The Nuclear & Chemical Cleanup of
Santa Susana Field Laboratory

ACMELA.ORG

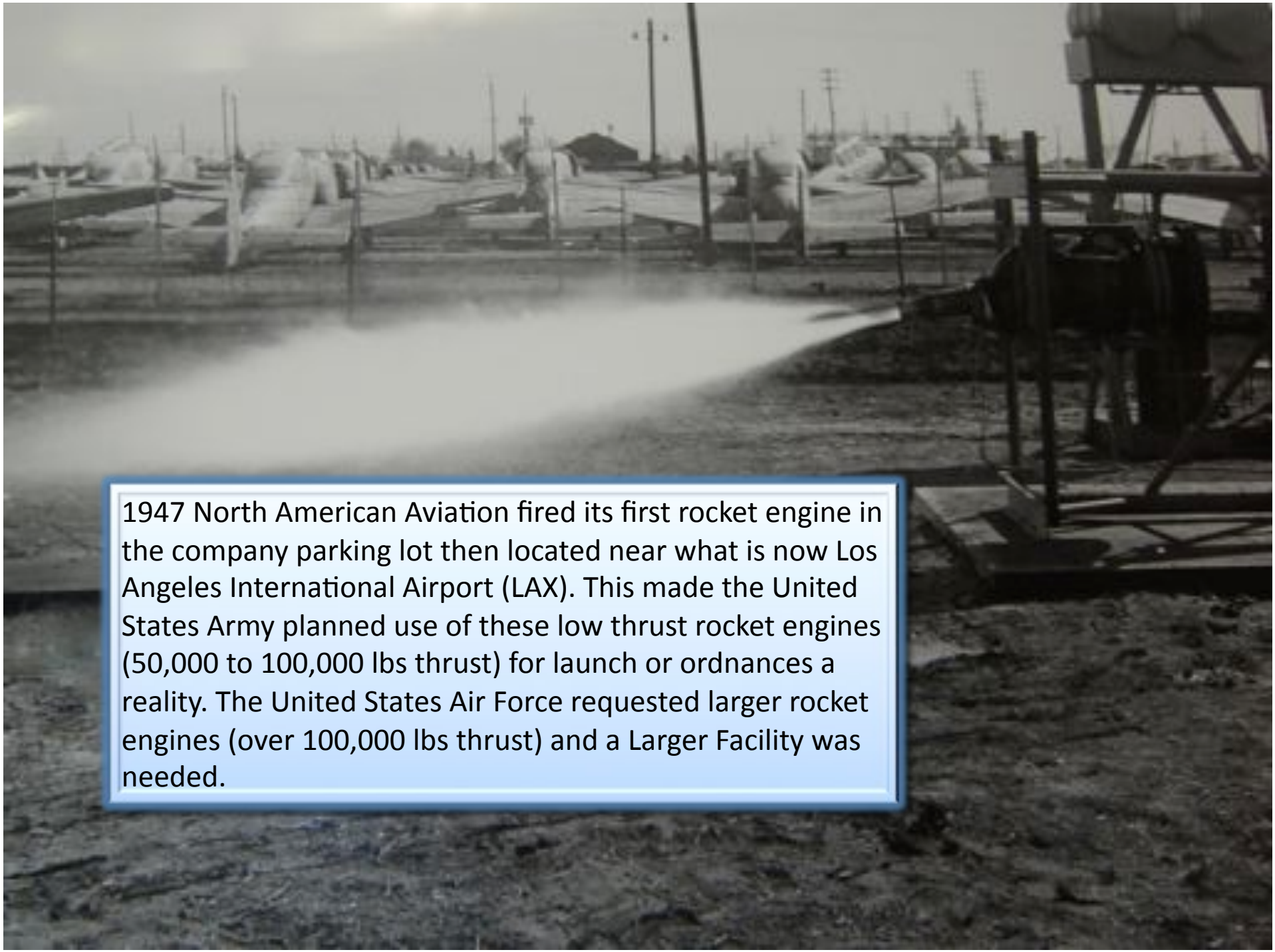
ACME

AEROSPACE CANCER MUSEUM OF EDUCATION

cleanuprocketdyne.org

History of the Rocket Engine Test Stands

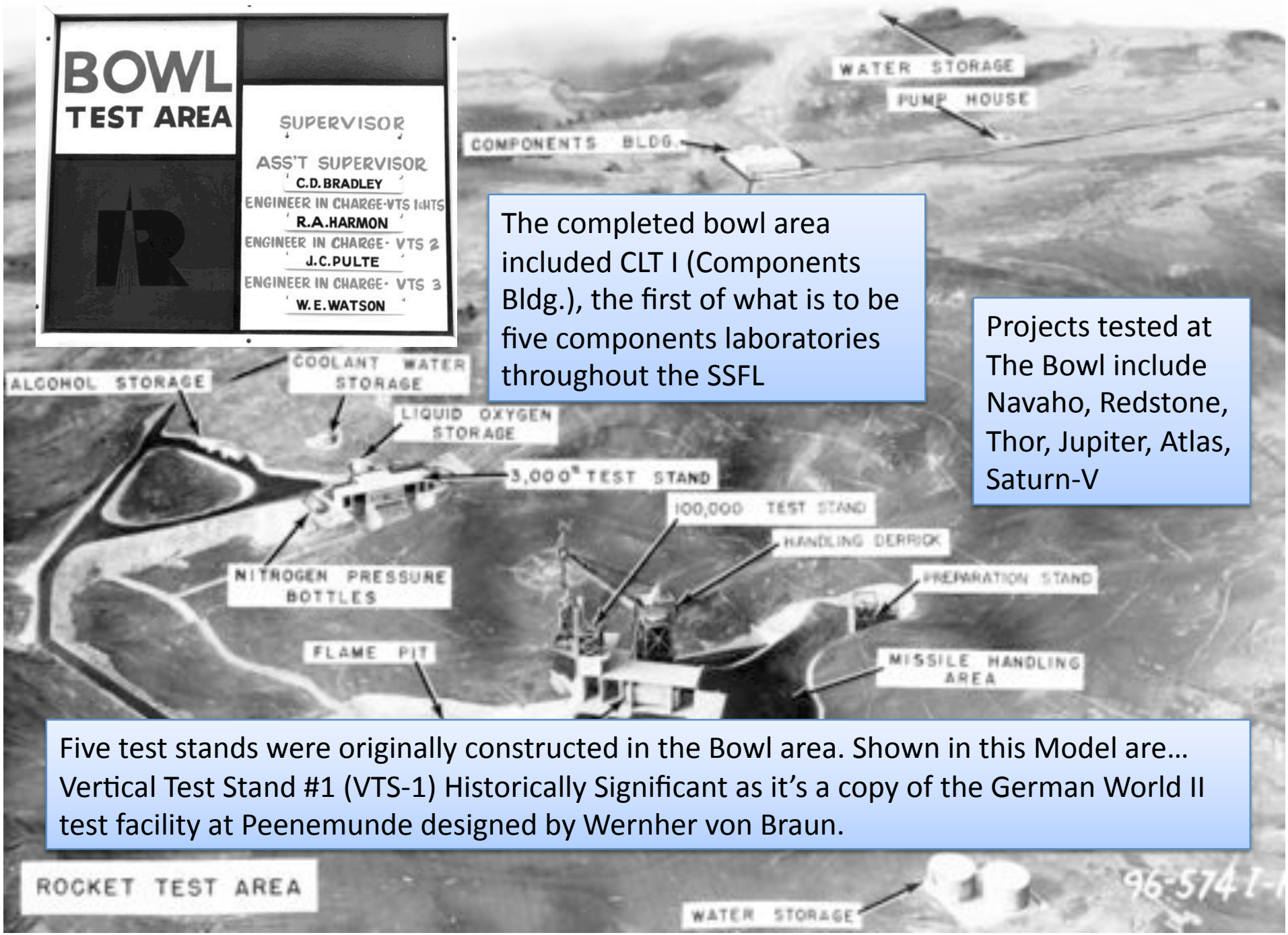
Santa Susana Field Laboratory



1947 North American Aviation fired its first rocket engine in the company parking lot then located near what is now Los Angeles International Airport (LAX). This made the United States Army planned use of these low thrust rocket engines (50,000 to 100,000 lbs thrust) for launch or ordnances a reality. The United States Air Force requested larger rocket engines (over 100,000 lbs thrust) and a Larger Facility was needed.

