-3, southeast of sample LXBS0064, which had reported phthalate exceedances and ND in excess of applicable RLs for VOCs, SVOC/PAHs, TPH, and PCBs in the subsurface. Sample will also address the debris pile ND-49, along the natural drainage. COPCs include VOCs, SVOC/PAHs, TPH, and PCBs.
		SO	5		X	H	H			X	H					
	11	SS	0				X									Reevaluate soils at sample NDBS0126. Initial sampling reported ND in excess of applicable RLs for phthalates only. COPCs include phthalates.
		SO	5				H									
	1SV	SV	5	X												Reevaluate soil vapor at sample LXSV03, north of PRA LOX-4. Initial sampling reported ND in excess of applicable RLs at 7 ft bgs.
		SV	10	X												

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	12	SS	0										X			Reevaluate soils northwest of PRA LOX-4 at sample LXBS12 with reported ND in excess of applicable RLs for metals only. Sample will also address extent evaluation of sample LXBS0043, which had an exceedance of metals. COPCs include metals.
		SO	5										H			
	13	SS	0		X								X			Extent evaluation of PRA LOX-4, southwest of sample LXBS0043, which had reported exceedances of lead only. Sample will also address exceedances of metals and reported ND in excess of RLs in sample ENBS0026 within PRA LOX-5. COPCs include VOCs and metals.
		SO	5		X								H			
	14	SS	0										X			Extent evaluation of PRA LOX-4, northeast of sample LXBS0043, which had reported exceedances of lead only. COPCs include metals.
		SO	5										H			
	15	SS	0		X					X		X	X		X	Extent evaluation of PRA LOX-5, northwest of sample ENBS0026, which had reported exceedances of metals. Additional analysis will address the reported ND in excess of applicable RLs for VOCs in sample ENBS0052 and in the natural drainage, as well as potential for TPH, energetics, and dioxins. COPCs include VOCs, TPH, metals dioxins, and energetics.
		SO	5		X					X		H	H		H	
	16	SS	0		X					X		X	X		X	Extent evaluation of PRA LOX-5, southeast of sample ENBS0026, which had reported exceedances of metals. Additional analysis will address the reported ND in excess of applicable RLs for VOCs, as well as potential for TPH, energetics, and dioxins. COPCs include VOCs, TPH, metals dioxins, and energetics.
		SO	5		X					X		H	H		H	
2	17	SS	0		X	X	X			X		X	X		X	Reevaluate soils west of PRA LOX-8 at sample LXBS05 with reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, TPH, metals ,and energetics. Sample location will also address extent for LXTSTP07 inside LOX-6 with an exceedance of TPH, and potential for dioxins. COPCs include VOCs, SVOC/PAHs, TPH, metals, dioxins, and energetics.
		SO	5		X	H	H			X		H	H		H	

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments	
2	18	SS	0		X	X	X			X		X	X		X	Reevaluate soils northeast of PRA LOX-6 at sample LXSA18, which had reported exceedances of TPH, and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics. Sample location will also address extent for LXTSTP07 inside LOX-6 with an exceedance of TPH, and potential for dioxins. COPCs include VOCs, TPH, metals, dioxins, and energetics.	
		SO	5		X	H	H			X		H	H		H		
	19	SS	0		X	X	X			X		X	X		X	Extent evaluation of PRA LOX-6, west of sample LXTSTP07, which had reported exceedances of TPH. Additional analysis will address the reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics, and metals exceedances from LXBS1015, and potential for dioxins. COPCs include VOCs, SVOC/PAHs, TPH, metals, dioxins, and energetics.	
		SO	5		X	H	H			X		H	H		H		
	20	SS	0							X		X	X		X	Extent evaluation of PRA LOX-6, south of sample LXBS1015, which had reported exceedance of TPH and metals to 14 ft bgs. Additional analysis will address potential for dioxins and energetics. COPCs include TPH, metals, dioxins, and energetics.	
		SO	5							X		H	H		H		
		SO	10								X		H	H			H
		SO	15								X		H	H			H
	21	SS	0							X		X	X		X	Extent evaluation of PRA LOX-6, southeast of sample LXBS1015, which had reported exceedances of TPH and metals to 14 ft bgs. Additional analysis will address potential for dioxins and energetics. COPCs include TPH, metals, dioxins, and energetics.	
		SO	5							X		H	H		H		
		SO	10								X		H	H			H
		SO	15								X		H	H			H

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	2SV	SV	5	X												Reevaluate soil vapor at sample LXSV08, east of PRA LOX-6. Initial sampling reported ND in excess of applicable RLs.
	22	SS	0		X	X	X			X		X	X		X	Extent evaluation west of PRA LOX-7, northwest of sample NDTC0128, which had reported exceedances of lead. Additional analysis will address the exceedance of TPH and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics in sample LXTSTP08, and potential for dioxins. COPCs include VOCs, SVOC/PAHs, metals, dioxins, and energetics.
		SO	5		X	H	H			X		H	H		H	
	3SV	SV	5	X												Reevaluate soil vapor at sample LXSV07, northwest of PRA LOX-7. Initial sampling reported ND in excess of applicable RLs.
	23	SS	0		X	X	X			X		X	X		X	Extent evaluation southeast of PRA LOX-7, east of sample NDTC0128, which had reported exceedances of lead. Additional analysis will address the exceedance of TPH and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics in sample LXTSTP08, and potential for dioxins. Also, analysis will address debris pile ND-50. COPCs include VOCs, SVOC/PAHs, metals, dioxins, and energetics.
		SO	5		X	H	H			X		H	H		H	
	24	SS	0		X	X	X			X		X	X		X	Extent evaluation southeast of PRA LOX-7, south of sample LXTSTP08, which had reported exceedances of TPH and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics. Additional analysis will address the potential for dioxins. COPCs include VOCs, SVOC/PAHs, metals, dioxins, and energetics.
		SO	5		X	H	H			X		H	H		H	
	25	SS	0		X	X	X			X	X	X	X		X	Extent evaluation east of PRA LOX-7, east of sample LXTSTP08, which had reported exceedances of TPH and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics. Additional analysis will address the data gap associated with the former Systems Control Building. COPCs include VOCs, SVOC/PAHs, TPH, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
	4SV	SV	5	X												Soil vapor sample to address the new building feature identified during the aerial photograph review.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments	
	26	SS	0		X	X				X		X				X	Reevaluate soils north of PRA LOX-7 at sample LXBS1010, which had reported ND in excess of applicable RLs for VOCs. Sample location will also address extent for LXTSTP08 with an exceedance of TPH and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics, and the potential for dioxins. COPCs include VOCs, TPH, dioxins, and energetics.
		SO	5		X	H				X		H				H	
	27	SS	0		X	X	X			X	X	X	X			X	Extent evaluation west of PRA LOX-9, northwest of sample ENBS0058, which had reported exceedances of VOCs, SVOCs, TPH, dioxins, and metals to 15.5 ft bgs. Additionally, this sample had reported ND in excess of applicable RLs for PAHs and PCBs. Sample location will also address the potential for energetics. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H			H	
		SO	10			X	H	H			X	H	H	H		H	
		SO	15			X	H	H			X	H	H	H		H	
	5SV	SV	5	X													Reevaluate soil vapor to address samples LXSV98, LXSV99, LXSV12, and LXSV13, west of PRA LOX-9. Initial sampling reported ND in excess of applicable RLs.
	28	SS	0		X	X	X			X	X	X	X			X	Extent evaluation west of PRA LOX-9, southwest of sample ENBS0058, which had reported exceedances of VOCs, SVOCs, TPH, dioxins, and metals to 15.5 ft bgs. Additionally, this sample had reported ND in excess of applicable RLs for PAHs and PCBs. Sample location will also address the potential for energetics. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H			H	
		SO	10			X	H	H			X	H	H	H		H	
		SO	15			X	H	H			X	H	H	H		H	
	6SV	SV	5	X													Reevaluate soil vapor to address samples LXSV12, and LXSV13, west of PRA LOX-9. Initial sampling reported ND in excess of applicable RLs.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments	
	29	SS	0		X	X	X			X	X	X	X		X	Extent evaluation north of PRA LOX-9, northeast of sample ENBS0058, which had reported exceedances of VOCs, SVOCs, TPH, dioxins, and metals to 15.5 ft bgs. Additionally, this sample had reported ND in excess of applicable RLs for PAHs and PCBs. Sample location will also address the potential for energetics. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.	
		SO	5		X	H	H			X	H	H	H		H		
		SO	10			X	H	H			X	H	H	H			H
		SO	15			X	H	H			X	H	H	H			H
	7SV	SV	5	X												Reevaluate soil vapor to address samples LXSV99, and LXSV13, north of PRA LOX-9. Initial sampling reported ND in excess of applicable RLs.	
	30	SS	0		X	X	X			X		X	X		X	Extent evaluation north of PRA LOX-9, northwest of sample LXTS0007, which had reported exceedances of phthalates and TPH in the surface sample. This sample had reported ND in excess of applicable RLs for SVOC/PAHs. Additional analysis will address the data gap and potential for VOCs, metals, and dioxins. COPCs include VOCs, SVOC/PAHs, TPH, metals, and dioxins.	
		SO	5		X	H	H			X		H	H		H		
	8SV	SV	5	X												Evaluate to address the data gap identified north of PRA LOX-9.	
	31	SS	0		X	X	X			X		X	X			Extent evaluation northeast of PRA LOX-9, east of sample LXTS0007, which had reported exceedances of phthalates and TPH in the surface sample. This sample had reported ND in excess of applicable RLs for SVOC/PAHs. Additional analysis will address the potential for VOCs, metals, and dioxins. COPCs include VOCs, SVOC/PAHs, TPH, metals, and dioxins.	
		SO	5			X	H	H			X		H	H			
	9SV	SV	5	X												Extent soil vapor at sample LXSV16, east of PRA LOX-9. Initial sampling reported VOC exceedances.	

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCS (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	32	SS	0		X					X		X				Reevaluate soils northwest of PRA LOX-10 at sample LXSA05, which had reported ND in excess of applicable RLs for VOCs only. Sample location will also address extent for LXSA04 (east of LOX-9) with exceedances reported ND in excess of applicable RLs for VOCs. Additional analysis will address the potential for TPH and dioxins. COPCs include VOCs, TPH, and dioxins.
		SO	5		X					X		H				
	33	SS	0		X					X		X	X			Extent evaluation southeast of PRA LOX-9, southeast of sample LXBS1003, which had reported exceedances of TPH and silver in the surface sample. Additional analysis will address the potential for dioxins and the pipeline. Sample will be collected beneath the pipeline. COPCs include VOCs, TPH, metals, and dioxins.
		SO	5		X					X		H	H			
	34	SS	0							X		X	X			Extent evaluation south of PRA LOX-9, southwest of sample LXBS1003, which had reported exceedances of TPH and silver in the surface sample. Sample location will also be an extent evaluation for LXBS1002 and NDTC0121 with exceedances of TPH and lead, respectively. Additional analysis will address the potential for dioxins and the pipeline. Samples will be collected beneath the pipeline. COPCs include TPH, metals, and dioxins.
		SO	5							X		H	H			
	35	SS	0							X		X	X			Extent evaluation southwest of PRA LOX-9, west of samples LXBS1002 and NDTC0121, which had reported exceedances of TPH and lead, respectively. Additional analysis will address the potential for dioxins. COPCs include TPH, metals, and dioxins.
		SO	5							X		H	H			
	36	SS	0							X		X	X			Extent evaluation west of PRA LOX-9, northwest of samples LXBS1002 and NDTC0121, which had reported exceedances of TPH and lead, respectively. Sample location is also an extent evaluation for LXBS1018 with exceedances of metals to 14.5 ft bgs. Additional analysis will address the potential for dioxins. COPCs include TPH, metals, and dioxins.
		SO	5							X		H	H			
		SO	15								X		H	H		

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	37	SS	0							X		X				Extent evaluation south of PRA LOX-10 and between samples LXBS1004 and LXBS1029 ,which had reported exceedances of TPH in the surface samples. Additional analysis will address the potential for dioxins. COPCs include TPH and dioxins.
		SO	5							X		H				
	38	SS	0							X		X				Extent evaluation southeast of PRA LOX-10, southeast of sample LXBS1029, which had reported exceedances of TPH in the surface sample. Additional analysis will address the potential for dioxins. COPCs include TPH and dioxins.
		SO	5							X		H				
	39	SS	0							X		X				Extent evaluation northeast of PRA LOX-10, east of sample LXBS1030 which reported TPH exceedances in the surface sample. Additional analysis will address the potential for dioxins. COPCs include TPH and dioxins.
		SO	5							X		H				
3	40	SS	0		X		X			X	X		X			Extent evaluation southeast of PRA LOX-11, southeast of sample NDBS74 which reported TPH and PAH exceedances in the surface sample. Additional analysis will address reported ND in excess of applicable RLs for metals and PCBs, and the potential for VOCs. COPCs include VOCs, PAHs, TPH, metals, and PCBs
		SO	5		X		H			X	H		H			
3	41	SS	0		X		X			X	X		X			Extent evaluation northwest of PRA LOX-11, northwest of sample NDBS74 which reported TPH and PAH exceedances in the surface sample. Additional analysis will address reported ND in excess of applicable RLs for metals and PCBs, and the potential for VOCs. COPCs include VOCs, PAHs, TPH, metals, and PCBs
		SO	5		X		H			X	H		H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
3	42	SS	0		X		X			X	X		X			Extent evaluation northwest of PRA LOX-12, northwest of sample NDBS0108 which reported phthalate and metal exceedances. Additional analysis will address TPH and PAH exceedances and reported ND in excess of applicable RLs for PAHs metals, and PCBs in sample NDBS74 in the upgradient natural drainage, and the potential for VOCs. COPCs include VOCs, PAHs, TPH, metals, and PCBs
		SO	5		X		H			X	H		H			
3	10SV	SV	5	X												Extent soil vapor due to exceedance in LXSV80, in PRA LOX-12.
3	43	SS	0		X	X	X			X	X		X			Extent evaluation southeast of PRA LOX-12, southeast of sample LXSS04, which had reported exceedances in metal only. Sample location will also address extent evaluation for sample NDBS73 (within PRA LOX-13) with PAHs and TPH exceedances and reported ND in excess of applicable RLs for SVOCs, metals, and PCBs. The potential for VOCs will also be addressed. COPCs include VOCs, SVOC/PAHs, TPH, metals, and PCBs
		SO	5		X	H	H			X	H		H			
3	11SV	SV	5	X												Extent soil vapor due to exceedance in LXSV80, in PRA LOX-12.
3	44	SS	0		X	X	X			X	X		X			Extent evaluation north of PRA LOX-13, north of sample LXTC0001S13, which had reported exceedances in silver only; and sample NDBS72, which had reported exceedances in SVOC/PAHs and TPH. Sample NDBS72 also reported ND in excess of applicable RLs for metals and PCBs. The potential for VOCs will also be addressed. COPCs include VOCs, SVOC/PAHs, TPH, metals, and PCBs.
		SO	5		X	H	H			X	H		H			
3	45	SS	0		X		X			X	X		X			Extent evaluation northeast of PRA LOX-13, east of sample NDBS72, which had reported exceedances in PAHs and TPH. Sample NDBS72 also reported ND in excess of applicable RLs for metals and PCBs. The potential for VOCs will also be addressed. COPCs include VOCs, PAHs, TPH, metals, and PCBs.
		SO	5		X		H			X	H		H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
3	46	SS	0		X								X			Extent evaluation east of PRA LOX-13, southeast of sample NDBS72, which had reported exceedances of lead only. The potential for VOCs will also be addressed. COPCs include VOCs and lead.
		SO	5		X								H			
3	47	SS	0		X								X			Extent evaluation southeast of PRA LOX-13, south of samples NDTC0103 and NDTC0104, which had reported exceedances of lead only. The potential for VOCs will also be addressed. COPCs include VOCs and lead.
		SO	5		X								H			
3	48	SS	0		X								X			Reevaluate soils northeast of PRA LOX-14 at sample NDBS0110, which had reported ND in excess of applicable RLs for VOCs. Sample location will also address extent for LXTC0001S20 with exceedances of metals. COPCs include VOCs and metals.
		SO	5		X								H			
3	49	SS	0		X					X			X			Extent evaluation west of PRA LOX-14, west of sample LXTC0001S20, which had exceedances of metals. Additional analysis will address the potential for VOCs and TPH. COPCs include VOCs, TPHs, and metals.
		SO	5		X					X			H			
	50	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the southwestern corner of the former Truck Scale Shack/System Controls Building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, and metals.
		SO	5		X	H	H			X	H	H	H			
	51	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the southeastern corner of the former Truck Scale Shack/Controls Building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, and metals.
		SO	5		X	H	H			X	H	H	H			
	12SV	SV	5	X												Data gap evaluation will address the southeastern corner of the new building feature identified during the aerial photograph review.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	52	SS	0		X	X				X	X	X	X			Data gap evaluation will address the northeastern corner of the former Truck Scale Shack/System Controls Building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, and metals.
		SO	5		X	H				X	H	H	H			
	13SV	SV	5	X												Data gap evaluation will address the northeastern corner of the new building feature identified during the aerial photograph review.
1	53	SS	0		X	X	X			X		X	X			Data gap evaluation will address the southwestern corner to the former building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, and metals.
		SO	10		X	H	H			X		H	H			
1	14SV	SV	5	X												Data gap evaluation will address the southwestern corner of the new building feature identified during the aerial photograph review.
1	54	SS	0		X	X	X			X		X	X			Data gap evaluation will address the southern edge of the former building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, and metals.
		SO	5		X	H	H			X		H	H			
1	15SV	SV	5	X												Data gap evaluation will address the southwestern corner of the new building feature identified during the aerial photograph review.
1	55	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the eastern side of the former building and western side of the former AST identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	16SV	SV	5	X												Extent soil vapor sample to address exceedance from sample LXS27, south of PRA LOX-15. Sample location will also address the data gap between the former building and former AST.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	56	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the area south of PRA-15, and between two former ASTs identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	17SV	SV	5	X												Extent soil vapor sample to address exceedances from samples LXS27 and LXS28, south of PRA LOX-15. Sample location will also address the data gap between two former ASTs.
1	57	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the area south of PRA-15, and between two former ASTs identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	18SV	SV	5	X												Extent soil vapor sample to address exceedance from sample LXS28, south of PRA LOX-15. Sample location will also address the data gap between two former ASTs.
1	58	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the area south of PRA-15. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	19SV	SV	5	X												Data gap evaluation will address the area south of PRA LOX-15.
1	59	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the area south of PRA-15. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	20SV	SV	5	X												Data gap evaluation will address the area south of PRA LOX-15.
1	60	SS	0		X	X	X			X	X	X	X			Data gap evaluation will address the area south of PRA-15, and between two former ASTs identified during the aerial photograph review. This sample location will also address the extent evaluation for ENBS0008. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	21SV	SV	5	X												Data gap evaluation will address the area south of PRA LOX-15, between two ASTs.
1	61	SS	0		X	X	X			X	X	X	X			Extent evaluation southeast of PRA LOX-15, west of sample ENBS0059, which had reported exceedances of TPH. Additional analysis will address the data gap identified and the former AST. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, and metals.
		SO	5		X	H	H			X		H	H			
1	22SV	SV	5	X												Data gap evaluation will address the area south of PRA LOX-15, and adjacent to the former large AST.
1	62	SS	0		X	X	X			X	X	X	X		X	Extent evaluation southeast of PRA LOX-15, southwest of sample ENBS0059 and west of sample LXBSCB04, which had reported exceedances of TPH. Sample LXBSCB04 also reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics to 15.5 ft bgs. Additional analysis will address the data gap identified and the former AST, and the potential for dioxins. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, metals, and energetics.
		SO	5		X	H	H			X		H	H		H	
		SO	10		X	H	H			X		H	H		H	
		SO	15		X	H	H			X		H	H		H	
1	23SV	SV	5	X												Data gap evaluation will address the area south of PRA LOX-15.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	63	SS	0		X	X	X			X	X	X	X		X	Extent evaluation southeast of PRA LOX-15, southwest of sample LXBSCB04, which had a reported exceedance of TPH to 15.5 ft bgs and reported ND in exceedance of applicable RLs for VOCs, SVOC/PAHs, and energetics. Additional analysis will address the potential for dioxins and TPH. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, metals, and energetics.
		SO	5		X	X	X			X		H	H		H	
		SO	10		X	X	X			X		H	H		H	
		SO	15		X	X	X			X		H	H		H	
1	24SV	SV	5	X											Extent soil vapor due to exceedance in LXSA07, southeast of PRA LOX-15.	
1	64	SS	0		X	X	X			X		X	X		X	Extent evaluation southeast of PRA LOX-15, east of sample LXBSCB04, which had a reported exceedance of TPH to 15.5 ft bgs and reported ND in exceedance of applicable RLs for VOCs, SVOC/PAHs, and energetics. Additional analysis will address the potential for dioxins and TPH. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, metals, and energetics.
		SO	5		X	X	X			X		H	H		H	
		SO	10		X	X	X			X		H	H		H	
		SO	15		X	X	X			X		H	H		H	
1	65	SS	0		X					X		X				Extent evaluation southeast of PRA LOX-15, northeast of sample ENBS0059, which had reported exceedances of TPH. Additional analysis will address the potential for dioxins and TPH. COPCs include VOCs, TPH, and dioxins.
		SO	5		X					X		H				

