

SSFL Field Sampling Plan Subgroup 5

Coca Test Area
Delta Test Area
R-2 Ponds

Public Meeting
8 March 2012

Agenda

- Welcome and Objectives
- Administrative Order on Consent (AOC)
- Describe Soil and Soil Vapor Sampling Approach
- Sequencing Field Sampling Plans (FSP) for NASA Sites
- Data Collection Methodology
- Coca Test Area
- Delta Test Area
- R-2 Ponds

Meeting Objectives

- Provide an overview of NASA FSP-5
- Provide details on proposed chemical investigation
- Visit the FSP-5 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 (lookup table values)

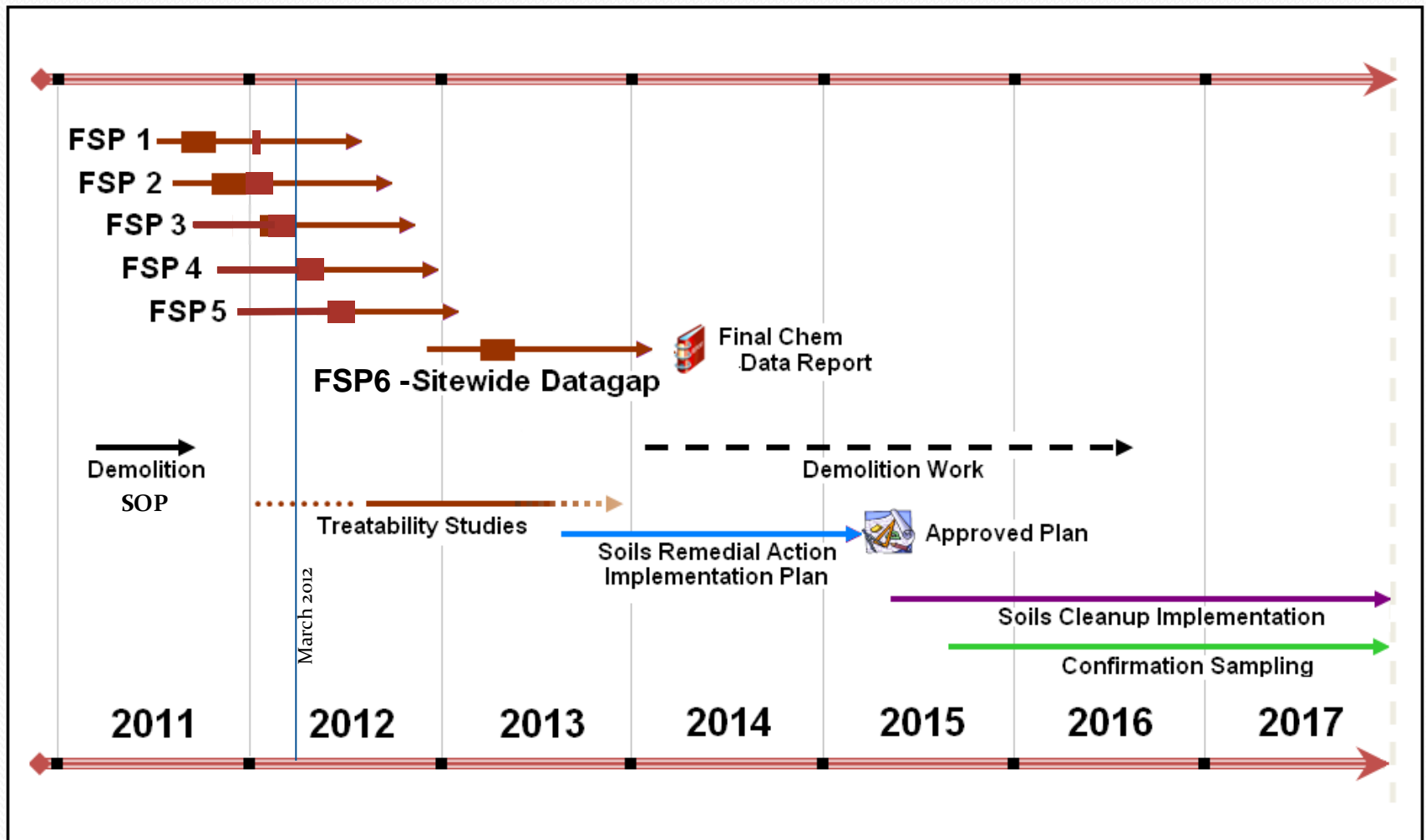
Soil Remedial Investigation Under AOC Process

