

SSFL Field Sampling Plan Subgroup 4

Liquid Oxygen Plant Area
Area 2 Landfill
Expendable Launch Vehicle

Public Meeting
26 January 2012

Agenda

- Welcome and Objectives
- AOC Soil Remediation Process
- Describe Sampling Approach
- Sequencing Field Sampling Plans (FSP) for NASA Sites
- Data Collection Methodology
- Liquid Oxygen (LOX) Plant Area
- Area 2 Landfill
- Expendable Launch Vehicle (ELV) Area

Meeting Objectives

- Provide an overview of NASA FSP-4
- Provide details on proposed investigation
- Visit the FSP-4 sites
- Obtain community input on sampling locations

Soil Remedial Investigation Under NASA-DTSC AOC Process

- NASA – DTSC AOC document signed December 6, 2010
- AOC defines process for characterization and cleanup of soils at NASA SSFL sites
- Requires cleanup of soils consistent with local background and lookup table values

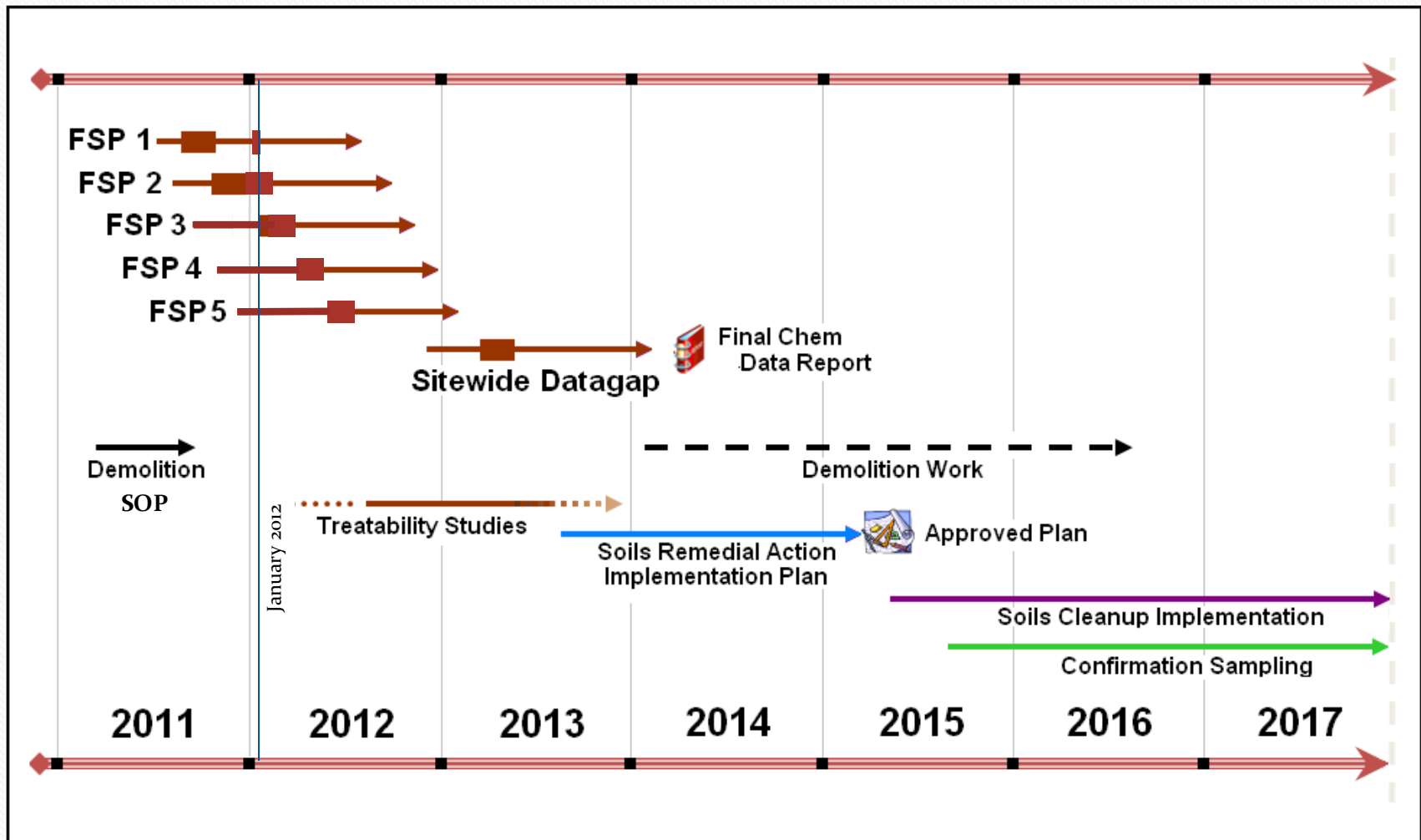
Soil Remedial Investigation Under AOC Process