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	66	SS	0		X					X	X	X				Extent evaluation east of PRA LOX-15, east of sample LXBS1169, which had reported exceedance of dioxins. Additional analysis will address the potential for VOCs and TPH, and PCB exceedances from LXBS1024. COPCs include VOCs, TPH, PCBs, and dioxins.
		SO	5		X					X	H	H				
1	67	SS	0		X					X		X	X			Extent evaluation east of PRA LOX-15, northeast of sample LXBS1169, which had reported exceedances of dioxins, and east of sample ENBS0013, which had reported exceedances of selenium. Additional analysis will address the potential for VOCs and TPH. COPCs include VOCs, TPH, dioxins, and metals.
		SO	5		X					X		H	H			
1	68	SS	0		X					X		X				Extent evaluation east of PRA LOX-15, northeast of sample LXBS1069 and east of sample LXBS1047, which had reported exceedances of dioxins. Additional analysis will address the potential for VOCs and TPH. COPCs include VOCs, TPH, and dioxins.
		SO	5		X					X		H				
1	69	SS	0		X					X		X				Extent evaluation northeast of PRA LOX-15, northeast of sample LXBS1167, north of sample LXBS1047, and east of sample LXBS1086, which had reported exceedances of dioxins in surface samples. Additional analysis will address the potential for VOCs and TPH. COPCs include VOCs, TPH, and dioxins.
		SO	5		X					X		H				
	70	SS	0		X					X			X			Extent evaluation northwest of PRA LOX-16 and adjacent to a rock outcrop, northwest of sample ENBS0023, which had reported exceedances of TPH and metals in the surface sample. Additional analysis will address reported ND in excess of applicable RLs for VOCs at 5 ft bgs and the former AST. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	71	SS	0		X					X			X			Extent evaluation east of PRA LOX-16, east of sample ENBS0023, which had reported exceedances of TPH and metals in the surface sample. Additional analysis will address reported ND in excess of applicable RLs for VOCs at 5 ft bgs and the former AST. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	72	SS	0		X					X			X			Extent evaluation south of PRA LOX-16, south of sample ENBS0023, which had reported exceedances of TPH and metals in the surface sample. Additional analysis will address reported ND in excess of applicable RLs for VOCs at 5 ft bgs and the former AST. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	73	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area northwest of PRA-8. Location will also address the extent evaluation for sample LXBS1026, which had reported exceedances of SVOCs and to 7.5 ft bgs, and sample LXBS1216, which had reported exceedances of copper in the surface sample. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10		X	H	H			X	H	H	H		H	
	25SV	SV	5	X												Evaluate soil vapor northwest of PRA LOX-8, in data gap area.
		SV	10	X												
1	74	SS	0		X					X	X	X	X			Extent evaluation north of PRA LOX-15, northeast of sample LXBS1156, which had reported exceedances of copper and dioxins in the surface sample, and exceedances in sample LXTSTP04 for VOCs, metals, TPH, and PCBs. Additional analysis will address the potential for VOCs and TPH and the pipeline. Sample will be collected beneath the pipeline. COPCs include VOCs, TPH, metals, PCBs, and dioxins.
		SO	5		X					X	H	H	H			
1	26SV	SV	5	X												Evaluate soil vapor in the northern portion of PRA LOX-15, beneath pipeline.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	75	SS	0		X					X	X		X			Evaluate soils north of PRA LOX-15, at pipeline. Additional analysis will address the LOX Area Dispersion Area sampling. Sample will be collected beneath the pipeline. COPCs include VOCs, TPHs, metals, and PCBs.
		SO	2		X					X	H		H			
		SO	5		X					X	H		H			
1	27SV	SV	5	X												Evaluate soil vapor north of PRA LOX-15, beneath pipeline.
1	76	SS	0		X					X		X	X			Evaluate soils north of PRA LOX-15, at pipeline. Additional analysis will address the potential for dioxins. Sample will be collected beneath the pipeline. COPCs include VOCs, TPHs, metals, and dioxins.
		SO	5		X					X		H	H			
1	28SV	SV	5	X												Evaluate soil vapor north of PRA LOX-15, beneath pipeline.
4	77	SS	0										X			LOX Area Dispersion Area sampling. COPCs include metals.
		SO	2										H			
4	78	SS	0								X		X			LOX Area Dispersion Area sampling. COPCs include metals and PCBs.
		SO	2								H		H			
4	79	SS	0										X			LOX Area Dispersion Area sampling. COPCs include metals.
		SO	2										H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCS (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments	
4	80	SS	0										X			LOX Area Dispersion Area sampling. COPCs include metals.	
		SO	2										H				
4	81	SS	0								X		X			LOX Area Dispersion Area sampling. COPCs include metals and PCBs.	
		SO	2								H		H				
4	82	SS	0										X			LOX Area Dispersion Area sampling. COPCs include metals.	
		SO	2										H				
1	83	SS	0		X						X		X			LOX Area Dispersion Area sampling. Additional analysis will address the extent evaluation of sample LXBS1007, with reported exceedances of VOCs to 10 ft bgs. COPCs include VOCs, metals, and PCBs.	
		SO	2		X						H		H				
		SO	5		X							H		H			
		SO	10		X							H		H			
1	29SV	SV	5	X												Extent soil vapor evaluation at sample LXSV96, north of PRA LOX-15 to 8 ft bgs.	
		SV	10	X													

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments	
1	84	SS	0		X					X		X				Extent evaluation north of PRA-15, north of sample LXBS1006, which had reported VOC exceedances to 20 ft bgs, and sample LXBS1192, which had reported dioxin exceedances in the surface sample. COPCs include VOCs, TPH, and dioxins.	
		SO	5		X					X		H					
		SO	10		X						X		H				
		SO	15		X						X		H				
		SO	20		X						X		H				
1	30SV	SV	5	X												Extent evaluation soil vapor sample for exceedances from sample LXSV71.	
3	85	SS	0		X	X	X			X	X	X	X			Evaluate soils north of PRA-15, to address pipelines and anticipated leach field area. Additional analysis will address the potential for dioxins and metals and extent for sample LXBS1051. Sample will be collected beneath the pipeline. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, and metals.	
		SO	5		X	H	H			X	H	H	H				
3	31SV	SV	5	X												Extent evaluation soil vapor sample to address reported ND in excess of applicable RLs from sample LXSA0041.	
3	86	SS	0		X	X	X			X	X	X	X			Extent evaluation north of PRA LOX-15, northeast of sample LXBS1132, which had reported exceedances of dioxins in the surface sample, and exceedances in sample LXTSTP04 for VOCs, TPH, metals, and PCBs . Additional analysis will address the potential for VOCs and TPH, and address the former empty drums in SWMU 4.6. COPCs include VOCs, SVOC/PAHs, TPH, metals, PCBs, and dioxins.	
		SO	5		X	H	H			X	H	H	H				

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
3	87	SS	0		X	X	X			X		X	X			Extent evaluation north of PRA LOX-15, northeast of sample LXBS1136, which had reported exceedances of dioxins in the surface sample. Additional analysis will address the potential for VOCs and TPH and address the former empty drums in SWMU 4.6. COPCs include VOCs, SVOC/PAHs, TPH, metals, and dioxins.
		SO	5		X	H	H			X		H	H			
3	88	SS	0		X					X		X				Extent evaluation northwest of PRA LOX-15, west of samples LXBS1135 and LXBS1136, which had reported exceedances of dioxins in the surface samples. Additional analysis will address the potential for VOCs and TPH. COPCs include VOCs, TPH, and dioxins.
		SO	5		X					X		H				
3	89	SS	0		X	X	X			X		X	X			Extent evaluation west of PRA LOX-15, northwest of samples LXBS0031 and LXTS03, which had reported exceedances of SVOCs and metals in the surface samples, respectively. Additional analysis will address the potential for VOCs and dioxins, and reported ND in excess of applicable RLs for PAHs and TPH. COPCs include VOCs, SVOC/PAHs, TPH, metals, and dioxins.
		SO	5		X	H	H			X		H	H			
3	90	SS	0		X	X	X			X		X	X			Extent evaluation west of PRA LOX-15, south of sample LXBS0031, which had reported exceedances of SVOCs in the surface samples. Additional analysis will address the potential for VOCs and dioxins, and reported ND in excess of applicable RLs for PAHs and TPH. COPCs include VOCs, SVOC/PAHs, TPH, metals, and dioxins.
		SO	5		X	H	H			X		H	H			
3	91	SS	0		X							X	X			Reevaluate soils southwest of PRA LOX-15, at sample LXTS04 (located adjacent to the debris pile), which had reported exceedances of metals. Additional analysis will address the potential for VOCs and dioxins. COPCs include VOCs, metals, and dioxins.
		SO	5		X							H	H			

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area
 NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
3	32SV	SV	5	X												Reevaluate soil vapor at samples LXSV01 and LXSV47, southwest of PRA LOX-15. VOC exceedances were found to 23 ft bgs in sample LXSV47.
		SV	10	X												
		SV	15	X												
		SV	20	X												
3	92	SS	0		X	X	X			X	X	X	X	X	X	Evaluate soils southwest of PRA LOX-15, adjacent and south of the LOX debris pile. Additional analysis will address the data gap and potential for VOCs, dioxins, and energetics, and mercury exceedance in sample LXST0001. COPCs include VOCs, SVOC/PAHs, TPH, dioxins, PCBs, metals, and energetics.
		SO	5		X	H	H			X	H	H	H	H	H	
3	33SV	SV	5	X												Reevaluate soil vapor at sample LXSV41, south of PRA LOX-15 and east of the LOX debris pile. VOC exceedances were found to 23 ft bgs.
		SV	10	X												
		SV	15	X												
		SV	20	X												
3	93	SS	0		X	X	X			X	X	X	X		X	Extent evaluation south of PRA LOX-15, south of sample LXTS01, which had reported exceedances of metals. Additional analysis will address the data gap and potential for VOCs, dioxins, and energetics. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
3	34SV	SV	5	X												Extent evaluation soil vapor sample to address reported ND in excess of applicable RLs from sample LXSA0041.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
3	94	SS	0		X	X	X			X	X	X	X		X	Evaluate soils from former building/structure identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
3	35SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in former area of former building/structure.
1	95	SS	0		X	X	X			X	X	X	X		X	Extent evaluation south of PRA LOX-15, southeast of sample LXBS1189, which had reported exceedances of dioxins. Additional analysis will address the data gap and potential for VOCs and energetics. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	36SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area.
1	96	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-15, and south of the main LOX Plant building, adjacent to the former chillers. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	37SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area.
1	97	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-15, and in area of former main LOX Plant building. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	38SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
1	98	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-15, and south of the main LOX Plant building, adjacent to the former cold boxes. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	39SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area.
1	99	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-15, and south of the main LOX Plant building. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	40SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area. Sample will also address extent evaluation for VOC exceedance in sample LXS32.
1	100	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-15, and adjacent to the former building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
1	41SV	SV	5	X												Evaluate soil vapor south of PRA LOX-15, in data gap area. Sample will also address extent evaluation for VOC exceedance in sample LXS33.
2	101	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area north of PRA LOX-8, and adjacent to the former building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
2	42SV	SV	5	X												Evaluate soil vapor north of PRA LOX-8, in data gap area.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
2	102	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area north of PRA LOX-8. Location will also address the extent evaluation for sample LXBS02, which had reported exceedances of VOCs, SVOCs, TPH, and metals to 9.5 ft bgs. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10		X	H	H			X	H	H	H		H	
2	43SV	SV	5	X												Evaluate soil vapor north of PRA LOX-8, in data gap area.
		SV	10	X												
		SV	15	X												
2	103	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area north of PRA LOX-8. Location will also address the extent evaluation for sample LXBS1026, which had reported exceedances of SVOCs and to 7.5 ft bgs. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10		X	H	H			X	H	H	H		H	
2	44SV	SV	5	X												Evaluate soil vapor north of PRA LOX-8, in data gap area.
		SV	10	X												
		SV	15	X												

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	104	SS	0		X	X	X			X	X	X	H			Data gap evaluation will address the central portion of the former Truck Scale Shack/System Controls Building identified during the aerial photograph review. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, and metals.
		SO	5		X	H	H			X	H	H	H			
	45SV	SV	5	X												Data gap evaluation will address the central portion of the new building feature identified during the aerial photograph review.
	105	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area southwest of PRA LOX-8. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10		X	H	H			X	H	H	H		H	
	46SV	SV	5	X												Evaluate soil vapor southwest of PRA LOX-8, in data gap area. Sample will also address the extent evaluation for VOC exceedance in sample SV-4.5-1. Additionally, this location will address the reported ND in excess of applicable RLs in sample LXSV20, to the southeast.
		SV	10	X												
	106	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area southwest of PRA LOX-8. This sample location will also address the extent evaluation for sample LXBS1011, which had reported copper exceedances. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10		X	H	H			X	H	H	H		H	
	47SV	SV	5	X												Evaluate soil vapor southwest of PRA LOX-8, in data gap area. Sample will also address the reported ND in excess of applicable RLs in sample LXSV20, to the north.
		SV	10	X												