- Remedial Investigation Workplan
 - Programmatic, NASA SSFL document
 - Submitted to DTSC March 2011
- Field Sampling Plans (FSPs)
 - Workplans to complete NASA RFI
 - 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
 - R-2 Ponds

NASA Soil Cleanup Schedule



Historical Information

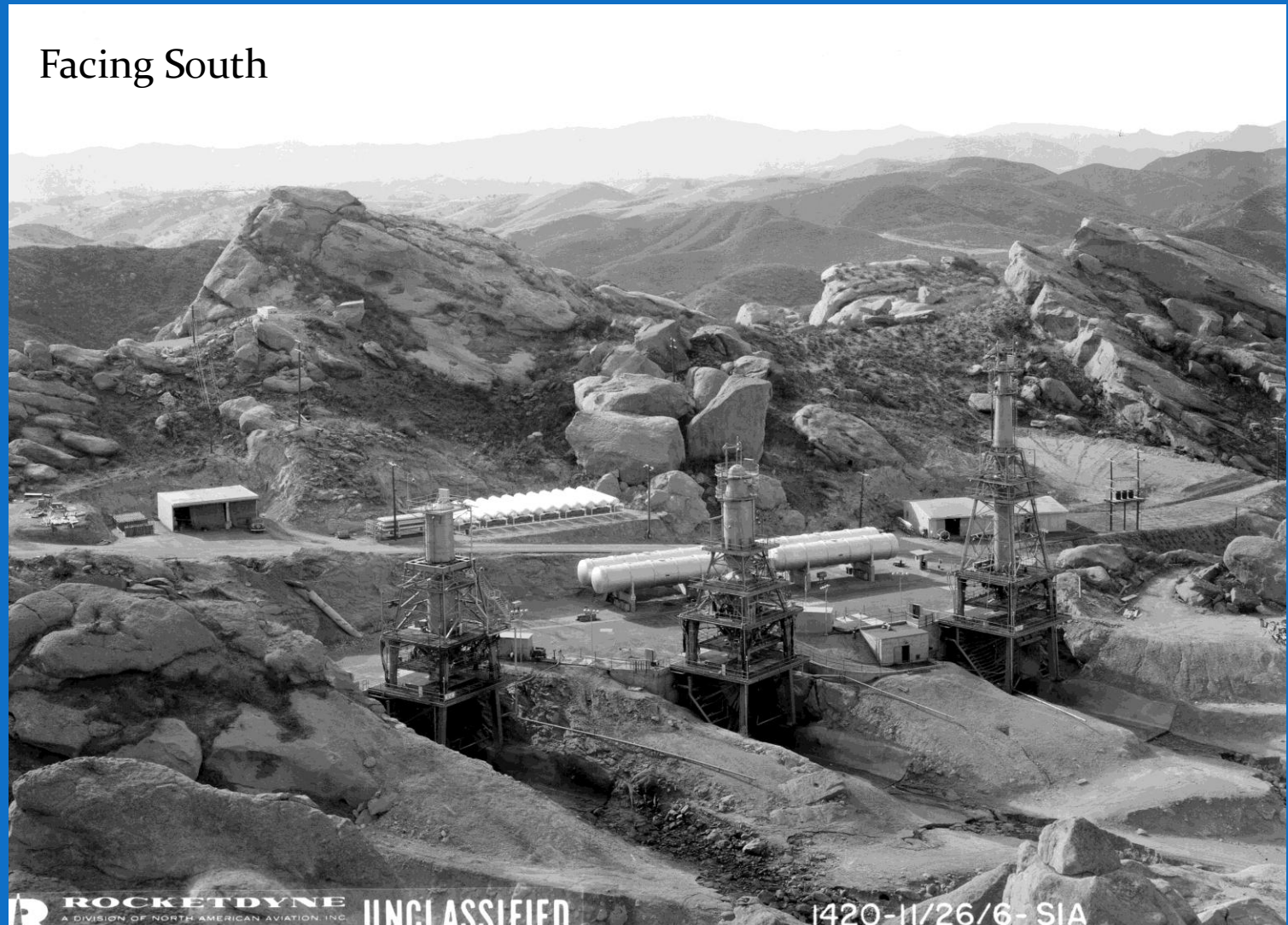
- Reviewed historical documents
- Reviewed drawings
- Conducted site inspections
- Conducted personnel interviews
- Reviewed decades of aerial photographs
- Information compiled in a GIS