- Remedial Investigation Workplan
 - Programmatic, NASA SSFL document
 - Submitted March 2011, currently in revision
- Field Sampling Plans (FSPs)
 - Workplans to complete NASA chemical investigation
 - Focus on subgroups of NASA sites
 - Collaborative development process
 - Aggressive schedule

NASA Site Sampling Sequence

- Field Sampling Plan 1
 - Alfa/Bravo Fuel Farm
 - Propellant Load Facility
 - Coca/Delta Fuel Farm
- Field Sampling Plan 2
 - Incinerator/AP/STP
 - Building 204
 - SPA
 - Skyline Road
- Field Sampling Plan 3
 - Alfa Test Stand
 - Bravo Test Stand
- Field Sampling Plan 4
 - LOX Plant
 - Area 2 Landfill
 - ELV
- Field Sampling Plan 5
 - Coca Test Stand
 - Delta Test Stand
 - R2 Ponds

NASA Soil Cleanup Schedule



Historical Information

- Reviewed historical documents
- Reviewed drawings
- Conducted site inspections
- Conducted personnel interviews
- Reviewed decades of aerial photographs
- Information compiled in a GIS

Community Involvement

- Comments on FSP-4 can be provided verbally today and in writing through 2/24/12
- DTSC will provide a written response to comments
- Comments on previous FSPs can continue to be provided
- FSP-3 Community Comments Update

Liquid Oxygen (LOX) Plant Area



LOX Plant Facing West

LOX Plant – Site Features

- The LOX Plant was constructed in 1955 and operated through 1971.
- Site Features
 - Former LOX Plant Waste Oil Sump and Clarifier (SWMU 4.5)
 - Excavated in 1993
 - Leach pit and leach field may have been associated with the waste oil sump and clarifier
 - LOX Asbestos and Drum Disposal Area (SWMU 4.6)
 - Debris pile was removed in 2007
 - LOX Generation/Compressor Building
 - Removed in 1978
 - Concrete foundation removed in 1996
 - LOX Storage and Distribution Building



LOX Plant – Site Features (continued)

- Systems Controls Building
 - Removed by 1977
 - Truck scales remain north of the building and a small shack south of the scale houses the truck scale controls
- Administration Office Building
 - Removed by 1977
- LOX Plant septic tank and leach field
- Northern Drainage
 - Approximately 10,463 cubic yards of soil and debris removed from the Northern Drainage between 2007 and 2010



LOX Plant – Chemical Use Areas

- The LOX Plant
 - Includes septic tank and leach field
- The Former Sump and Clarifier
 - Includes a depression around the sump and clarifier (Previously reported as a leach pit)
- LOX Western Debris Area and Asbestos Extent
- LOX Plant Demolition Air Particulate Deposition Area
 - Northern side of the LOX Plant Area.

LOX Plant – Production Process

Cryogenic Air Separation

[LOX Flow Diagram](#)

[LOX Photograph](#)

LOX Plant – Operational History

- Four – 75 ton/day LOX Generators
- LOX Storage and Distribution
 - Conveyance piping and ASTs fed tanker trucks with product
 - Tanker trucks serviced all six large-engine test areas throughout SSFL including Bowl, Canyon, Alfa, Bravo, Coca, and Delta test stands

LOX Plant – Operational History (continued)

- LOX Plant Equipment Cleaning
 - “LOX Clean” is a standard for tanks and pipelines allowed virtually no oils or grease to be present on the metal
 - TCE (and/or potentially Freon) was used to clean tanks and pipelines
- LOX Plant Septic Tank and Leach Field
- Former LOX Plant Waste Oil Sump and Clarifier
 - The sump and clarifier were used as a collection point for disposal of liquid wastes containing solvents and fuel, waste oil, and wastewater containing oil.