The SSFL was Selected for its Natural Rocky Bowls

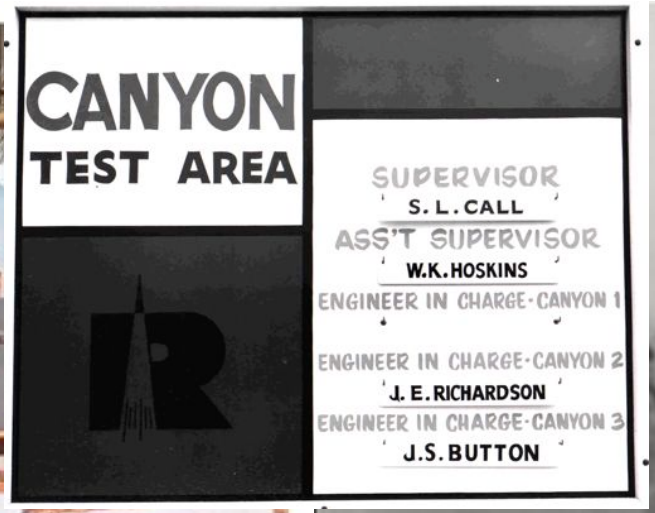
The Bowl TODAY



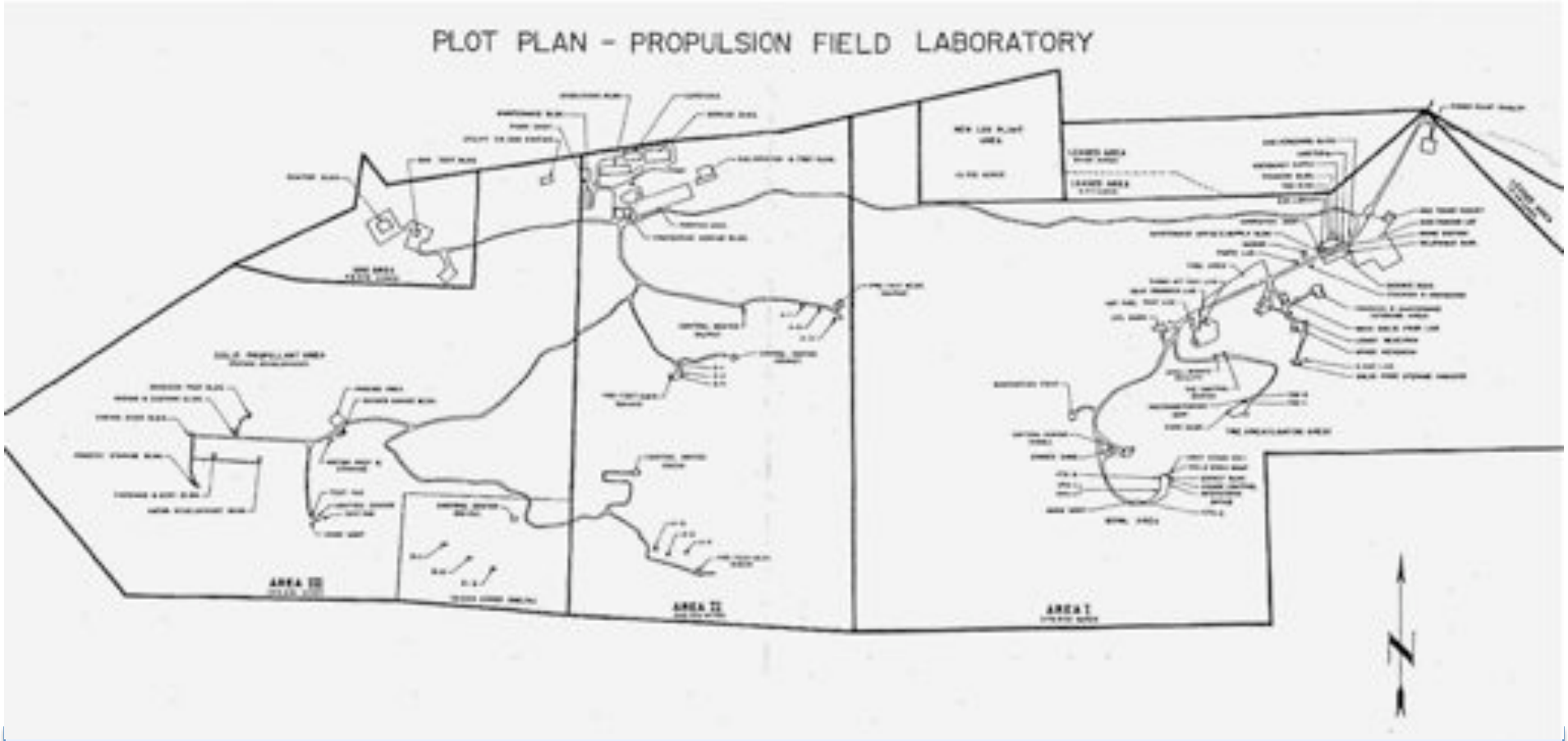
The completed bowl area included CLT I (Components Bldg.), the first of what is to be five components laboratories throughout the SSFL

Projects tested at The Bowl include Navaho, Redstone, Thor, Jupiter, Atlas, Saturn-V

Five test stands were originally constructed in the Bowl area. Shown in this Model are… Vertical Test Stand #1 (VTS-1) Historically Significant as it's a copy of the German World II test facility at Peenemunde designed by Wernher von Braun.



- In 1953 we see the completion of the Canyon AREA



- To handle the needs for THOR and ATLAS Development and testing AIR FORCE PLANT #57 (AREA II) and AIR FORCE PLANT #64 (Known as NASA LOX PLANT in AREA I) were established in 1954 under the NAA umbrella and officially transferred to the federal government in 1958 with construction of 4 testing areas ALFA, BRAVO, COCA & DELTA