Community Involvement

- Comments on FSP-5 can be provided verbally today or in writing to DTSC through 4/6/12
- DTSC will provide a written response to comments
- Comments on previous FSPs can continue to be provided
- FSP-3 and 4 Community Comments Update
- Beyond FSP-5 . . .

Coca Test Area

Facing South



Coca Area Test Stands - I, Atlas Dev; II, Atlas Flt, & III Navaho Engine - 1956

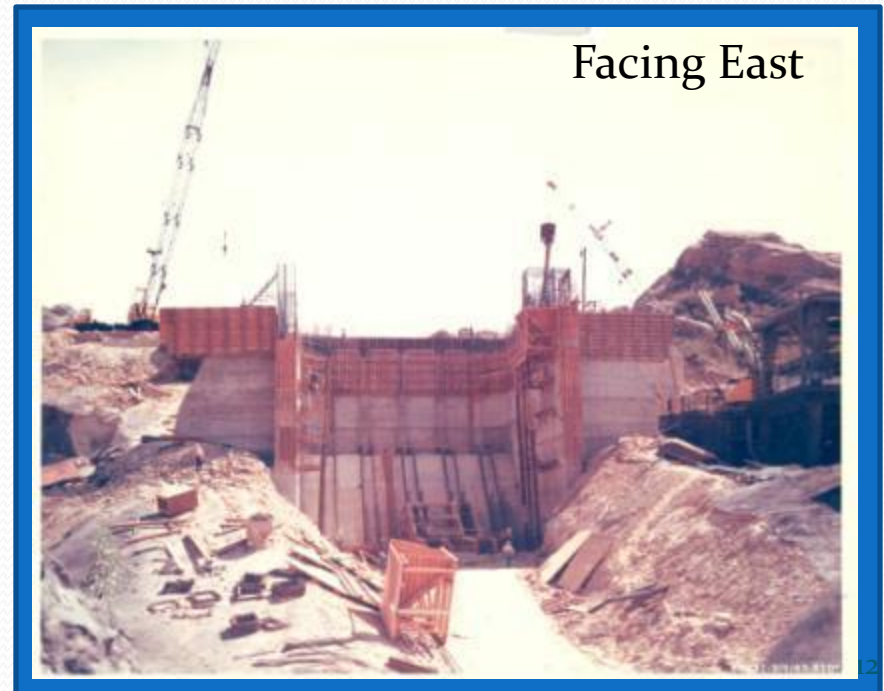
Snow?



Coca Area - A-3 Test Stand - Snow

Coca Test Area – Facts

- Coca Test Area had 3 test stands constructed in 1956
- 1964 – Additional stand was constructed and one modified
- One test stand has been dismantled, and another partially dismantled
- The Coca Test Area has been predominantly inactive since 1988, with limited hydrogen tank testing in 2000 and 2005
- Engines tested include:
 - Atlas
 - Navajo
 - J-2 (Jupiter)
 - Saturn
 - Space Shuttle Main Engine



