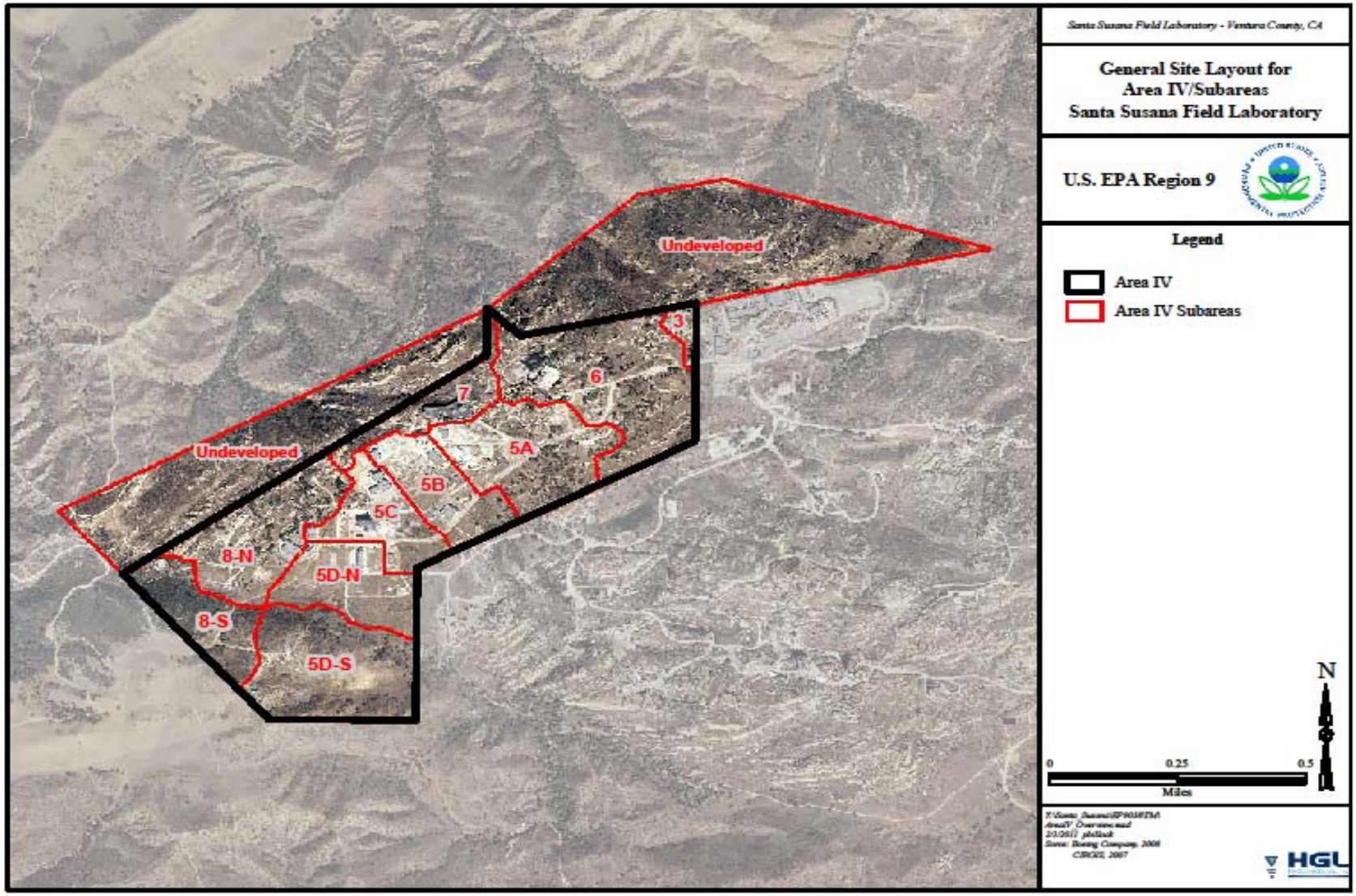
Overview of the Historical Site Assessment For Subarea 7, Subarea 3, and the Northern Buffer Zone

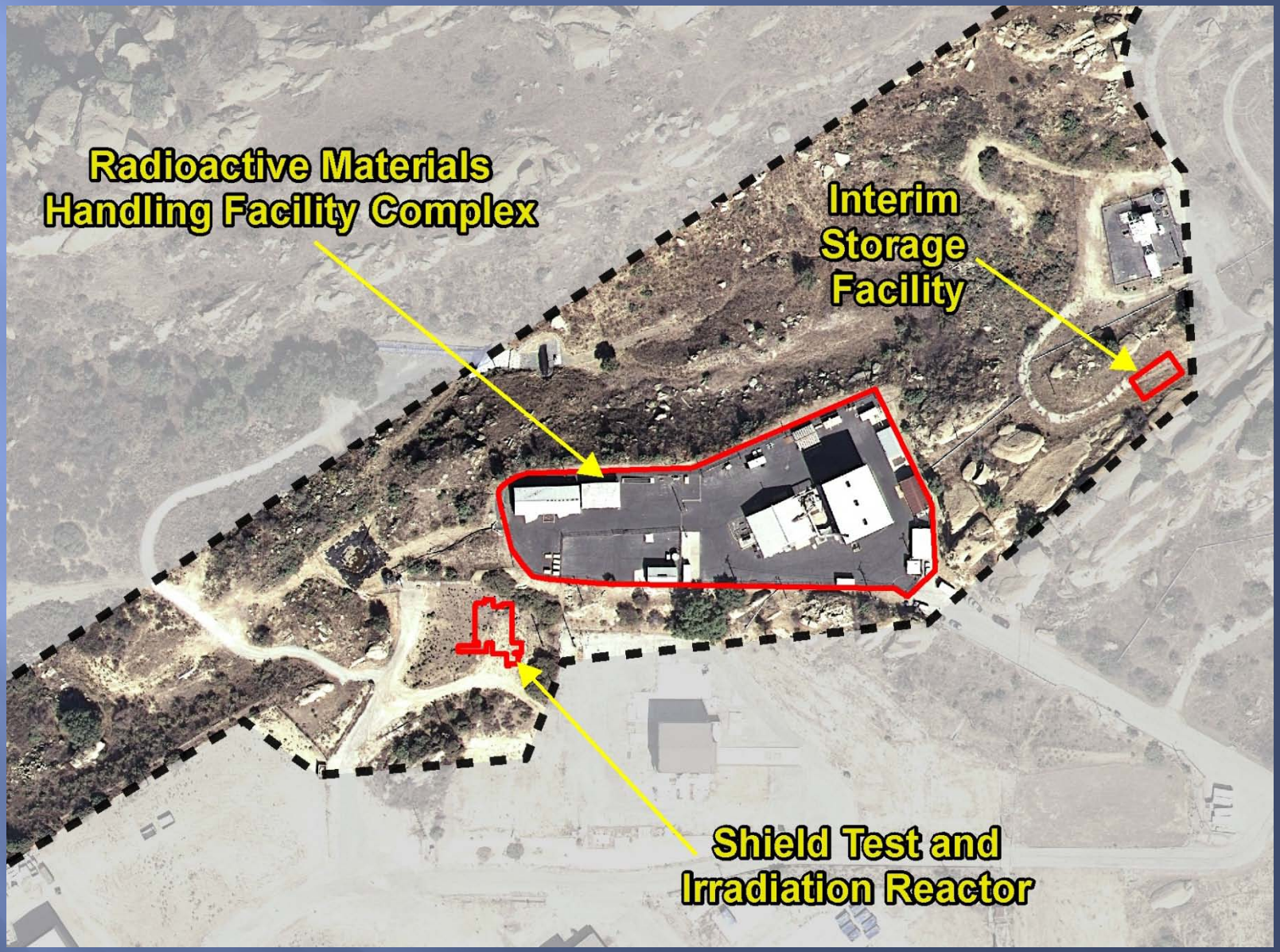
August 17, 2011

EPA Project Subareas



Subarea 7 Overview

- Covers approximately 16 acres
- Discussion of surface water drainage
- Three key radiological use areas:
  - Radioactive Materials Handling Facility (RMHF) Complex
  - Shield Test Reactor (STR)/Shield Test and Irradiation Reactor (STIR)
  - Interim Storage Facility (ISF)


Radioactive Materials
Handling Facility Complex
Interim
Storage
Facility
Shield Test and
Irradiation Reactor

Key Radiological Use Areas

Radioactive Materials Handling Facility Complex

- Building 4021 Decontamination and Packaging Rooms
- Building 4022 Radioactive Material Storage Vault
- Building 4075 Contaminated Equipment Storage
- Building 4621 Radioactive Waste Storage
- RMHF Leach Field and RMHF Holdup Pond

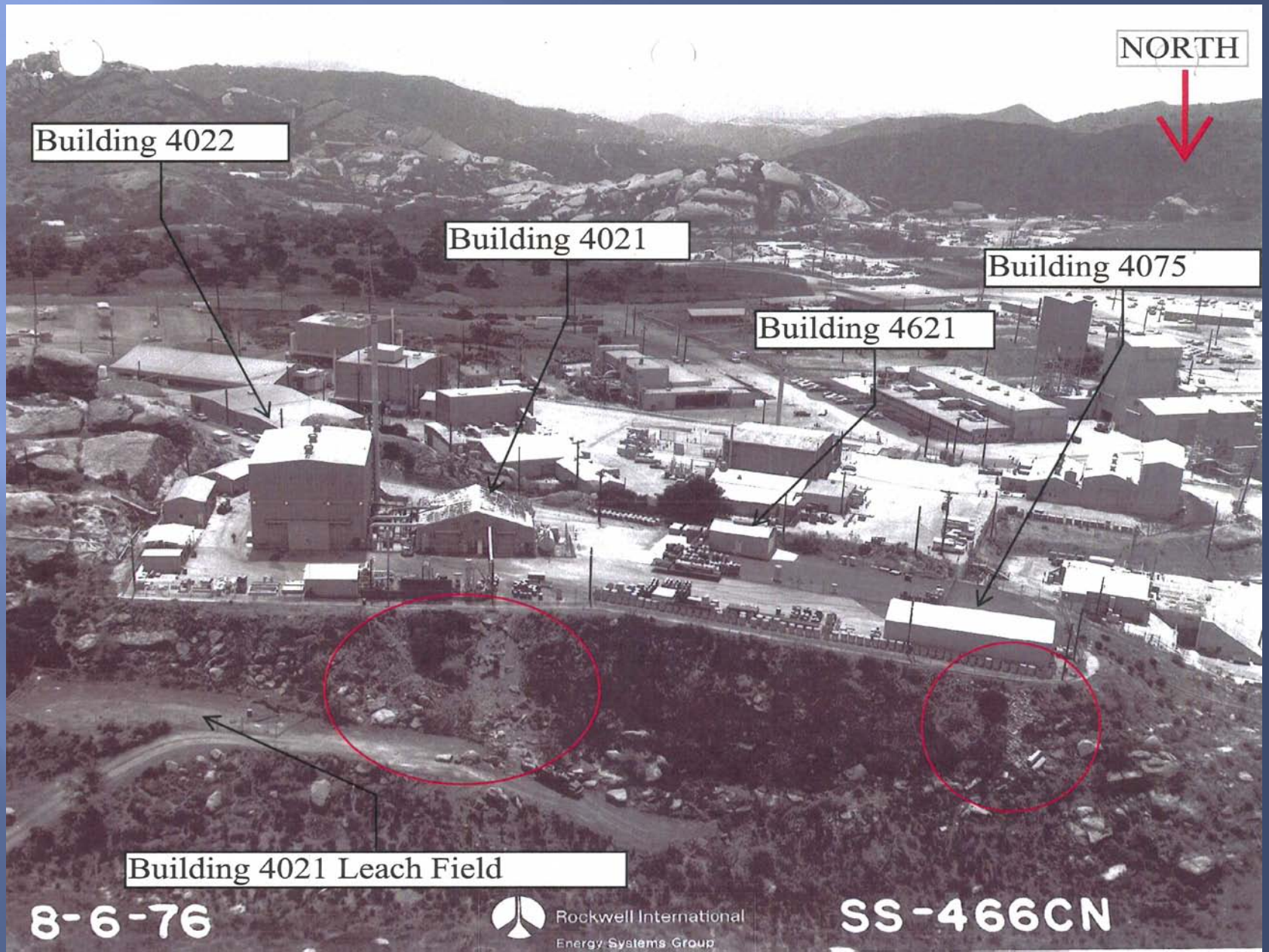
Shield Test Reactor/Shield Test and Irradiation Reactor

- Reactor Building

Interim Storage Facility

- Storage Tubes (8) for spent fuel
- Storage Area

RMHF Complex – 1976



RMHF Complex – 1999

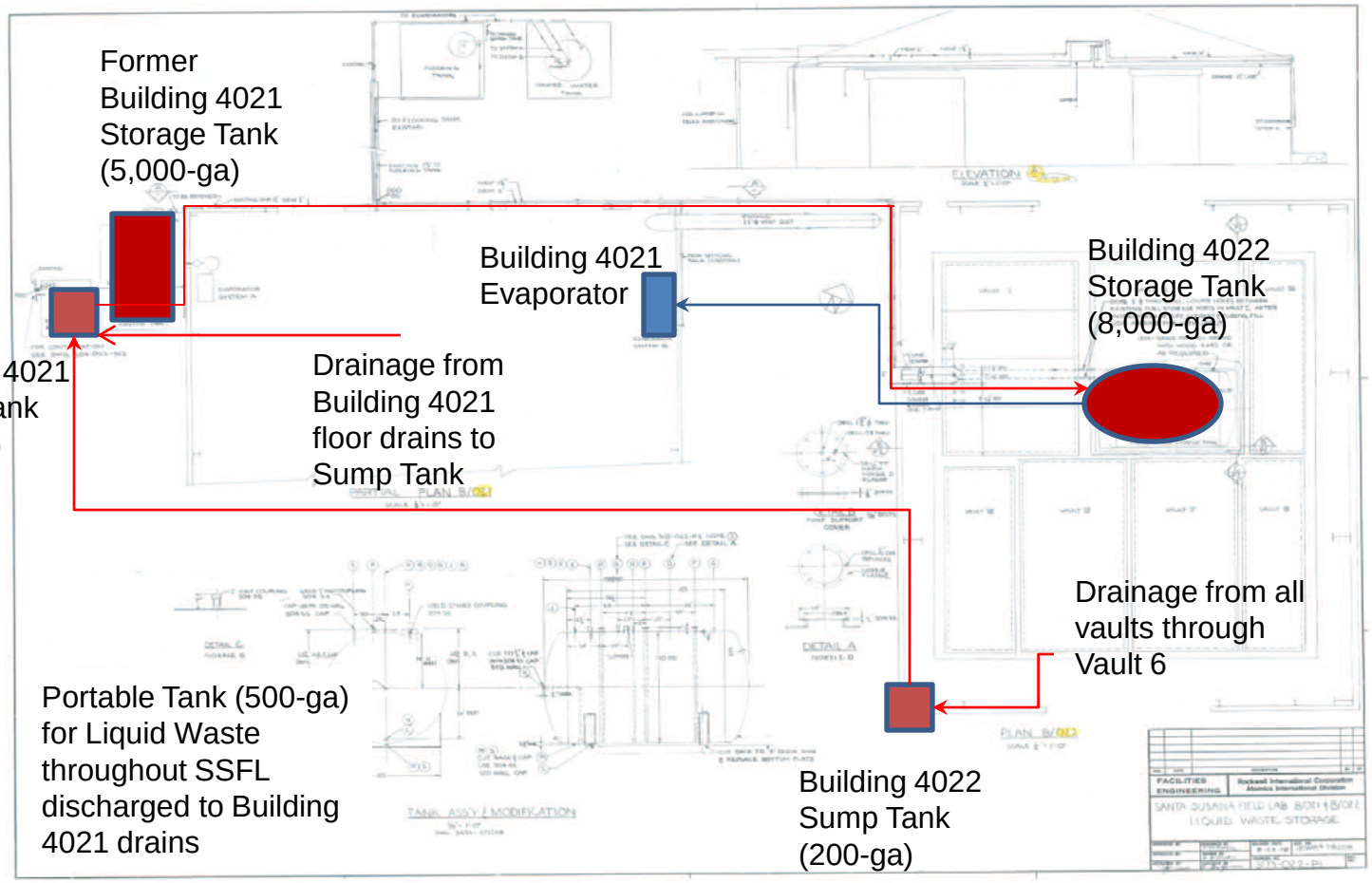
RMHF Packaging and Decontamination Building (4021)

- Built in 1959 as support facility to process and package radioactive waste
- Radioactive Liquid Waste Evaporation System
  - Liquid waste enters Building 4021 drains to below-grade sump tank (150/200-ga) through filters to Building 4022 storage tank (8,000-ga) where it is then pumped on demand to Building 4021 evaporation system
  - Prior to 1980, a Building 4021 tank (5,000-ga) stored liquid waste
  - Portable tank (500-ga) used throughout SSFL also fed to Building 4021 sump tank
- Air Exhaust and Filtration
- Connected to septic tank and leach field from early 1959 to late 1961, then connected to central sanitary sewer system
- 24 Documented incidents with 9 involving releases
- 2004 - Radioactive Waste Evaporation System taken offline
- 2007 – All equipment removed
- 2011 – No storage of radioactive waste; building walls, floor, ventilation, drains contaminated

RMHF Vault Storage Building (4022)

- Built in 1959 as support facility to temporarily store radioactive material
- 7 Below-grade storage vaults (processed and unprocessed fuels)
  - By 1980 Vault 2 housed liquid waste storage tank (8,000-ga) and two additional storage tanks (5,000-ga each) from leach field cleanup
- Radioactive Liquid Waste Evaporation System
  - Building 4022 storage tank (8,000-ga) holds liquid waste and pumps on demand to Building 4021 evaporation system
  - Building 4022 sump tank (200-ga) collects water from vaults and filter condensate then pumps to Building 4021 drain line
  - Portable tank (500-ga) used throughout SSFL may have been stored in Building 4022
- Air Exhaust and Filtration
- 21 documented incidents with 4 involving releases
- 2004 - Radioactive Waste Evaporation System taken offline
- 2007 – All equipment removed
- 2011 – No storage of radioactive waste; vault walls, floor, ventilation, drains contaminated

RMHF 4021/4022 Radioactive Liquid Waste Storage and Processing



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Project.EP9038
Revised: 06/29/11 TJ
Source: Boeing Company, 2008