LOX Plant – Release History

- There were no required reports of releases at the LOX Plant Area. Discolored soil with odors was identified, along with a potential leach field feature, during the removal of the sump and clarifier.



LOX Plant Facing North

LOX Plant – Removals

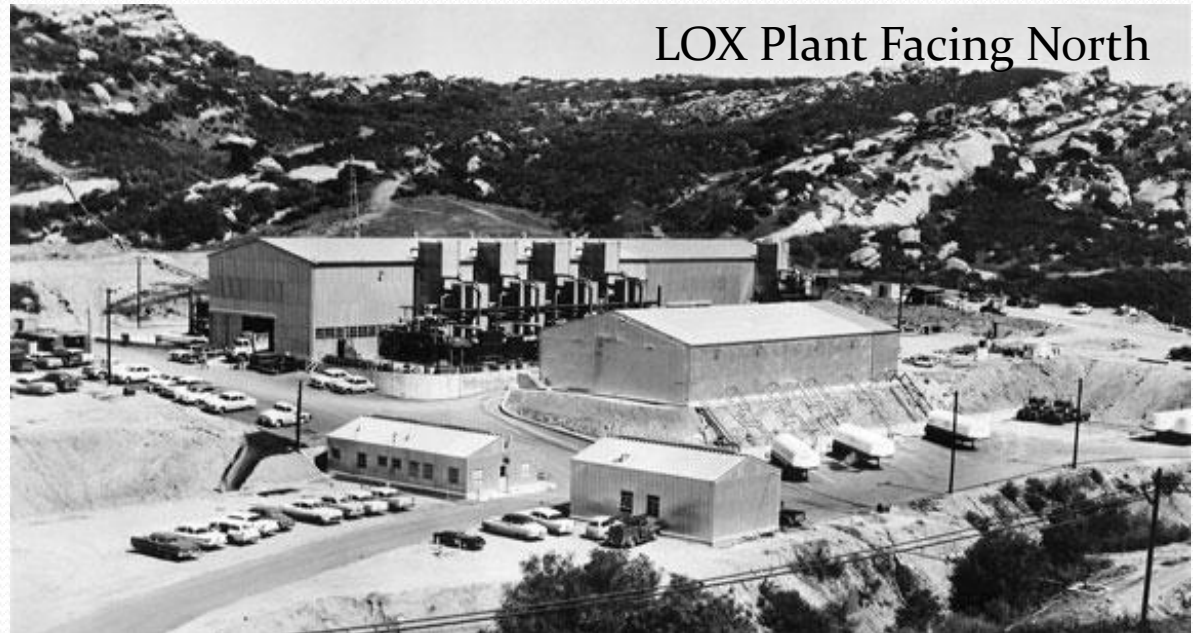
- LOX Plant was removed by 1978
- LOX Plant Waste Oil Sump and Clarifier was removed in 1993. Discolored soil and potential leach field features were disposed offsite.
- Soils sampled after excavation were analyzed and no significant impacts to the soil were identified (1993 standards).
- LOX Asbestos and Drum Disposal Area where asbestos containing materials were stockpiled, were removed in 1990. Approximately 2,800 cubic yards of soils and 30 cubic yards of floor tiles were removed and disposed.

LOX Plant – Removals (continued)

- A second debris pile was removed in 2007. Approximately 2,500 cubic yards of soil were removed from the Drum Disposal Area.
- Between 2007 and 2010, approximately 10,463 cubic yards of soil and debris was removed from the Northern Drainage.