Coca Test Stands

Facing East



Coca Test Area

Facing East



Coca Test Area – Site Features

- Four test stands (B2733, B2734, B2735, B2787) with electrical control shacks (SWMU 5.18)
 - Fuel run tanks
 - Fuel dump lines
 - Flame buckets
 - TCE capture system
 - Hydraulic system
 - Fuel filter mechanisms
 - Deluge water controls
 - Lubrication system (grease)
- Pretest shop
- Septic tanks
- Liquid oxygen (LOX) tanks
- Gaseous nitrogen (GN₂) and Gaseous hydrogen (GH₂) tanks
- Liquid nitrogen (LN₂) and Liquid hydrogen (LH₂) tanks
- Freon tanks
- Petroleum-based fuel tanks

Coca Test Area – Site Features (continued)

- Oil tanks
- Oxidizers (other than LOX) Tanks
- Trichloroethene (TCE) Tanks
- Coca Skim Pond (SWMU 5.19)
- Hydrogen Compressor Area
- Coca Electrical Control Stations (B2E, B2235, and B2236)
- Coca Control Center (B2218)
- Pill Boxes (B2A, B 2614, B2B)
- Terminal House (2219)
- Underground Tunnel (Ground Service Building to Control Center)
- Vehicle Shelter and Rocket Nozzle Test Facility (RNTF [B2220])
- Lower and Upper Pretest Buildings (B 2222, B 2234)
- Hydraulic Pump House (B2240)
- Carousel Storage (B2451)
- Area 2520 (Vault [High Pressure Bottles])
- Bulkhead Test Facility (B2751)
- Compressor Shelter (B2919)
- Leach Fields (B2218, B2222, and B2234) (Area II Areas of Concern)
- Debris Area
- Transformers

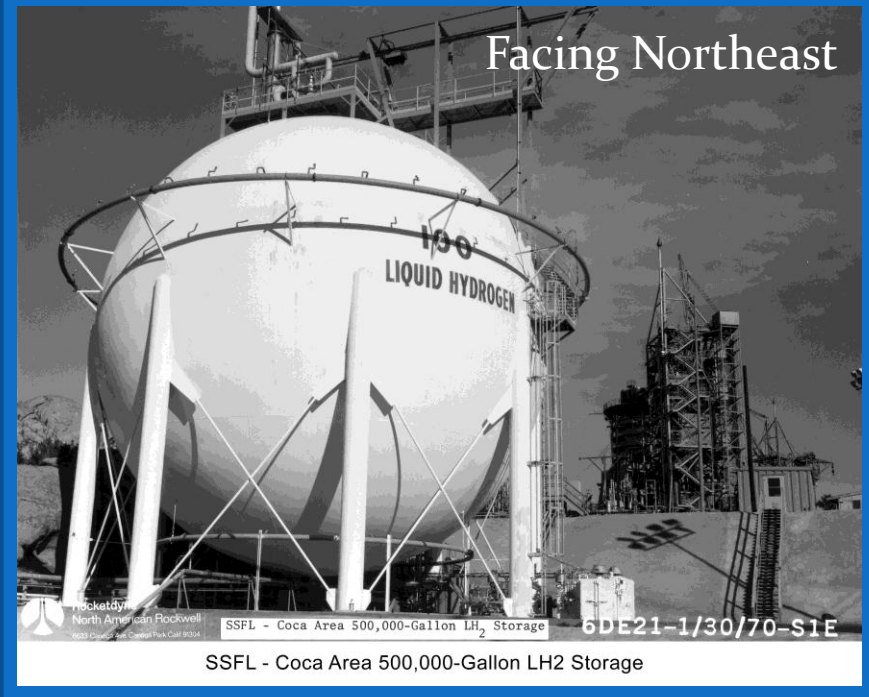
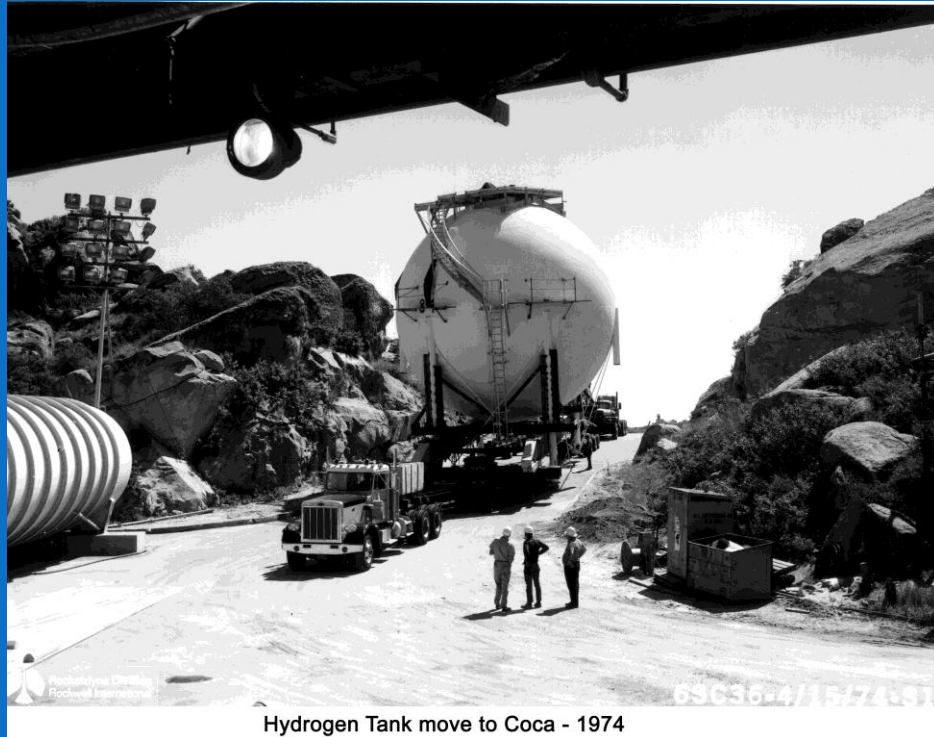
Coca Test Area – Chemical Use Areas