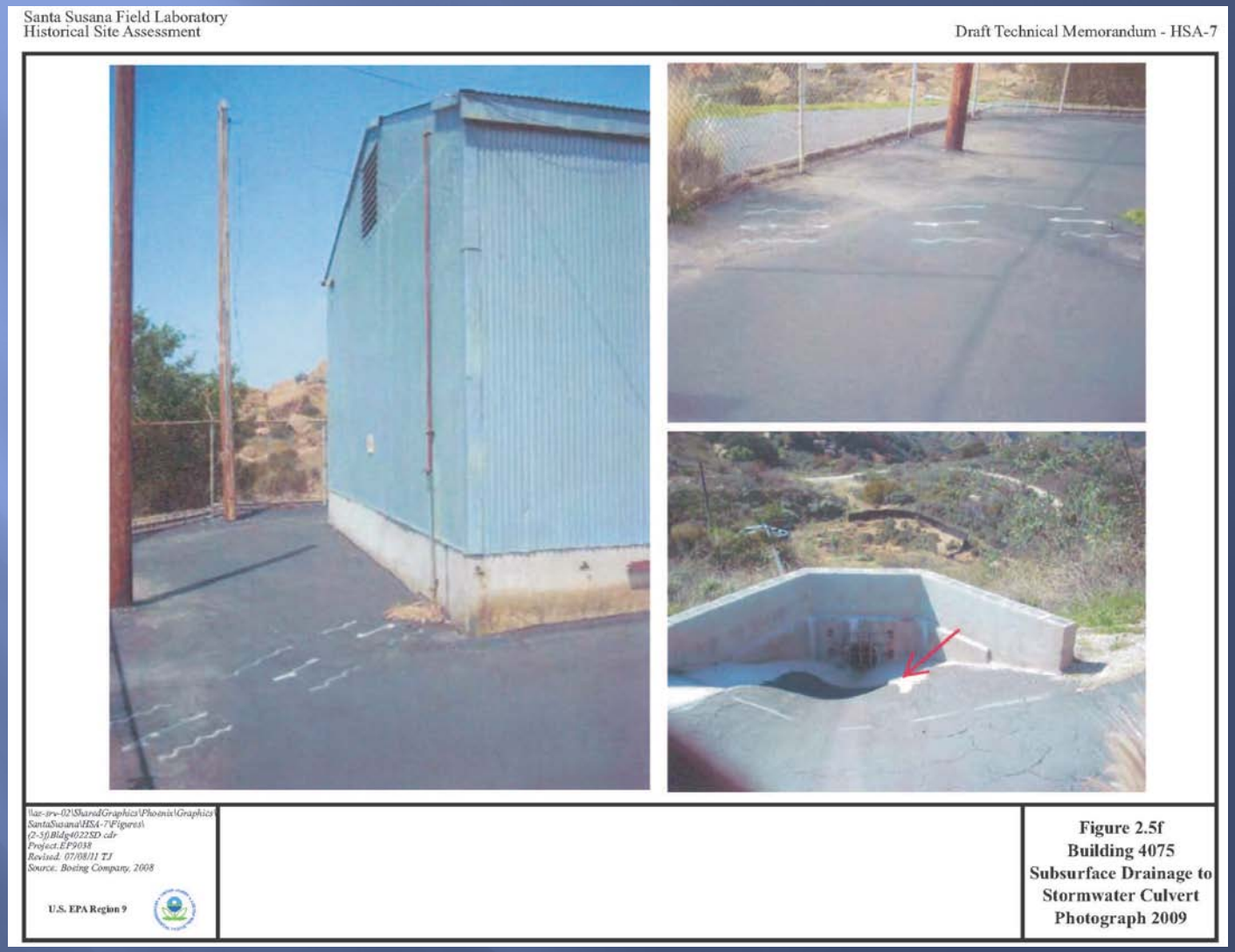
U.S. EPA Region 9

Figure 2.1o
Building 4021 Liquid Waste Storage Plan

RMHF Contaminated Equipment Storage Building (4075)

- Constructed in 1971
- Temporary storage for low-level packaged waste
- Primarily used for staging of waste shipments
- 1 documented incident involving release
- Subsurface drainage to stormwater culvert

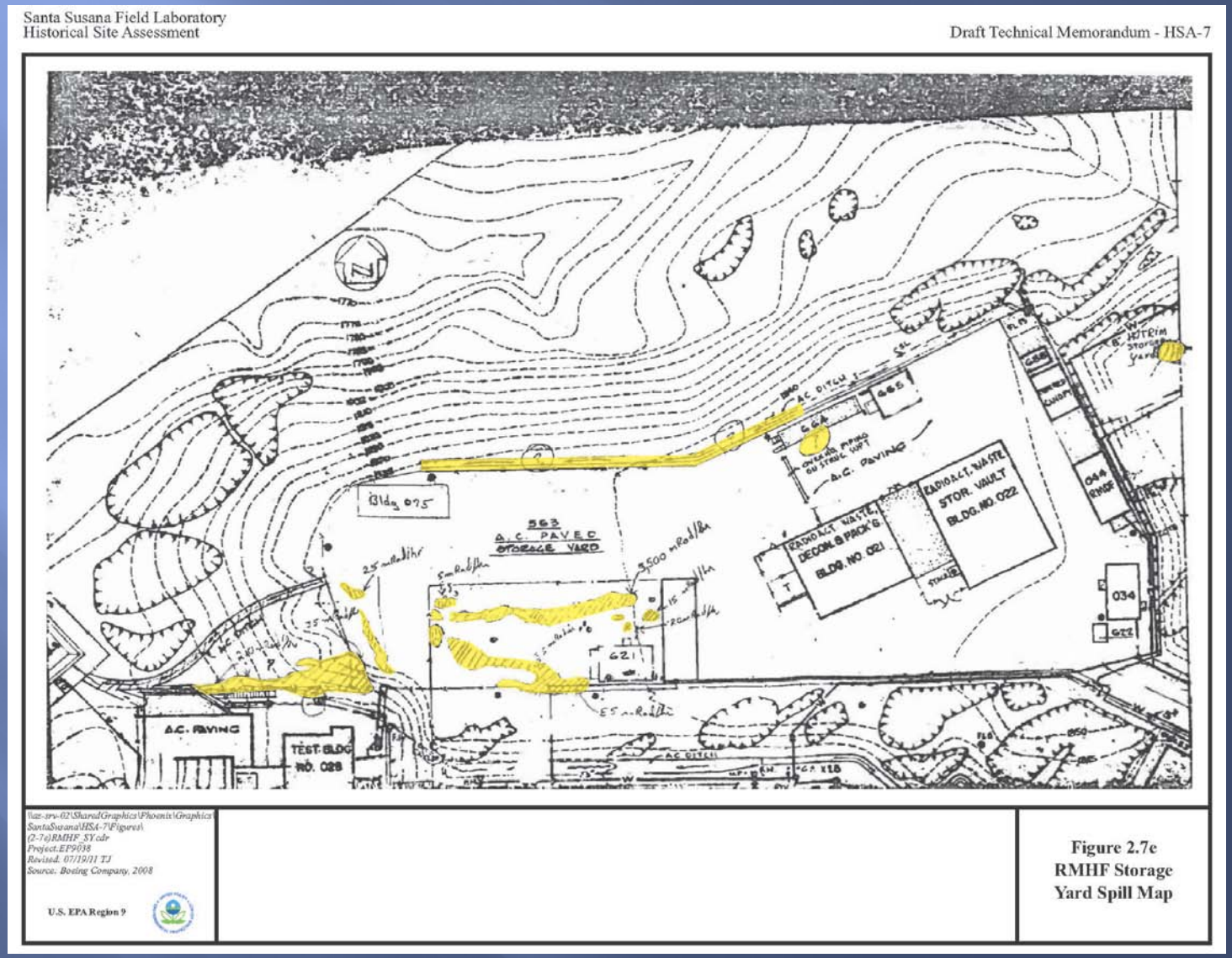
RMHF Contaminated Equipment Storage Building (4075)



RMHF Radioactive Waste Storage Building (4621)

- Constructed in mid-1960s
- Building and contiguous mixed waste storage yard enclosed in fence
- Temporary storage for low- to intermediate-level radioactive waste
- Primarily used for staging of waste shipments
- 4 documented incidents with 1 involving multiple releases

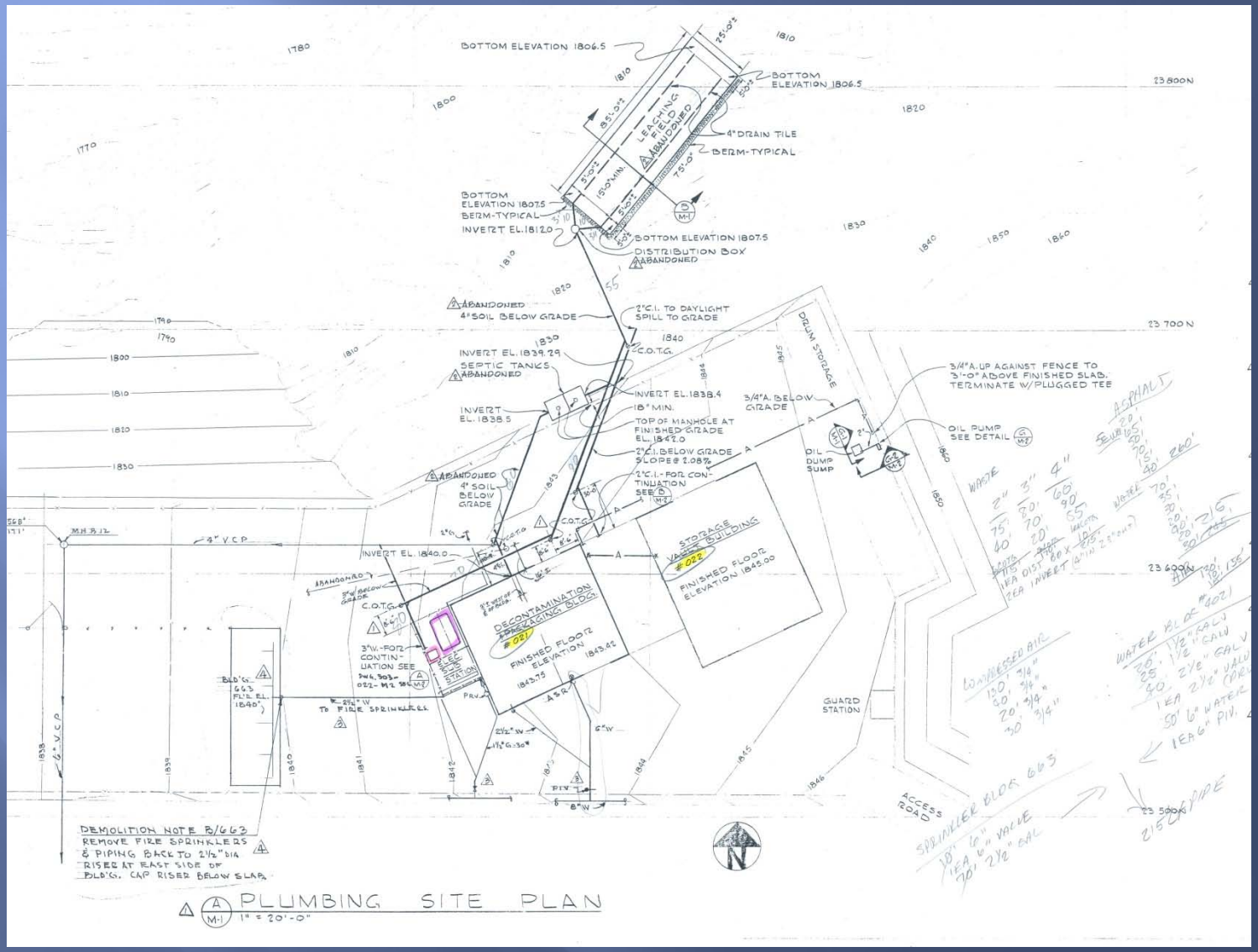
RMHF Storage Yard Spills 1972-1975



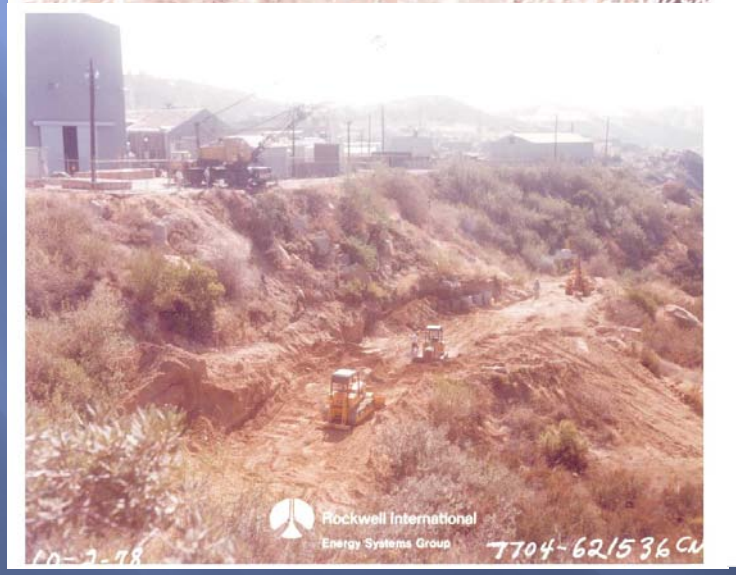
RMHF Leach Field

- Constructed in early 1959 for the RMHF
- Connected through septic tank (1,500-ga) to Building 4021 toilets and shower
- Second direct connection (bypassing septic tank) to Building 4021 storage tank (5,000-ga) containing radioactive liquid
- 35 feet wide, 110 feet long, 6 feet deep
- 2 documented incidents involving releases

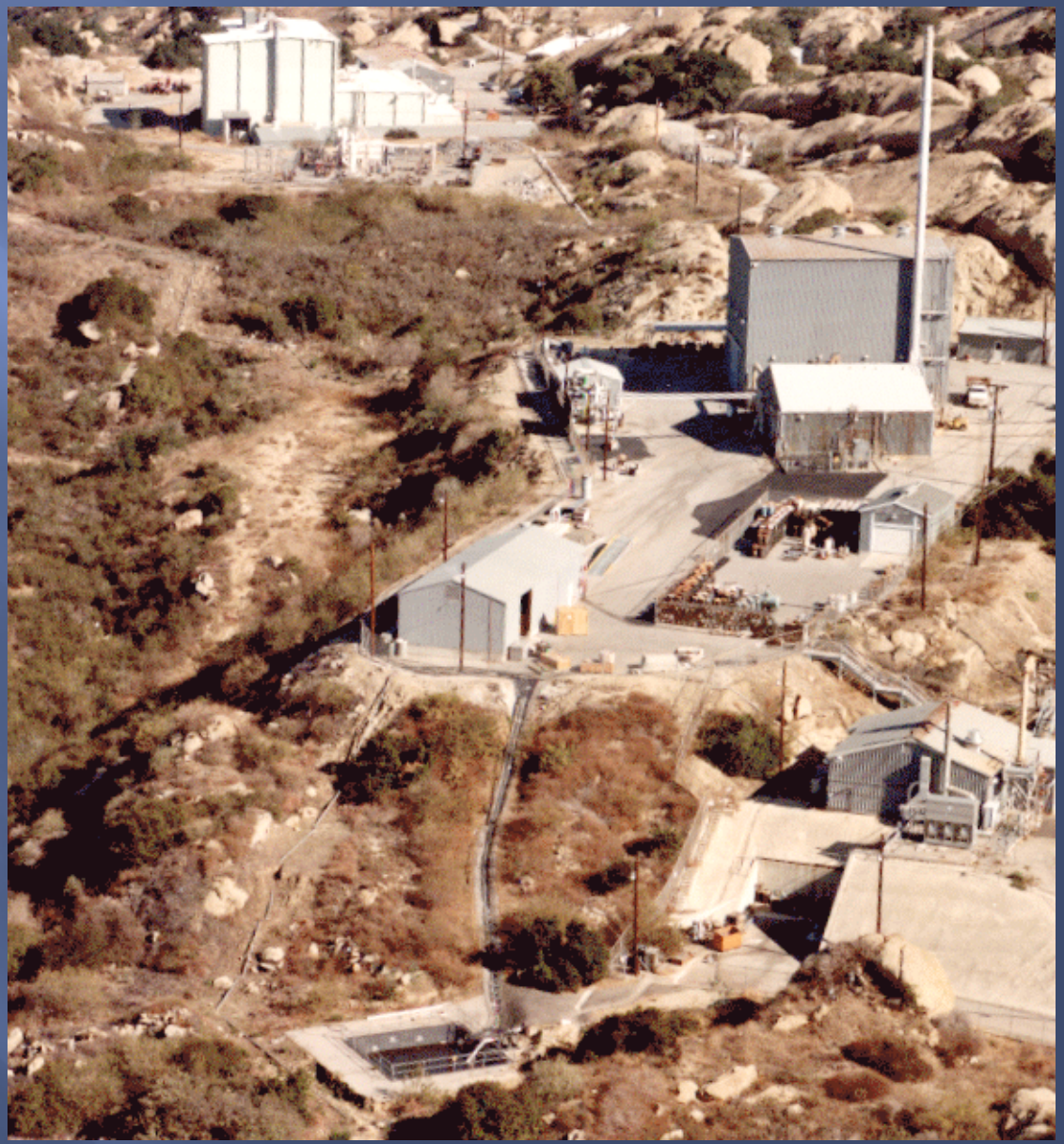
RMHF Leach Field Plan



RMHF Leach Field Excavation 1978



RMHF Holdup Pond

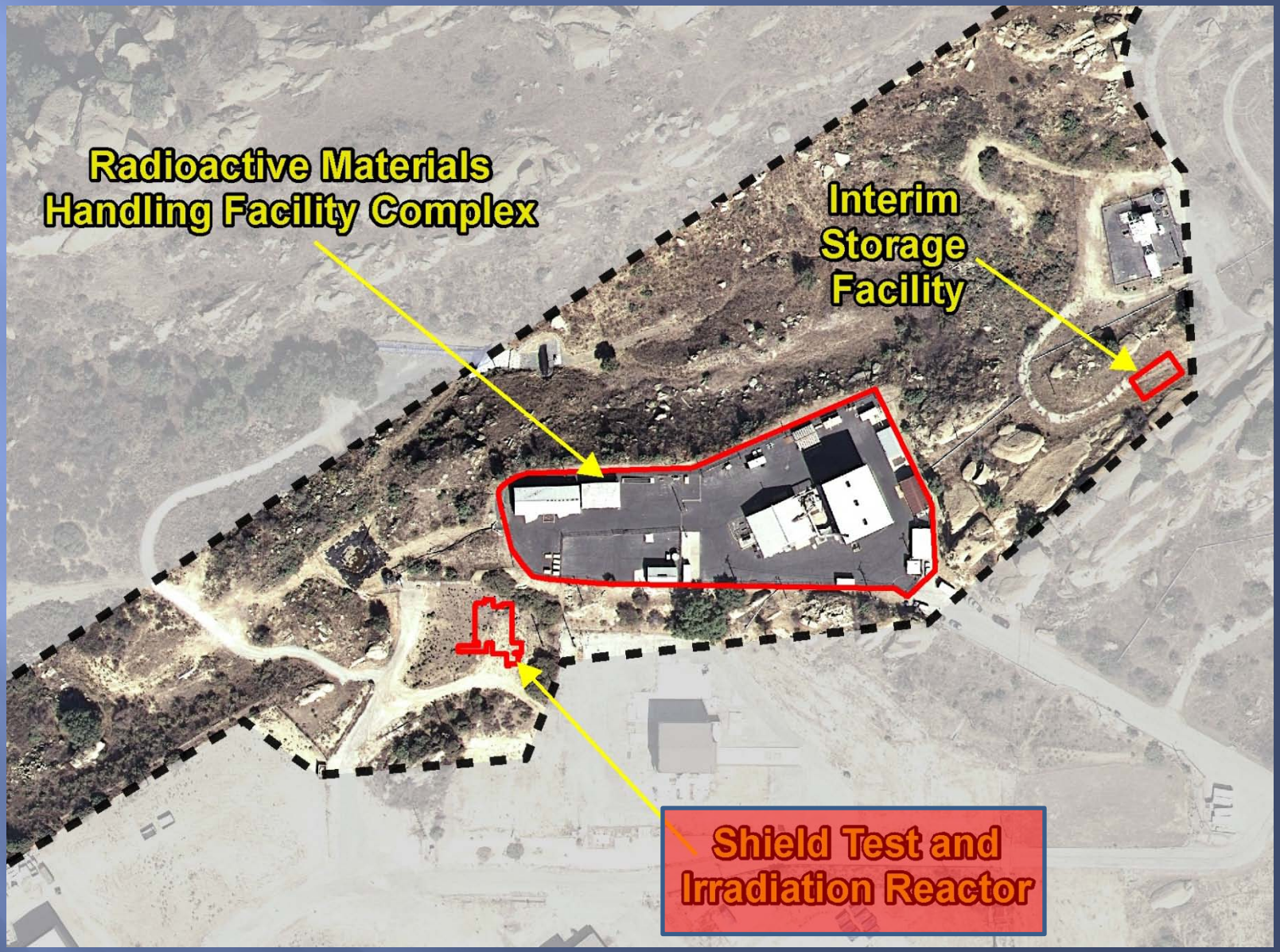


RMHF Holdup Pond

- Originally constructed in early to mid-1960s as retention pond for STIR facility and then converted for RMHF use by constructing drainage channel from west end of RMHF complex (also collected from northern swale of RMHF)
- Approximately 25 foot square by 4 foot deep pond with 30,000-gallon capacity
- Pond sealed and coated with asphalt; equipped with centrifugal pumps, three level switches, radioactivity alarm
- Water tested and pumped to 17th Street Drainage
- Sediment in pond bottom reportedly removed during dry season due to frequent findings of low level Cs-137
- Demolished in 2006
- Replaced with 1,500-gallon aboveground storage tank
- 5 documented incidents with releases to or from pond