LOX Plant – Aerial Photographs

- Distillation columns – 5
- Buildings – 5
- ASTs – 5
- Dirt paths
- Unidentifiable features – 4



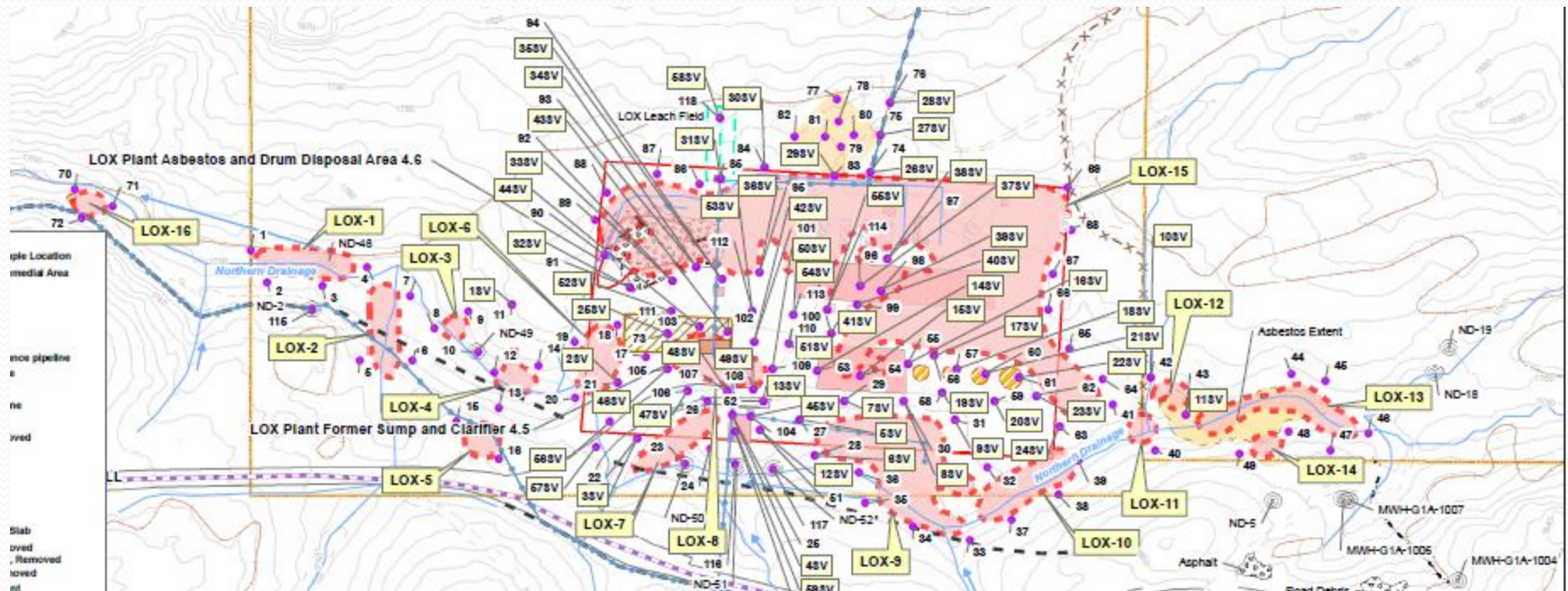
LOX Plant – Previous Sampling Results

- VOCs
- SVOCs
- TPH
- PCBs
- Pesticides
- Metals
- Dioxins
- Energetics



LOX Plant Facing East

LOX Plant – Proposed Sampling



Area 2 Landfill



Landfill Facing West

Area 2 Landfill – Site Features

- Unengineered disposal location used from 1955 to 1980
- The Area 2 Landfill (SWMU 5.1) has been designated a “closed landfill” as part of the VCEHD landfill program.
- Site Features
 - The Area 2 Landfill is 3.6 acres and is located in the northern portions of Areas 1 and 2.
 - NASA – 352 Debris Area

Area 2 Landfill – Chemical Use Areas

- Area 2 Landfill (SWMU 5.1)



Landfill Facing East

Area 2 Landfill – Operational History

- The area was active from approximately 1955 to 1980, but the years of primary use were between 1965 and 1978.
- Received unused fill materials, vegetation, some drums of unknown content, and construction debris.