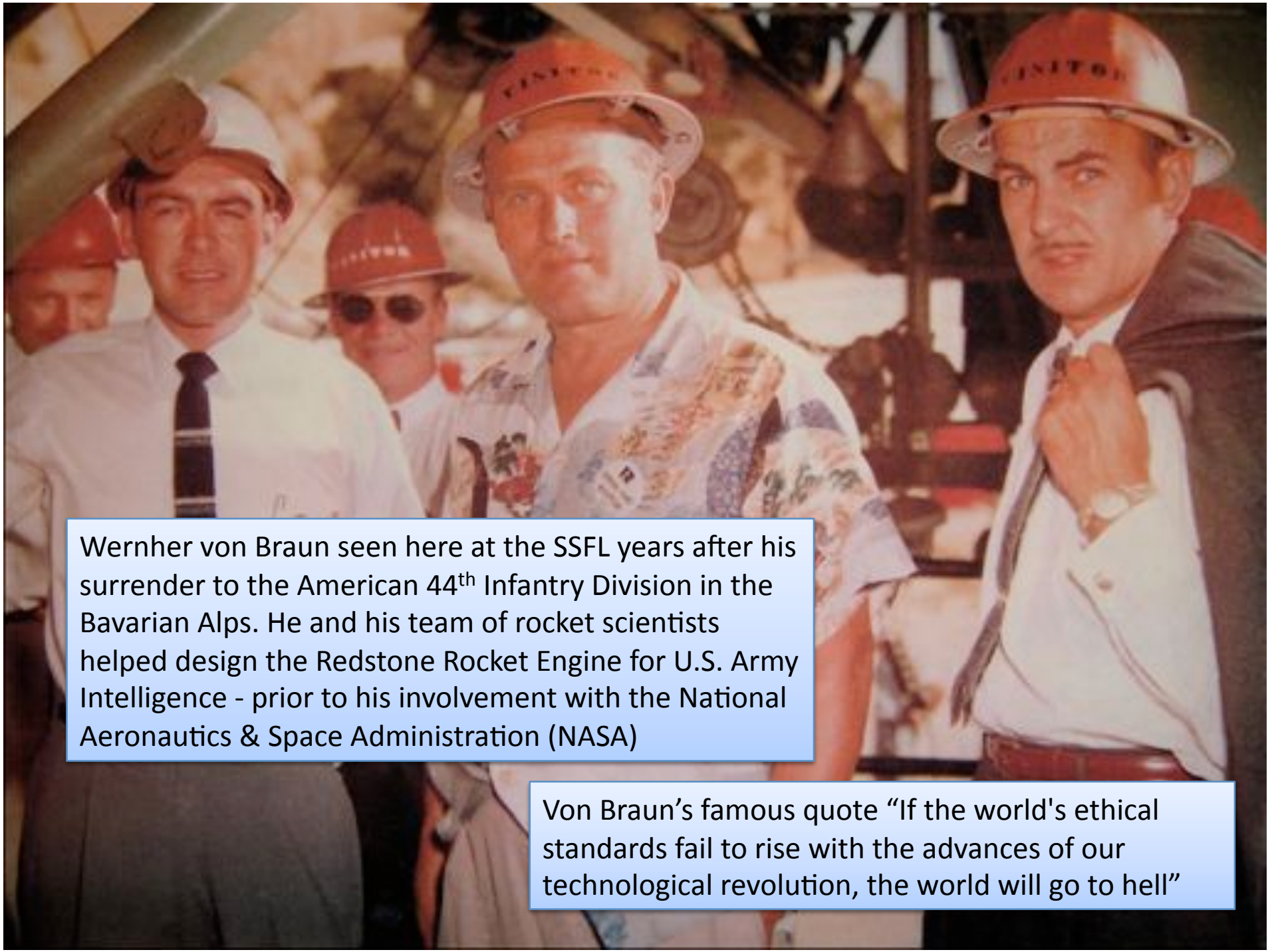
- ALFA activated in 1955


• BRAVO activated in 1956


• COCA activated in 1956


1957 COCA gets SNOW

- Delta activated in 1957



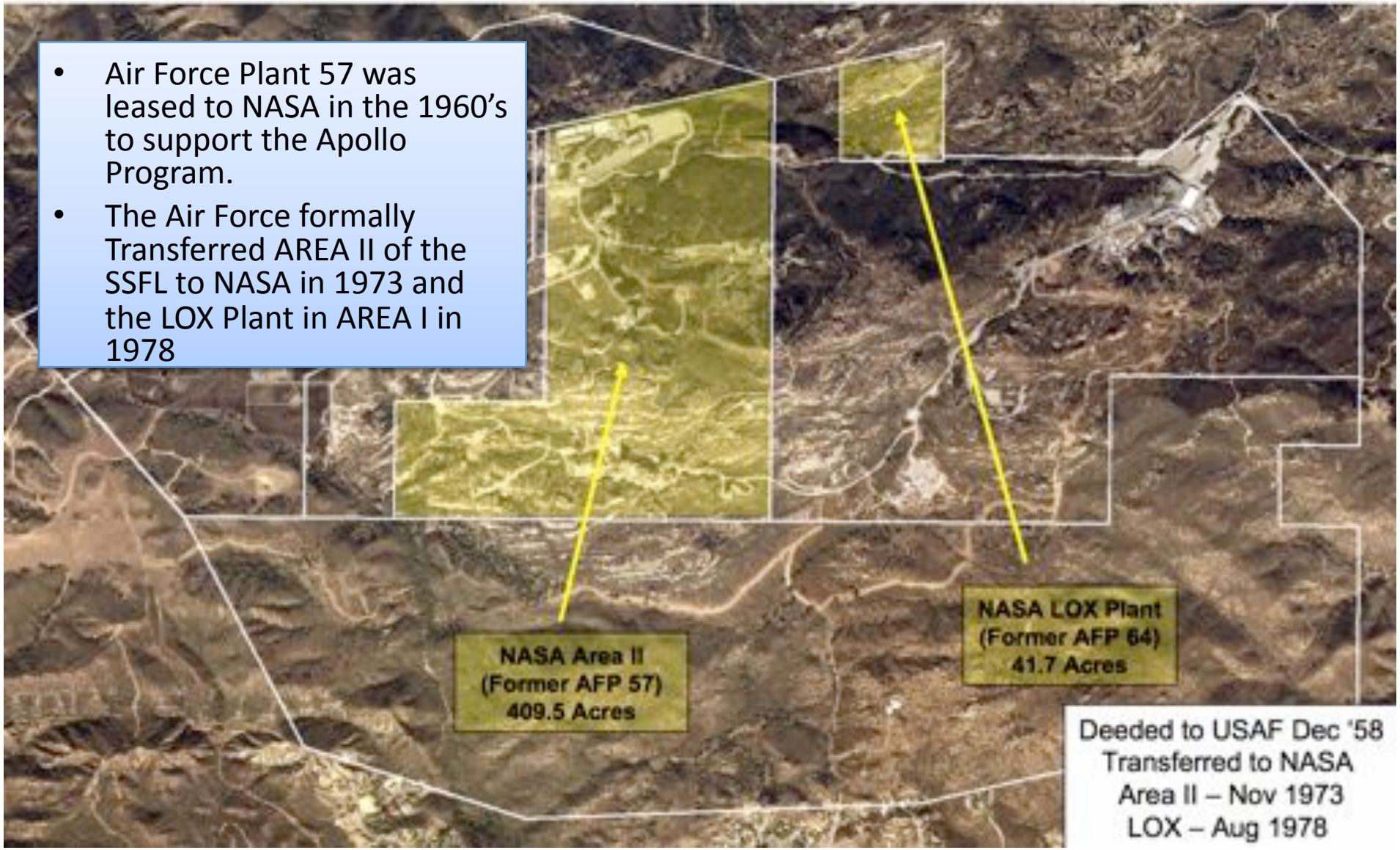
Wernher von Braun seen here at the SSFL years after his surrender to the American 44th Infantry Division in the Bavarian Alps. He and his team of rocket scientists helped design the Redstone Rocket Engine for U.S. Army Intelligence - prior to his involvement with the National Aeronautics & Space Administration (NASA)

Von Braun's famous quote "If the world's ethical standards fail to rise with the advances of our technological revolution, the world will go to hell"