RMHF Incident Summary

- 62 documented incidents
- Incident categories include: fire, explosion, releases to air, radiation alarms, spills, loss of radioactive material, rule violations, and personnel injuries/exposures
- Examples:
  - Sodium fires/explosions/releases to air
  - Spills resulting from overflowing tanks/drums and rainwater collection from outdoor storage
  - Radioactive source discovered on ground following cleanout of storage building
  - Personnel failing to wear proper safety equipment, entering controlled areas without permission, falling into vault


Radioactive Materials
Handling Facility Complex
Interim
Storage
Facility
Shield Test and
Irradiation Reactor

STIR Circa 1980s

STIR Architectural Drawings

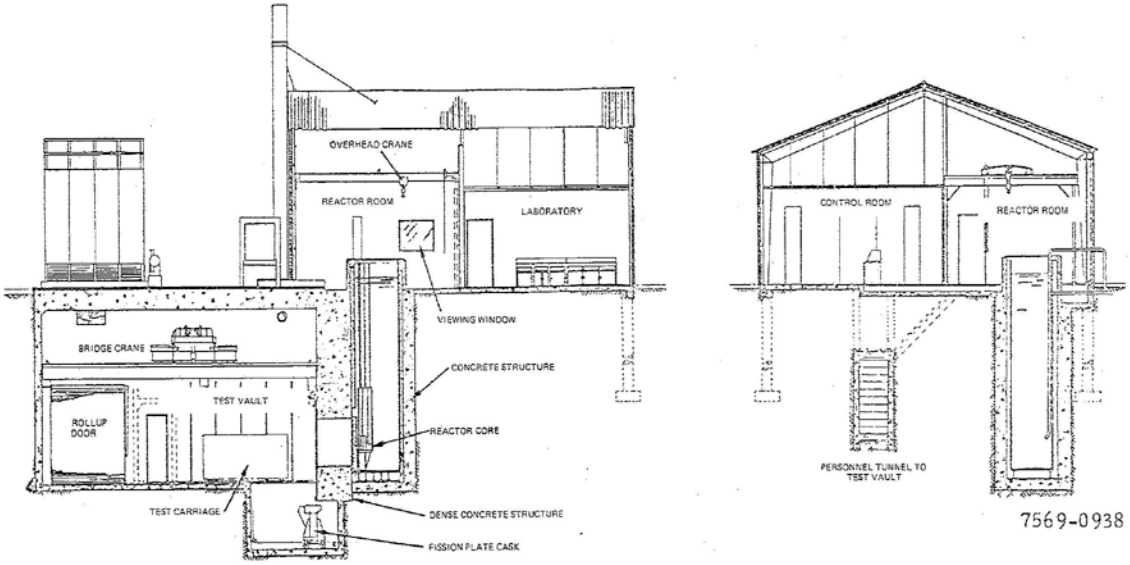
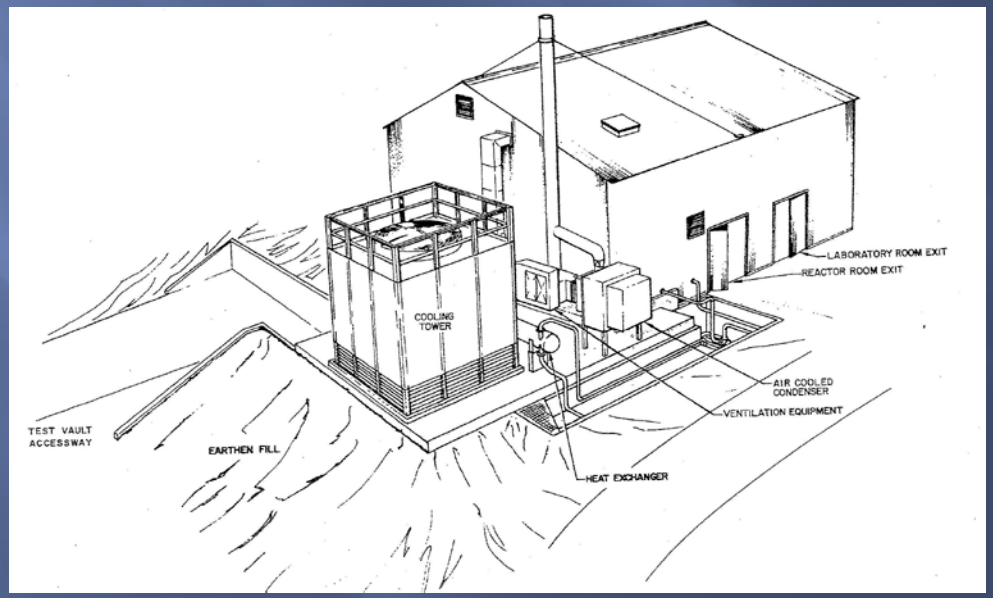
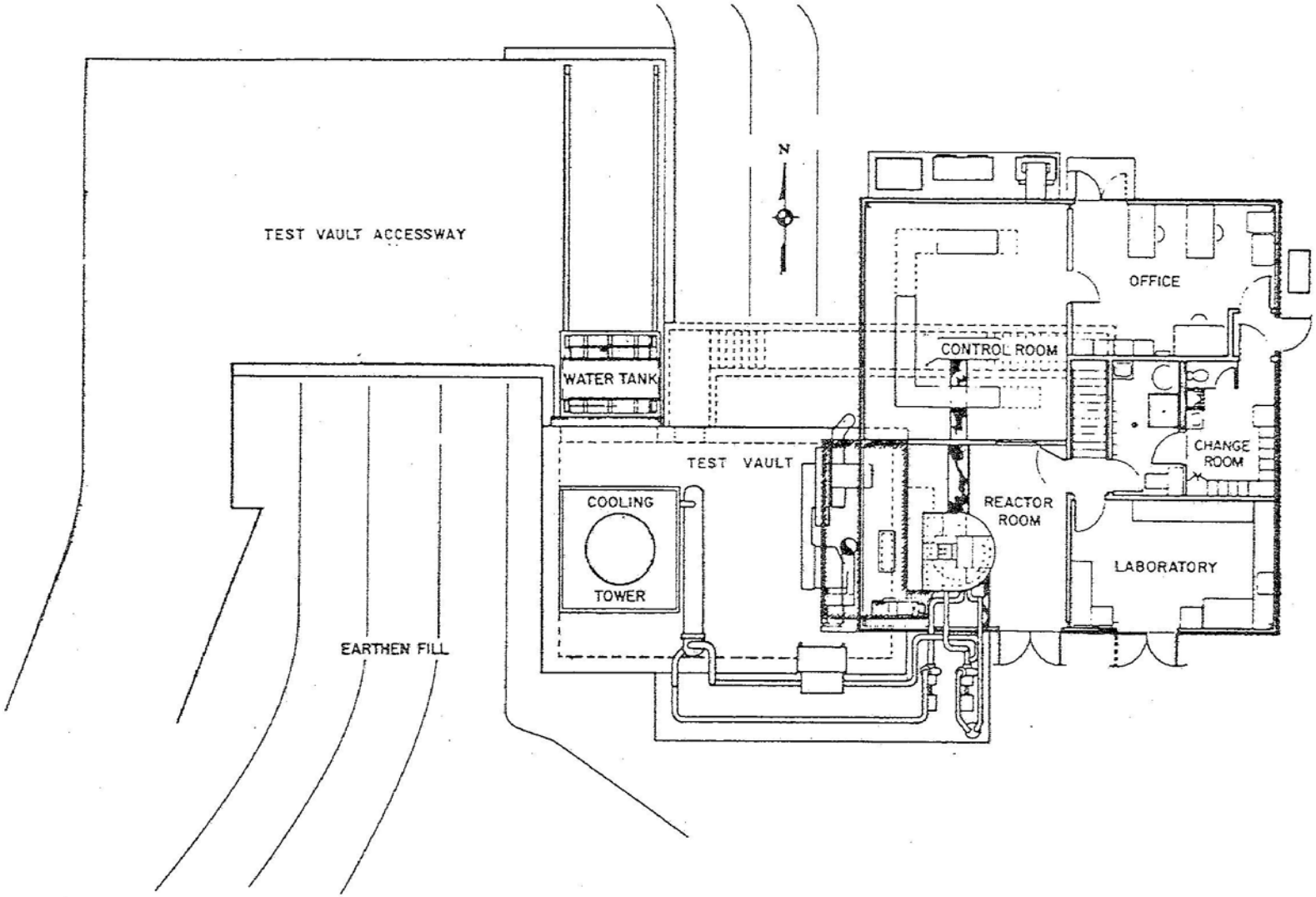


Figure 3. STIR Architectural Sections and Details



STIR Architectural Floor Plan



7569-0937

Figure 2. STIR Architectural Floor Plan

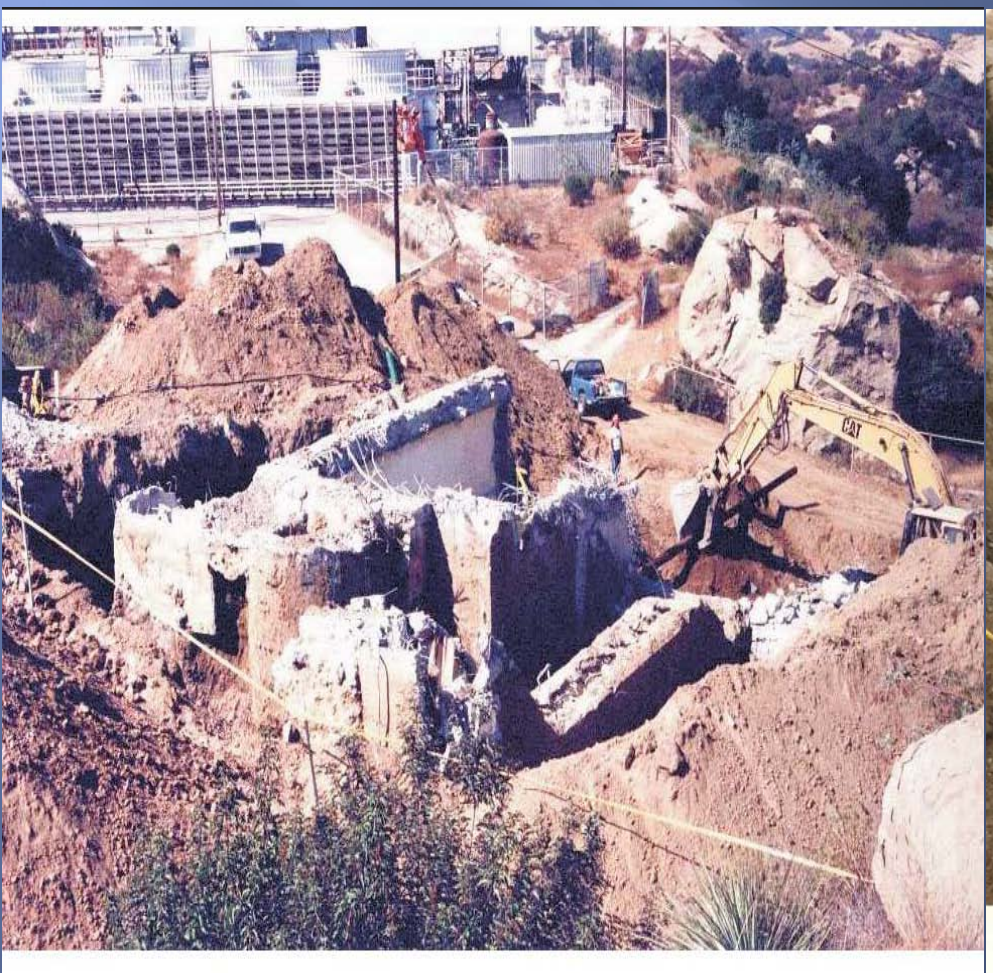
Shield Test and Irradiation Reactor (STIR)

- Constructed in 1960 (pool-type reactor)
- 1961 to 1964 - Operated as Shield Test Reactor (50-Kw)
- 1964 - Modified in 1964 to operate as Shield Test and Irradiation Reactor (1-Mw)
- Reactor core in 20-foot tank; cask pit ~ 27 feet below ground
- 1975 to 1976 – STIR D&D (reactor cavity backfilled)
- 1977 to 1981 – Operated as Liquid Metal Fast Breeder Reactor Fuel Safety Building (aka Arc Melt Facility) to experiment with molten UO_2
- 10 documented incidents with 9 involving releases
- July 1988 – D&D efforts following UO_2 testing
- April to July 1989 – Aboveground building structures demolished (concrete floor and belowground test vault remained)
- 1998 – Below-grade structures demolished

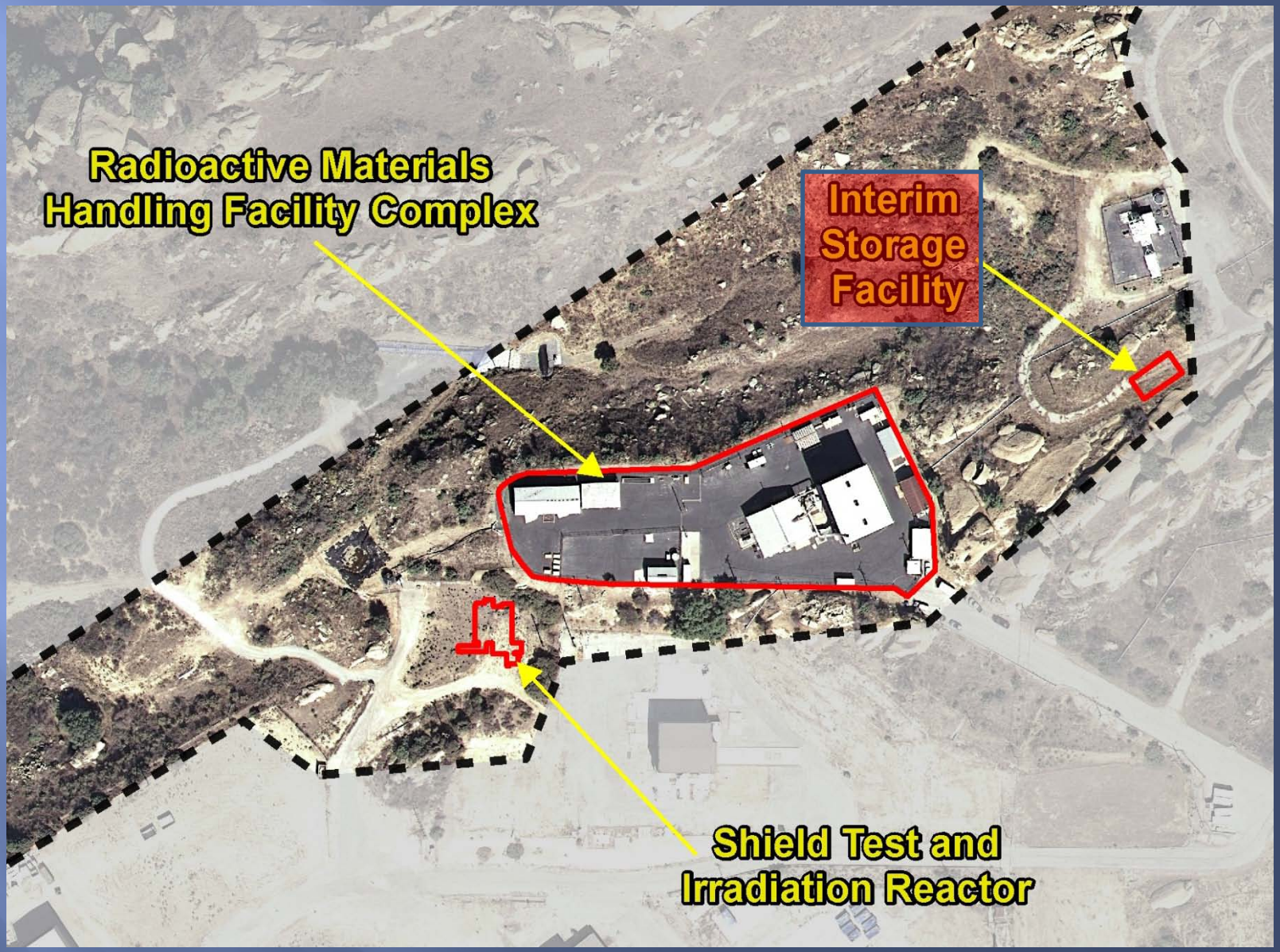
STIR Incident Summary

- 10 documented incidents
- Incident categories include: fire, releases to air, radiation alarms, spills, rule violations, and personnel exposure
- Examples:
  - Releases to air during removal of irradiated samples
  - Small uranium fire
  - Spills to RMHF pond (formerly STIR pond)
  - Transport of radioactive material in personal vehicle

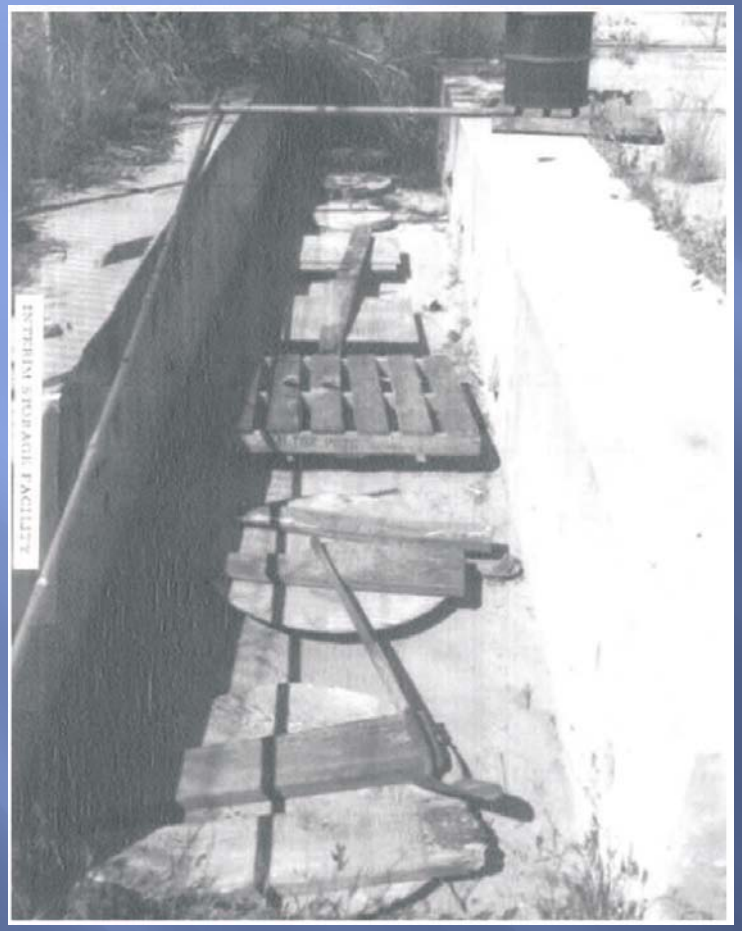
1998 Demolition of STIR



B/4028 LMFBR Foundation Removal (Looking West)