- Coca Test Stands
- Channels to Coca Skim Pond
- Coca Skim Pond
- Lower Pretest Building
- Leach Fields (B2222, B2234)
- Upper Pretest Building
- TCE, Solvent, and Freon Tanks
- Petroleum Fuel Pipelines, Tanks, and Fuel Filter Pits
- Lube Oil Unit Area
- Hydraulic Pump Station
- Air Dispersion Area
- Groundwater VOC Area

Coca Test Area – Chemical Use Areas (continued)

- Substations and Transformer Areas
- Building 2218 Leach Field
- Debris Areas
- Bulkhead Test Facility
- V100 Vacuum Shed
- Vehicle Shelter, Fire House, and RNTF Storage
- Flame Deflector Pump House
- Hydrogen Compression Building
- Hydrogen Compressor Area
- V99 Bleed-off Valves

Coca Test Area – V100 Area

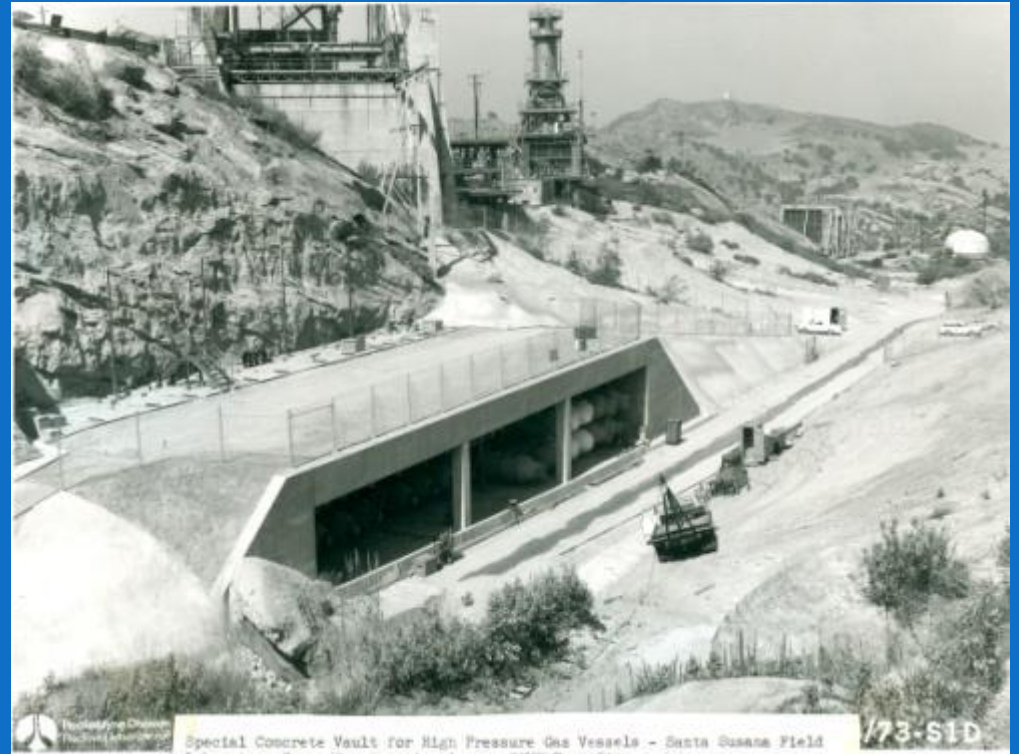