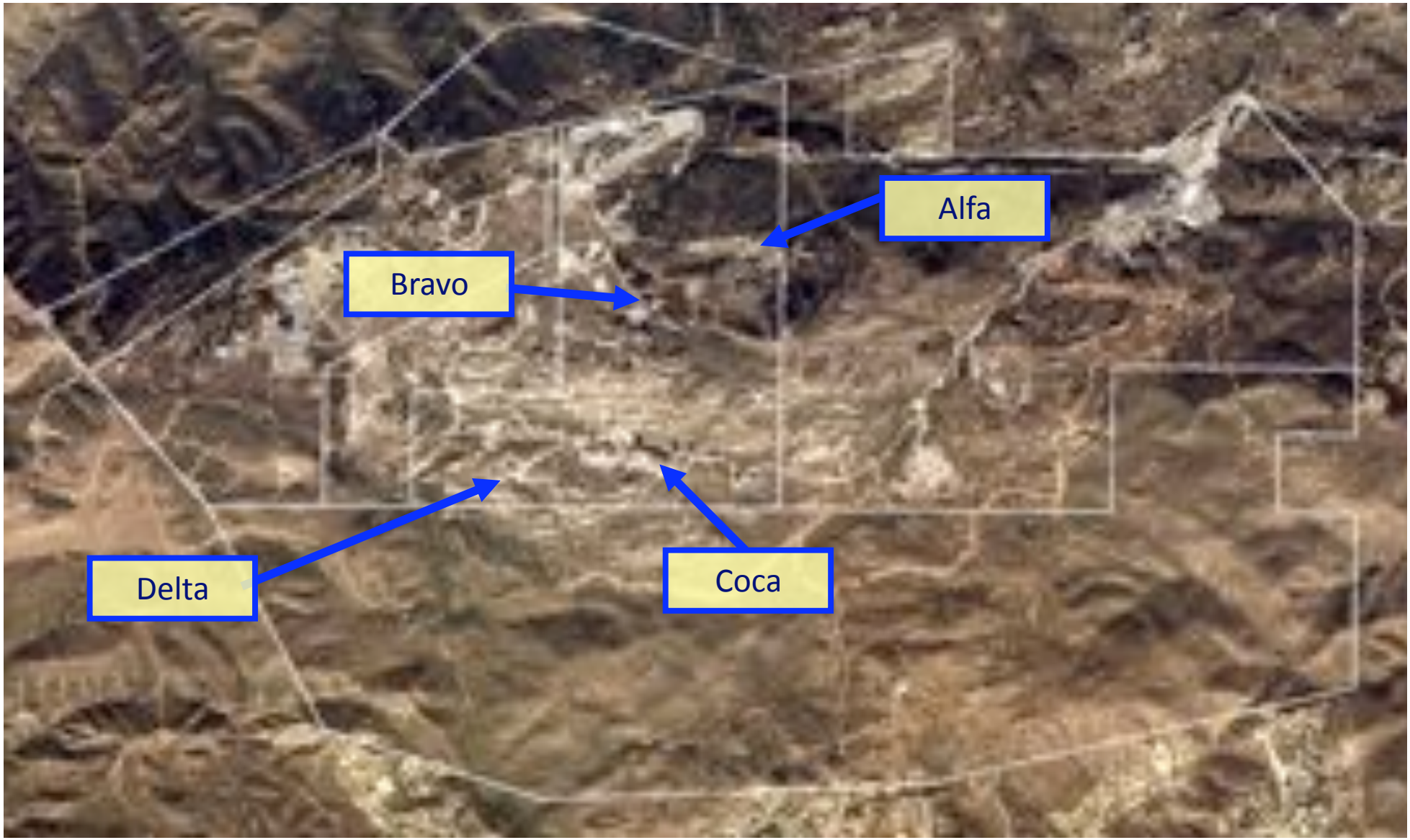
Years before von Braun's efforts and achievements American Physicist Robert H. Goddard was launching rockets since the 1920s and would often receive phone calls and letters from Von Braun asking his advice - at the time Germany was allied with America. We also have to remember China with their introduction of gunpowder, one could say early fireworks were the first uses of the Rocket Engine Design.