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	107	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area south of PRA LOX-8. This sample location will also address the extent evaluation for samples LXBS1014, which had reported VOC exceedances in the surface sample and LXBS08 with TPH exceedances at 5 ft bgs. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10			X	H	H			X	H	H	H		
	48SV	SV	5	X												Evaluate soil vapor south of PRA LOX-8, in data gap area.
		SV	10	X												
	108	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area southeast of PRA LOX-8. This sample location will also address the extent evaluation for sample LXBS03, which had reported TPH and metals exceedances, and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics to 20 ft bgs. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10			X	H	H			X	H	H		H	
		SO	15			X	H	H			X	H	H		H	
		SO	20			X	H	H			X	H	H		H	
	49SV	SV	5	X												Re-evaluate soil vapor at sample LXSV21, southeast of PRA LOX-8. VOC exceedances were found in the shallow sample.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	109	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area east of PRA LOX-8. This sample location will also address the extent evaluation for sample LXBSCB03 with TPH and metals exceedances, and reported ND in excess of applicable RLs for VOCs, SVOC/PAHs, and energetics to 20 ft bgs. Proposed sample depth is to 10 ft bgs because this location is in the front of the former building, where no known LOX operations are reported. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
		SO	10			X	H	H			X	H	H	H		
	50SV	SV	5	X												Evaluate soil vapor east of PRA LOX-8, in data gap area. Sample will also address the VOC exceedances in sample LXSV36, to the northeast.
	110	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation will address the area east of PRA LOX-8. This sample location will also address the reevaluation for sample LXBS0046 with reported ND in excess of applicable RLs for VOCs. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
	51SV	SV	5	X												Evaluate soil vapor east of PRA LOX-8, in data gap area. Sample will also address the VOC exceedances in sample LXSV36, to the south, and reporting limit exceedances from samples LXSV35 (same location as proposed sample) and LXSV34 to the northeast.
2	111	SS	0		X	X	X			X	X	X	X		X	Reevaluate soils at sample B-2-01 with reported ND in excess of applicable RLs for VOCs. This location will also address the data gap between PRAs LOX-8 and LOX-15. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
2	52SV	SV	5	X												Evaluate soil vapor between PRAs LOX-8 and LOX-15, west of sample LXSV45, which had reported VOC exceedances. This location will also address the data gap.
	112	SS	0		X	X	X			X	X	X	X		X	Reevaluate soils at sample B-2-01 with reported ND in excess of applicable RLs for VOCs. This location will also address the data gap between PRAs LOX-8 and LOX-15. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	53SV	SV	5	X												Evaluate soil vapor between PRAs LOX-8 and LOX-15. This location will address reevaluation of samples LXSV0023, LXSV23, and LXSV44, and the extent for sample LXSV43 , which had reported VOC exceedances to 12 ft bgs.
		SV	10	X												
		SV	15	X												
	113	SS	0		X	X	X			X	X	X	X		X	Data gap evaluation of soils south of the main LOX Plant building. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, dioxins, metals, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
	54SV	SV	5	X												Evaluate soil vapor south of the main LOX Plant building. This location will address extent evaluation for samples LXSV42 and LXSV43, which had reported VOC exceedances to 18 ft bgs. This location will also address the reevaluation of samples LXSV0023, LXSV23, LXSV35, and LXSV34.
		SV	10	X												
		SV	15	X												
		SV	20	X												
	114	SS	0		X	X	X			X	X	X	X		X	Reevaluate soils between the two LOX Plant buildings at sample LXBS0048, which had reported ND in excess of applicable RLs for VOCs. Sample location will also address the data gap area. COPCs include VOCs, SVOC/PAHs, TPH, PCBs, metals, dioxins, and energetics.
		SO	5		X	H	H			X	H	H	H		H	
	55SV	SV	5	X												Evaluate soil vapor south of the main LOX Plant building. This location will also address extent evaluation for samples LXSV33 and LXSV59, which had reported VOC exceedances to 5 ft bgs.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	115	SS	0		X					X			X			Evaluate soils south of PRA LOX-1, at debris pile ND-2. Additional analysis will address the pipeline. Sample will be collected within 10 feet of the debris pile. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	116	SS	0		X					X			X			Evaluate soils east of PRA LOX-7, at debris pile ND-51. Sample will be collected within 10 feet of the debris pile. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	117	SS	0		X					X			X			Evaluate soils west of PRA LOX-9, at debris pile ND-52. Sample will be collected within 10 feet of the debris pile. COPCs include VOCs, TPH, and metals.
		SO	5		X					X			H			
	118	SS	0		X	X	X			X	X		X			Evaluate soils north of PRA LOX-15 in anticipated leach field. COPCs include VOCs, SVOCs/PAHs, TPH, PCBs, and metals.
		SO	5		X	H	H			X	H		H			
	56SV	SV	5	X												Reevaluate soil vapor at sample LXSV10, east of PRA LOX-7.
	57SV	SV	5	X												Reevaluate soil vapor at sample LXSV11, east of PRA LOX-7.
	58SV	SV	5	X												Evaluate soil vapor north of PRA LOX-15 in anticipated leach field.

TABLE 1.10-2

Data Quality Objectives: Former LOX Plant Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV)2 (EPA Method 8260B)	VOCs (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C [SIM])	NDMA (EPA Method 1625C)	Formaldehyde (EPA Method 8315A)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins (EPA Method 8290)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471A)	Energetics (EPA Method 8330A)	Rationale/Comments
	59SV	SV	5	X												Data gap evaluation will address the southwestern corner of the new building feature identified during the aerial photograph review.

Notes:

CUA = chemical use area
 DTSC GSU = California Department of Toxic Substances Control Geological Services Unit
 ft bgs = feet below ground surface
 H = Sample will be held until it is needed; e.g., to delineate a detection in shallower samples at the same or nearby locations
 ID = identification
 NDMA = n-nitrosodimethylamine
 PCB = polychlorinated biphenyl
 RBSL = risk-based screening level
 SV = soil vapor
 SVOC = semivolatile organic compound
 SVOC SIM = SVOCs with selected ion monitoring
 TPH = total petroleum hydrocarbons
 VOC = volatile organic compound

1. Actual vertical profile sampling depths might change as field conditions warrant; however, a sample will be collected from the bottom of each boring except where noted in rationale/comments.
 * = Surface samples (SS) for VOCs will be collected at 1 ft bgs.

TABLE 1.11-1

Chemical Use Areas at Area II Landfill

NASA SSFL Field Sampling Plans

Chemical Use Area Types and Typical Target Analytical Suites						
Chemical Use Area Name	Petroleum Fuels / Solvents	PAHs ² and SVOCs	Energetic Constituents / Propellants	Oil-Related Materials and Debris	Dioxins	Pesticides
	TPH, VOCs ¹		Hydrazine, NDMA, UDMH, MMH, NTO, IRFNA, Formaldehyde, Metals	SVOCs, PAHs ² , TPH, PCBs, Metals		
1 - Area II Landfill	X	X	X	X		
Notes: IRFNA = Inhibited red fuming nitric acid MMH = monomethyl hydrazine NDMA = n-nitrosodimethylamine NTO = nitrogen tetroxide PAH = polycyclic aromatic PCB = polychlorinated biphenyl SPA = Storable Propellant Area SVOC = semivolatile organic compound TPH = total petroleum hydrocarbons UDMH = unsymmetrical diethyl hydrazine VOC = volatile organic compound ¹ VOCs are a COPC for TPH-gasoline. ² SVOCs and PAHs are COPCs for TPH-diesel.						

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
--	1	SS	0			X	X													Northern extent evaluation of A2LF-1. COCs include PAHs, phthalates, and SVOCs. Sample NDBS0113 had a phthalate detection and non-detected PAH, phthalate, and SVOC concentrations that exceeded screening criteria.
		SO	5			H	H													
--	2	SS	0			X	X													Eastern extent evaluation of A2LF-1. COCs include PAHs, phthalates, and SVOCs. Sample NDBS0113 had a phthalate detection and non-detected PAH, phthalate, and SVOC concentrations that exceeded screening criteria.
		SO	5			H	H													
--	3	SS	0			X	X													Southern extent evaluation of A2LF-1. COCs include PAHs, phthalates, and SVOCs. Sample NDBS0113 had a phthalate detection and non-detected PAH, phthalate, and SVOC concentrations that exceeded screening criteria.
		SO	5			H	H													
--	4	SS	0			X	X													Western extent evaluation of A2LF-1. COCs include PAHs, phthalates, and SVOCs. Sample NDBS0113 had a phthalate detection and non-detected PAH, phthalate, and SVOC concentrations that exceeded screening criteria.
		SO	5			H	H													
--	5	SS	0								X								118, 121	Western extent evaluation of A2LF-2. COCs include dioxins. Sample A2BS1077 had a dioxin detection.
		SO	5								H									
--	6	SS	0								X								118, 121	Eastern extent evaluation of A2LF-2. COCs include dioxins. Sample A2BS1077 had a dioxin detection.
		SO	5								H									
--	7	SS	0								X								118, 121	Southern extent evaluation of A2LF-2. COCs include dioxins. Sample A2BS1077 had a dioxin detection.
		SO	5								H									
--	8	SS	0									X								Data gap evaluation. Sample A2BS0041S70 had a non-detected PCB concentration that exceeded screening criteria. COCs include PCBs.
		SO	5									H								
--	9	SS	0									X								Data gap evaluation. Sample A2BS0041S70 had a non-detected PCB concentration that exceeded screening criteria. COCs include PCBs.
		SO	5									H								
--	10	SS	0									X								Northwestern extent evaluation of A2LF-3. Sample A2BS1090, A2BS1100, and A2BS1101 had lead and mercury detections. COCs include metals.
		SO	5									H								

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
--	11	SS	0									X								Southwestern extent evaluation of A2LF-3. Sample A2BS1090, A2BS1100, and A2BS1101 had lead and mercury detections. COCs include metals.
		SO	5									H								
--	12	SS	0									X								Southern extent evaluation of A2LF-3. Sample A2BS1090, A2BS1100, and A2BS1101 had lead and mercury detections. COCs include metals.
		SO	5									H								
--	13	SS	0									X								Southeastern extent evaluation of A2LF-3. Sample A2BS1090, A2BS1100, and A2BS1101 had lead and mercury detections. COCs include metals.
		SO	5									H								
--	14	SS	0									X								Northeastern extent evaluation of A2LF-3. Sample A2BS1090, A2BS1100, and A2BS1101 had lead and mercury detections. COCs include metals.
		SO	5									H								
1	15	SS	0		X		X	X			X	X							118, 121	Data gap and western extent evaluation for A2LF-5. Sample A2TS31501, A2TS33501, and A2TS33502 had dioxin, metals, PAH, TPH and VOC detections and non-detected dioxin, metals, PAH, TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxin, metals, PAH, TPH, and VOCs.
		SO	5		X		H	X			H	H								
1	16	SS	0		X	X	X	X		X			X							Data gap and A2LF-5 extent evaluation. Sample A2BS17 had TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. Sample A2BS33 had a mercury detection. COCs include mercury, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H			H							
1	17	SS	0		X	X	X	X		X		X	X							Data gap and A2LF-5 extent evaluation. Sample A2BS16 had mercury, TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include mercury, metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H	H							
1	18	SS	0		X	X	X	X		X		X	X							Data gap and A2LF-5 extent evaluation. Samples A2BS16, ASBS19, and A2BS20 had mercury, TPH, PAH, and VOC detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include mercury, metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H	H							
1	19	SS	0		X	X	X	X		X		X		X	X	X		X	120	Data gap and A2LF-5 extent evaluation. Sample A2TS1000A and A2TS03 had metals, PAH, phthalate, and TPH detections and non-detected energetics, metals, PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include energetics (including formaldehyde, fluoride, and NDMA), metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H		H	H	H		H		
1	20	SS	0		X	X	X	X		X										Data gap and A2LF-5 extent evaluation. Samples A2BS1051 and A2TS20501 had a PCB detection and non-detected PAH, PCB, phthalate, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, phthalates, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	1SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV05, A2SV16, and A2SV22 had non-detected VOC concentrations that exceeded screening criteria.
1	21	SS	0		X		X	X		X		X								A2LF-5 extent evaluation. Samples A2BS1050 and A2TS35S01 had barium, TPH, and PAH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H		H								
1	2SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV05, A2SV16, and A2SV22 had non-detected VOC concentrations that exceeded screening criteria.
1	22	SS	0		X		X	X		X										A2LF-5 extent and data gap evaluation. Samples A2BS1057 and A2TS27S01 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	3SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV21 had non-detected VOC concentrations that exceeded screening criteria.
1	23	SS	0		X	X	X	X		X		X		X	X	X	X	X	120	A2LF-5 extent and data gap evaluation. Sample A2TS24S01 and A2TS03 had metals, PAH, phthalate, TPH, and VOC detections and non-detected energetics, metals, PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include energetics (including formaldehyde, fluoride, perchlorate and NDMA), metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H		H	H	H	H	H		
1	4SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV22 had non-detected VOC concentrations that exceeded screening criteria.
--	24	SS	0		X		X	X		X										Data gap evaluation. Sample A2TS21S01 had PAH, PCB, TPH, and VOC non-detected concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	25	SS	0		X		X	X		X										A2LF-5 extent and data gap evaluation. Sample A2TS19S01 and A2TS1902 had non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	26	SS	0		X		X	X		X										A2LF-5 extent and data gap evaluation. Sample A2TS19S01 and A2TS1902 had non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	5SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV24 had non-detected VOC concentrations that exceeded screening criteria.
--	27	SS	0		X		X	X		X										Data gap evaluation. Sample A2TS23S01 had non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	6SV	SV	5	X																Data gap and A2LF-5 extent evaluation. Sample A2SV302 had non-detected VOC concentrations that exceeded screening criteria.
1	28	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Samples A2TS15S01 and A2TS16S01 had non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	29	SS	0		X		X	X		X										Data gap and A2LF-8 extent evaluation. Samples A2TS15S01 and A2TS16S01 had non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	7SV	SV	5	X																Data gap and A2LF-8 extent evaluation. Samples A2SV09 and A2SV28 had non-detected VOC concentrations that exceeded screening criteria.
1	30	SS	0		X	X	X	X		X		X								Data gap and A2LF-5 and A2LF-8 extent evaluation. Samples A2TS02 and A2TS11S01 had metals and TPH detections and non-detected metal, PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								
1	31	SS	0		X		X	X		X										Data gap and A2LF-5 and A2LF-8 extent evaluation. Samples A2BS1064, A2TS12S02 and A2TS13S01 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	8SV	SV	5	X																Data gap and A2LF-5 and A2LF-8 extent evaluation. Samples A2SV10 and A2SV27 had non-detected VOC concentrations that exceeded screening criteria.
1	32	SS	0		X	X	X	X		X										A2LF-8 extent evaluation. Samples A2BS1052 and A2TS09S02 had TPH and PAH detections and non-detected PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	33	SS	0		X	X	X	X		X										A2LF-8 extent evaluation. Samples A2BS1052 and A2TS09S02 had TPH and PAH detections and non-detected PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	34	SS	0		X	X	X	X		X		X								A2LF-8 extent and data gap evaluation. Samples A2TS01S01 and A2TS06S01 had metals detections and non-detected PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	9SV	SV	5	X																Data gap and A2LF-8 extent evaluation. Samples A2SV14 and A2SV15 had non-detected VOC concentrations that exceeded screening criteria.
1	35	SS	0		X	X	X	X		X		X								A2LF-8 extent and data gap evaluation. Samples A2TS01S01 and A2TS06S01 had metals detections and non-detected PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								
1	36	SS	0		X	X	X	X		X		X								A2LF-8 extent and data gap evaluation. Samples A2TS01S01 and A2TS06S01 had metals detections and non-detected PAH, PCB, phthalate, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								
1	37	SS	0		X	X	X	X		X										A2LF-8 extent and data gap evaluation. Samples A2TS04S01, A2TS05S01 and A2BS1068 had TPH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	38	SS	0		X	X	X	X		X										A2LF-8 extent and data gap evaluation. Samples A2TS04S01, A2TS05S01 and A2BS1068 had TPH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	39	SS	0		X	X	X	X		X										A2LF-8 extent and data gap evaluation. Sample A2BS1068 had a TPH detection and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	10SV	SV	5	X																Data gap and A2LF-8 extent evaluation. Sample A2SV14 had non-detected VOC concentrations that exceeded screening criteria.
1	40	SS	0		X	X	X	X		X										A2LF-8 extent evaluation. Sample A2BS1066, A2TS22S01, and A2TS22S02 had TPH and VOC detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	41	SS	0							X	X	X								A2LF-8 extent evaluation. Sample A2BS01 and A2BS02 had TPH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxins, metals, and PCB.
		SO	5							H	H	H								
1	42	SS	0							X	X	X	X							A2LF-8 extent evaluation. Sample A2BS03 and A2BS1142 had mercury and TPH detections and non-detected metal, PAH, PCB, SVOC (phthalates), TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxins, mercury, metals, and PCB.
		SO	5							H	H	H	H							
1	43	SS	0							X	X	X								A2LF-8 extent evaluation. Sample A2BS04 had a TPH detection and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxins, metals, and PCB.
		SO	5							H	H	H								