Area 2 Landfill – Operational History (continued)

- Chemicals associated with operations in Area 2 (rocket testing, component testing, maintenance facilities, Peacekeeper missile loading) include:
 - Liquid rocket test fuels (kerosene, jet fuel, monomethyl hydrazine, hydrazine derivatives)
 - Oxidizers (LOX and nitrogen tetroxide)
 - Fluoride compounds and inhibited red fuming nitric acid
 - Solvents (TCE, TCA, Freon 113)
 - Energetic materials
 - Various chemicals associated with lab operations, waste oils, incinerator ash, and construction debris

Area 2 Landfill – Release History

- There have been no documented releases from the Area 2 Landfill



Landfill Facing East

Area 2 Landfill – Removals

- Some debris removal from the landfill occurred prior to September 1989
- Additional debris areas removed in 2006 and 2007
- Drums were removed during 2009

Area 2 Landfill – Aerial Photographs

- Roads



Landfill Facing East

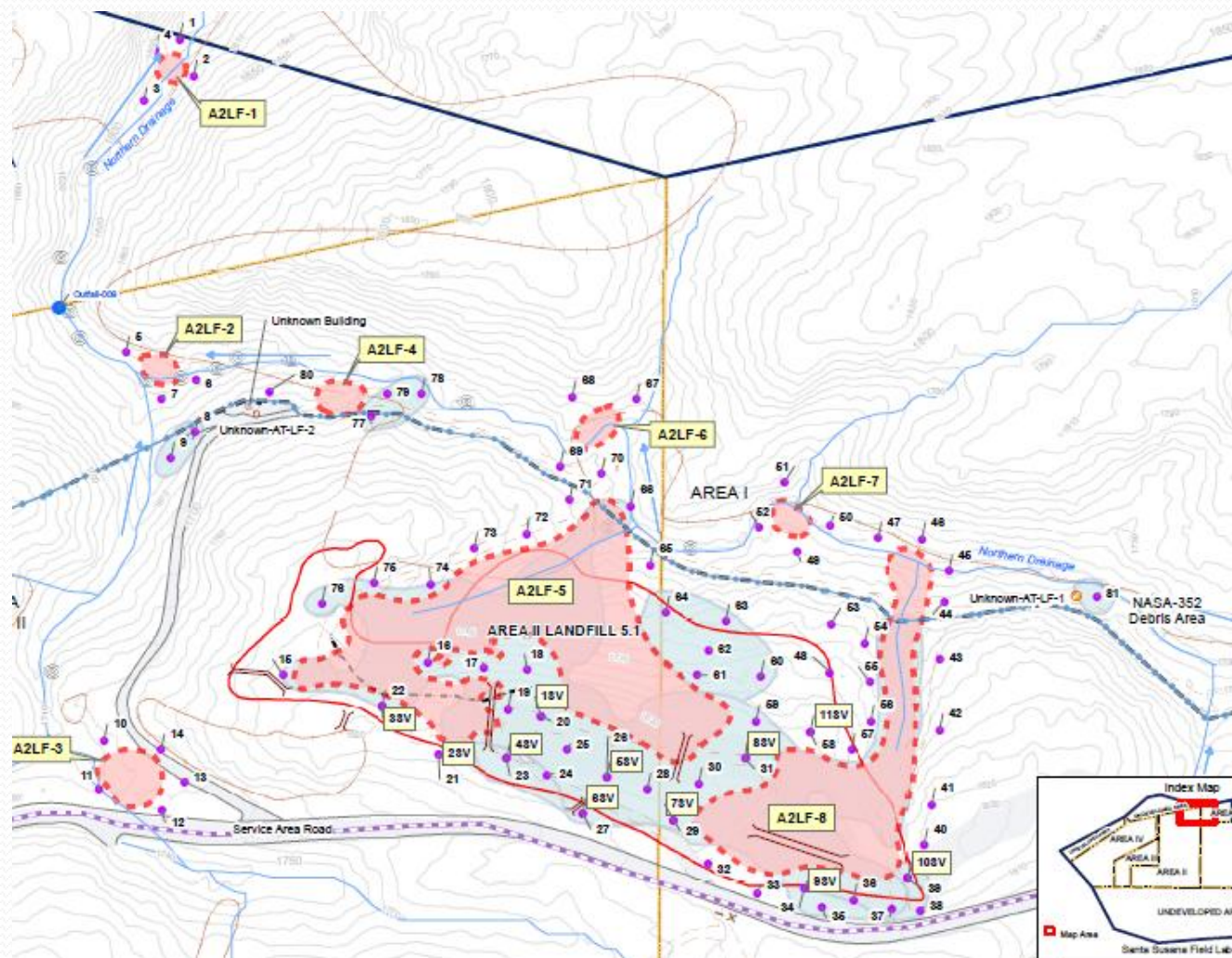
Area 2 Landfill – Previous Sampling Results