Radioactive Materials
Handling Facility Complex
Interim
Storage
Facility
Shield Test and
Irradiation Reactor

ISF Historical Photos 1983



Interim Storage Facility (ISF)

- Constructed in 1958 to support the SRE
- Designed to store spent fuel elements, shipping and storage casks, and radioactive waste
- ISF consisted of concrete trench holding 8 storage tubes drilled 25 feet into bedrock and paved storage pad all enclosed in fence
- Originally served SRE, then OMRE and SNAP
- 1964 – ISF taken out of service
- 1964 to 1984 – Surveillance and maintenance mode (low-level contamination and water found in storage tubes)
- 2 documented incidents involving releases
- 1984 to 1985 – D&D (storage tube punctured during removal)

ISF Excavation

Subarea 3 Overview

- Southern California Edison (SCE) Electrical Substation is only structure
- Constructed in approximately 1956
- Covers 0.887 acres; enclosed in fence
- Provides power to SSFL facilities
- No known radionuclide use/incidents
- Borders Old Conservation Yard
- Debris area south of SCE

SCE Historical Photo 1963

Northern Buffer Zone Overview

- Purchased by Boeing in 1997
- Covers approximately 175 acres
- Northeast buffer zone borders Subareas 3 and 6
  - Collects drainage from Area II and SRE Pond (prior to 1959 and in heavy rains)
  - Scattered debris, truck tire, and rusted containers found
- Northwest buffer borders Subareas 7 and 8
  - Collects drainage from Sodium Disposal Facility, ESADA, OMR, AETR, Landfill 4056, SNAP8DR, RMHF, ISF, Contaminated Sodium Cleaning Facility
  - Well piping, pump, wiring; metal containers; and soil pile containing asphalt, concrete, metal debris found

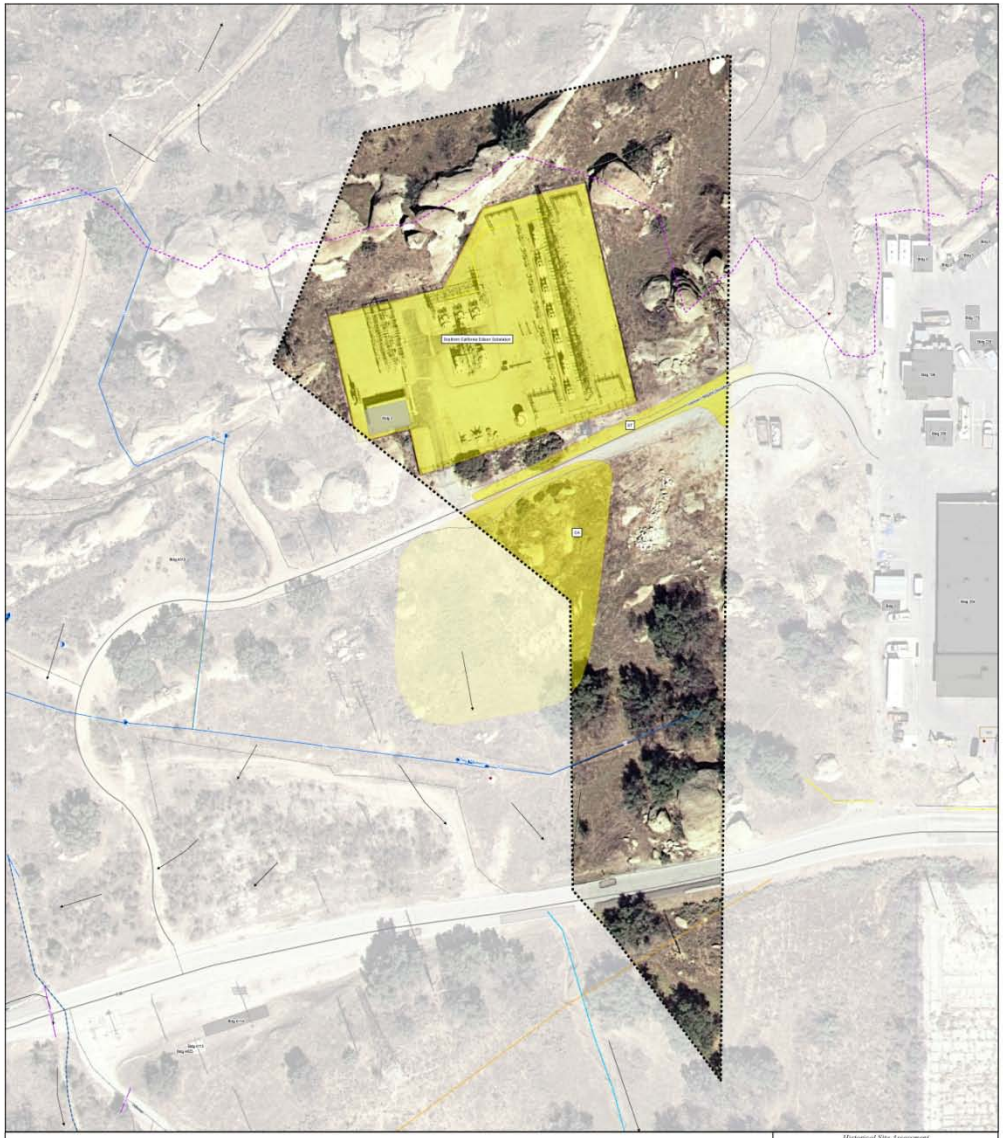
Northern Buffer Zone – Northeast

Northern Buffer Zone – Northwest

Summary of Findings

- HSA Aerial Photo Features
- Process Knowledge and Past Operation Practices
- Soil Removals/Excavations

Contrail Channel
Contrail Channel
Contrail Channel


Bldg 1
Bldg 2
Bldg 3
Bldg 4
Bldg 5
Bldg 6
Bldg 7
Bldg 8
Bldg 9
Bldg 10
Bldg 11
Bldg 12
Bldg 13
Bldg 14
Bldg 15
Bldg 16
Bldg 17
Bldg 18
Bldg 19
Bldg 20
Bldg

Samples with readings above Preliminary BTV's

- Samples with readings above Preliminary BTV's
- Subarea Boundary
- ScreenLayer
- Demolished
- Existing

Past Radiological Soil Investigations
Subarea 7
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Gamma Radiation Scanning Update

August 17, 2011

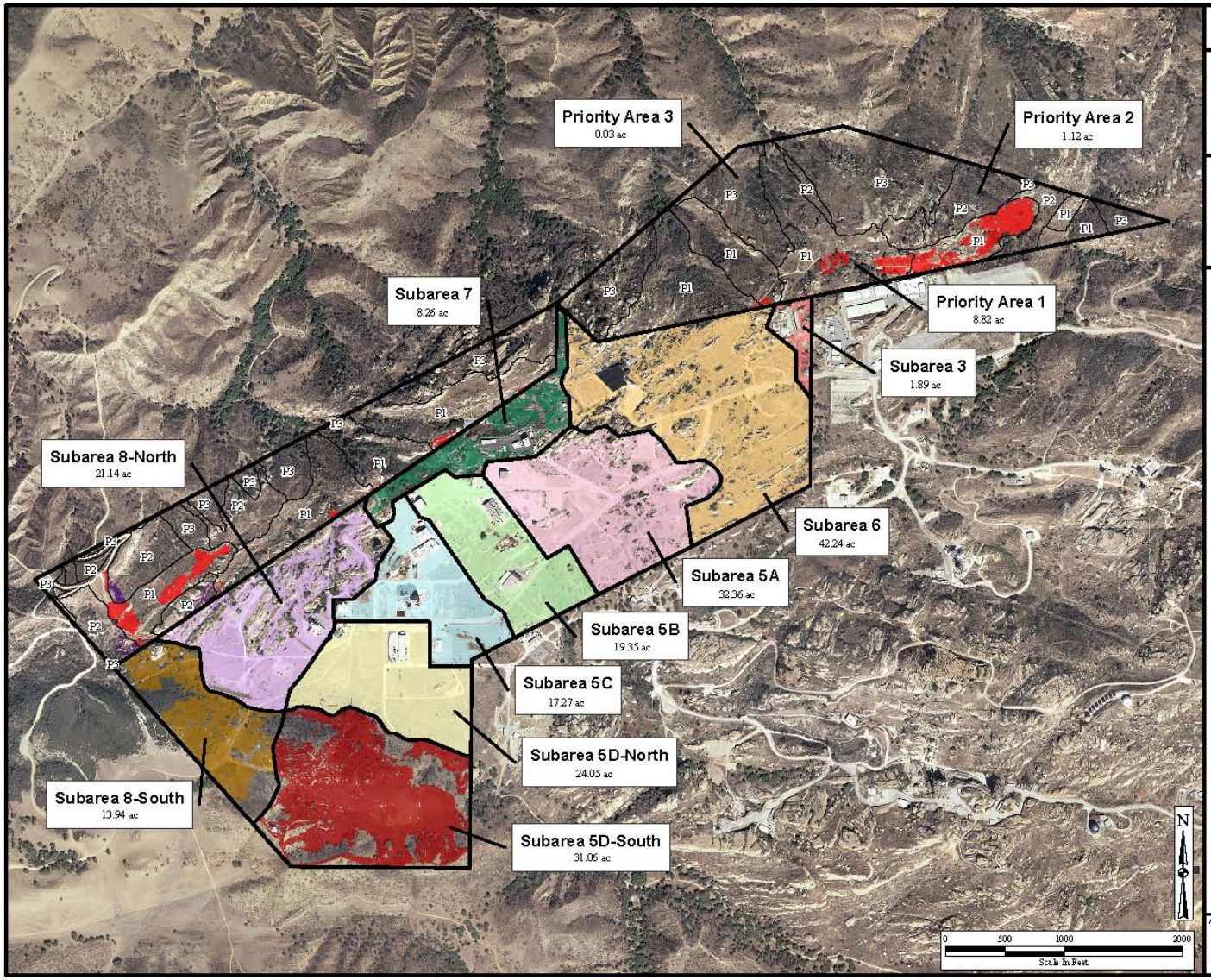
Agenda

- Gamma Scanning Accomplishments
- Scanning Coverage
- Subarea 7 Potential Gamma Radiation Anomalies
  - Findings
  - Gamma Data Analysis
- Subarea 3 PGRAYs

Accomplishments in Subarea 7

- Scanned 99% of the accessible areas of Subarea 7
- Completed gamma scanning data evaluation
- Identified, verified, and evaluated 41 of 42 Potential Gamma Radiation Anomalies (PGRAYs)
- One PGRAY is in an archaeological site. It will be verified at a later date with all similar sites.

Gamma Scanning Progress



HGL—Gamma Scanning, Santa Susana Field Laboratory Site Ventura County, California

Gamma Scanning Progress
Santa Susana Field Laboratory

U.S. EPA Region 9

Legend

Gamma Scanning Coverage

Subarea

- Priority Area 1
- Priority Area 2
- Priority Area 3
- Subarea 3
- Subarea 5A
- Subarea 5B
- Subarea 5C
- Subarea 5D-North
- Subarea 5D-South
- Subarea 6
- Subarea 7
- Subarea 8-North
- Subarea 8-South

Type of Scanning Equipment	Week (29July11 thru 04Aug11)	Total To Date
ERGS	0.75	155.33
WMGS	0	24.87
MMGS	0.53	55.54
TMGS	1	24.19
STGS	0.34	1.21

Acreage Totals
Including Overlaps: 261.14
Excluding Overlaps: 221.51

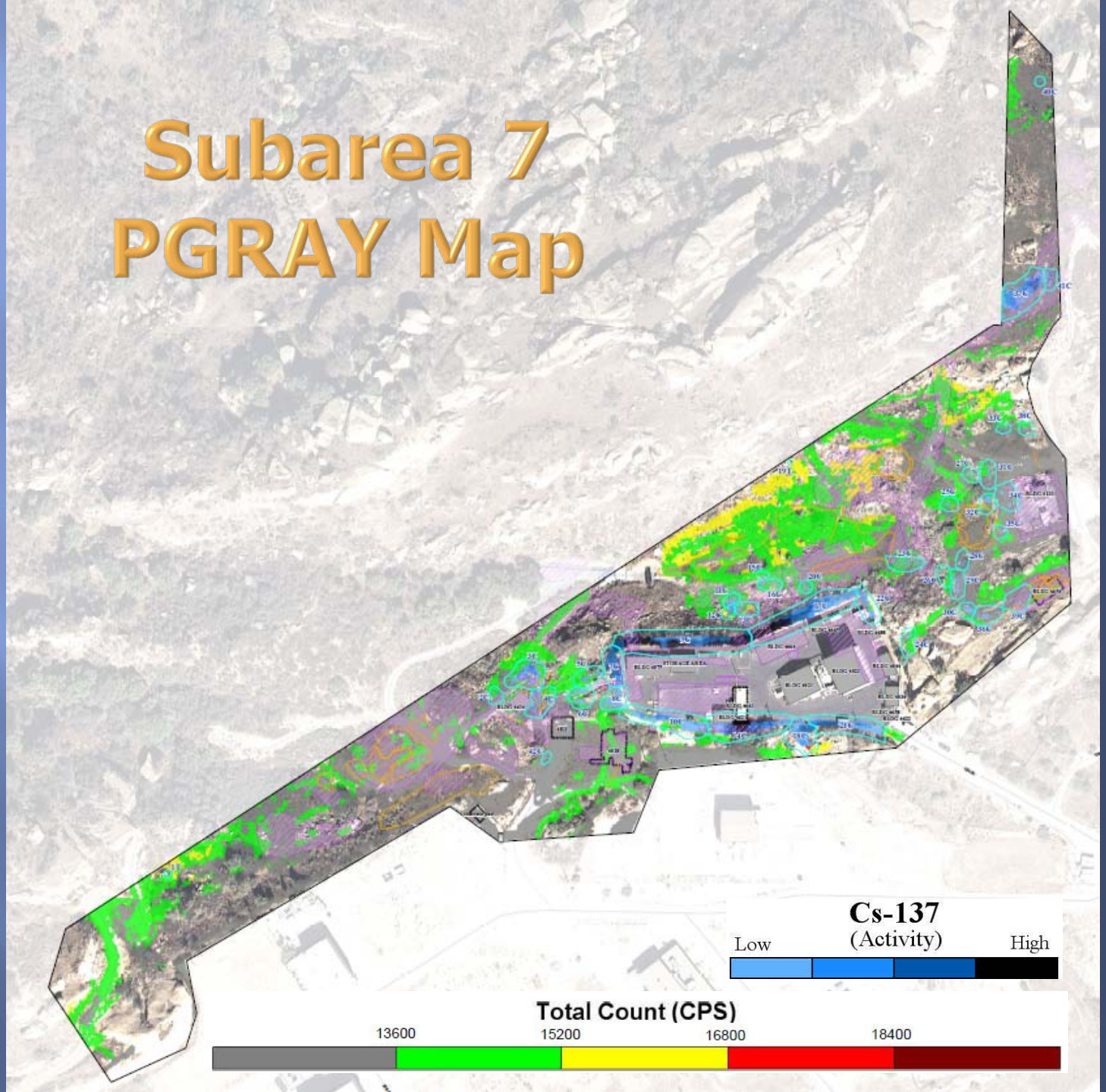
Notes:
- The totals listed in the table include overlap.
- The totals listed on the map exclude overlap.

Project: BP0038
Edited By: PLB/6/2011
Source: CIRGIS 2007, HGL 2010

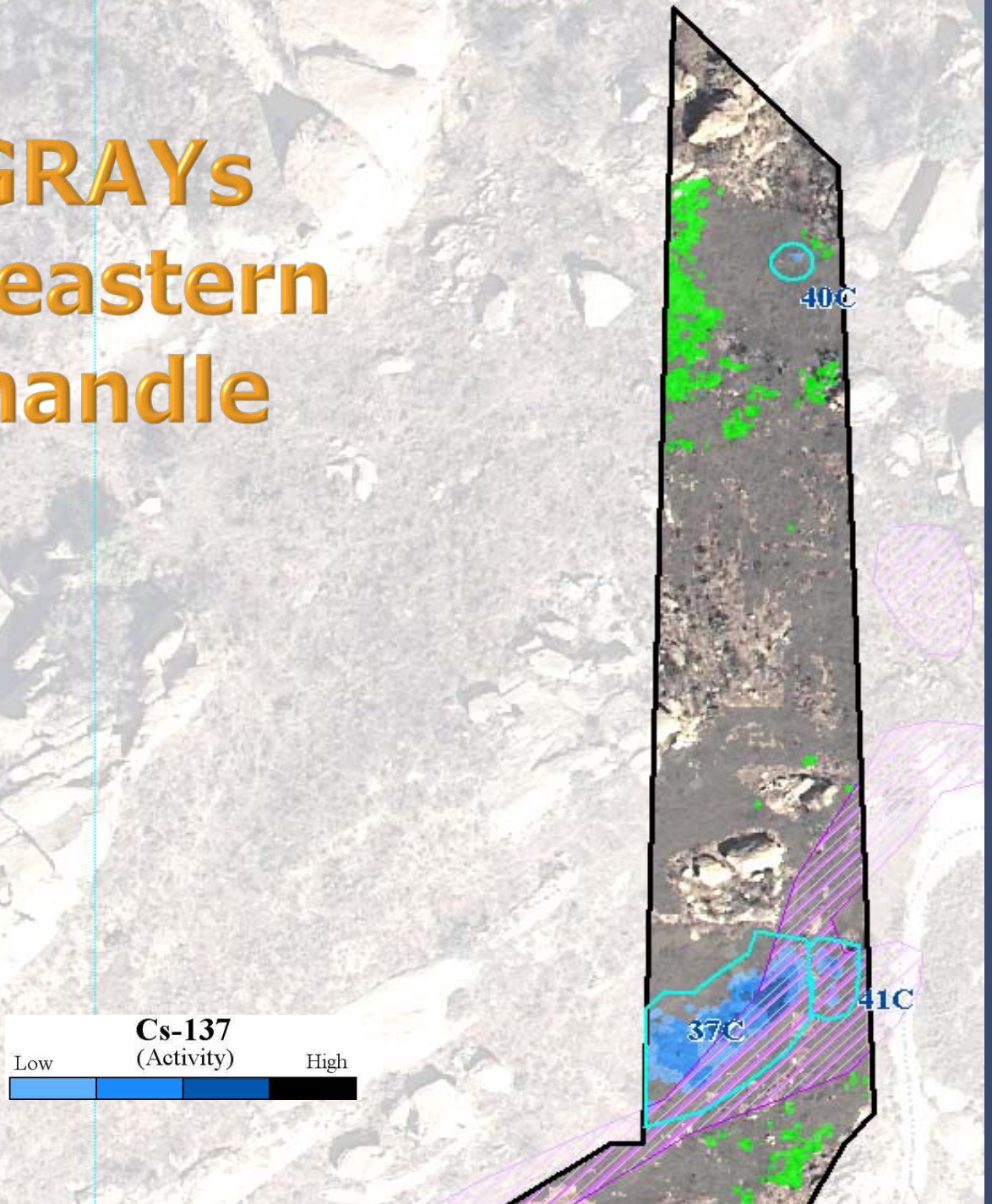
HGL TECHNOLOGIES, INC.