Coca Test Area – Vault Area

Facing Southwest



Coca Foundation Construction for "Vault" - 1973

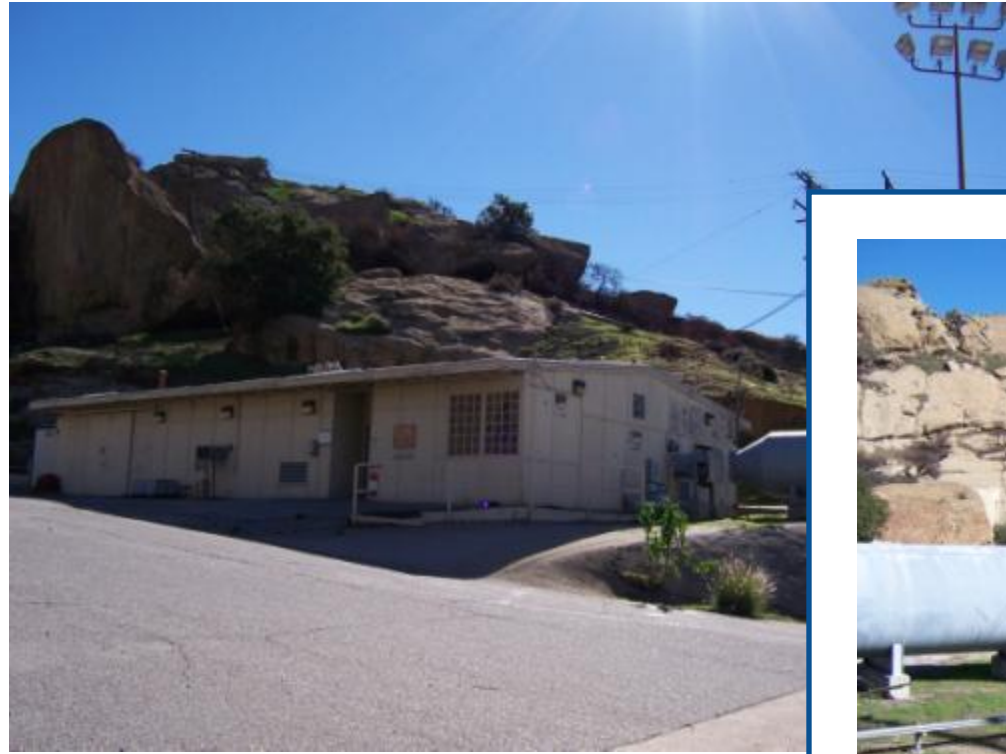


Special Concrete Vault for High Pressure Gas Vessels - Santa Susana Field

Coca Test Area – Pretest Shop Operations

- Pretest Shop was used to prepare engines and test stands for testing operations, and modify parts of the test stands for various test and engine configurations
- RNTF
 - B2222 served as the RNTF from 1994 until 2001
 - The RNTF was used to test various nozzles and rocket motor fittings using high-pressure gas

Coca Test Area – Lower Pretest Shop Photographs



The Upper Pretest Shop was destroyed in the Topanga wild fire in 2005.