- VOCs
- SVOCs
- TPH
- PCBs
- Metals
- Energetics
- Dioxins



Landfill Facing East

Area 2 Landfill – Proposed Sampling



Expendable Launch Vehicle (ELV)



ELV Facing West

ELV – Site Features

- The ELV Area primarily consists of buildings constructed in the mid- to late-1950s and which had a variety of uses.
- Site Features
 - ELV Final Assembly Building 2206 (SWMU 5.2)
 - Test bays
 - Sumps
 - Drum storage area
 - Vault
 - Catchment pond



ELV – Site Features (continued)

- AOC Building 2206 Diesel UST (UT-51)
 - Removed in 1987
 - Closed by VCEHD in 1996
- 1,500 gallon oil UST on east side of building 2207
 - Removed in 1998
 - Closed by VCEHD

ELV – Site Features (continued)

- Polychlorinated Biphenyl (PCB) Storage Facility Building 2231 (SWMU 5.3)
 - Closed by DTSC in 1998
- Building 2207 UST (UT-53)
 - Removed in 1988
 - Closed by VCEHD in 1996
- Wastewater Treatment Clarifier
- Septic tanks and leachfield
- Outfall 010 storm water retention pond north of Building 2202
- Building 2201, Engineering Offices
- Building 2202, Cafeteria and Photo Laboratory



ELV – Site Features (continued)

- Building 2203, Lasers Lab Facility
- Building 2207, Protective Services Building
- Building 2211, Operations Building



ELV – Site Features (continued)

- Building 2232, LOX Tank Control Building
- Building 2932, Compressor Shelter
 - ASTs
 - Foundations/tank cradles of former ASTs
 - Transformers



B232 West Side

ELV – Photograph



ELV Facing East

ELV – Chemical Use Areas

- ELV – Northwestern Portion
 - Consists of Buildings 2211, 2201, 2202, 2203, and 2932
- ELV – Southeastern Portion and PCB Storage
 - Consist of Building 2206, the ELV catchment pond, two large parking areas, and Building 2231
- Building 2207



ELV Facing Northwest

ELV – Operational History

- Building 2206
 - Machine and welding shop
 - Used lubricating oils and compressed gas
 - Component Testing
 - Included chemical processing and storage, engine component cleaning, vapor degreasing
 - ELV Final Assembly Building
 - Included painting, and metal plating
 - Diesel UST (UT-51)
 - Discharges channeled to a pond on south side of building



ELV – Operational History (continued)

- Building 2231
 - PCB storage facility
 - Storage of waste PCBs, usually contained in transformers



B231 North Side

ELV – Operational History (continued)

- Building 2201
 - Engineering offices and operations building
 - Electrical assembly operations including soldering and welding



B201 North Side

ELV – Operational History (continued)

- Building 2202
 - Cafeteria and photo laboratory
 - Wastewater treatment clarifier and photo lab neutralizing tank
 - Oil storage area
 - Laser and Electro-Optical System (LEOS) storage



ELV – Operational History (continued)

- Building 2203
 - Instrument Laboratory, and Lasers Lab Facility used by LEOS including an equipment cleaning area
 - Service Building including tinning, degreasing, sand blasting, and welding
 - Former oil storage area