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	44	SS	0		X	X	X	X		X		X								A2LF-8 extent evaluation. Sample A2BS04 and NDTC0147 had a TPH and metals detection and non-detected metals, PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								
1	45	SS	0		X		X	X		X		X								A2LF-8 extent evaluation. Sample NDTC0147 had a metals detection. Additional COCs include metals, PAH, PCB, TPH, and VOC based on other historic sample results upgradient from this location.
		SO	5		X		H	X		H		H								
1	46	SS	0		X		X	X		X		X								A2LF-8 extent evaluation. Sample NDTC0147 had a metals detection. Additional COCs include metals, PAH, PCB, TPH, and VOC based on other historic sample results upgradient from this location.
		SO	5		X		H	X		H		H								
1	47	SS	0		X		X	X		X		X								A2LF-8 extent evaluation. Sample NDTC0147 had a metals detection. Additional COCs include metals, PAH, PCB, TPH, and VOC based on other historic sample results upgradient from this location.
		SO	5		X		H	X		H		H								
1	48	SS	0		X	X	X	X	X	X	X	X	X	X	X	X	X	X		A2LF-8 extent evaluation. Sample NDTC0147 had a lead detection. Additional COCs include dioxins, energetics, formaldehyde, fluoride, mercury, metals, NDMA, PAH, PCB, perchlorate, pesticides, SVOCs, TPH, and VOC based on other historic sample results upgradient from this location.
		SO	2		X	H	H	X	H	H	H	H	H	H	H	H	H	H		
--	49	SS	0									X								A2LF-7 extent evaluation. Samples NDTC0151 and NDTC0152 had lead detections. The COCs for this PRA are metals.
		SO	2									H								
--	50	SS	0									X								A2LF-7 extent evaluation. Samples NDTC0151 and NDTC0152 had lead detections. The COCs for this PRA are metals.
		SO	2									H								
--	51	SS	0									X								A2LF-7 extent evaluation. Samples NDTC0151 and NDTC0152 had lead detections. The COCs for this PRA are metals.
		SO	2									H								
--	52	SS	0									X								A2LF-7 extent evaluation. Samples NDTC0151 and NDTC0152 had lead detections. The COCs for this PRA are metals.
		SO	2									H								
1	53	SS	0		X	X	X	X	X	X	X	X	X	X	X	X	X	X		A2LF-8 extent evaluation. Sample A2BS04 had a TPH detection and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxins, energetics, formaldehyde, fluoride, mercury, metals, NDMA, PAH, PCB, perchlorate, pesticides, SVOCs, TPH, and VOC.
		SO	2		X	H	H	X	H	H	H	H	H	H	H	H	H	H		
1	54	SS	0		X	X	X	X		X										A2LF-8 extent evaluation. Sample A2BS04 had a TPH detection and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	2		X	H	H	X		H										

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	55	SS	0		X		X	X		X										A2LF-8 extent evaluation. Sample A2BS03 had a TPH detection and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	2		X		H	X		H										
1	56	SS	0		X	X	X	X		X		X	X							A2LF-8 extent evaluation. Sample A2BS03 and A2BS1142 had mercury and TPH detections and non-detected metal, PAH, PCB, SVOC (phthalates), TPH, and VOC concentrations that exceeded screening criteria. COCs include mercury, metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	2		X	H	H	X		H		H	H							
1	57	SS	0		X	X	X	X		X		X	X							A2LF-8 extent evaluation. Sample A2BS1142 and A2TS08S13 had copper, mercury and TPH detections and non-detected metal, PAH, PCB, SVOC (phthalates), TPH, and VOC concentrations that exceeded screening criteria. COCs include mercury, metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	2		X	H	H	X		H		H	H							
1	58	SS	0		X		X	X		X										A2LF-8 extent evaluation. Sample A2BS1064 and A2TS12S02 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	2		X		H	X		H										
1	11SV	SV	5	X																Data gap and A2LF-5 and A2LF-8 extent evaluation. Sample A2SV10 and A2SV27 had non-detected VOC concentrations that exceeded screening criteria.
1	59	SS	0		X		X	X		X										A2LF-5 and A2LF-8 extent evaluation. Sample A2TS13S01 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	2		X		H	X		H										
1	60	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS21 and A2TS13S01 had TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	2		X		H	X		H										
1	61	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS21 and A2TS13S01 had TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	2		X		H	X		H										
1	62	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS21, A2BS22 and A2TS13S01 had TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	63	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS21, A2BS22 and A2TS13S01 had TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	64	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS22 and A2SS02 had TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	65	SS	0		X	X	X	X		X										A2LF-5 extent evaluation. Sample A2BS10 had TPH, PAH and VOC detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	66	SS	0		X	X	X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS1141 and A2BS10 had metals, PAH, phthalate, TPH and VOC detections and non-detected metals, PAH, phthalate, PCB, SVOC, TPH, and VOC concentrations that exceeded

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	65	SO	5		X	H	H	X		H										screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
--	67	SS	0		X	X	X	X		X										A2LF-6 extent evaluation. Sample A2BS0037 had TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
--	68	SS	0		X	X	X	X		X										A2LF-6 extent evaluation. Sample A2BS0037 had TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
--	69	SS	0		X	X	X	X		X										A2LF-6 extent evaluation. Sample A2BS0037 had TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	70	SS	0		X	X	X	X		X		X								A2LF-5 and A2LF-6 extent evaluation. Sample A2BS0037 and A2BS1141 had metals, TPH, phthalate and PAH detections and non-detected metals, phthalate, PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include metals, PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H		H								
1	71	SS	0					X												A2LF-5 extent evaluation. Sample A2BS1062 had TPH detections and non-detected TPH concentrations that exceeded screening criteria. COCs include TPH.
		SO	5					X												
1	72	SS	0		X	X	X	X		X										A2LF-5 extent evaluation. Sample A2BS1062 and A2BS11 had TPH and PAH detections and non-detected PAH, PCB, SVOC, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, SVOC, TPH, and VOC.
		SO	5		X	H	H	X		H										
1	73	SS	0		X		X	X		X										A2LF-5 extent evaluation. Sample A2BS1060 and A2BS14 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	74	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample C-1-02 and A2BS14 had TPH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										
1	75	SS	0		X		X	X		X										Data gap and A2LF-5 extent evaluation. Sample A2BS15 had TPH and PAH detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H										

TABLE 1.11-2
Data Quality Objectives - Area II Landfill
NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s)* (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs ^{1,2} (EPA Method 8260B)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	Pesticides (EPA Method 8081)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290/1613)	Metals (EPA Method 6010/6020B)	Mercury (EPA Method 7471)	Formaldehyde (EPA Method 8315A)	Energetics (EPA Method 8330A)	Fluoride (EPA Method 6010/6020B)	Perchlorate (EPA Method 8321/331.0/6850/6869)	NDMA (EPA Method 1625C)	DTSC GSU Comment No(s).	Rationale / Comments ^{2,3}
1	76	SS	0		X		X	X		X	X	X							118, 121	Data gap and A2LF-5 extent evaluation. Sample A2TS29S01, A2SS03, A2BS15, A2TS37S01, and A2TS33S01 had dioxin, metals, PAH, TPH and VOC detections and non-detected PAH, PCB, TPH, and VOC concentrations that exceeded screening criteria. COCs include dioxin, metals, PAH, PCB, TPH, and VOC.
		SO	5		X		H	X		H	H	H								
--	77	SS	0		X			X												Data gap and A2FL-4 extent evaluation. Samples ENBS0021 and A2BS1042 had TPH detections and nondetected TPH and VOC concentrations that exceeded screening criteria. COCs include TPH and VOC.
		SO	5		X			X												
--	78	SS	0		X			X												Data gap and A2FL-4 extent evaluation. Samples ENBS0021 and A2BS1042 had TPH detections and nondetected TPH and VOC concentrations that exceeded screening criteria. COCs include TPH and VOC.
		SO	5		X			X												
--	79	SS	0		X			X												Data gap and A2FL-4 extent evaluation. Samples ENBS0021 and A2BS1042 had TPH detections and nondetected TPH and VOC concentrations that exceeded screening criteria. COCs include TPH and VOC.
		SO	5		X			X												
--	80	SS	0		X			X												A2FL-4 extent evaluation. Samples ENBS0021 and A2BS1042 had TPH detections and nondetected TPH and VOC concentrations that exceeded screening criteria. COCs include TPH and VOC.
		SO	5		X			X												
--	81	SS	0		X	X	X	X		X		X	X	X	X	X	X	X	120	Data gap and unknown tank evaluation. Historic samples in the vicinity have contained no detections. COCs include VOCs, SVOCs, PAHs, TPH, PCB, Metals, Mercury, Formaldehyde, Energetics, Fluoride, Perchlorate, and NDMA based on operations occurring within Area II during landfill use.
		SO	5		X	H	H	X		H		H	H	H	H	H	H	H		

Notes:

* Per comment on response to DTSC comment 98, it is assumed the disturbed area was regraded affecting the top 6" to 1' of soil; therefore, the shallow samples will be collected at 1' bgs. Samples will continue to be collected in successive 5' intervals and just above bedrock. Per comment on response to DTSC comment 87, due to soil disturbance and redistribution, analytical results for shallow samples cannot be assumed to be an indicator of underlying conditions and deeper samples should be analyzed. This applies for all Alfa locations where post-demolition grading has occurred and for all Alfa standard or supplemental suite chemicals proposed for analysis.

CUA = chemical use area
ID = identification
ft bgs = feet below ground surface
VOC = volatile organic compounds
EPA = Environmental Protection Agency
SVOC = semivolatile organic compounds
PAH = polycyclic aromatic hydrocarbons
NDMA = n-nitrosodimethylamine
SIM = select ion monitoring
TPH = Total petroleum hydrocarbons
H = Sample will be held until it is needed; e.g., to delineate a detection in shallower samples at the same location or nearby locations

¹ = Hold VOC samples where TPH samples are also collected. The VOC suite will be analyzed if TPHs are detected at elevated concentrations.
² = All soil (SS and SO) VOC samples should be collected from 1-2 feet
³ = General Comment 4 requests rationale for investigation of specific chemicals at RFI sites.

TABLE 1.12-1

Chemical Use Areas at ELV

NASA SSFL Field Sampling Plans

Chemical Use Area Types and Typical Target Analytical Suites					
Chemical Use Area Name	Petroleum Fuels / Solvents	PAHs² and SVOCs	Energetic Constituents / Propellants	Oil-Related Materials and Debris	Dioxins
	TPH, VOCs¹		Hydrazine, NDMA, UDMH, MMH, NTO, IRFNA, Formaldehyde, Metals	SVOCs, PAHs², TPH, PCBs, Metals	
1 - ELV - Northwestern Portion	X	X	X	X	X
2 - ELV - Southeastern Portion and PCB Storage	X	X	X	X	X
3 - Building 2207	X	X	X	X	

Notes:

IRFNA = Inhibited red fuming nitric acid
MMH = monomethyl hydrazine
NDMA = n-nitrosodimethylamine
NTO = nitrogen tetroxide
PAH = polycyclic aromatic
PCB = polychlorinated biphenyl
SPA = Storable Propellant Area
SVOC = semivolatile organic compound
TPH = total petroleum hydrocarbons
UDMH = unsymmetrical dimethyl hydrazine
VOC = volatile organic compound

¹. VOCs are a COPC for TPH-gasoline.
². SVOCs and PAHs are COPCs for TPH-diesel.

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	1	SS	0		X	X	X	X	X	X				X			No	Extent evaluation south of samples EVBS1047 and EVBM0037S70, which had reported ND in excess of applicable RLs and an exceedance of acetone and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, PCBs, and energetics.
		SO	5		X	X	H	H	X	H				H				
1	1SV	SV	5	X													No	Soil vapor sample to address the data gap identified southwest of PRA ELV-1 at BUSV0012.
2	2	SS	0		X	X			X		X	X					No	Extent evaluation at sample C-14-01, which had reported ND in excess of applicable RLs and EVBS1157 which reported an exceedance of dioxins. Also evaluates extent of PRA ELV-9. COPCs include VOCs, TPH, metals, and dioxins.
		SO	5		X	X			X		X	X						
		SO	10		X	X			X		H	H						
2	3	SS	0		X	X			X								No	Extent evaluation at samples C-14-02, C-14-03, and east of EVBS07, which had reported ND in excess of applicable RLs. COPCs include TPH and VOCs.
		SO	5		X	X			X									
2	4	SS	0		X	X		X	X			X					No	Extent evaluation east of sample C-14-05 and west of C-14-06, which had reported ND in excess of applicable RLs, and an exceedance of TCA. Extent evaluation west of samples EVBS1105 and EVBS06 which reported ND in excess of applicable RLs and an exceedance of PAHs and manganese. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
2	16SV	SV	5	X													No	Extent evaluation soil vapor sample south of PRA ELV-10, to address exceedances from EVSV17.
		SV	10	X														
2	5	SS	0		X	X		X	X		X	X					No	Extent evaluation east of sample ENBS0001, which had reported ND in excess of applicable RLs, and exceedances of selenium. Extent evaluation west of sample EVBM0027 which reported ND in excess of applicable RLs, and exceedances of PAHs. Also evaluates extent of PRAs ELV-5 and ELV-11. COPCs include VOCs, SVOCs, PAHs, dioxins, and metals.
		SO	5		X	X		X	X		X	X						
		SO	10		X	X		H	X		H	X						
2	6	SS	0		X	X			X			X					No	Extent evaluation south of sample ENBS0002, which had reported ND in excess of applicable RLs, and an exceedance of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, TPH, and metals.
		SO	5		X	X			X			X						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	7	SS	0		X	X		X	X			X					No	Extent evaluation south of sample ENBS0003, which had reported ND in excess of applicable RLs, and exceedances of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
2	8	SS	0					X	X			X					No	Extent evaluation north of sample ENBS0006, which had reported ND in excess of applicable RLs, and an exceedance of TPH and selenium. Also evaluates extent of PRA ELV-8. COPCs include PAHs, TPH, and metals.
		SO	5					H	X			X						
2	9	SS	0		X	X			X								No	Extent evaluation north of sample ENBS0018, which had reported ND in excess of applicable RLs and an exceedance in TPH and methylene chloride. Also evaluates extent of PRA ELV-7. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	10	SS	0		X	X		X	X								No	Extent evaluation east of samples EVBM0025, EVBS29, and EVBS1102, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, and TPH.
		SO	5		X	X		H	X									
2	11	SS	0		X	X		X	X		X	X					No	Extent evaluation east of samples EVBM0026, EVBS1055, and EVBS15, which had reported ND in excess of applicable RLs, and exceedances of dioxins, TPH, metals, and PAHs. Also evaluates extent of PRA ELV-9. COPCs include VOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X		X	X		X	X						
3	12	SS	0		X	X			X	X							No	Extent evaluation west of sample EVBM0032 and north of sample EVBS1031, which had reported ND in excess of applicable RLs, and exceedances of TPH. Evaluation of a new AST observed during the 2010 aerial photo review. Also evaluates extent of PRA ELV-3. COPCs include PCBs, VOCs, and TPH.
		SO	5		X	X			X	H								
3	13	SS	0		X	X			X	X							No	Extent evaluation north of samples EVBM0033 and EVBM0032, which had reported ND in excess of applicable RLs, and exceedances of TPH. Also evaluates extent of PRA ELV-3. COPCs include PCBs, VOCs, and TPH.
		SO	5		X	X			X	H								
1	14	SS	0		X	X			X	X							No	Extent evaluation at sample EVBM0036S70 and northwest of EVBS1061 and EVBS1076, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, TPH, and PCBs.
		SO	5		X	X			X	H								
		SO	10		X	X			X	H								