Scanning Near The RMHF Complex

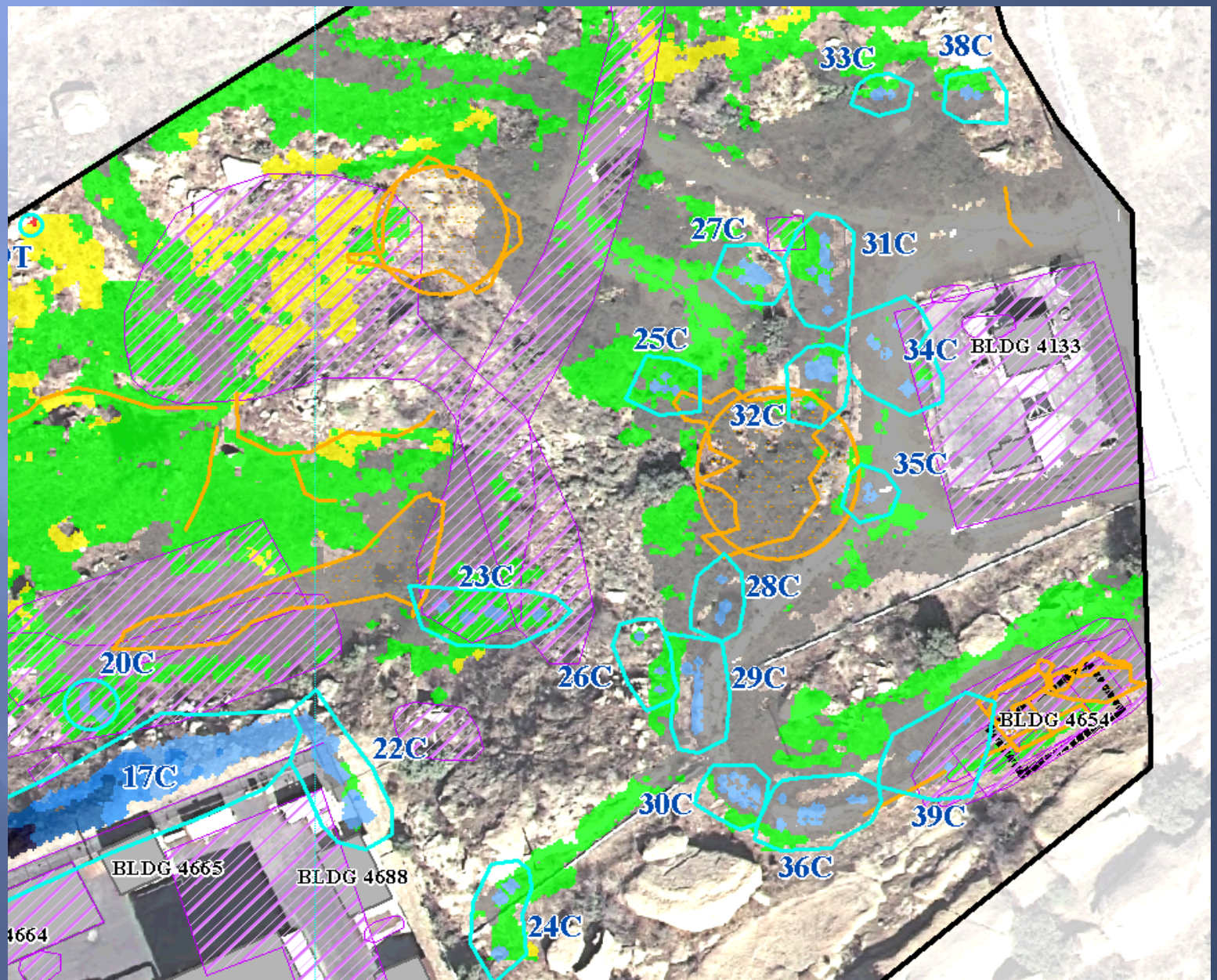
Subarea 7 PGRAY Map



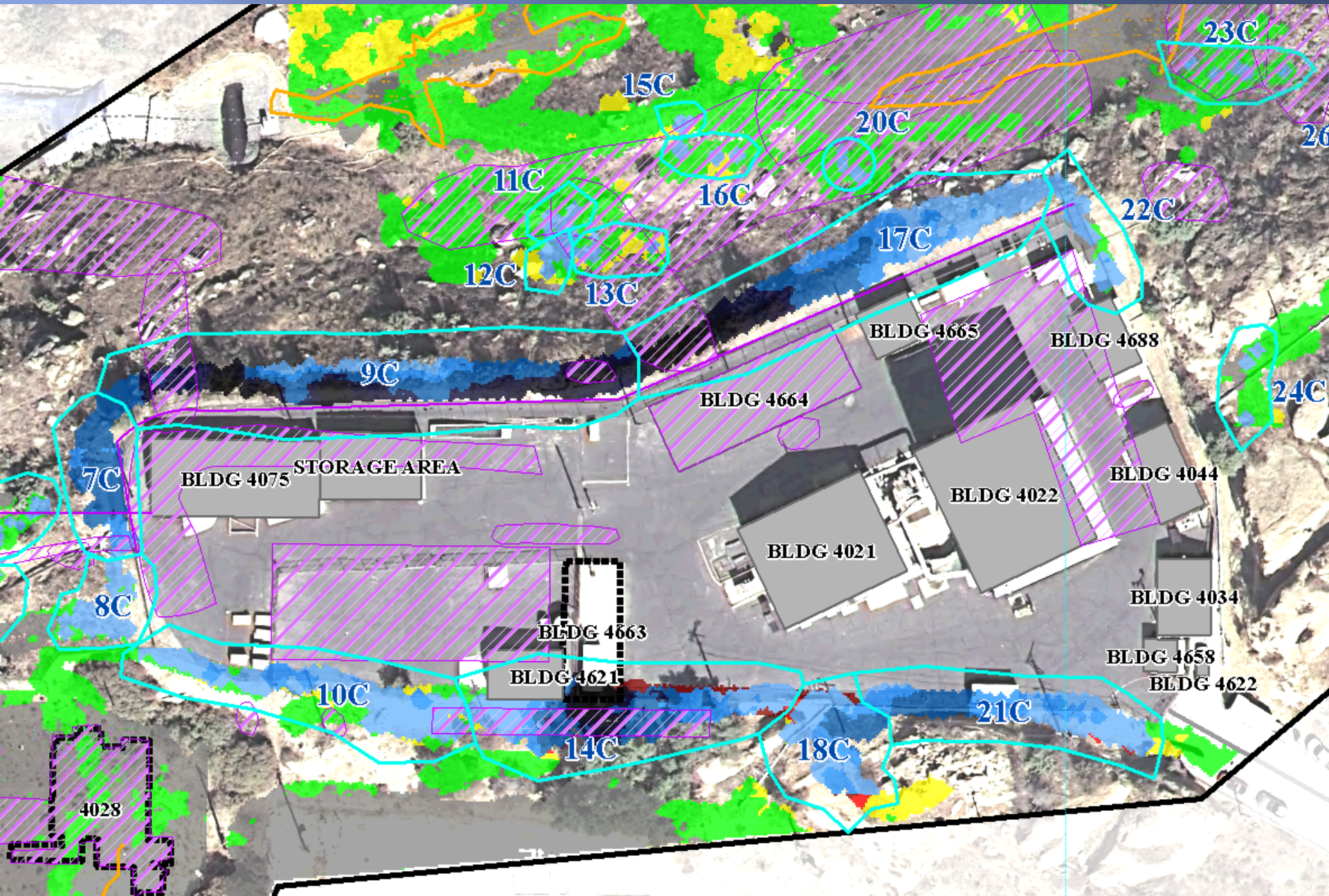
7 PGRAYs Northeastern Panhandle



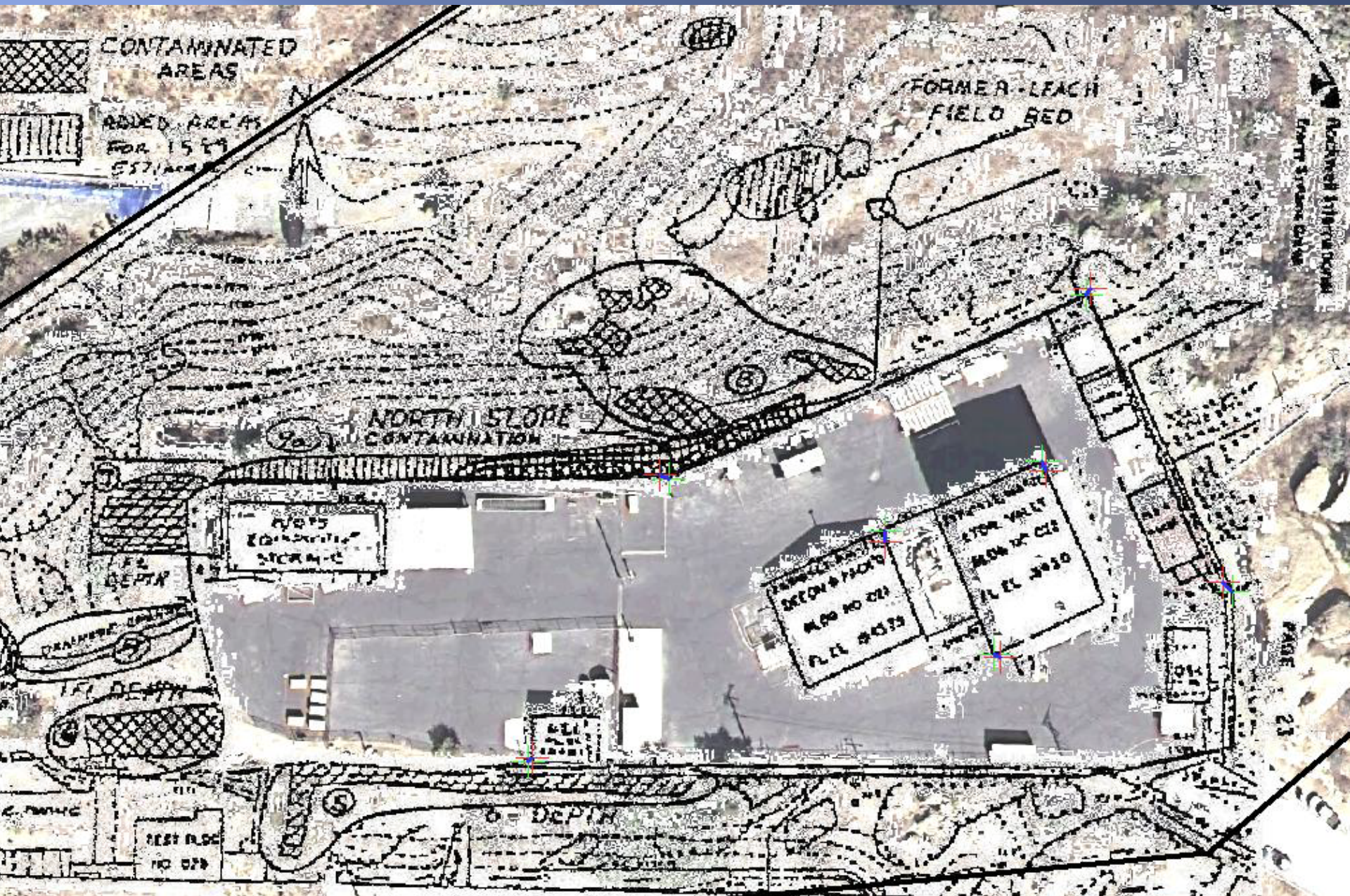
7 PGRAYs Northeast Of The RMHF



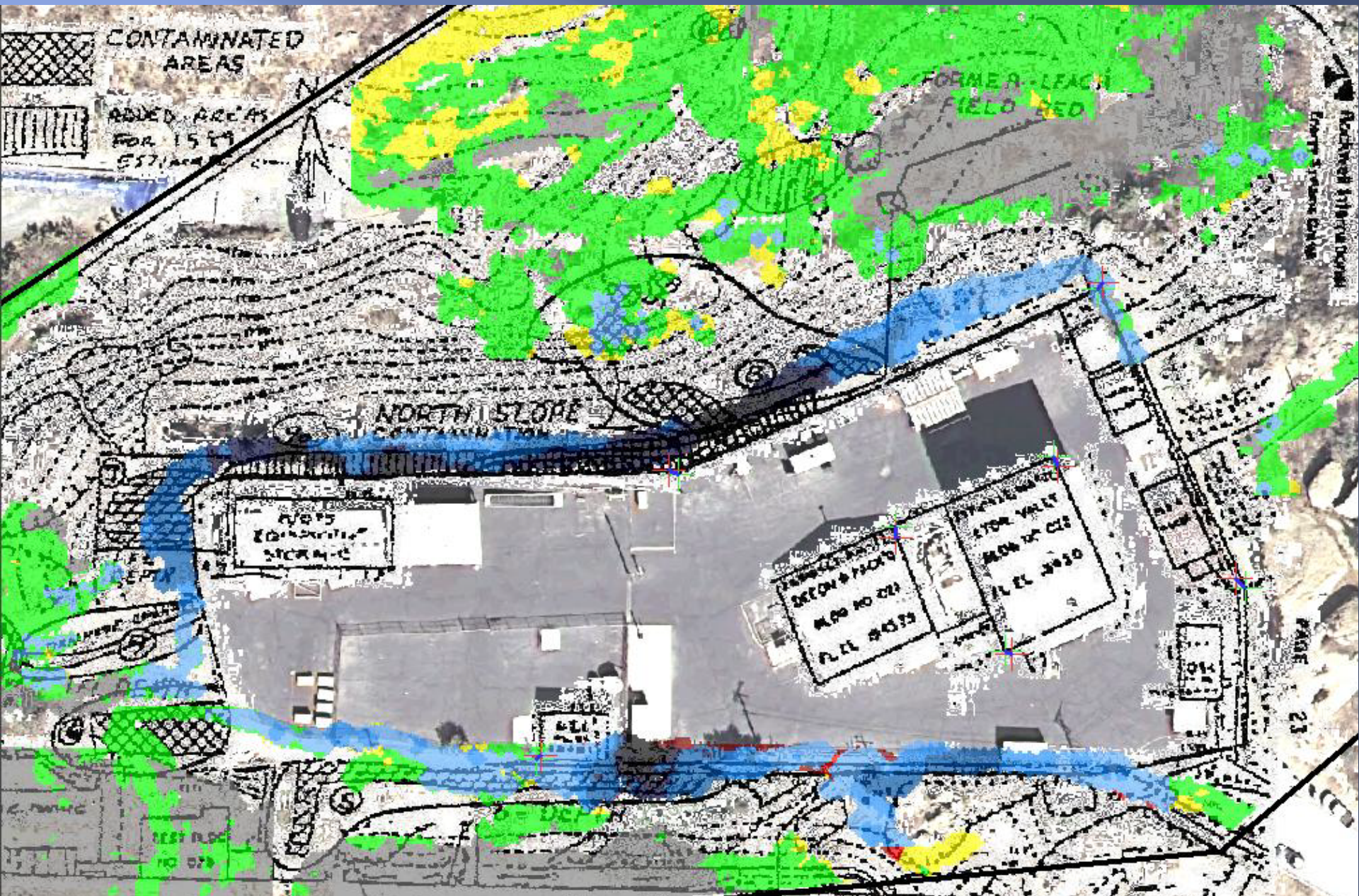
7 PGRAYs by the RMHF



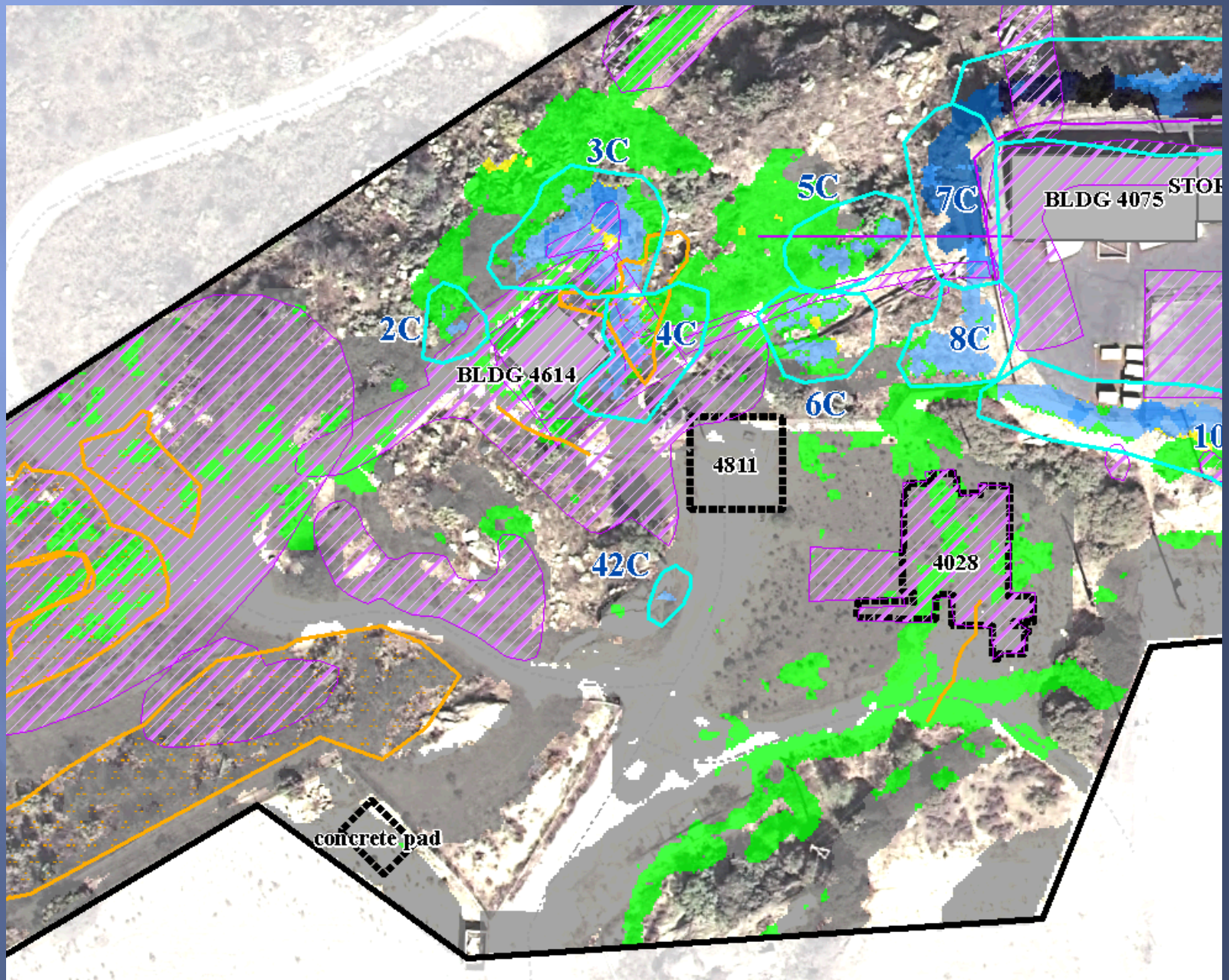
Rockwell Contamination Areas Drawing



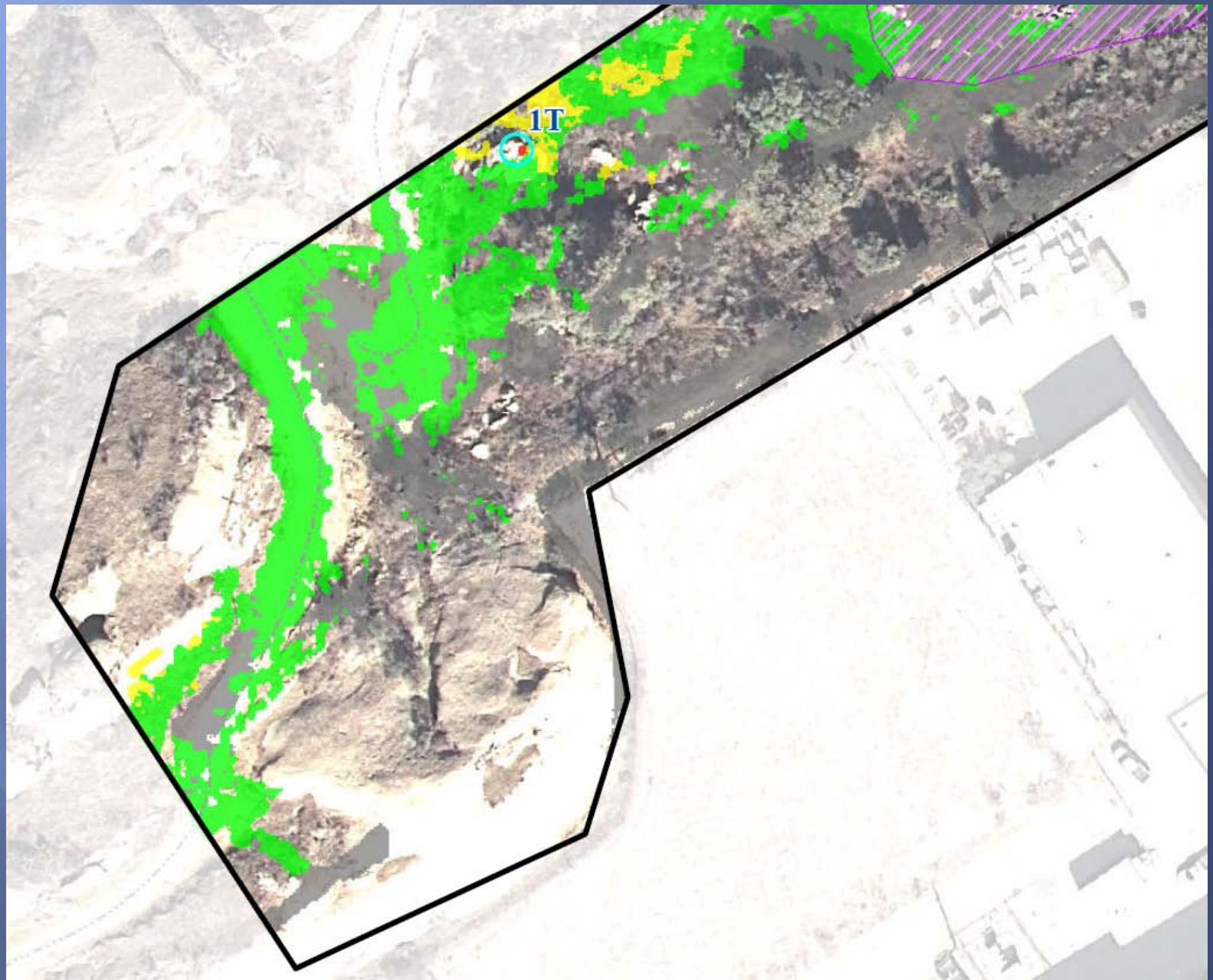
Drawing Plus Current Gamma Data



7 PGRAYs West of the RMHF



7 PGRAYs Southwest Section



Evaluation of 7 Potential GRAYs

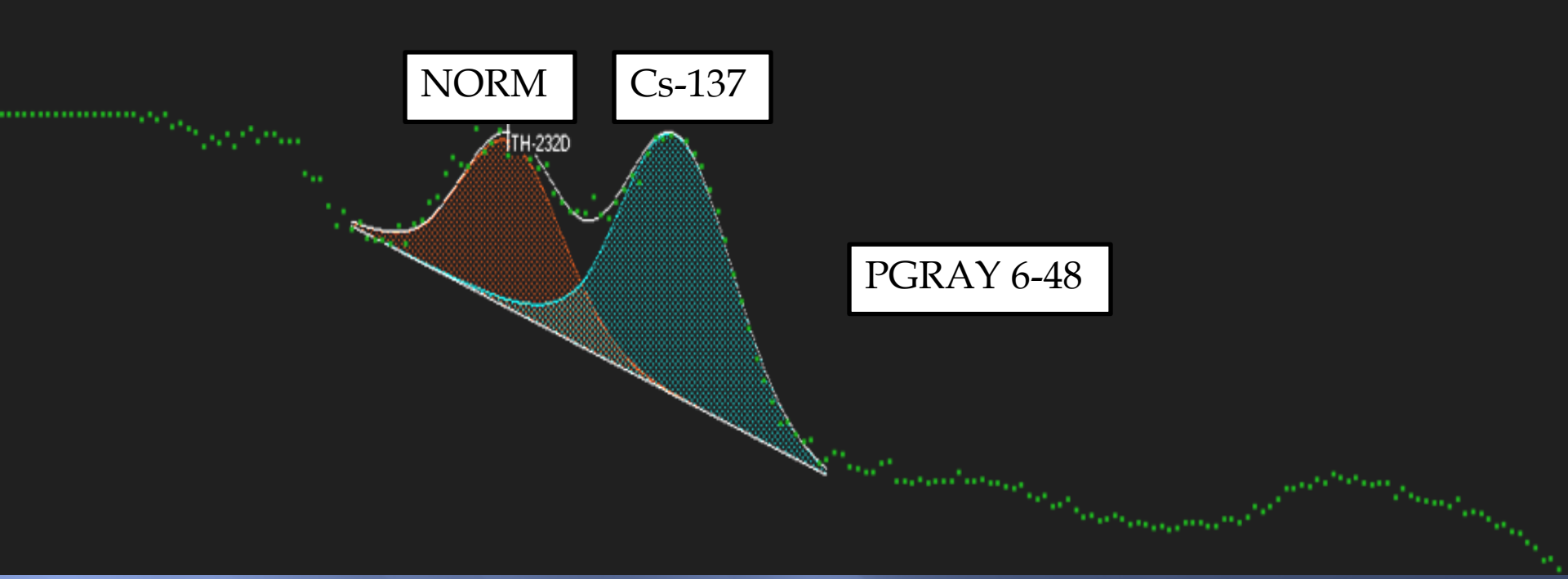
Locations	Evaluation
3-5, 7-18, 21-27, 29-39, 41	GRAY
6, 20	Suspect
1, 2, 19, 28, 42	Not a GRAY; NORM
40	Inaccessible due to an archaeological site
NORM is Naturally Occurring Radioactive Materials (Uranium, Thorium, and Potassium-40)	

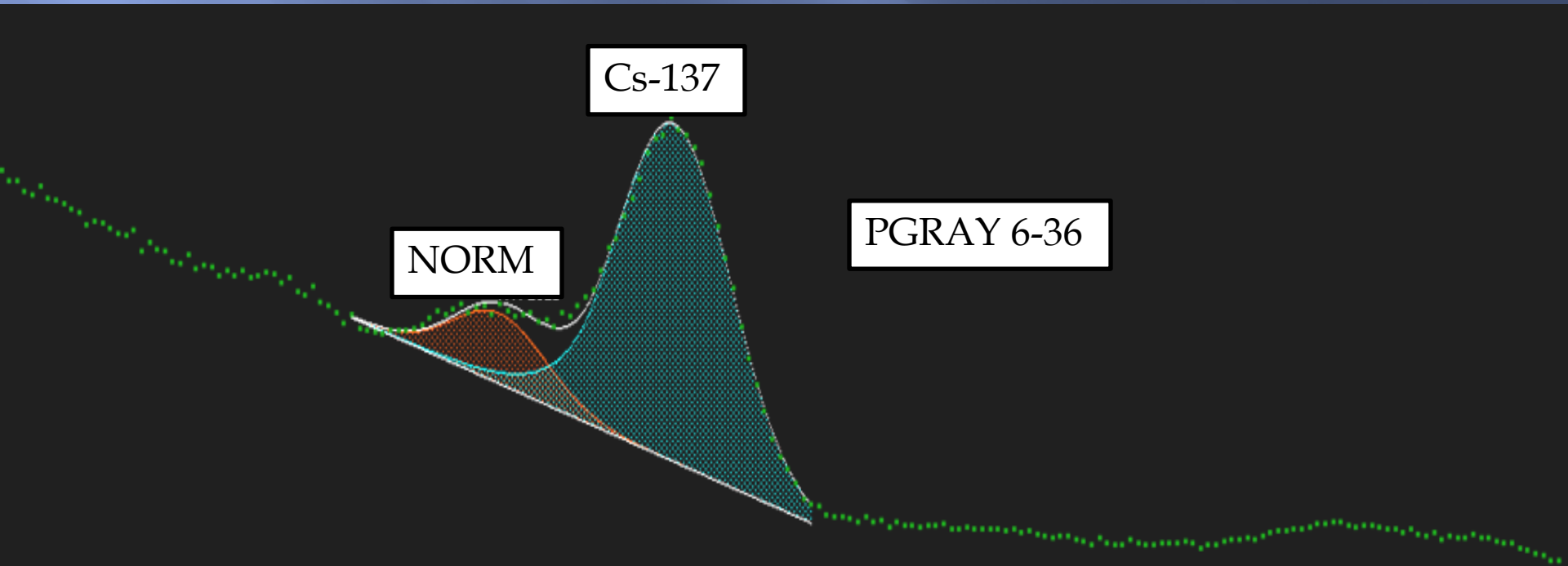
PGRAY Evaluation Process

- Scanning data are assembled to determine local Subarea gamma detector background
- Anomalies are identified, mapped, and then verified with static counts. Selected locations are analyzed using an In Situ Gamma Spectrometer