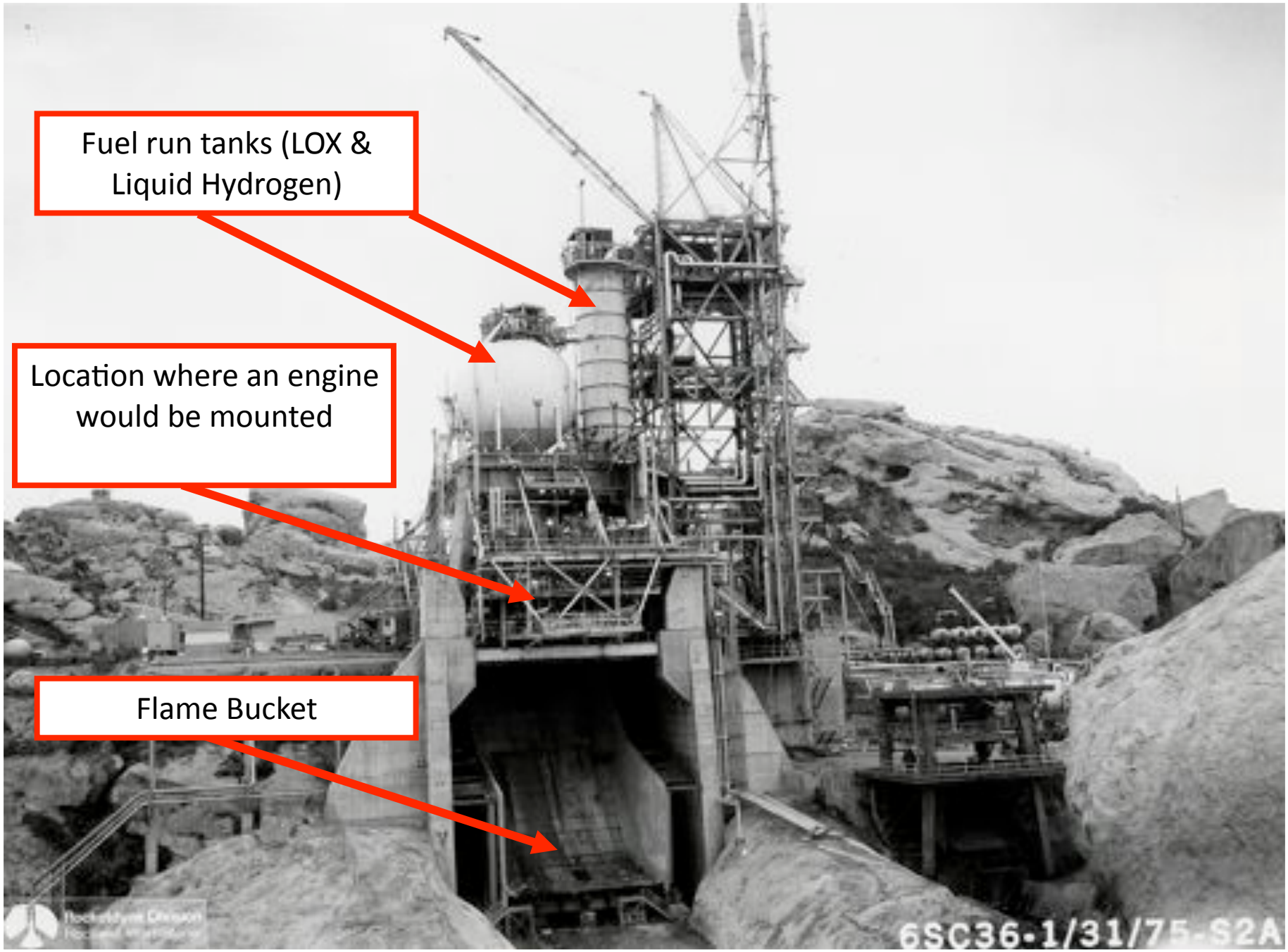
SSFL Site Map

WELCOME Allen Elliott from the National Aeronautics and Space Administration



Location Map



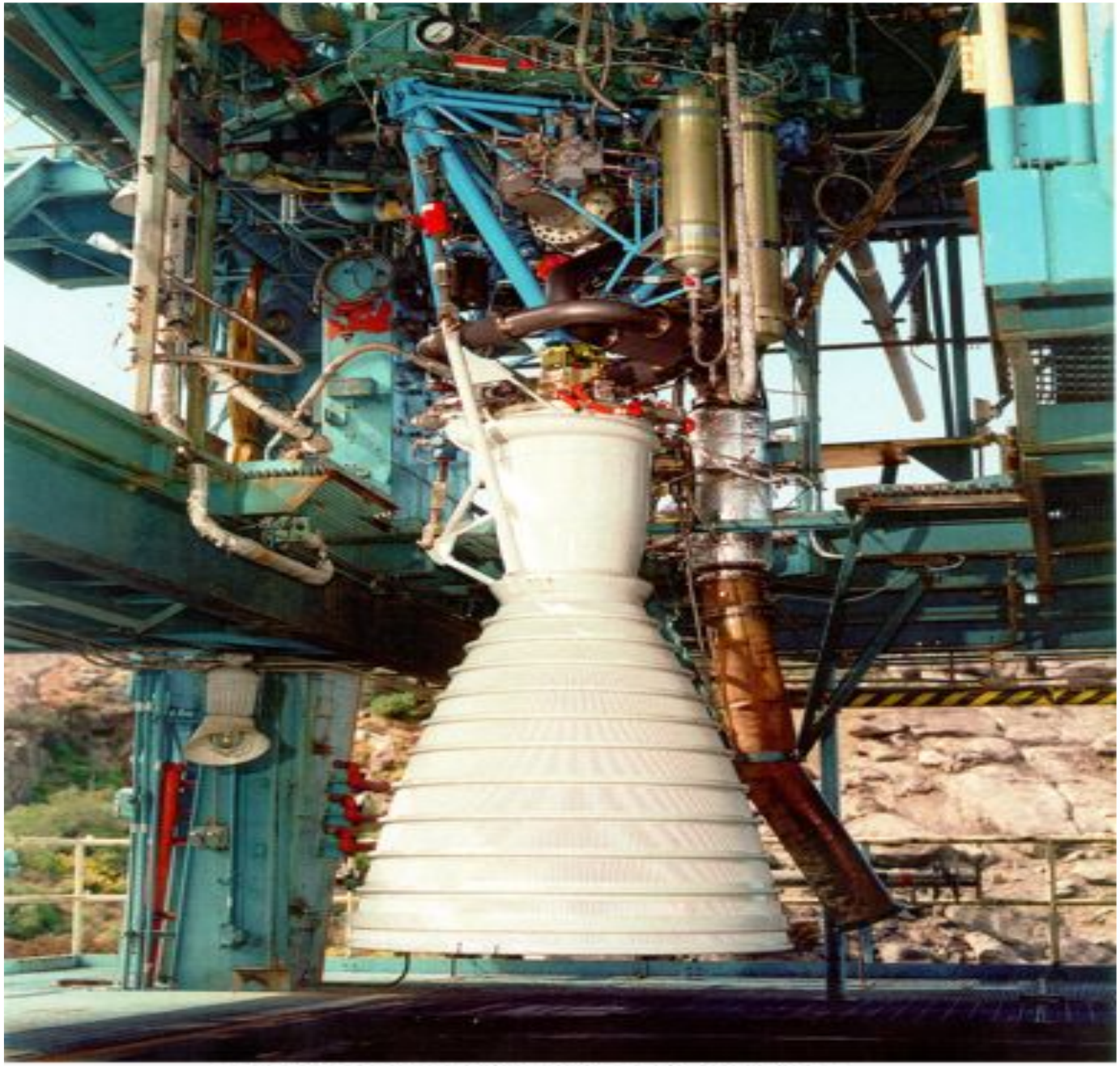

Fuel run tanks (LOX & Liquid Hydrogen)
Location where an engine would be mounted
Flame Bucket
6SC36-1/31/75-S2A

Alfa Test Area

- **Alfa Test Stand No. 1**
  - Atlas B-1 Engine R&D (1955)
  - Atlas B-2 Engine R&D (1955 - 1956)
  - Atlas B-3 Engine R&D (1956)
  - Atlas C-1 Engine R&D and Acceptance (1957)
  - Atlas Booster Engine (1969 - 1981)
  - Atlas Sustainer Engine (1970 - 1981)
  - Atlas MA-5 Engine (1982 - 2000)
- **Alfa Test Stand No. 2**
  - Navajo G-38 Engine (1956 – 1957)
- **Alfa Test Stand No. 3**
  - Thor MB-182 (1955 - 1958)
  - Thor MB-3 (1955 - 1958)
  - Atlas S-4 Engine R&D (1956 - 1957)
  - Jupiter (1957)
  - Thor MB-3-1 and Thor MB-3-2 (1958 - 1963)
  - Thor MB-3-3 (1969 -1979)
  - Delta RS-27 (1972 - 1983)
  - Delta RS-27A (1987 - 2006)

Engine Hot Fire Test on Alfa Test Stand - 1960

MA-5 Engine System Hot Firing - 1972



RS-27A Engine Installed in Alfa Test Stand
Santa Susana Field Laboratory (SSFL) - 1999

Bravo Test Area (con't)

- **Bravo Test Stand No. 1A**
  - Atlas 135K Thrust Chamber (1956 – 1957)
  - Atlas 150K Thrust Chamber (1956 – 1957)
  - E-1 Thrust Chamber (1956 – 1959)
  - F-1 Engine Thrust Chamber (1960s)
  - F-1 Engine Gas. Gen. (1960s)

- **Bravo Test Stand No. 1B**
  - Atlas 150K Thrust Chamber (1957)
  - Atlas Thrust Chamber (1963 – 1964)
  - F-1 Component Testing (1965 – ?)

- **Bravo Test Stand No. 1C**
  - F-1 Heat Exchanger (1960s)

- **Bravo Test Stand No. 1D**
  - Atlas & Delta Vernier Eng. Accept. (1960s – 2005)

Bravo Test Area (con't)

- **Bravo Test Stand No. 2**
  - Atlas B-2C Engine (1956 – 1957)
  - Atlas B-3 Engine—PFRT (1957)
  - Atlas C-1 Engine—R&D (1957)
  - Atlas MA-1 Engine—Acceptance (1957)

- **Bravo Test Stand No. 2A**
  - F-1 Turbopump (1960s)

- **Bravo Test Stand No. 2B**
  - F-1 Turbopump (1960s)
  - Atlas Sustainer T-pump Testing (1960s – 2005)

- **Bravo Test Stand No. 2C**
  - F-1 Turbopump (1960s)
  - Atlas Booster & Delta T-pump Testing (1960s – 2005)

Aerial view of Bravo Test Area 1960

Coca Test Area

- Coca Test Stand No. 1 (Old):
  - Atlas B-3A Engine—R&D (1956 – 1957)
  - Atlas C-1 Engine—R&D (1956 – 1957)

- Coca Test Stand No. 1 (New)
  - Saturn-V J-2 Engine Cluster (1964 – late 1960s)
  - Space Shuttle Main Engine (SSME) Component Development (1972? – 1978?)
  - SSME R&D and T-Pump Accept. (1978 – 1988)

- Coca Test Stand No. 2
  - Atlas B-3A Engine—R&D (1956 – 1957)
  - Atlas C-1 Engine—R&D (1956 – 1957)

Coca Test Area (con't)

- Coca Test Stand No. 3
  - Navajo XG-38 Engine (1956-1957)
  - Atlas Engine—Hot Env. Test (Late 1950s)

- Coca Test Stand No. 4
  - Saturn-V 2nd-Stage Vehicle Testing (1964 – 1964)
  - SSME Component Development (1972? – 1975?)