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments	
1	15	SS	0		X	X	X	X	X	X		X		X	X		Yes	Extent evaluation east of samples EVBM0038S03 and EVBS1036, which had reported ND in excess of applicable RLs, and an exceedance of acetone, phenol, and chromium. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, PCBs, dioxins, and energetics.	
		SO	5		X	X	X	X	X	X		X		X	X				
		SO	10		X	X	X	X	X	X	X		H		X	X			
		SO	15		X	X	X	H	X	H		H		H	X				
2	16	SS	0		X	X			X	X	X	X					No	Extent evaluation at samples EVBM0039S70 and EVBS1056 through EVBS1059, which had reported ND in excess of applicable RLs and an exceedance of dioxins. Also evaluates extent of PRA ELV-9. COPCs include VOCs, TPH, PCBs, metals, and dioxins.	
		SO	5		X	X			X	H	X	X							
		SO	10		X	X			X	H	H	H							
2	17	SS	0		X	X	X	X	X	X	X	X				ELV-122c	No	Extent evaluation south of samples EVBM0044 and EVBM0045, which had reported ND in excess of applicable RLs, and exceedances of TPH and PAHs. Also evaluates debris area CH2-G02-3001 and evaluates extent of PRA ELV-8. COPCs include dioxins, VOCs, SVOCs, PAHs, TPH, PCBs, and metals.	
		SO	5		X	X	H	X	X	H	H	H							
2	18	SS	0				X	X	X	X							No	Extent evaluation east of sample EVBS01, at EVBS12 and EVBS22, north of EVBS25, and south of EVBS23, which had reported ND in excess of applicable RLs. Also evaluates extent of PRA ELV-10. COPCs include SVOCs, PAHs, TPH, and PCBs.	
		SO	5				H	H	X	H									
1	19	SS	0		X	X	X	X	X			X		X			No	Extent evaluation east of sample EVBS1009 and northwest of EVBS1085, which had reported ND in excess of applicable RLs and exceedances of TPH, VOCs, and silver. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.	
		SO	5		X	X	X	X	X			X		X					
		SO	10		X	X	H	H	X			H		H					
1	17SV	SV	5	X													No	Reevaluate soil vapor at sample EVSV20 at PRA ELV-1, south of B2202. Initial sampling reported ND in excess of applicable RLs.	
2	20	SS	0		X	X		X	X		X	X					No	Extent evaluation south of samples EVBS1016, EVBS16, and EVBS17, which had reported ND in excess of applicable RLs and exceedances of TPH, metals, dioxins, and PAHs. Also evaluates extent of PRA ELV-9. COPCs include VOCs, PAHs, TPH, dioxins, and metals.	
		SO	5		X	X		X	X		X	X							

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments	
2	21	SS	0		X	X		X	X		X	X					No	Extent evaluation southeast of sample EVBS1017 and southwest of samples EVBM0026, EVBS1055, and EVBS15, which had reported ND in excess of applicable RLs and exceedances of dioxins, metals, TPH, and PAHs. Also evaluates extent of PRA ELV-9. COPCs include VOCs, PAHs, TPH, dioxins, and metals.	
		SO	5		X	X		X	X		X	X							
1	22	SS	0		X	X	X	X	X	X	X			X			No	Extent evaluation north of sample EVBS1020, which had reported ND in excess of applicable RLs and an exceedance of TPH, dioxins, and PCBs. Also evaluates extent of PRA ELV-2. COPCs include VOCs, SVOCs, PAHs, TPH, PCBs, dioxins, and energetics.	
		SO	5		X	X	X	X	X	X	X			X					
		SO	10		X	X	X	X	X	X	H	H			X				
2	23	SS	0		X	X		X	X		X	X					No	Extent evaluation north of samples EVBS1030, EVBS18, and EVBS1159, which had reported ND in excess of applicable RLs and exceedances of PAHs, TPH, metals, VOCs and dioxins. Also evaluates extent of PRA ELV-9. COPCs include VOCs, PAHs, TPH, dioxins, and metals.	
		SO	5		X	X		X	X		X	X							
3	24	SS	0		X	X			X	X							No	Extent evaluation north of sample EVBS1032 and northeast of EVBM0033, which had reported ND in excess of applicable RLs and an exceedance of toluene and TPH. Also evaluates extent of PRA ELV-3. COPCs include PCBs, VOCs, and TPH.	
		SO	5		X	X			X	H									
3	25	SS	0		X	X			X	X							No	Extent evaluation northeast of sample EVBS1034, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-3. COPCs include PCBs, VOCs, and TPH.	
		SO	5		X	X			X	H									
		SO	10		X	X			X	H									
		SO	15		X	X			X	H									
1	26	SS	0		X	X	X	X				X		X	X		No	Extent evaluation east of sample EVBS1036, which had reported ND in excess of applicable RLs and exceedances of phenol and chromium. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, metals, and energetics.	
		SO	5		X	X	X	X				X		X	X				
		SO	10		X	X	X	X				H		X	X				
		SO	15		X	X	X	H				H		H	X				
1	27	SS	0		X	X	X	X	X			X		X			No	Extent evaluation west of sample EVBS1040, which had reported ND in excess of applicable RLs and exceedances of metals, PAHs, VOCs, and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.	
		SO	5		X	X	H	X	X			X		H					

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	28	SS	0		X	X	X	X	X			X		X			No	Extent evaluation south of sample EVBS1042, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.
		SO	5		X	X	X	X	X			X		X				
		SO	10		X	X	H	H	X			H		H				
2	29	SS	0		X	X	X	X	X			X		X			No	Extent evaluation north of sample EVBS1045, which had reported ND in excess of applicable RLs and exceedances of metals, VOCs, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.
		SO	5		X	X	H	H	X			X		H				
2	30	SS	0		X	X	X	X	X		X			X			No	Extent evaluation south of samples EVBS1048 and EVBS24, which had reported ND in excess of applicable RLs and exceedances of PAHs and TPH. Extent evaluation north of sample EVBS1147 which reported an exceedance of dioxins. Also evaluates extent of PRA ELV-9 and PRA ELV-10. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and energetics.
		SO	5		X	X	H	X	X		X			H				
2	7SV	SV	5	X													Yes	Reevaluate soil vapor at sample EVSV10, southeast of B2206 and PRA ELV-10. Initial sampling reported ND in excess of applicable RLs.
2	31	SS	0		X	X		X	X		X	X					No	Extent evaluation northwest of samples EVBM0026, EVBS1055, and EVBS15 and northeast of EVBS1017, which had reported ND in excess of applicable RLs, and exceedances of dioxins, TPH, metals, and PAHs. Also evaluates extent of PRA ELV-9. COPCs include VOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X		X	X		X	X						
2	32	SS	0		X	X	X	X	X		X	X		X		ELV-153	No	Extent evaluation north of sample EVBS1060, which had reported ND in excess of applicable RLs and exceedances of PAHs, metals, and TPH. Evaluates pipeline from B2206 to ELV catchment pond. Also evaluates extent of PRA ELV-9. COPCs include VOCs, SVOCs, PAHs, TPH, metals, dioxins, and energetics.
		SO	5		X	X	H	X	X		X	X		H				
	15SV	SV	5	X													No	Extent evaluation soil vapor sample north of PRA ELV-9, to address an exceedance from EVSV15.
		SV	10	X														
1	33	SS	0		X	X		X	X	X	X						Yes	Extent evaluation southeast of samples EVBS1061 and EVBS1076, which had reported exceedances of TPH. Extent evaluation northeast of sample EVBS1126 which reported ND in excess of applicable RLs and exceedances of PAHs, TPH, dioxins, and PCBs. Also evaluates extent of PRA ELV-1. COPCs include VOCs, PAHs, TPH, dioxins, and PCBs.
		SO	5		X	X		X	X	X	X							
		SO	10		X	X		H	X	X	H	H						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	34	SS	0		X	X	X	X	X			X		X			No	Extent evaluation south of sample EVBS1065, southeast of EVBS1064, southwest of EVBS1066, which had reported ND in excess of applicable RLs and exceedances of arsenic and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.
		SO	5		X	X	H	H	X			X		H				
1	35	SS	0		X	X						X				ELV-143	Yes	Evaluation at the southwest corner of Building 2201, at EVBS1067, which had reported ND in excess of applicable RLs. COPCs include metals and VOCs.
		SO	5		X	X					H							
1	36	SS	0		X	X		X				X				ELV-143	Yes	Extent evaluation south of PRA ELV-2, at sample EVBS1068, which had reported ND in excess of applicable RLs. COPCs include VOCs, metals, and PAHs.
		SO	5		X	X		H			H							
		SO	10		X	X		H			H							
		SO	15		X	X		H			H							
1	2SV	SV	5	X												Yes	Reevaluate soil vapor at sample EVSV1001, south of PRA ELV-2. Initial sampling reported ND in excess of applicable RLs.	
1	37	SS	0		X	X		X	X			X				ELV-143	Yes	Extent evaluation west of samples EVBS1073 through EVBS1075, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, metals, PAHs, and TPH.
		SO	5		X	X		H	X			H						
1	9SV	SV	5	X													Yes	Reevaluate soil vapor at sample EVSV1007, west of PRA ELV-1 at B2201. Initial sampling reported ND in excess of applicable RLs.
1	38	SS	0		X	X		X	X							ELV-143	No	Extent evaluation south of samples EVBS1073 through EVBS1075, which had reported ND in excess of applicable RLs and exceedances of TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, PAHs, and TPH.
		SO	5		X	X		H	X									
1	39	SS	0		X	X		X	X	X	X	X				ELV-143	Yes	Extent evaluation north of samples EVBS1073 through EVBS1075, which had reported ND in excess of applicable RLs and exceedances of TPH. Extent evaluation southwest of sample EVBS1126 which reported ND in excess of applicable RLs and exceedances of PAHs, TPH, dioxins, and PCBs. Also evaluates extent of PRA ELV-1. COPCs include VOCs, PAHs, PCBs, metals, dioxins, and TPH.
		SO	5		X	X		H	X	X	X	H						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	40	SS	0		X	X	X	X	X			X		X			No	Extent evaluation north of samples EVBS1135, EVBS1076, and EVBS1077, which had reported ND in excess of applicable RLs and exceedances of manganese and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, and energetics.
		SO	5		X	X	X	X	X			X		X				
		SO	10		X	X	X	X	X	X			X		X			
		SO	15		X	X	H	H	X			X		H				
1	4SV	SV	5	X												No	Reevaluate soil vapor at samples EVSV1009 and EVSV1010 at PRA ELV-1, east of B2211. Initial sampling reported ND in excess of applicable RLs.	
1	41	SS	0		X	X						X					Yes	Extent evaluation north of sample EVBS1082 and west of EVBS1080 and EVBS1081, which had reported ND in excess of applicable RLs and exceedances of metals. Also evaluates extent of PRA ELV-1. COPCs include VOCs and metals.
		SO	5		X	X						X						
1	42	SS	0		X	X		X	X			X					Yes	Extent evaluation north of samples EVBS1085 and EVBS1086, which had reported ND in excess of applicable RLs and exceedances of VOCs, silver, and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		H	X			H						
1	6SV	SV	5	X												Yes	Reevaluate soil vapor at sample EVSV1019 north of PRA ELV-1, adjacent to B2203. Initial sampling reported ND in excess of applicable RLs.	
1	43	SS	0		X	X											Yes	Extent evaluation east of sample EVBS1087 and west of EVBS134, which had reported ND in excess of applicable RLs. Also evaluates extent of PRA ELV-1. COPCs include VOCs.
		SO	5		X	X												
1	18SV	SV	5	X													Yes	Extent evaluation soil vapor sample south of PRA ELV-1, to address exceedances from EVSV22.
1	44	SS	0		X	X		X	X	X							No	Extent evaluation east of sample EVBS1094 and southeast of EVBM0038S03, which had reported ND in excess of applicable RLs and exceedances of acetone and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, PAHs, TPH, and PCBs.
		SO	5		X	X		X	X	X								
		SO	10		X	X		H	X	X								
		SO	15		X	X		H	X	H								
1	8SV	SV	5	X												Yes	Reevaluate soil vapor at sample EVSV1027 at PRA ELV-1, southeast of B2203. Initial sampling reported ND in excess of applicable RLs.	

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	45	SS	0		X	X		X	X			X					No	Extent evaluation northwest of sample EVBS1097 and southwest of EVBS1112, which had reported ND in excess of applicable RLs and exceedances of metals, PAHs, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		X	X			X						
2	10SV	SV	5	X													Yes	Reevaluate soil vapor at sample EVSV1030 at PRA ELV-10, west of B2206. Initial sampling reported ND in excess of applicable RLs.
2	46	SS	0		X	X		X	X	X		X					No	Extent evaluation north of samples EVBS1098, EVBS1112, and EVBS1099, which had reported ND in excess of applicable RLs and exceedances of metals, PAHs, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X		X	X	H		X						
2	47	SS	0		X	X		X	X			X					No	Extent evaluation northeast of sample EVBS1099 and northwest of EVBS1136, which had reported ND in excess of applicable RLs and an exceedance of PAHs, metals, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
2	48	SS	0		X	X	X	X	X			X	X	X			No	Extent evaluation north of sample EVBS1100 and northwest of EVBS1045, which had reported ND in excess of applicable RLs and exceedances of PAHs, metals, VOCs, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, SVOCs, PAHs, TPH, metals, fluoride, and energetics.
		SO	5		X	X	H	X	X			X	X	H				
		SO	10		X	X	H	X	X			H	X	H				
		SO	15		X	X	H	X	X			H	H	H				
2	11SV	SV	5	X													No	Reevaluate soil vapor at sample EVSV1033 at PRA ELV-10, north of B2206. Initial sampling reported ND in excess of applicable RLs.
3	49	SS	0		X	X	X	X	X	X		X		X			No	Extent evaluation to the west of sample EVBS1114 and south of samples EVBS1116 and EVBS1117, which had reported ND in excess of applicable RLs and exceedances of lithium and TPH. Also evaluates extent of PRA ELV-3. COPCs include VOCs, SVOCs, PAHs, TPH, metals, PCBs, and energetics.
		SO	5		X	X	H	H	X	H		X		H				
3	50	SS	0		X	X			X	X							No	Extent evaluation to the south of samples EVBS1115 and EVBS1120, which had reported ND in excess of applicable RLs and an exceedance of TPH. Also evaluates extent of PRA ELV-3. COPCs include PCBs, VOCs, and TPH.
		SO	5		X	X			X	H								

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
3	12SV	SV	5	X													No	Extent evaluation soil vapor sample south of PRA ELV-3, at B2207 to address an exceedance from EVSV1048.
		SV	10	X														
3	51	SS	0		X	X	X	X	X	X		X		X			No	Extent evaluation to the northwest of samples EVBS1116 and EVBS1117 and southwest of EVBS1031, which had reported ND in excess of applicable RLs and exceedances of lithium and TPH. Also evaluates extent of PRA ELV-3. COPCs include VOCs, SVOCs, PAHs, TPH, PCBs, metals, and energetics.
		SO	5		X	X	H	H	X	H		X		H				
3	13SV	SV	5	X													No	Reevaluate soil vapor at sample EVSV1049 at PRA ELV-3, west of B2207. Initial sampling reported ND in excess of applicable RLs.
3	52	SS	0		X	X		X	X	X		X					No	Extent evaluation to the southeast of sample EVBS1119, which had reported ND in excess of applicable RLs and exceedances of zinc, VOCs, and TPH. Also evaluates extent of PRA ELV-3. COPCs include VOCs, PAHs, PCBs, TPH, and metals.
		SO	5		X	X		H	X	H		X						
		SO	10		X	X		H	X	H		H						
		SO	15		X	X		H	X	H		H						
1	53	SS	0		X	X		X	X	X		X					No	Extent evaluation to the northwest of samples EVBS1123 and EVBS1131 and southwest of EVBS1124, which had reported ND in excess of applicable RLs and exceedances of PAHs, PCBs, zinc, and TPH. Also evaluates extent of PRA ELV-2. COPCs include VOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X		X	X	X		X						
1	54	SS	0		X	X		X	X	X		X					No	Extent evaluation to the north of samples EVBS1124 and EVBS1132, which had reported ND in excess of applicable RLs and an exceedance of PAHs, zinc, TPH, and PCBs. Also evaluates extent of PRA ELV-2. COPCs include VOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X		X	X	X		X						
1	55	SS	0		X	X	X	X	X	X	X						Yes	Extent evaluation to the north of sample EVBS1126 and south of samples EVBS1128 and EVBS1130, which had reported ND in excess of applicable RLs and exceedances of PAHs, TPH, dioxins, and PCBs. Also evaluates extent of PRA ELV-1 and PRA ELV-2. COPCs include VOCs, PAHs, TPH, PCBs, SVOCs, and dioxins.
		SO	5		X	X	X	X	X	X	X							
3	14SV	SV	5	X													Yes	Reevaluate soil vapor at sample EVSV1061 at PRA ELV-2, at B2211. Initial sampling reported ND in excess of applicable RLs.