- Verification results and other lines of evidence determine whether a PGRAY is –

  GRAY, Suspect, or Not a GRAY

- **Soil results determine** whether a location is above a clean up value


NORM
Cs-137
TH-232D
PGRAY 6-48


Cs-137
NORM
PGRAY 6-36

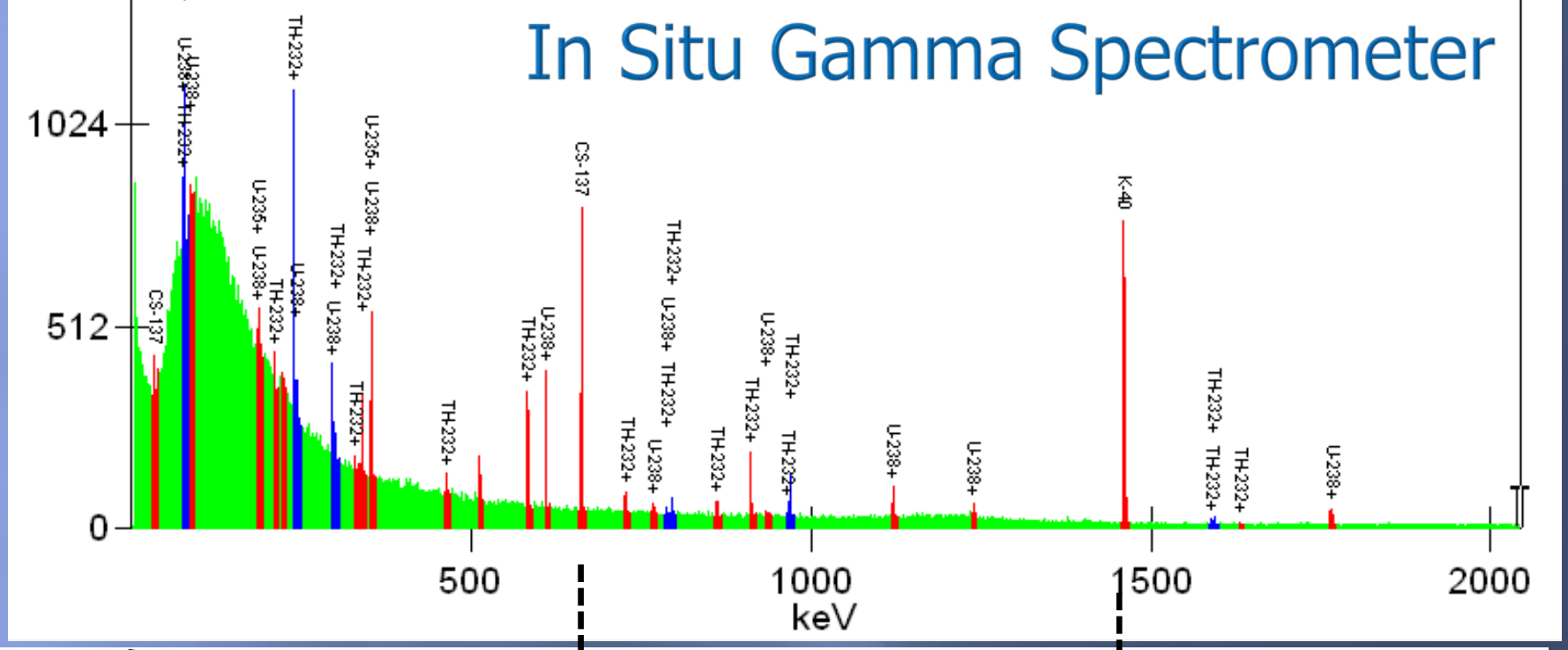
Verification of Gamma Emitting Radionuclides

Scanning Data	Verification Count Result
Subarea 6 29 Cs-137 PGRAYs	27 GRAYs with Cs-137, one has U-235, and 2 Not a GRAY
Subarea 6 30 TCPS PGRAYs	1 GRAY with Cs-137, 1 suspect, and 28 Not a GRAY
Subarea 7 40 Cs-137 PGRAYs	34 GRAYs with Cs-137, 2 Suspect, 3 Not a GRAY, and 1 Inaccessible
Subarea 7 2 Total PGRAYs	2 Not a GRAY

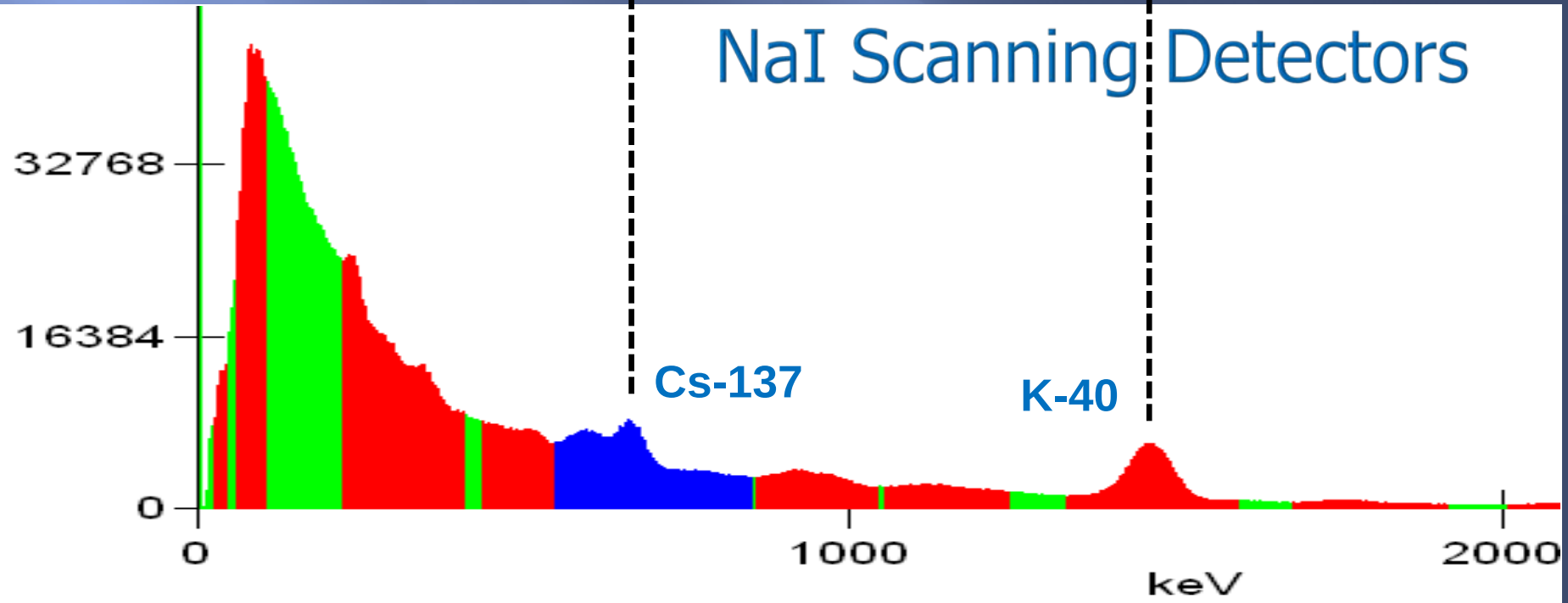
In Situ Gamma Spectrometer Supplements Gamma Scanning Detection Systems

- In Situ Gamma is placed at a PGRAY for a 20 minute count
- Detects man-made and naturally occurring radionuclides
- In Situ Gamma has better peak resolution but is not made for scanning
- Field Of Views differ greatly, so comparisons are approximate