Coca Test Area - S-II Battleship J-2 Five Engine Cluster Hot Fire Test - 1965

Coca Foundation Construction for "Vault" - 1973

Coca Test Area Construction for SSME - 1974

Delta Test Area

- **Delta Test Stand No. 1A**
  - Jupiter Engine (1960 – 1963)
  - J-2 Engine (1960 – ?)
- **Delta Test Stand No. 1B**
  - Jupiter Engine (1961 – 1963)
  - J-2 Engine (1960 – ?)
- **Delta Test Stand No. 2A**
  - X-1 Engine—R&D (1958 – 1961)
  - E-1 Engine—R&D (1958 – 1960)
  - X-4 Engine—R&D (1960)
  - J-2 Engine (1960 – ?)
  - Linear Aerospike (1970)
- **Delta Test Stand No. 2B**
  - J-2 Engine (1960 – ?)
- **Delta Test Stand No. 3**
  - Lance (1962 – ?)
- **Delta Test Stand No. 3C**
  - Atlas 60K Thrust Chamber – R&D (1957)

Delta Test Stand Santa Susana Field Laboratory (SSFL) - 1960

Delta Test Area - 1964

NASA's Commitments

NASA is committed to protecting public health and the environment.

We take our obligations seriously to respect and manage cultural resources on our lands.

We are committed to working, as partners, with local residents and their experts.

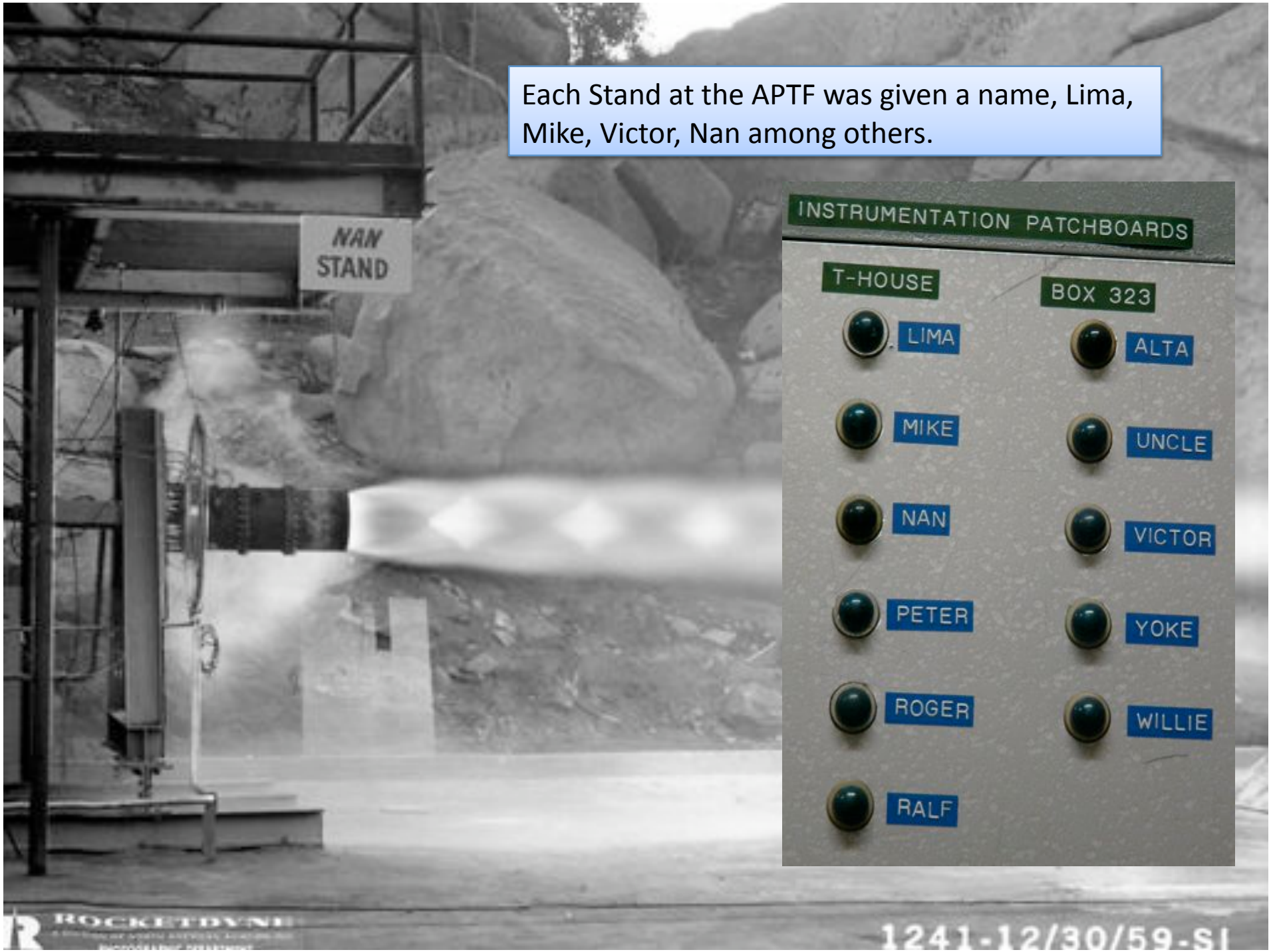
Dudleya pulverulenta

Contact Information

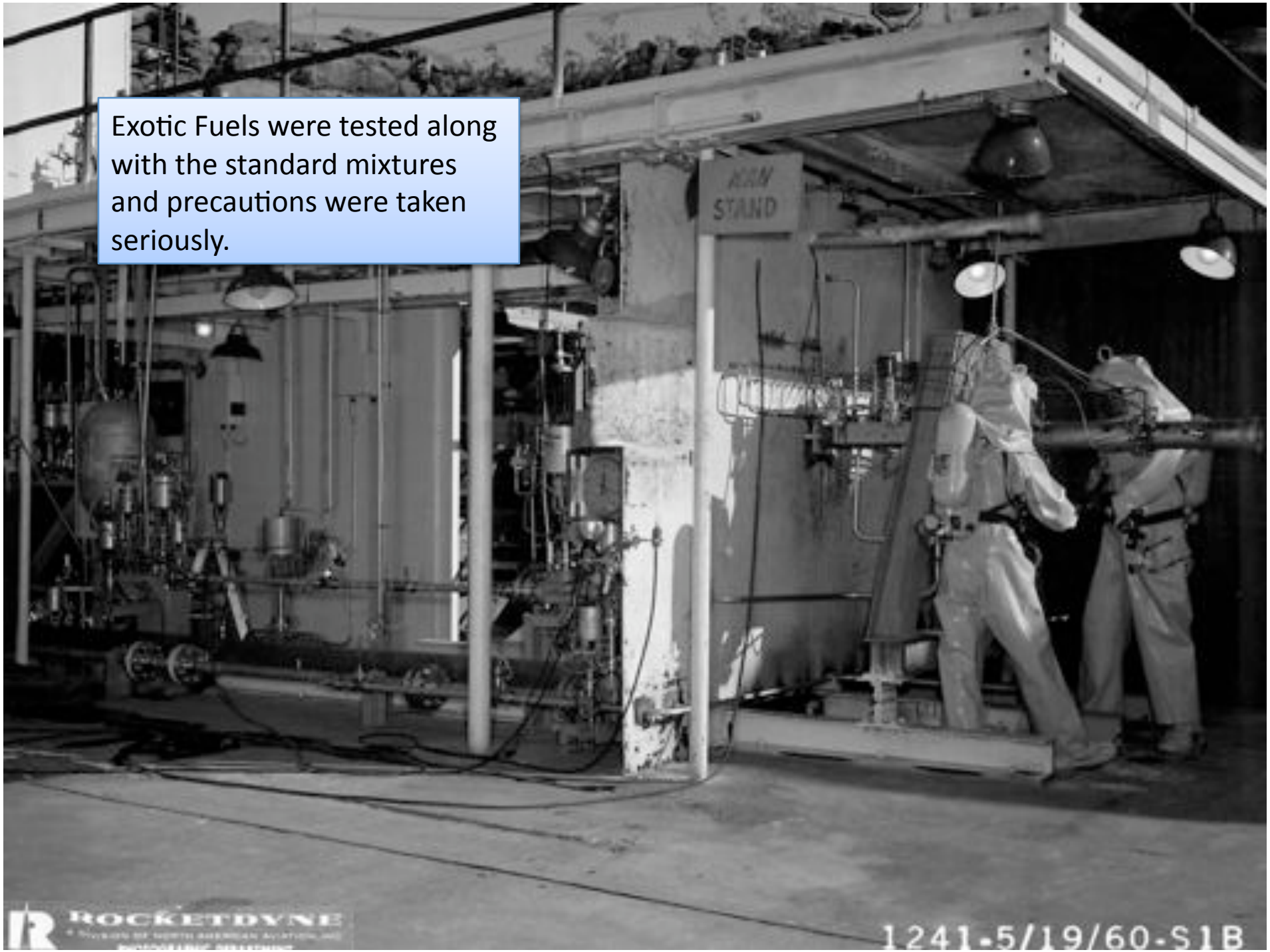
Allen Elliott
NASA Project Manager for SSFL
(256) 544-0662
allen.elliott@nasa.gov