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	56	SS	0		X	X	X	X	X	X							Yes	Extent evaluation at samples EVBS1127 through EVBS1130, which had reported ND in excess of applicable RLs and an exceedance of PCBs and TPH. Also evaluates extent of PRA ELV-2. COPCs include VOCs, PAHs, TPH, SVOCs, and PCBs.
		SO	5		X	X	X	X	X	X								
1	57	SS	0		X	X	X	X	X	X		X					No	Extent evaluation south of sample EVBS1131, which had reported ND in excess of applicable RLs and exceedances of PAHs, TPH, and PCBs. Evaluates new awning feature identified in the 2010 aerial photo review. Also evaluates extent of PRA ELV-2. COPCs include VOCs, SVOCs, PAHs, TPH, metals and PCBs.
		SO	5		X	X	H	X	X	X		H						
2	58	SS	0		X	X			X		X	X					No	Extent evaluation south of samples EVBS1164, EVBS1141, EVBS1151, and 3VBS1153, which had reported ND in excess of applicable RLs and exceedances of metals, dioxins, and TPH. Also evaluates extent of PRA ELV-9. COPCs include VOCs, TPH, dioxins, and metals.
		SO	5		X	X			X		X	X						
		SO	10		X	X			X		H	H						
2	59	SS	0								X						No	Extent evaluation south of samples EVBS1148 and EVBS1149, which had reported an exceedance of dioxins. Also evaluates extent of PRA ELV-9. COPCs include dioxins.
		SO	5								X							
2	60	SS	0								X						No	Extent evaluation north of sample EVBS1154, which had reported an exceedance of dioxins. Also evaluates extent of PRA ELV-9. COPCs include dioxins.
		SO	5								X							
1	61	SS	0		X	X			X								No	Extent evaluation south of sample EVBS1160, which had reported ND in excess of applicable RLs and an exceedance of TPH. Evaluates debris point CH2-G02-1054. SVOCs, PAHs, and metals were ND in EVBS1160. Also evaluates extent of PRA ELV-1. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	62	SS	0		X	X		X	X			X					No	Extent evaluation south of sample EVBS1161, which had reported ND in excess of applicable RLs and exceedances of boron, PAHs, and TPH. Also evaluates extent of PRA ELV-4. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		H	X			X						
2	63	SS	0		X	X			X			X					No	Extent evaluation west of sample EVBS1162, which had reported ND in excess of applicable RLs and an exceedance of boron. Evaluates debris point CH2-G02-1066. SVOCs and PAHs were ND in EVBS1162. Also evaluates extent of PRA ELV-5. COPCs include VOCs, TPH, and metals.
		SO	5		X	X			X			X						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	64	SS	0		X	X			X			X					No	Extent evaluation north of sample EVBS1163, which had reported ND in excess of applicable RLs and an exceedance of boron. Evaluates debris point CH2-G02-1065. SVOCs and PAHs were ND in EVBS1163. Also evaluates extent of PRA ELV-5. COPCs include VOCs, TPH, and metals.
		SO	5		X	X			X			X						
1	65	SS	0		X	X			X								No	Extent evaluation north of sample EVBS1165, which had reported ND in excess of applicable RLs and an exceedance of TPH. Evaluates debris point CH2-G02-1068. SVOCs, PAHs, and metals were ND in EVBS1165. Also evaluates extent of PRA ELV-6. COPCs include VOCs and TPH.
		SO	5		X	X			X									
	66	SS	0		X	X			X		X						No	Evaluation of debris pile CH2-G02-1060-1 north of ELV at sample EVBS1166, which had reported ND in excess of applicable RLs. COPCs include VOCs, dioxins, and TPH. There were No exceedances of SVOCs, PAHs, or metals in EVBS1166. The sample will be collected within 10 feet of the debris.
		SO	5		X	X			X		H							
	67	SS	0		X	X			X		X						No	Evaluation of debris pile CH2-G02-1060-1 north of ELV at sample EVBS1168, which had reported ND in excess of applicable RLs. COPCs include VOCs, dioxins, and TPH. There were No exceedances of SVOCs, PAHs, or metals in EVBS1166. The sample will be collected within 10 feet of the debris.
		SO	5		X	X			X		H							
2	68	SS	0		X	X	X	X	X					X			No	Extent evaluation east of sample EVBS33 and south of EVBS1048, which had reported ND in excess of applicable RLs and exceedances of PAHs and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, SVOCs, PAHs, TPH, and energetics.
		SO	5		X	X	H	X	X					H				
		SO	10		X	X	H	H	X					H				
2	5SV	SV	5	X													No	Reevaluate soil vapor at sample EVSV01, east of B2206 at PRA ELV-10. Initial sampling reported ND in excess of applicable RLs.
2	3SV	SV	5	X													No	Reevaluate soil vapor at sample EVSV14, east of PRA ELV-9. Initial sampling reported ND in excess of applicable RLs.
2	19SV	SV	5	X													No	Extent evaluation soil vapor sample west of PRA ELV-10, to address exceedances from SV-5.2-9.

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	69	SS	0					X									No	Extent evaluation north of sample EVBM0027, which had reported ND in excess of applicable RLs and an exceedance of PAHs. Also evaluates extent of PRA ELV-11. COPCs include PAHs.
		SO	5					X										
2	70	SS	0								X	X					No	Extent evaluation west of sample APBS0018, which had reported ND in excess of applicable RLs and an exceedance of dioxins and silver. Also evaluates extent of PRA ELV-11. COPCs include dioxins and metals.
		SO	5								X	X						
2	71	SS	0								X	X					No	Extent evaluation south of samples APBS1086, APBS1087, and APBS0018, which had reported ND in excess of applicable RLs and an exceedance of dioxins and metals. Also evaluates extent of PRA ELV-11. COPCs include dioxins and metals.
		SO	5								X	X						
2	72	SS	0								X	X					No	Extent evaluation north of sample APBS1086, west of APBS1087 and east of APBS0018, which had reported ND in excess of applicable RLs and an exceedance of dioxins and metals. Also evaluates extent of PRA ELV-11. COPCs include dioxins and metals.
		SO	5								X	X						
2	73	SS	0								X	X					No	Extent evaluation east of sample EVBM0027, northwest of APBS1087, which had reported ND in excess of applicable RLs and an exceedance of PAHs and dioxins. Also evaluates extent of PRA ELV-11. COPCs include dioxins and metals.
		SO	5								X	X						
1	74	SS	0		X	X	X	X	X	X				X			No	Extent evaluation west of samples EVBS1047 and EVBM0037S70, which had reported ND in excess of applicable RLs and an exceedance of acetone and TPH. Extent evaluation east of samples EVBS1073 and EVBS1074 which reported ND in excess of applicable RLs and an exceedance of TPH. Also evaluates extent of PRA ELV-1. COCPs include VOCs, SVOCs, PAHs, TPH, PCBs, and energetics.
		SO	5		X	X	H	H	X	H				H				
1	75	SS	0		X	X	X	X	X	X		X		X			No	Extent evaluation southwest of sample EVBS1094 and southeast of EVBS1042, which had reported ND in excess of applicable RLs and exceedances of acetone and TPH. Also evaluates extent of PRA ELV-1. COPCs include VOCs, SVOCs, PAHs, TPH, metals, energetics, and PCBs.
		SO	5		X	X	X	X	X	X		X		X				
		SO	10		X	X	H	H	X	X		H		H				
		SO	15		X	X	H	H	X	H		H		H				

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
3	76	SS	0		X	X		X	X	X		X					No	Extent evaluation to the northeast of sample EVBS1119, and southeast of EVBS1034, which had reported ND in excess of applicable RLs and exceedances of zinc, VOCs, and TPH. Also evaluates extent of PRA ELV-3. COPCs include VOCs, PAHs, PCBs, TPH, and metals.
		SO	5		X	X		H	X	H		X						
		SO	10		X	X		H	X	H		H						
		SO	15		X	X		H	X	H		H						
2	77	SS	0		X	X		X	X			X					No	Extent evaluation west of sample EVBS1161, which had reported ND in excess of applicable RLs and exceedances of boron, PAHs, and TPH. Also evaluates extent of PRA ELV-4. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		H	X			X						
2	78	SS	0		X	X		X	X			X					No	Extent evaluation north of sample EVBS1161, which had reported ND in excess of applicable RLs and exceedances of boron, PAHs, and TPH. Also evaluates extent of PRA ELV-4. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		H	X			X						
2	79	SS	0		X	X		X	X			X					No	Extent evaluation east of sample EVBS1161, which had reported ND in excess of applicable RLs and exceedances of boron, PAHs, and TPH. Also evaluates extent of PRA ELV-4. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
		SO	10		X	X		H	X			X						
2	80	SS	0		X	X		X	X			X					No	Extent evaluation southeast of sample ENBS0003 and southwest of ENBS0002, which had reported ND in excess of applicable RLs, and exceedances of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
2	81	SS	0		X	X			X			X					No	Extent evaluation southwest of sample EVBS1163 and east of ENBS0002, which had reported ND in excess of applicable RLs and exceedances of metals. Also evaluates extent of PRA ELV-5. COPCs include VOCs, TPH, and metals.
		SO	5		X	X			X			X						
2	82	SS	0		X	X	X	X	X			X					No	Extent evaluation southwest of sample ENBS0001 and southeast of EVBS1147, which had reported ND in excess of applicable RLs, and exceedances of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, SVOCs, PAHs, and metals.
		SO	5		X	X	X	X	X			X						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	83	SS	0		X	X	X	X	X			X					No	Extent evaluation north of sample ENBS0001 and northeast of EVBS1147, which had reported ND in excess of applicable RLs, and exceedances of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, SVOCs, PAHs, and metals.
		SO	5		X	X	X	X	X			X						
2	84	SS	0		X	X			X			X					No	Extent evaluation southeast of sample EVBS1163 and north of ENBS0002, which had reported ND in excess of applicable RLs and exceedances of metals. Also evaluates extent of PRA ELV-5. COPCs include VOCs, TPH, and metals.
		SO	5		X	X			X			X						
2	85	SS	0		X	X		X	X			X					No	Extent evaluation northeast of sample ENBS0003 and northwest of ENBS0002, which had reported ND in excess of applicable RLs, and exceedances of selenium. Also evaluates extent of PRA ELV-5. COPCs include VOCs, PAHs, TPH, and metals.
		SO	5		X	X		X	X			X						
2	86	SS	0		X	X			X								No	Extent evaluation west of sample ENBS0018, which had reported ND in excess of applicable RLs and an exceedance in TPH and methylene chloride. Also evaluates extent of PRA ELV-7. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	87	SS	0		X	X			X								No	Extent evaluation south of sample ENBS0018, which had reported ND in excess of applicable RLs and an exceedance in TPH and methylene chloride. Also evaluates extent of PRA ELV-7. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	88	SS	0		X	X			X								No	Extent evaluation east of sample ENBS0018, which had reported ND in excess of applicable RLs and an exceedance in TPH and methylene chloride. Also evaluates extent of PRA ELV-7. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	89	SS	0		X	X	X	X	X	X		X				ELV-122c	No	Extent evaluation southwest of sample EVBM0044 and southeast of ENBS0006, which had reported ND in excess of applicable RLs, and exceedances of selenium, TPH and PAHs. Also evaluates debris area CH2-G02-3001 and evaluates extent of PRA ELV-8. COPCs include VOCs, SVOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X	H	X	X	H		X						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
2	90	SS	0		X	X	X	X	X	X	X	X				ELV-122c	No	Extent evaluation northwest of sample EVBM0044 and southeast of ENBS0006, which had reported ND in excess of applicable RLs, and exceedances of selenium, TPH and PAHs. Also evaluates debris area CH2-G02-3001 and evaluates extent of PRA ELV-8. COPCs include dioxins, VOCs, SVOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X	H	X	X	H	H	X						
2	91	SS	0		X	X	X	X	X	X	X	X				ELV-122c	No	Extent evaluation north of samples EVBM0044 and EVBM0045, which had reported ND in excess of applicable RLs, and exceedances of TPH and PAHs. Also evaluates debris area CH2-G02-3001 and evaluates extent of PRA ELV-8. COPCs include dioxins, VOCs, SVOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X	H	X	X	H	H	H						
2	92	SS	0		X	X	X	X	X	X	X	X				ELV-122c	No	Extent evaluation east of sample EVBM0045, which had reported ND in excess of applicable RLs, and exceedances of TPH and PAHs. Also evaluates debris area CH2-G02-3001 and evaluates extent of PRA ELV-8. COPCs include dioxins, VOCs, SVOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X	H	X	X	H	H	H						
2	93	SS	0		X	X		X	X	X		X					No	Extent evaluation northwest of samples EVBS1097 and EVBS1112 and west of EVBS1098 and EVBS1099, which had reported ND in excess of applicable RLs and exceedances of metals, PAHs, and TPH. Also evaluates extent of PRA ELV-10. COPCs include VOCs, PAHs, TPH, PCBs, and metals.
		SO	5		X	X		X	X	H		X						
		SO	10		X	X		X	X	H		X						
1	94	SS	0		X	X			X								No	Extent evaluation west of sample EVBS1165, which had reported ND in excess of applicable RLs and an exceedance of TPH. Evaluates debris point CH2-G02-1068. SVOCs, PAHs, and metals were ND in EVBS1165. Also evaluates extent of PRA ELV-6. COPCs include VOCs and TPH.
		SO	5		X	X			X									
1	95	SS	0		X	X			X								No	Extent evaluation south of sample EVBS1165, which had reported ND in excess of applicable RLs and an exceedance of TPH. Evaluates debris point CH2-G02-1068. SVOCs, PAHs, and metals were ND in EVBS1165. Also evaluates extent of PRA ELV-6. COPCs include VOCs and TPH.
		SO	5		X	X			X									

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
1	96	SS	0		X	X			X								No	Extent evaluation east of sample EVBS1165, which had reported ND in excess of applicable RLs and an exceedance of TPH. Evaluates debris point CH2-G02-1068. SVOCs, PAHs, and metals were ND in EVBS1165. Also evaluates extent of PRA ELV-6. COPCs include VOCs and TPH.
		SO	5		X	X			X									
2	97	SS	0		X	X	X	X	X			X					No	Evaluation of debris point CH2-G02-3001. COPCs include VOCs, SVOCs, PAHs, TPH, and metals.
		SO	5		X	X	H	H	X			H						
2	98	SS	0		X	X	X	X	X			X					No	Evaluation of debris point CH2-G02-1056. COPCs include VOCs, SVOCs, PAHs, TPH, and metals.
		SO	5		X	X	H	H	X			H						
	99	SS	0		X	X			X		X						No	Evaluation of debris pile CH2-G02-1060 north of ELV and the cleared vegetation area identified in the 2010 aerial photo review. COPCs include VOCs, dioxins, and TPH.
		SO	5		X	X			X		H							
	100	SS	0		X	X			X		X						No	Evaluation of debris pile CH2-G02-1060 north of ELV and the cleared vegetation area identified in the 2010 aerial photo review. COPCs include VOCs, dioxins, and TPH. The sample will be collected within 10 feet of the debris.
		SO	5		X	X			X		H							
1	101	SS	0		X	X	X	X	X	X	X	X					No	Extent evaluation south of sample EVBS1130 and west of EVBS1126, which had reported ND in excess of applicable RLs and exceedances of PAHs, TPH, dioxins, and PCBs. Evaluates new awning feature identified in the 2010 aerial photo review. Also evaluates extent of PRA ELV-1 and PRA ELV-2. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, metals and PCBs.
		SO	5		X	X	H	X	X	X	X	H						
1	102	SS	0		X	X	X	X	X		X	X				ELV-160m	Yes	Evaluation of new structure identified during the 2010 aerial photo review. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X	H	H	X		H	H						
1	103	SS	0		X	X	X	X	X		X	X				ELV-160m	Yes	Evaluation of new structure identified during the 2010 aerial photo review. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X	H	H	X		H	H						
1	104	SS	0		X	X	X	X	X		X	X					No	Evaluation of new structure identified during the 2010 aerial photo review. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X	H	H	X		H	H						

TABLE 1.12-2

Data Quality Objectives - ELV Area

NASA SSFL Field Sampling Plan

CUA	Object ID	Matrix	Targeted Sampling Depth(s) (Top Depth, ft bgs)	VOCs (SV) (EPA Method 8260B)	VOCs (EPA Method 8260B)	VOCs - 1,4-dioxane (EPA Method 8260B SIM)	SVOCs (EPA Method 8270C)	PAHs (EPA Method 8270C SIM)	TPH (EPA Method 8015B)	PCBs (EPA Method 8082)	Dioxins/Furans (EPA Method 8290 1613)	Metals (EPA Method 6010/6020B)	Fluoride (EPA Method 300.0)	Energetics (EPA Method 8330A)	Chromium (EPA Method 7196A)	DTSC GSU Comment No(s).	Building Feature Evaluation Related?	Rationale/Comments
	105	SS	0		X	X	X	X	X			X					No	Evaluation of debris point CH2-G02-1077. COPCs include VOCs, SVOCs, PAHs, TPH, and metals.
		SO	5		X	X	H	H	X			H						
2	106	SS	0		X	X	X	X	X		X	X					No	Extent evaluation southwest of sample EVBS1154, which had reported an exceedance of dioxins. Also evaluates debris point CH2-G02-1067 and evaluates extent of PRA ELV-9. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X	H	H	X		X	H						
2	107	SS	0		X	X	X	X	X	X	X	X		X		ELV-153	No	Extent evaluation west of samples EVBS23, EVBS12, EVBS01, EVBS22, and EVBS25 and northeast of EVBS24 and EVBS1048, which had reported ND in excess of applicable RLs and exceedances of PAHs and TPH. Evaluates pipeline from B2206 to ELV catchment pond. Also evaluates extent of PRA ELV-10. COPCs include VOCs, SVOCs, PAHs, TPH, metals, dioxins, and energetics.
		SO	5		X	X	H	X	X	H	X	H		H				
1	108	SS	0		X	X	X	X	X		X	X				ELV-160m	Yes	Evaluation of new structure identified during the 2010 aerial photo review. COPCs include VOCs, SVOCs, PAHs, TPH, dioxins, and metals.
		SO	5		X	X	H	H	X		H	H						
3	109	SS	0							X						ELV-160o	No	Evaluation of transformers at B2207. COPCs include PCBs.
		SO	5							H								

Notes:

1. Actual vertical profile sampling depths might change as field conditions warrant; however, a sample will be collected from the bottom of each boring except where noted in rationale/comments.