In Situ Gamma Spectrometer



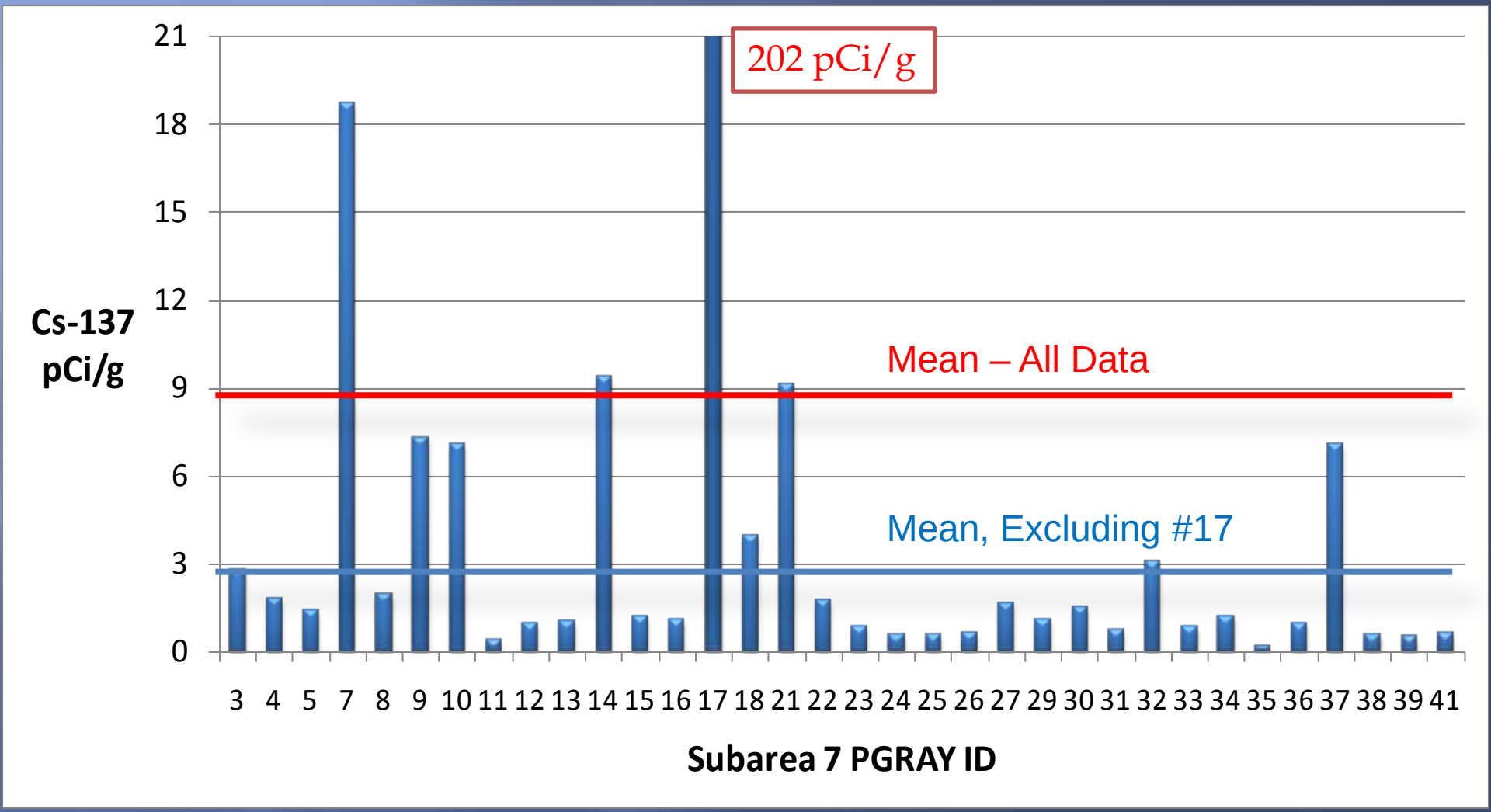
NaI Scanning Detectors



Subarea 7 PGRAY Field Results

PGRAY ID	PGRAY Evaluation	PGRAY Label	In Situ Gamma Cs-137 (pCi/g)	NaI Cs-137 (cps)	Detection System	NaI Efficiency c/d per pCi/g
SA 7-01	Not a GRAY	Total	0.1	0.0	TMGS	0.0
SA 7-02	Not a GRAY	Cs	0.2	0.0	ERGS II	0.0
SA 7-03	GRAY	Cs	2.8	453.3	ERGS II	188.6
SA 7-04	GRAY	Cs	1.8	366.7	ERGS II	238.5
SA 7-05	GRAY	Cs	1.4	218.7	ERGS II	183.6
SA 7-06	Not a GRAY	Cs	0.3	0.0	TMGS	0.0
SA 7-07	GRAY	Cs	18.7	738.3	TMGS	46.4
SA 7-08	GRAY	Cs	1.9	82.9	TMGS	50.1
SA 7-09	GRAY	Cs	7.3	581.7	TMGS	93.9
SA 7-10	GRAY	Cs	7.1	313.3	TMGS	52.2
SA 7-11	GRAY	Cs	0.4	13.3	TMGS	37.6
SA 7-12	GRAY	Cs	1.0	28.9	TMGS	34.4
SA 7-13	GRAY	Cs	1.0	36.7	TMGS	42.0
SA 7-14	GRAY	Cs	9.4	490.0	TMGS	61.3
SA 7-15	GRAY	Cs	1.2	126.7	ERGS II	125.8
SA 7-16	GRAY	Cs	1.1	157.7	ERGS II	171.8
SA 7-17	GRAY	Cs	202.0	8916.7	TMGS	51.9
SA 7-18	GRAY	Cs	3.9	368.3	TMGS	109.7
SA 7-19	Not a GRAY	Total	0.5	0.0	TMGS	0.0

Cs-137 Concentration Data From The In Situ Gamma Spectrometer



Correlations Between In Situ Gamma And Verification Count Data

K-40

Parameter	In Situ Gamma (pCi/g)	ERGS II (CPS)	ERGS II (c/d per pCi/g)	TMGS (CPS)	TMGS (c/d per pCi/g)	ERGS II /TMGS Response Ratio
Mean	21	466	213	156	67	3.2
Std. Dev.	2	19	10	25	4	
Minimum	14	420	195	110	61	
Maximum	28	497	233	207	78	

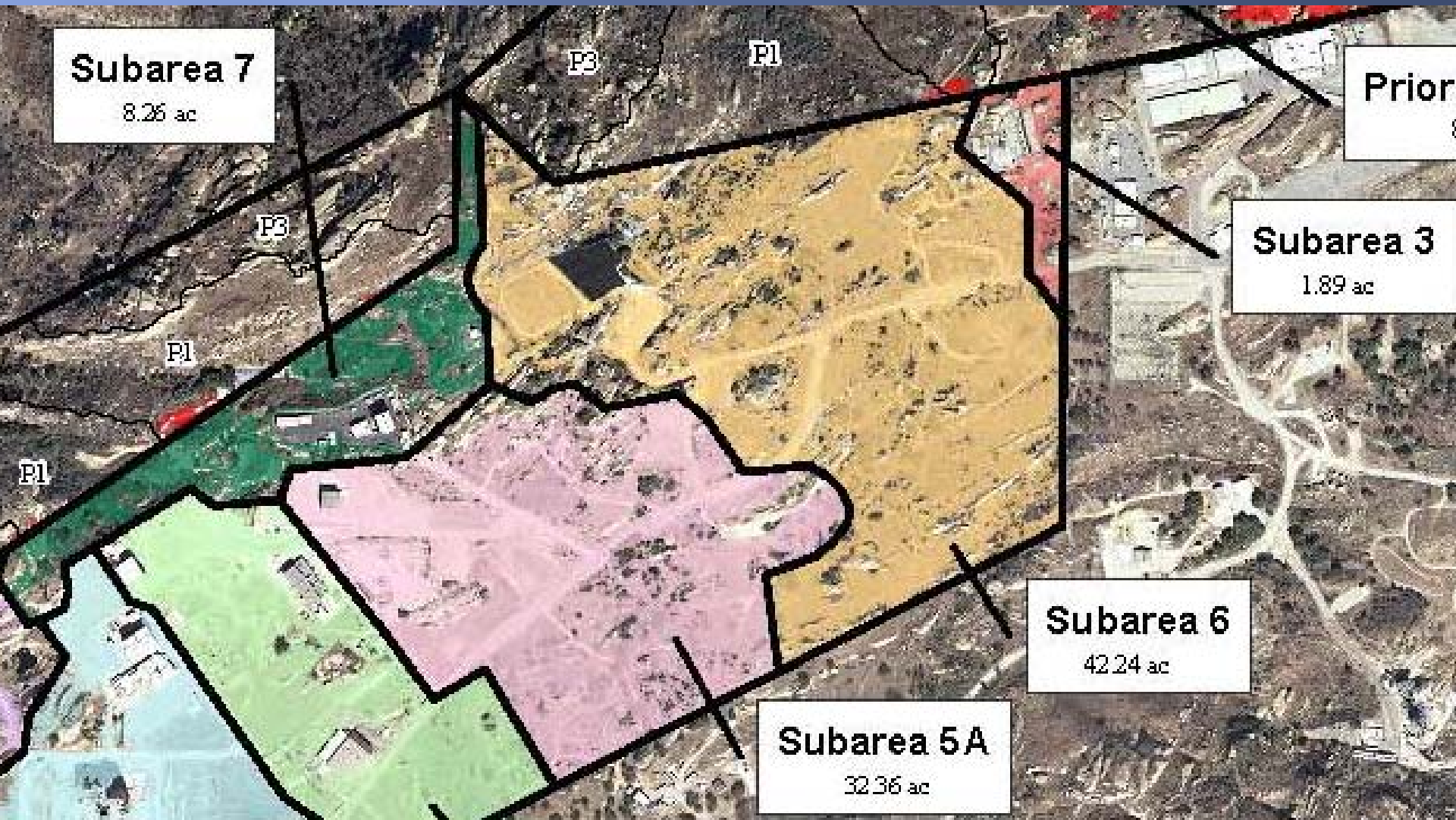
Cs-137

Parameter	In Situ Gamma (pCi/g)	ERGS II (CPS)	ERGS II (c/d per pCi/g)	TMGS (CPS)	TMGS (c/d per pCi/g)	ERGS II /TMGS Response Ratio
Mean	9	317	197	930	47	4.2
Std. Dev.	36	436	58	2526	9	
Minimum	0.41	45	93	13	34	
Maximum	202	1950	325	8917	61	

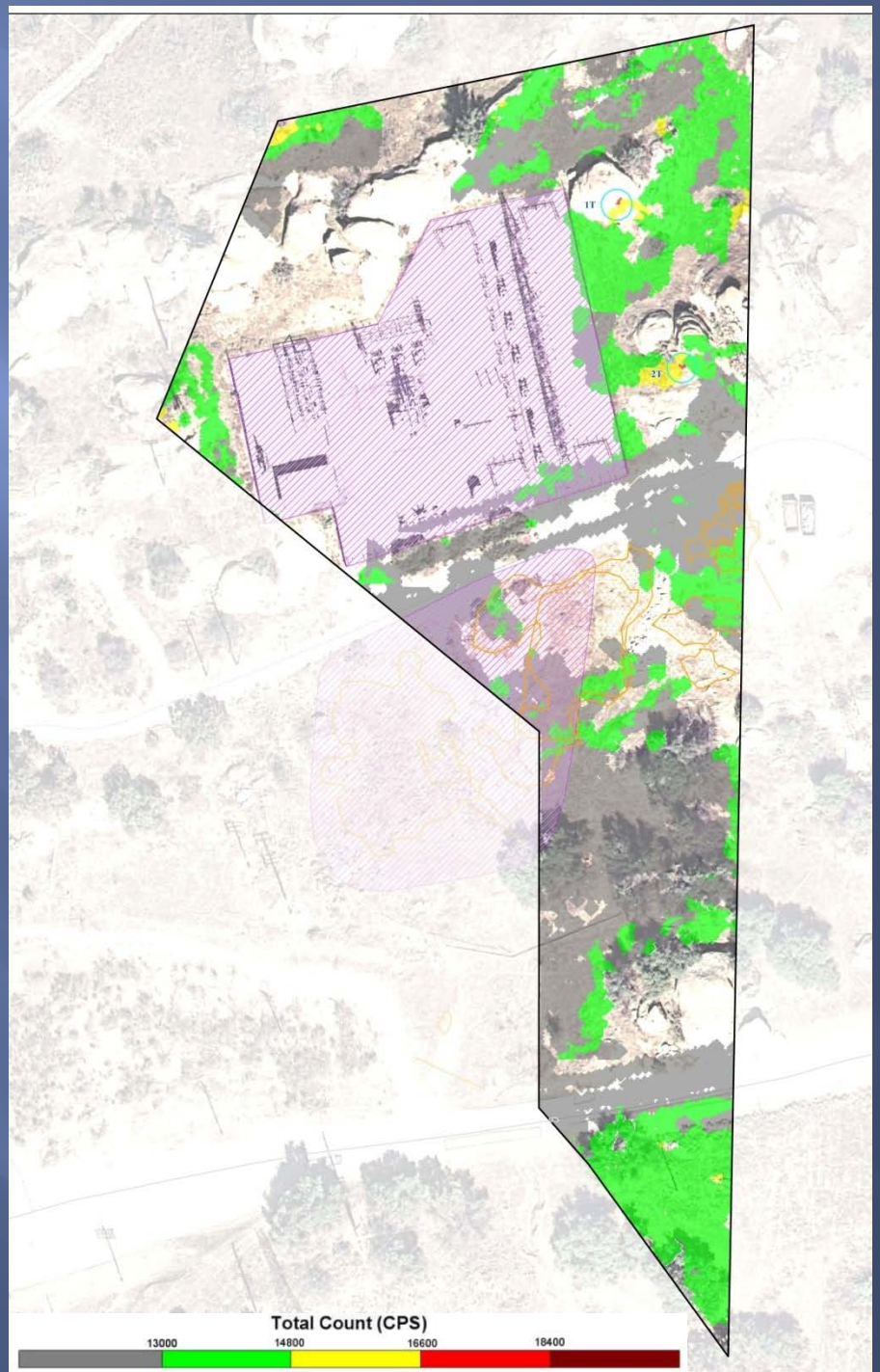
Accomplishments in Subarea 3

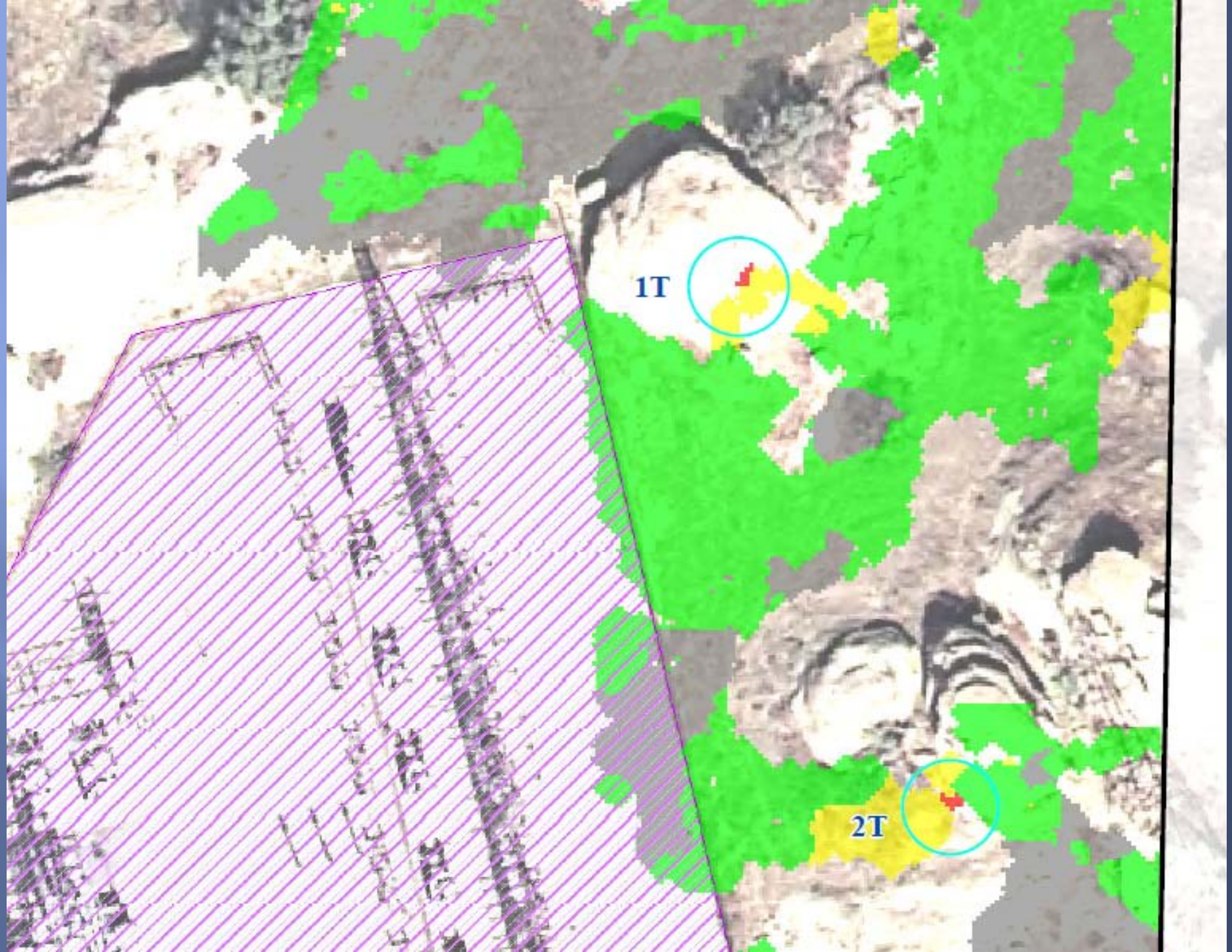
- Scanned 95% of the accessible areas of Subarea 3
- Completed gamma scanning data evaluation
- Identified, verified, and evaluated 2 of 2 Potential Gamma Radiation Anomalies (PGRAYs)

Background Data From Subarea 6 Was Applied To Subarea 3



Subarea 3 PGRAY Map




1T
2T

Evaluation of 3 Potential GRAYs

Locations	Evaluation
1, 2	Not a GRAY; NORM
NORM is Naturally Occurring Radioactive Materials (Uranium, Thorium, and Potassium-40)	

Questions?

Legend

Subarea 7 Groups

Centerline Roads
- Primary Roads
- Secondary Roads
- Tertiary Roads

Buildings
- Demolished
- Existing

Geophysical Anomalies

Point Anomalies

Type
- Buried Metals
- Ground Penetrating Radar
- Leachate
- Magnetometer
- Terrain Conductivity

Linear Anomalies

Type
- Ground Penetrating Radar
- Interpreted Drain Remnant
- Magnetometer
- Terrain Conductivity

Anomaly Areas

Type
- Ground Penetrating Radar
- Ground Penetrating Radar Fill
- Magnetometer
- Magnetometer Anomaly Area
- Terrain Conductivity
- Terrain Conductivity Fill

1 Blocked cut boulders, unremarkable otherwise
2 Mounded/disturbed area next to well, border of DG area (Disturbed ground area from historical data)
3 Cut and fill area/remnantes to DG from historical data
4 Slope, debri field (general trash)
5 Black rock material and fill
6 Wide drainage area to outfall
7 Fill area
8 Former leachate area Bldg 21, capped radiological contamination (10 ft bgs)
9 Debris field, metal and concrete, buried metal, surface, partial buried
10 Fill slope, metal and concrete debris, rebar, buried and partially buried metal
11 GPR anomaly, magnetometer anomaly, remnants and debris of interim waste storage facility, and storage pad
12 GPR and magnetometer anomaly, GPR shows large metal object at 3ft bgs, oblong 10 by 5 ft approx.