Engine Testing Operations - Fuels

- Fuels were stored at the Coca/Delta Fuel Farm (FSP-1)
- Pipelines and valve boxes were used to direct the flow of fuel (fuel filtration system)
- Fuels stored on the test stand in a run tank
- Fuel dump line used in case of emergency shut off
- Fuel remaining in engine was drained to waste tank
- Fuels used at Coca include petroleum based fuels (RP-1 and JP-4), LH₂, IRFNA, and MMH



Engine Testing Operations – Fuels: Filters



Engine Testing Operations - Ignition

- Fill ignition chamber with ethylene glycol/sodium nitrate (burned off during engine ignition and used to smooth out the combustion sequence)
- Charge engine with RP-1 fuel
- Pyrotechnics (4 charges) fired in fuel-rich gas generator (brings pressure up in turbo pump)
- Initiate LOX flow (oxidizer)
- Use hypergol cartridge for ignition (Triethylaluminum [TEA] and Triethylborane [TEB])
- Engine Ignition (ethylene glycol and sodium nitrate is burned off along with TEA and TEB).
- Air dispersion area for exhaust

Engine Testing Operations – Hydraulic Systems

- Stands were equipped with hydraulic systems
 - Oil reservoirs
 - Tubing/Piping
- Hydraulic systems were used to gimbal engines and open valves in engine

Engine Testing Operations – Hydraulic Systems at Coca



Engine Testing Operations – Cleaning at Test Stands

- Liquid Oxygen (LOX) Systems – LOX clean standard
 - TCE was used to clean LOX tanks; hand wiping while being assembled
 - Piping was cleaned via gravity feeding TCE through pipelines



Engine Testing Operations – Cleaning at Test Stands (continued)

- Small Parts Cleaning
 - Small “sinks” of TCE located on various levels of test stand
- Engine Cleaning
 - After testing (engines cooled), TCE was fed through fuel system for cleaning (amount of TCE = size of engine combustion chamber)
 - Engine LOX domes were flushed with TCE
 - TCE capture began in 1961 and recovery systems were improved with time

Engine Testing Operations – TCE Catch Pans



TCE Catch Pan

Figure 4-7
TCE Catch Pans, Coca 1 Test Stand
Photograph provided courtesy of RSC/SSFL
Photograph number: Unknown

Engine Testing Operations – TCE Tank at Coca



Engine Testing Operations – Test Stand Discharges

- Deluge Water
 - Deluge water used for noise suppression
 - Deluge water gravity fed from Skyline Tanks (FSP-2)
 - Deluge water source (Water district and reclamation system [FSP-2])
- TCE
 - TCE used for cleaning released to flame bucket and into spillway between 1955 – 1961
 - TCE recovery and recycling efforts started in 1961
- Fuels
 - Excess fuel in combustion chambers released to flame bucket and into spillway between 1955 - 1961

Engine Testing Operations – Test Stand Discharges (continued)