CUA = chemical use area

DTSC GSU = California Department of Toxic Substances Control Geological Services Unit

ft bgs = feet below ground surface

H = Sample will be held until it is needed; e.g., to delineate a detection in shallower samples at the same location or nearby locations

ID = identification

NDMA = n-nitrosodimethylamine

PCB = polychlorinated biphenyl

RBSL = risk-based screening level

SV = soil vapor

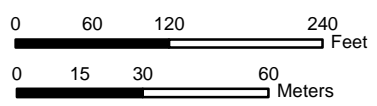
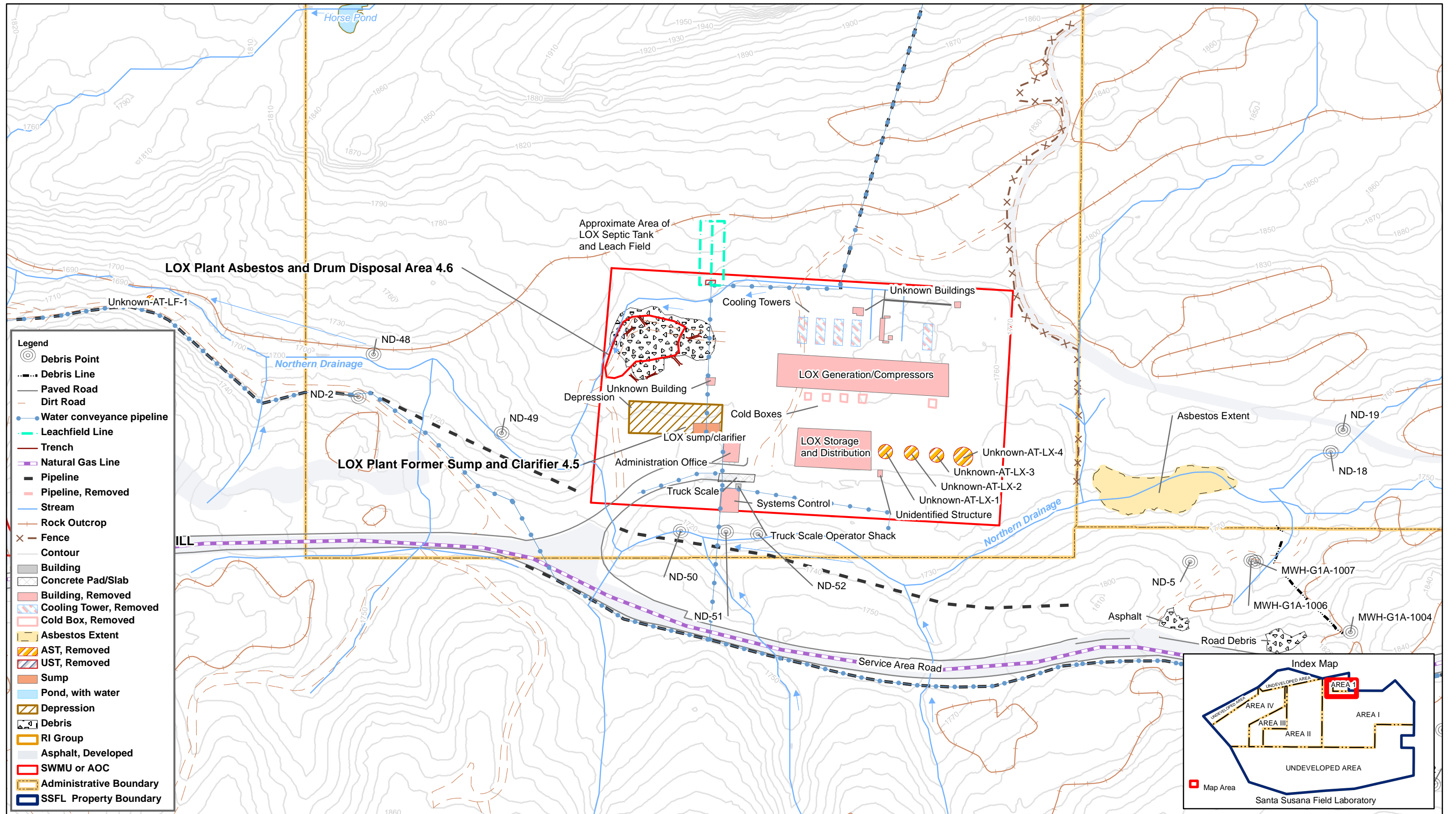
SVOC = semivolatile organic compound

SVOC SIM = SVOCs with selected ion monitoring

TPH = total petroleum hydrocarbons

VOC = volatile organic compound

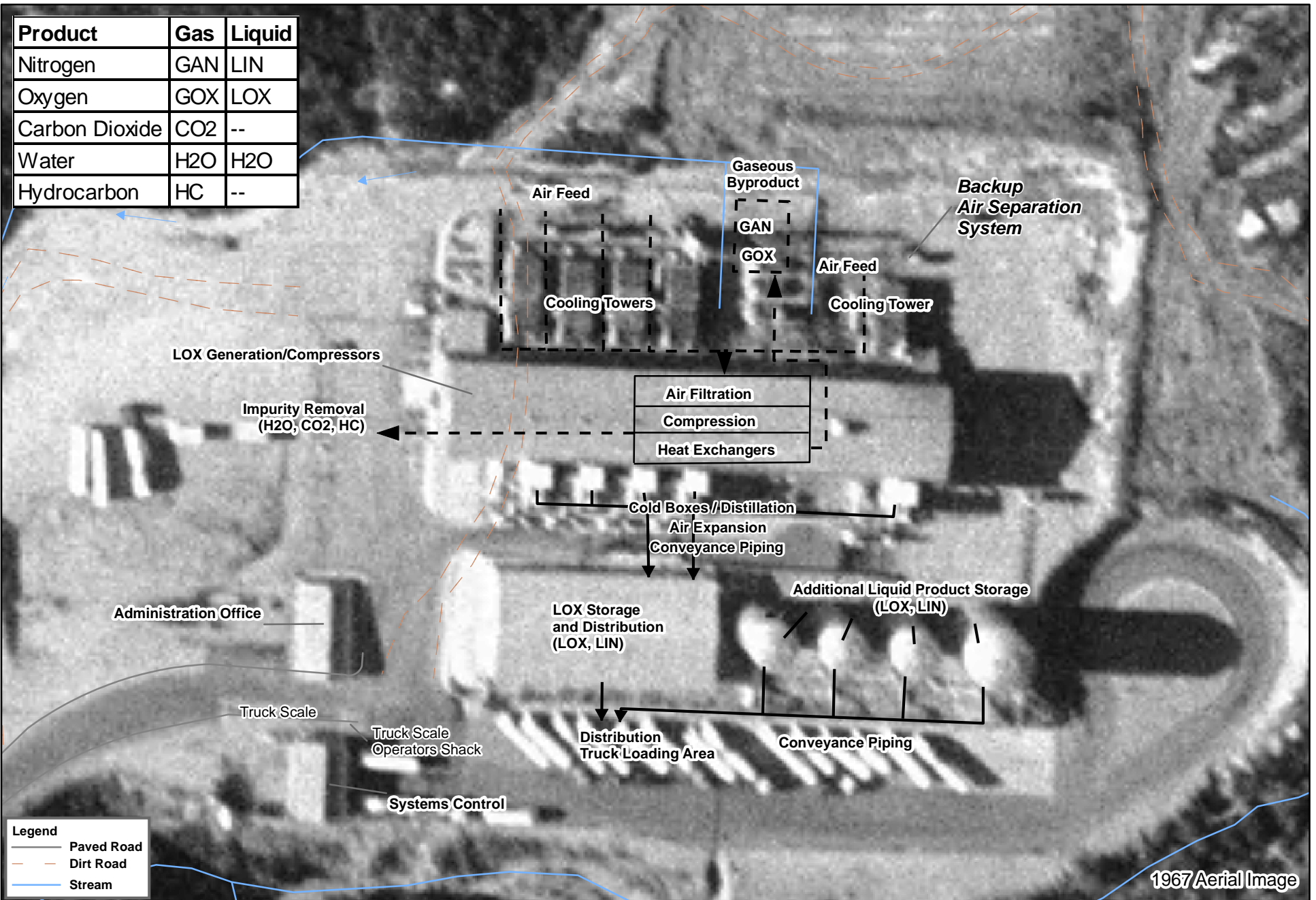
Figures



17-Jan-2012
 Drawn By:
 A. Cooley

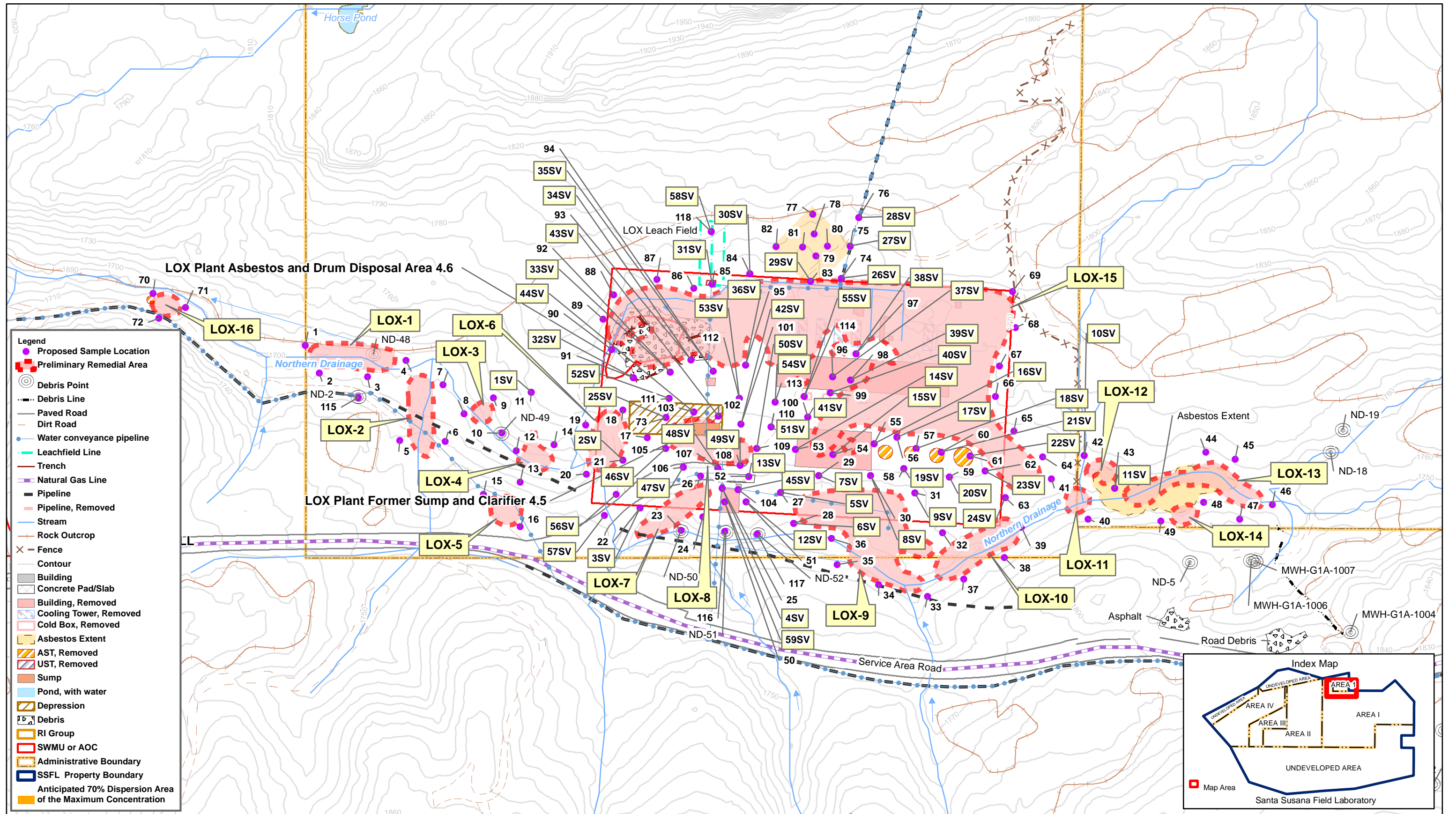
Figure 1.10-1 LOX Site Map
 Field Sampling Plan
 Santa Susana Field Laboratory
 Ventura County, California

Product	Gas	Liquid
Nitrogen	GAN	LIN
Oxygen	GOX	LOX
Carbon Dioxide	CO2	--
Water	H2O	H2O
Hydrocarbon	HC	--

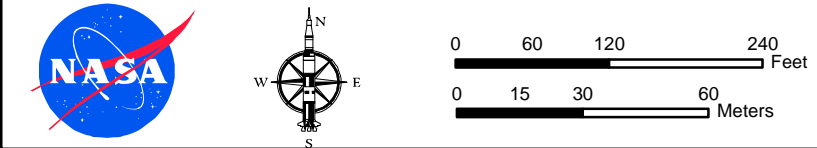
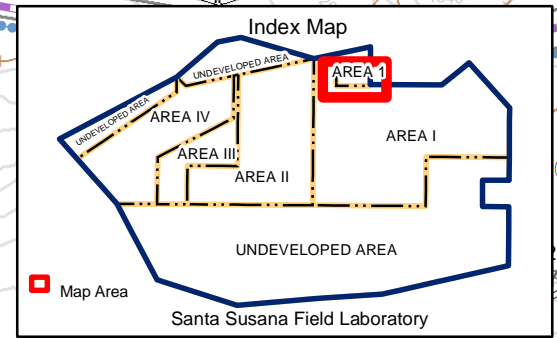


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Figure 1.10-2 General LOX PLant Process
 Field Sampling Plan
 Santa Susana Field Laboratory
 Ventura County, California

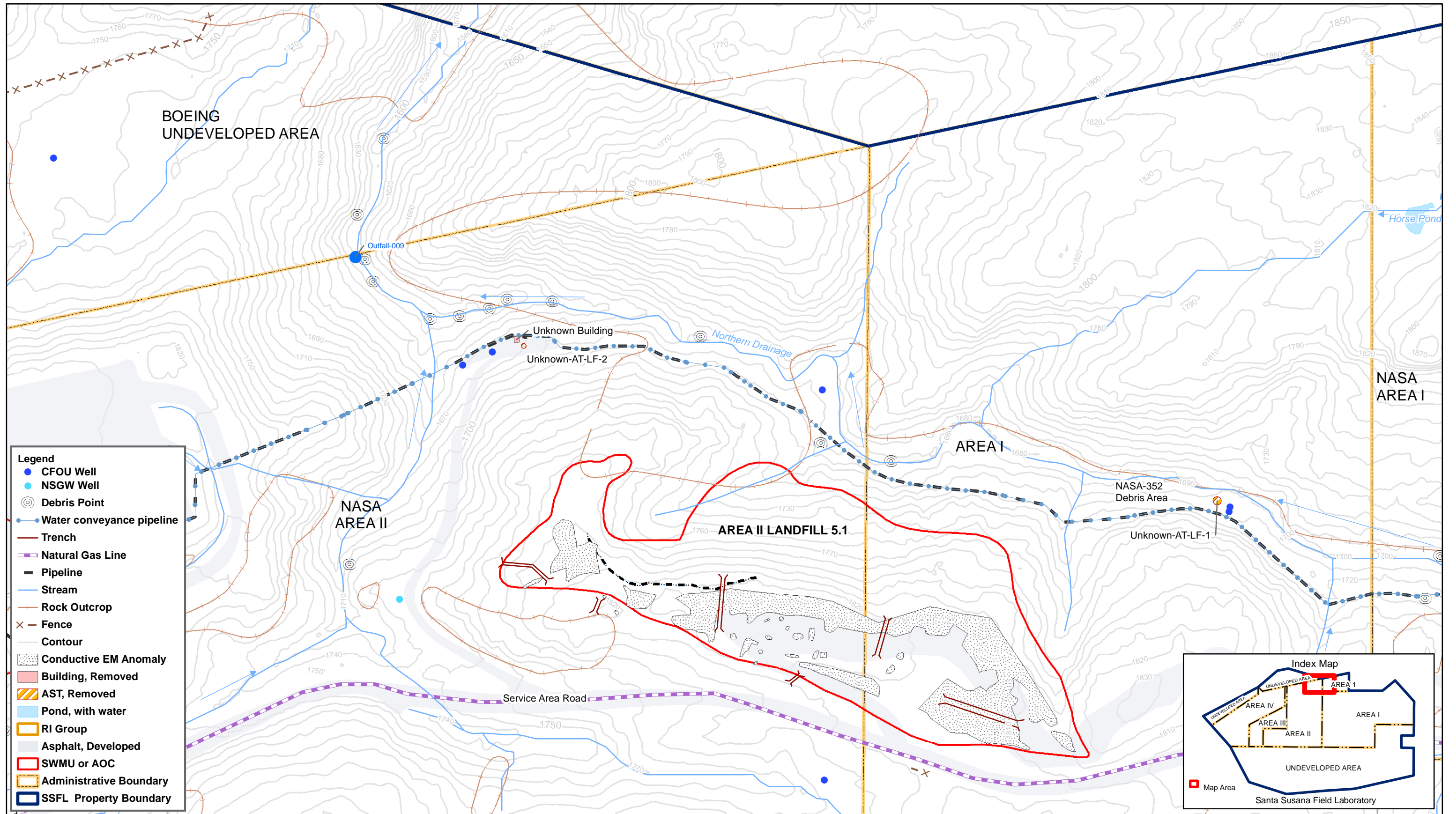


- Legend**
- Proposed Sample Location
 - Preliminary Remedial Area
 - ⊙ Debris Point
 - Debris Line
 - Paved Road
 - - - Dirt Road
 - Water conveyance pipeline
 - Leachfield Line
 - Trench
 - Natural Gas Line
 - Pipeline
 - Pipeline, Removed
 - Stream
 - Rock Outcrop
 - × Fence
 - Contour
 - Building
 - Concrete Pad/Slab
 - Building, Removed
 - Cooling Tower, Removed
 - Cold Box, Removed
 - Asbestos Extent
 - AST, Removed
 - UST, Removed
 - Sump
 - Pond, with water
 - Depression
 - Debris
 - RI Group
 - SWMU or AOC
 - Administrative Boundary
 - SSFL Property Boundary
 - Anticipated 70% Dispersion Area of the Maximum Concentration