ELV – Operational History (continued)

- Building 2207
 - Protective Services Building, current Fire Station
 - Former drum storage
 - Former vehicle wash area
 - Former diesel UST (UT-53)



ELV – Operational History (continued)

- Building 2211
 - Operations building and furniture storage
- Building 2232
 - LOX Tank Control Building
- Building 2932
 - Compressor Shelter and Material Preparations Shelter

ELV – Release History

- Hydraulic fluid spilled on the floor of Building 2206, 6 quarts to 6 gallons.
- Hydraulic oil released inside Building 2206, 4-6 gallons.
- Zep cleaner (a degreaser) was released from a drum leak at Building 2203, 2 gallons.
- Battery acid spilled in front of Building 2206, 0.1 gallon.
- RP-1 was released from an RS-27 engine at Building 2206, 0.1 gallon.
- Diesel released from a generator in the maintenance lot of Building 2206, 1 gallon.
- Unknown liquid was released from a damaged container in the oil yard, 1 gallon.

ELV – Release History (continued)

- Oil was released at the shop of Building 2203, 0.1 gallon.
- Oil and water were released from the reservoir on a pipe cutter trailer, 5 gallons.
- Antifreeze and water were released at Building 2206, 2 quarts.
- Oil was released from a front-end loader at Building 2206, 0.5 pint.
- Methyl n-amyl ketone rusted through the can in the flammable locker at Building 2206, less than 1 quart.
- CS-405P coolant twice leaked from a sight glass at Building 2203, less than 18 gallons, each leak.
- Mercury was spilled inside Building 2203, 1 pound.

ELV – Photograph



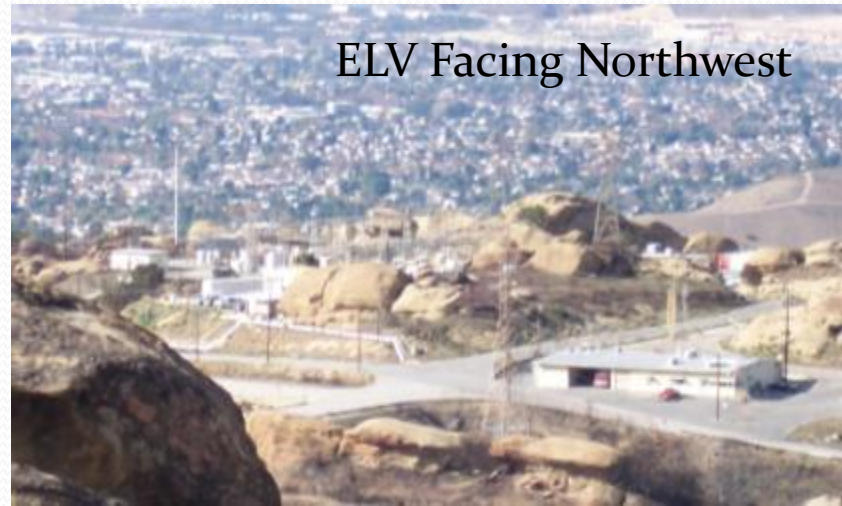
ELV Facing Northwest

ELV – Removals

- Approximately 3,000 cy of mercury-contaminated soil was removed north of Buildings 2202 and 2203 in 1994.
- Diesel UST UT-51 was removed in 1987 and was closed by VCEHD in 1996.
- Diesel UST UT-53 was removed in 1988 and was closed by VCEHD in 1996.