Merrilee Fellows
NASA Manager for Community Involvement
(818) 393-0754
mfellows@nasa.gov

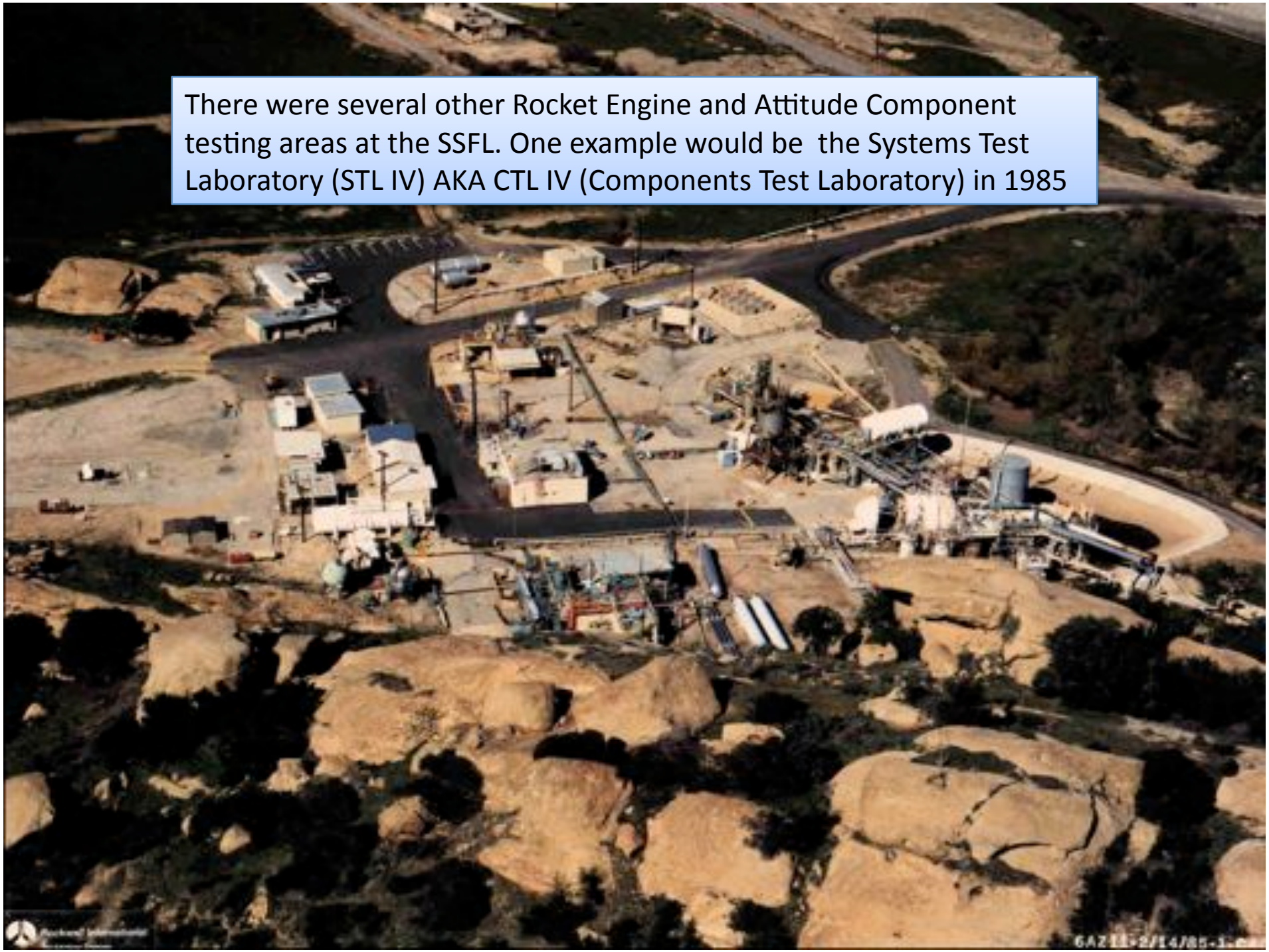
Aside from the Large Rocket Engines typically seen at COCA, DELTA, ALFA & BRAVO the APTF (Advanced Propulsion Test Facility) was designed for smaller Attitude Adjusting Engines