Coca Test Stand 4
Flame Bucket

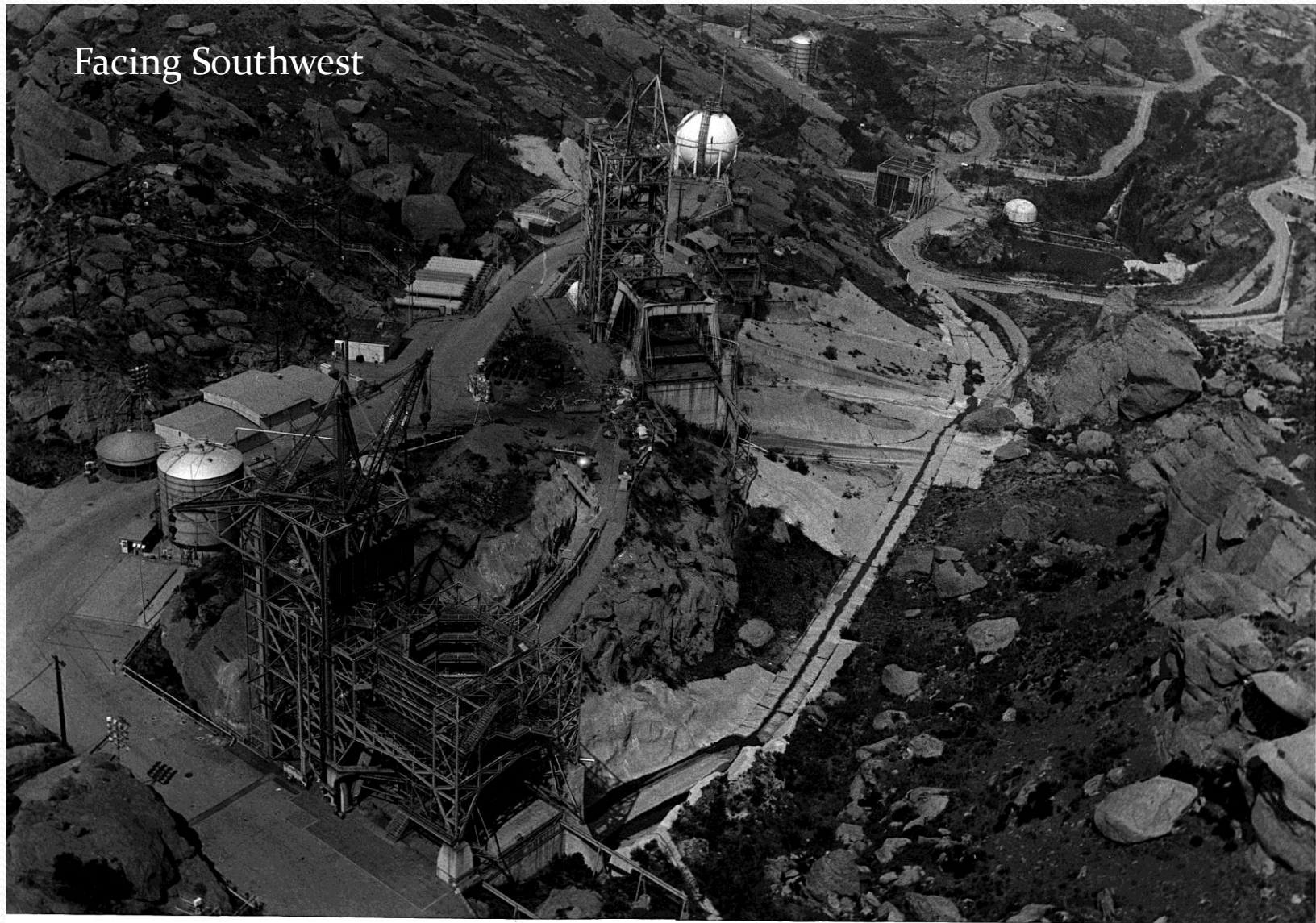
Facing East

Engine Testing Operations – Test Stand Discharges (continued)

- Test Stand Spillways
 - Gunitite lined
 - Channeled mixture of water, fuel and TCE to:

Coca skim pond -> R-2 Pond

Engine Testing Operations – Spillways and Ponds



Coca Area Test Stands

Coca Test Area - Release History

- April 2000 – Gasoline and hydraulic oil – 2-gallon release of gasoline & 2-gallon hydraulic oil release from forklift
- June 2000 – Versi-Foam – 5 gallons of Versi-Foam (Component B) released
- December 2000 – Hydraulic Oil – 30 gallons of hydraulic oil from forklift puncturing a 55-gallon drum
- Fuels, TCE, and deluge water were released to Coca Skim Pond -> R-2 Pond

Coca Test Area- Soil Removals

- None identified



Coca Test Area- Aerial Photographs

- Road re-construction area near Building 2222
- Sinkhole area
- Several temporary structures present during operational activities



Coca Test Area- Previous Sampling Results

- VOCs
- SVOCs – including NDMA and PAHs
- TPH
- PCBs
- Pesticides
- Metals
- Perchlorate
- Formaldehyde
- Energetics
- Fluoride
- Dioxins



Coca Test Area- Proposed Sampling