ELV – Aerial Photographs

- Buildings – 3
- Awnings – 3
- AST – 1
- Above ground portion of pipelines
- Cleared vegetation area north of ELV on the edge of the undeveloped area
- ~~Debris area east of the ELV parking lot~~



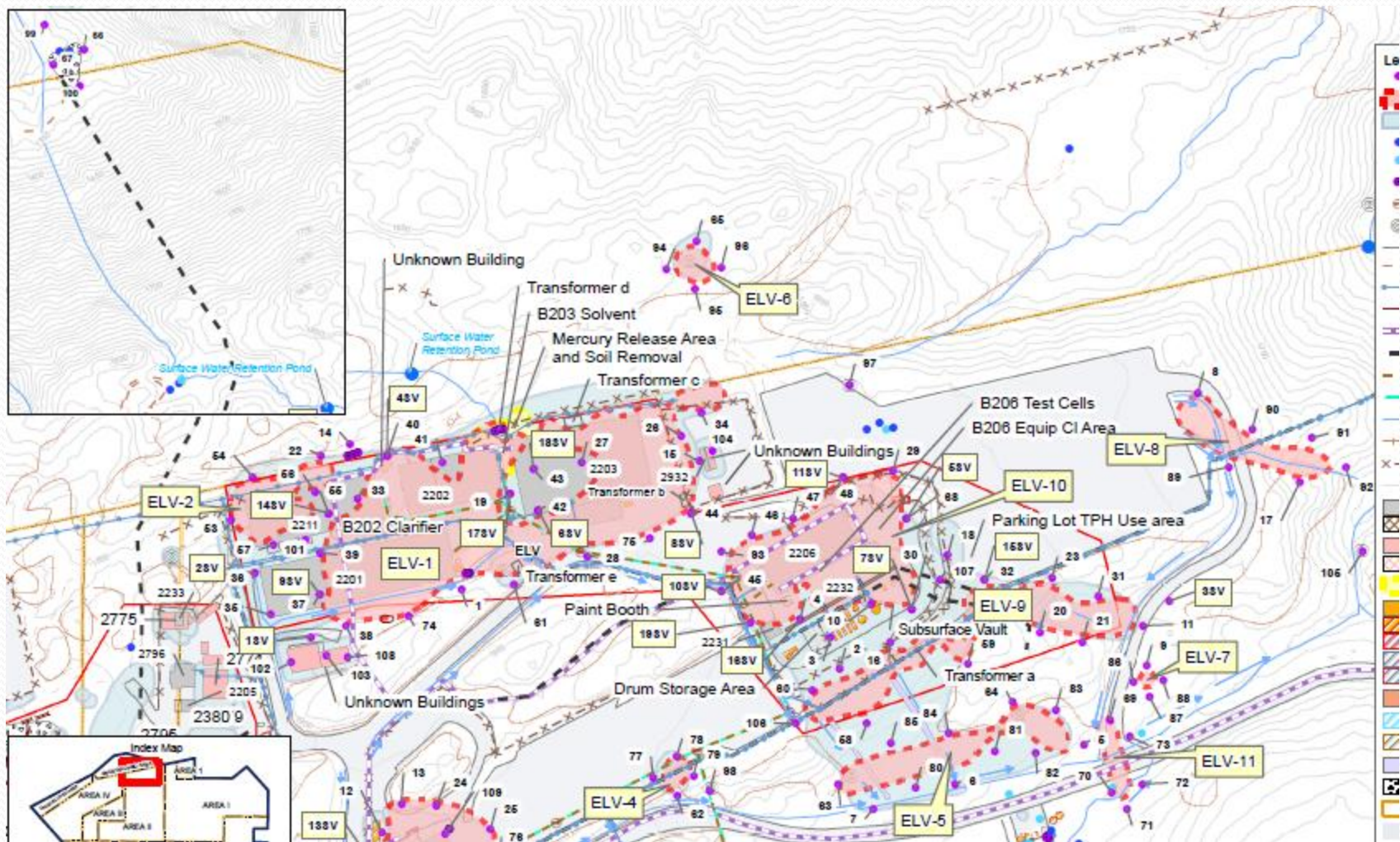
ELV – Previous Sampling Results

- VOCs
- SVOCs
- TPH
- PCBs
- Pesticides
- Metals
- Energetics
- Dioxins



ELV Facing Northeast

ELV – Proposed Sampling



Contact Information and Links

- Draft FSP-4 is located at the link below

http://www.dtsc-ssfl.com/files/lib_rcra_soils/RIWP-NASA/wp/65211_FSP_Histories_LOX_A2LF_ELIV.pdf

- Comments due 2/24/12
- Send comments to
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