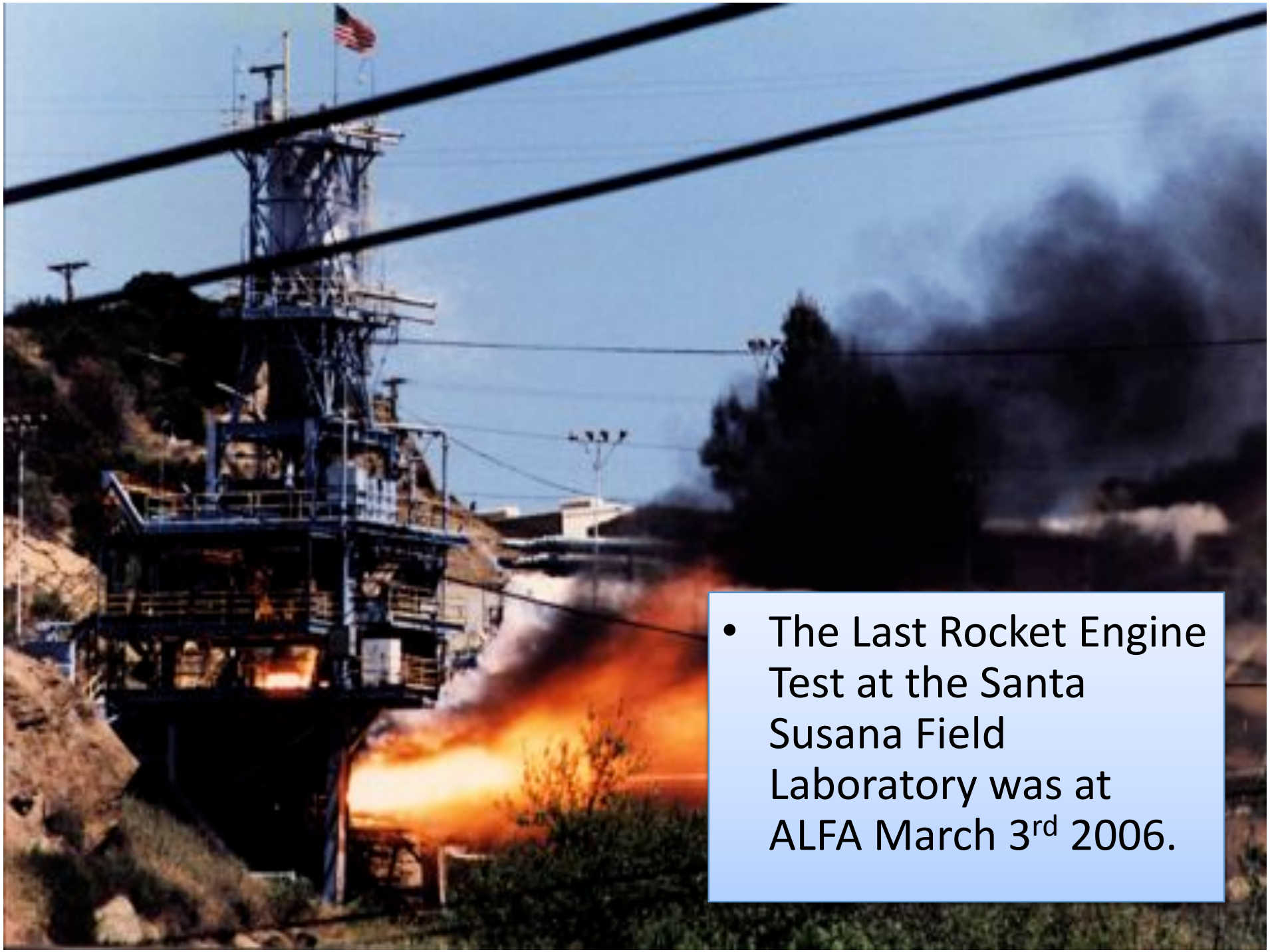


Each Stand at the APTF was given a name, Lima, Mike, Victor, Nan among others.


Exotic Fuels were tested along with the standard mixtures and precautions were taken seriously.
STAND
ROCKETDYNE
1241-5/19/60-S1B

The Boeing Co. Graciously Donated this sign to ACME A relic from the now demolished APTF


There were several other Rocket Engine and Attitude Component testing areas at the SSFL. One example would be the Systems Test Laboratory (STL IV) AKA CTL IV (Components Test Laboratory) in 1985


• The Last Rocket Engine Test at the Santa Susana Field Laboratory was at ALFA March 3rd 2006.

- With the amount of testing and TCE use over the last 60 some years we have to think about the impacts and how we can Ensure a Proper Cleanup

Chemicals Historically Used at SSFL

The UCLA study only considered hydrazine and asbestos. Following is a more comprehensive list of chemicals used frequently, used in potentially large quantites, or are known or thought to be hazardous. We are using this list to conduct our own comprehensive exposure assessment.

TRICHLOROETHYLENE – Used primarily for flushing of large rocket engines using RP-1 as a fuel and as a cleaning solvent

SAFETY

PROCEDURE

FOR THE OPERATION OF

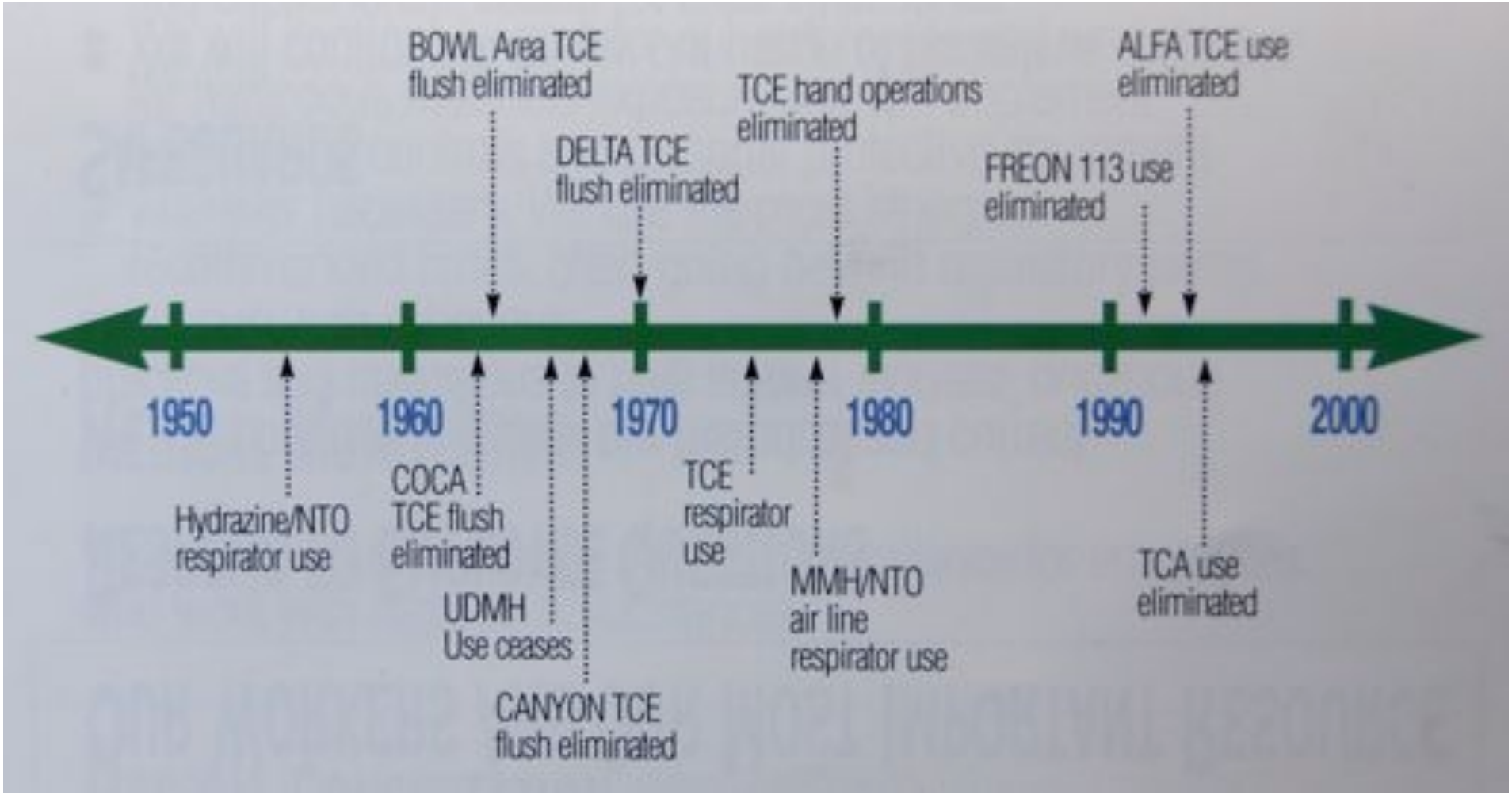
TRICHLORETHYLENE

DEGREASERS

NORTH AMERICAN AVIATION, INC.
SAFETY STANDARD No. 1, Revised: March, 1958

For this reason, it is necessary that employees working with, or near this fluid should be especially careful to observe safe practices. Toxic effects after inhalation are: Headaches, dizziness, nausea, and vomiting. Skin contact, as a result of splashing or spilling the liquid may result in dermatitis. Continuous inhalation exposure produces, in some workers, a marked narcotic craving for these vapors. It is mandatory, therefore, that workers assigned to degreasing operations be rotated every four (4) to six (6) months.

- TCE discontinued Used in 1994
- TCA use Eliminated in 1996




GREETINGS! from the Santa
SUSANA
Field Laboratory
Home of the Sodium Reactor Experiment
and more than 30,000 Rocket Engine Tests.
ACME

THE END