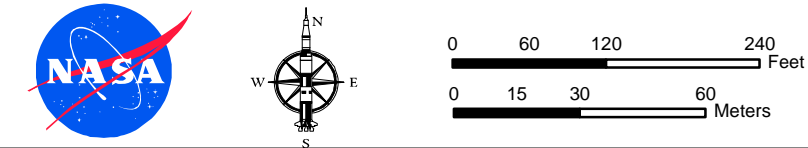
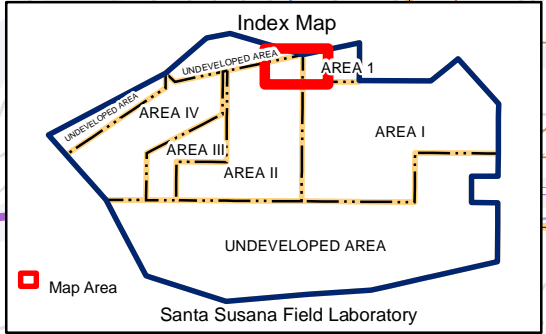


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**Figure 1.10-3 LOX Proposed Sample Locations
 Field Sampling Plan
 Santa Susana Field Laboratory
 Ventura County, California**

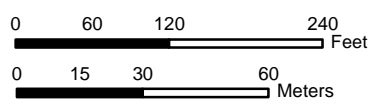
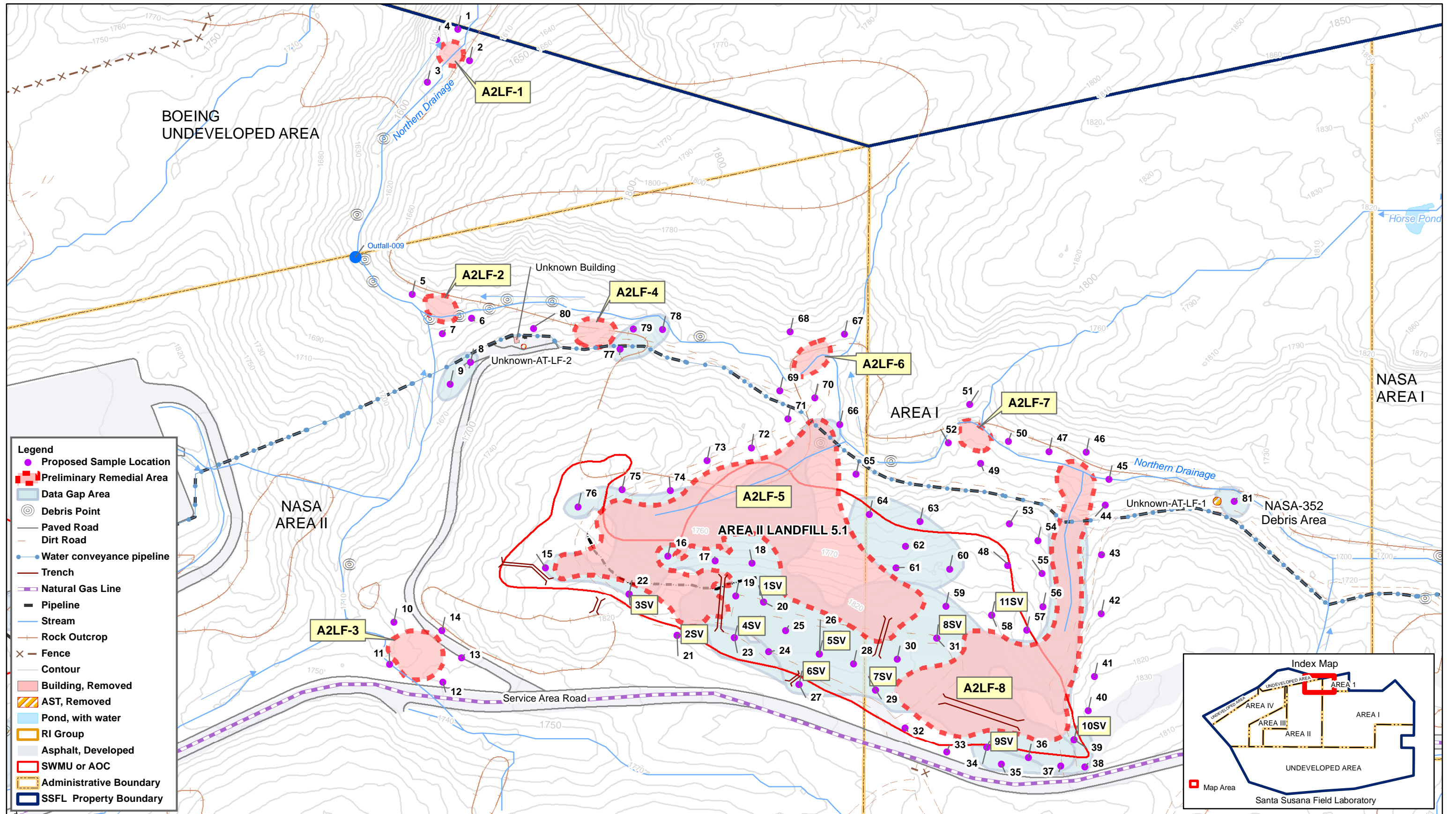


- Legend**
- CFOU Well
 - NSGW Well
 - ⊙ Debris Point
 - Water conveyance pipeline
 - Trench
 - Natural Gas Line
 - Pipeline
 - Stream
 - Rock Outcrop
 - × Fence
 - Contour
 - ▨ Conductive EM Anomaly
 - Building, Removed
 - ▨ AST, Removed
 - Pond, with water
 - RI Group
 - Asphalt, Developed
 - ▭ SWMU or AOC
 - Administrative Boundary
 - SSFL Property Boundary



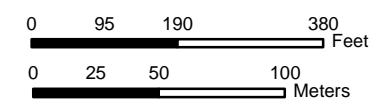
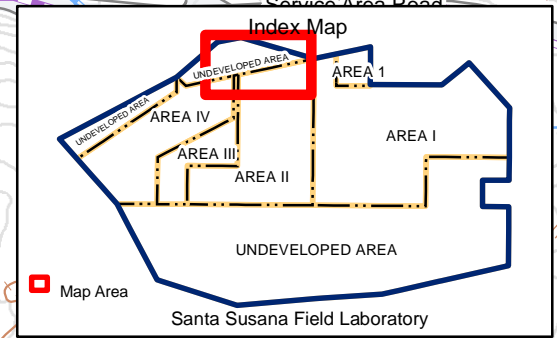
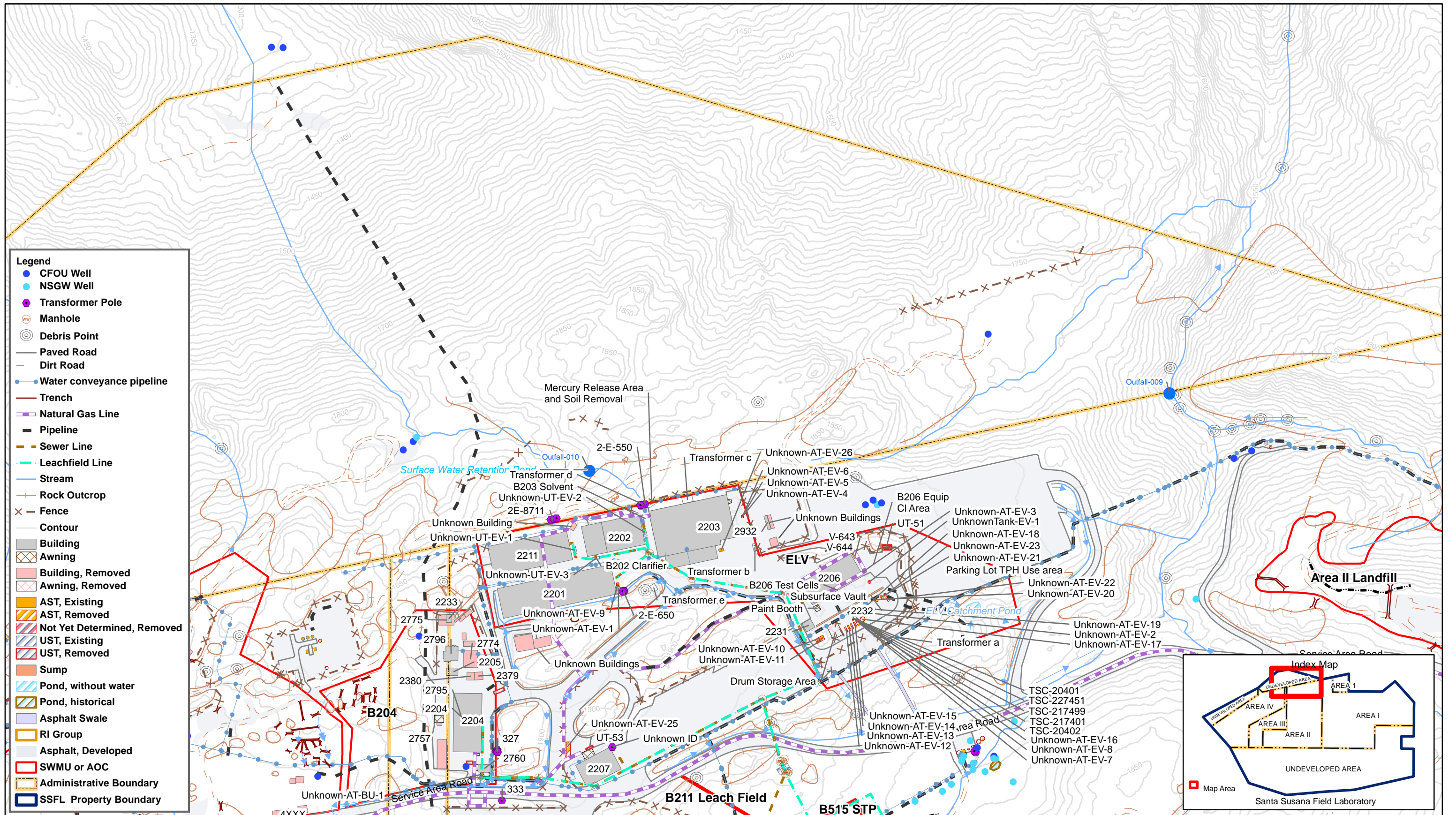
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Figure 1.11-1 Area II Landfill Site Map
Field Sampling Plan
Santa Susana Field Laboratory
Ventura County, California



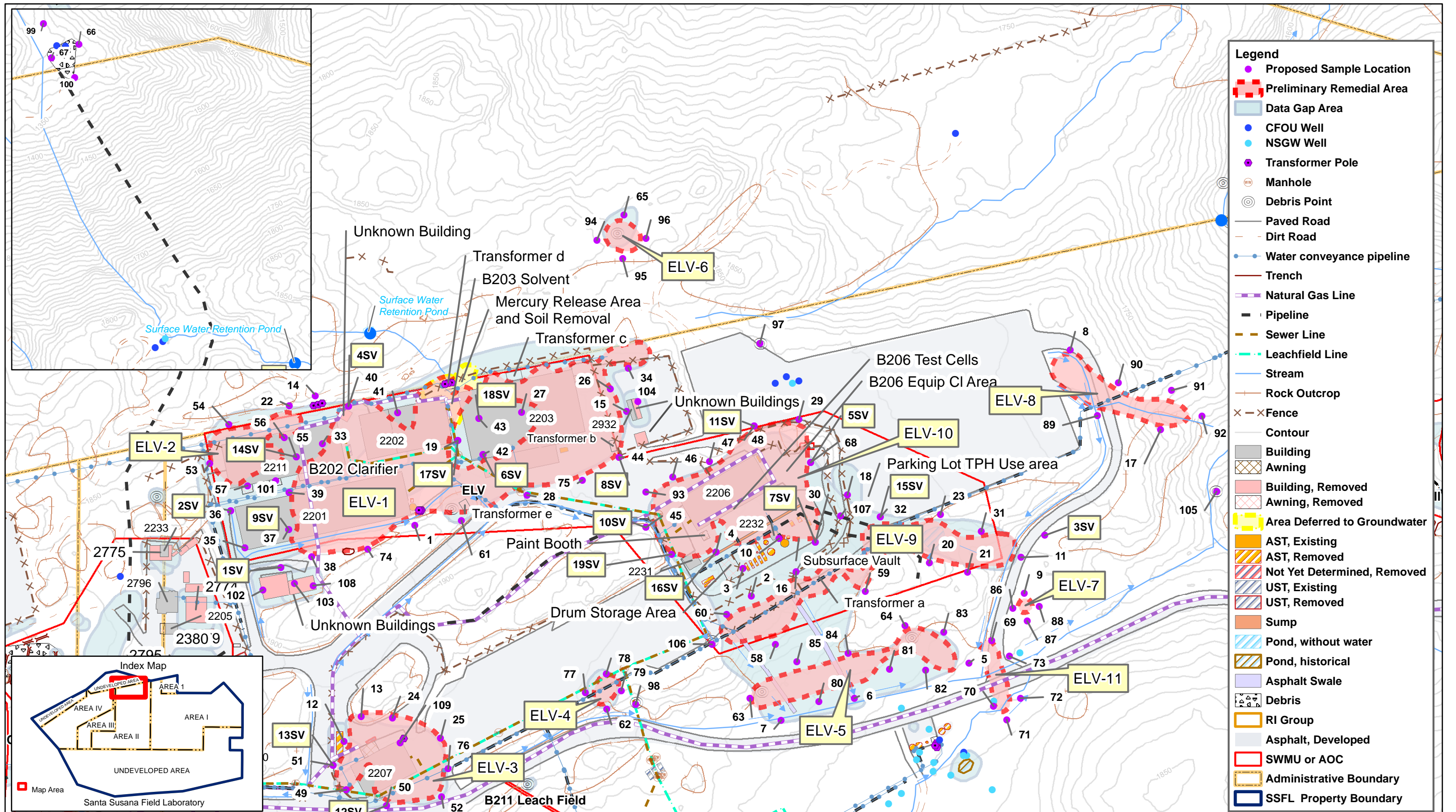
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Figure 1.11-2 Area II Landfill Proposed Sampling Locations
Field Sampling Plan
Santa Susana Field Laboratory
Ventura County, California



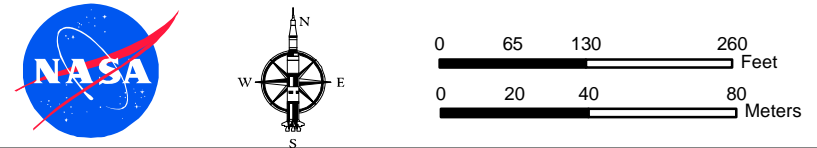
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Figure 1.12-1 ELV Site Map
Field Sampling Plan
Santa Susana Field Laboratory
Ventura County, California



- Legend**
- Proposed Sample Location
 - Preliminary Remedial Area
 - Data Gap Area
 - CFOU Well
 - NSGW Well
 - Transformer Pole
 - Manhole
 - Debris Point
 - Paved Road
 - Dirt Road
 - Water conveyance pipeline
 - Trench
 - Natural Gas Line
 - Pipeline
 - Sewer Line
 - Leachfield Line
 - Stream
 - Rock Outcrop
 - × Fence
 - Contour
 - Building
 - Awning
 - Building, Removed
 - Awning, Removed
 - Area Deferred to Groundwater
 - AST, Existing
 - AST, Removed
 - Not Yet Determined, Removed
 - UST, Existing
 - UST, Removed
 - Sump
 - Pond, without water
 - Pond, historical
 - Asphalt Swale
 - Debris
 - RI Group
 - Asphalt, Developed
 - SWMU or AOC
 - Administrative Boundary
 - SSFL Property Boundary

Figure 1.12-2
ELV Proposed Sample Locations
Field Sampling Plan
Santa Susana Field Laboratory
Ventura County, California



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