Geophysical Anomalies
Subarea 6
Santa Susana Field Laboratory

U.S. EPA Region 9

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

C:\Users_Access\EPW10\Geophysical Subarea7_Geophysical_Anomaly_LabelsLrnal
Scale 1:2017 ubradley@hgl.com
Source: HGL, 2010, CSS-GIS, 2007

HGL

Legend

Subarea 3 Groups

Centerline Roads
- Primary Roads
- Secondary Roads
- Tertiary Roads

Buildings
- Demolished
- Existing

Magnetometer Anomaly Area

Geophysical Anomalies
- Terrain Conductivity
- Magnetometer
- Ground Penetrating Radar
- Cut and Fill Boundaries
- Magnetometer Anomaly Linear
- Terrain Conductivity Anomaly Linear
- Ground Penetrating Radar
- Interpreted Drain Remnant
- Buried Metals

Surface Water
- Intermittent Stream
- Permanent Stream
- Surface Water
- Lined Channel

Surface Water Flow
- Surface Water Flow (From Boeing Database, 2008)

Surface Features
- Channel
- Drain
- Drain
- Drainage Divide
- Gutter
- Tank
- Tank
- Vault
- Well

Utilities
- Gas
- Storm Drain
- Sanitary Sewer
- Water
- Water (Removed)
- Water (Removed)
- Pipes (Unknown Type)
- Pipes (Unknown Type)

0 12.5 25 50
Scale In Feet

N

Geophysical Anomalies
Subarea 3
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Coordinate System: NAD83 CA State Plane V

Legend

Subarea 7 Groups

Centerline Roads

Type, narrative

- PRIMARY, Area IV, NBZ Road Centerline
- SECONDARY, Area IV, NBZ Road Centerline
- TERTIARY, Area IV, NBZ Road Centerline

Buildings

- Demolished
- Existing

Streams

- Intermittent Stream
- Permanent Stream

Proposed Sample Locations Subarea 7

- Drainage Sample
- Subsurface Sample
- Surface and Subsurface Sample
- Sediment Sample Locations
- Likely Structural Remediation Zones
- Likely Chemical Remediation Zones
- Historical Radiological Samples
- Gamma Static Count
- Cs-137

Total Count (CPS)

Geophysical Anomalies

- Magnetometer Point Features
- Terrain Conductivity Point Features
- Ground Penetrating Radar Point Features
- Magnetometer Linear Anomaly
- Terrain Conductivity Linear Anomaly
- Ground Penetrating Radar Linear Anomaly
- Magnetometer
- Terrain Conductivity
- Ground Penetrating Radar
- Magnetometer Anomaly Area
- Cut and Fill

HSA Findings

- Aerial Photography Features
- Process Knowledge

Historical Site Assessment
Draft Technical Memorandum - HSA-7

Soil Sample Locations
Subarea 7
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Legend

Subarea 3 Groups

Centerline Roads

Type, narrative

- PRIMARY, Area IV, NBZ Road Centerline
- SECONDARY, Area IV, NBZ Road Centerline
- TERTIARY, Area IV, NBZ Road Centerline

Buildings

- Demolished
- Existing

Streams

- Intermittent Stream
- Permanent Stream

Proposed Sample Locations Subarea 3

- Drainage Sample
- Subsurface Sample
- Surface and Subsurface Sample
- Sediment Sample Locations
- Likely Structural Remediation Zones
- Likely Chemical Remediation Zones
- Historical Radiological Samples
- Gamma Static Count
- Cs-137

Total Count (CPS)

Geophysical Anomalies

- Magnetometer Point Features
- Terrain Conductivity Point Features
- Ground Penetrating Radar Point Features
- Magnetometer Linear Anomaly
- Terrain Conductivity Linear Anomaly
- Ground Penetrating Radar Linear Anomaly
- Magnetometer
- Terrain Conductivity
- Ground Penetrating Radar
- Magnetometer Anomaly Area
- Cut and Fill

HSA Findings

- Aerial Photography Features
- Process Knowledge

Historical Site Assessment
Draft Technical Memorandum - HSA-3

Soil Sample Locations
Subarea 3
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Gamma Radiation Scanning Update

August 17, 2011

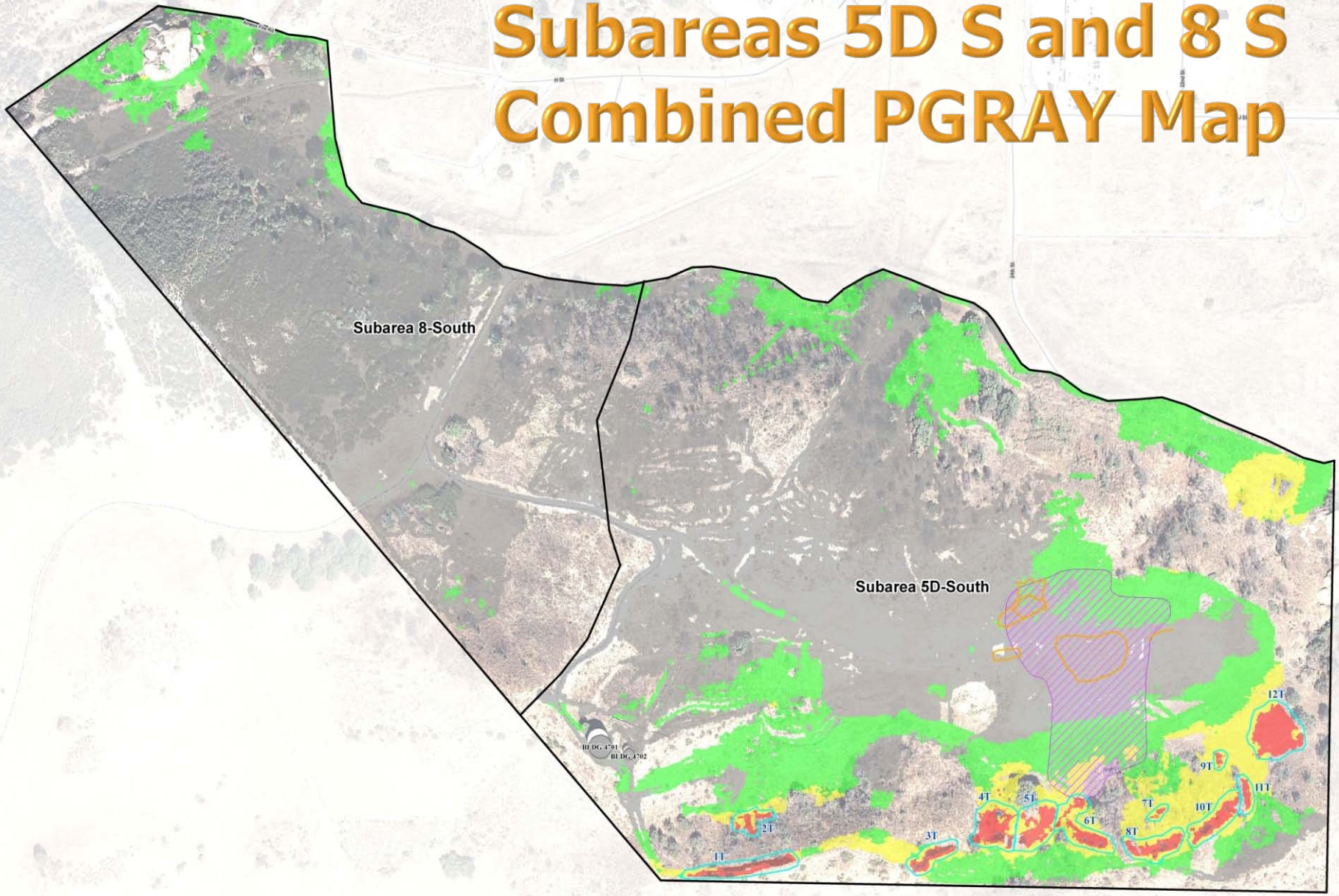
Agenda

- Subarea 5D S and 8 S Potential Gamma Radiation Anomalies

Subareas 5D S and 8 S

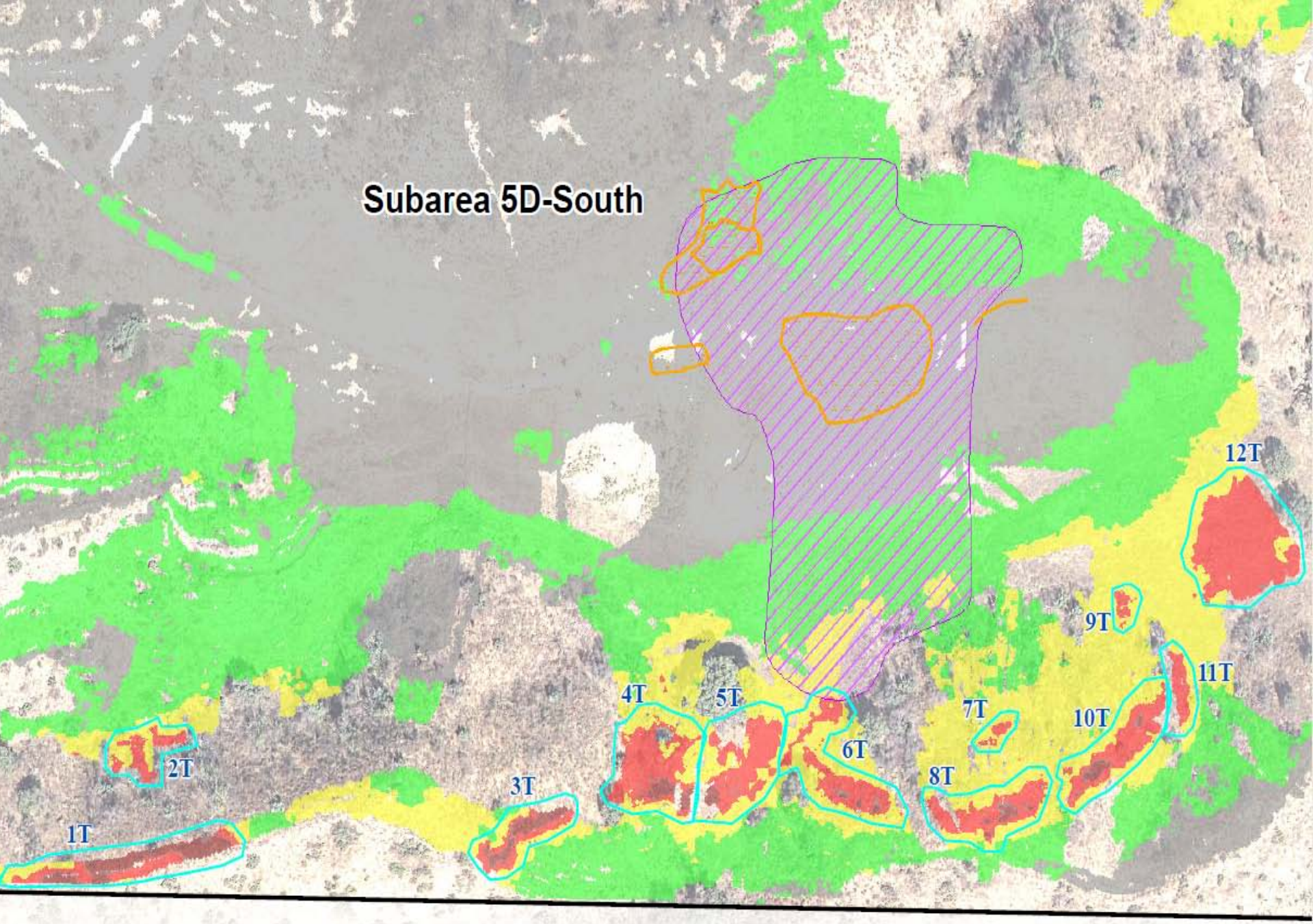
- Scanned 83% of the accessible areas
- Completed gamma scanning data evaluation
- Identified, verified, and evaluated 12 of 12 PGRAYs

Subareas 5D S and 8 S Combined PGRAY Map



Total Count (CPS)

12000 | 15000 | 18000 | 21000

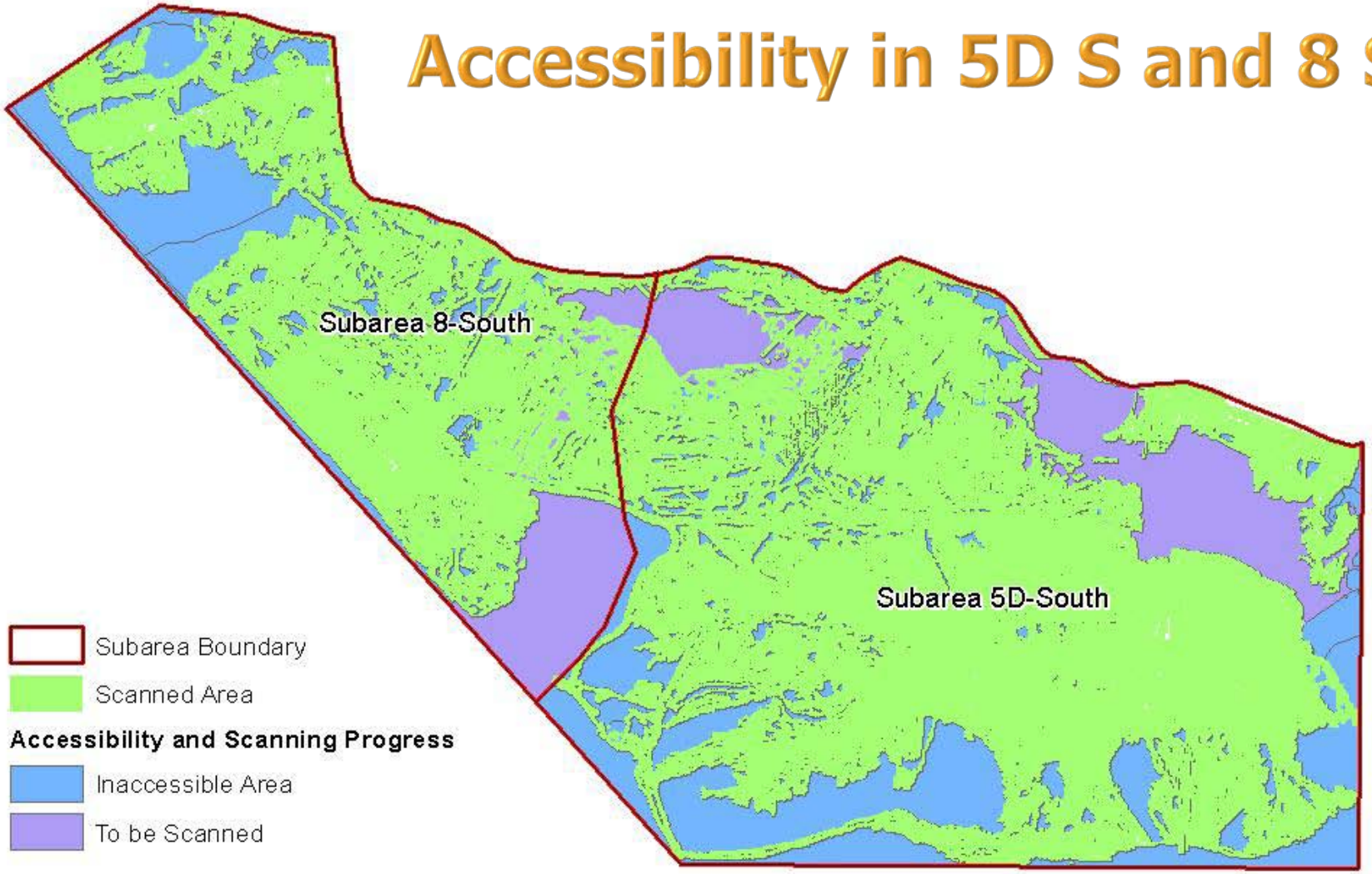

Subarea 5D-South
1T
2T
3T
4T
5T
6T
7T
8T
9T
10T
11T
12T

Evaluation of 5D S and 8 S Potential GRAYs

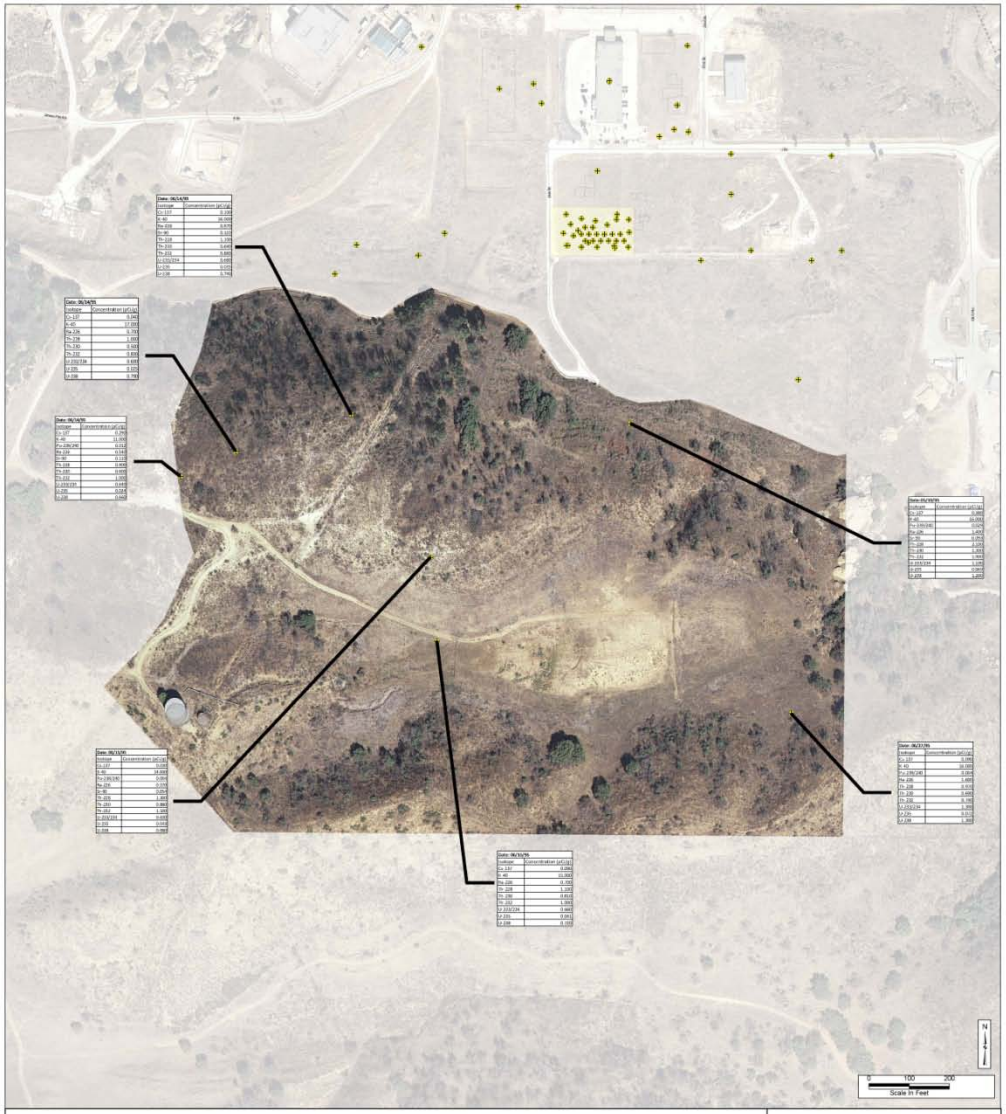
Locations	Evaluation
(5D S) 6	Suspect
(5D S) 1-5, 7-12	Not a GRAY; NORM
8 S	No PGRAYs observed
NORM is Naturally Occurring Radioactive Materials (Uranium, Thorium, and Potassium-40)	

Terrain in 5D S

Accessibility in 5D S and 8 S



Questions?



Legend

RAD Soil Location

- Above NDA
- Below NDA
- Screen/Layer
- Subarea 5D Groups
- Primary Roads
- Secondary Roads
- Tertiary Roads
- Demolished
- Existing

Past Radiological Soil Investigations
Subarea 5D South
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Legend

RAD Soil Location

- Above NDA
- Below NDA
- Subareas_polygon
- Subarea 8 Groups
- Primary Roads
- Secondary Roads
- Tertiary Roads
- ScreenLayer
- Demolished
- Existing

Past Radiological Soil Investigations
Subarea 8 South
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Legend

Subarea 5D South Groups

Centerline Roads
- Primary Roads
- Secondary Roads
- Tertiary Roads

Buildings
- Demolished
- Existing

Geophysical Anomalies
- Magnetometer Point Features
- Terrain Conductivity Point Features
- Geophysical Anomaly Linear
- Interpreted Drain Remnants
- Magnetometer
- Terrain Conductivity
- Cut and Fill
- Cut and Fill

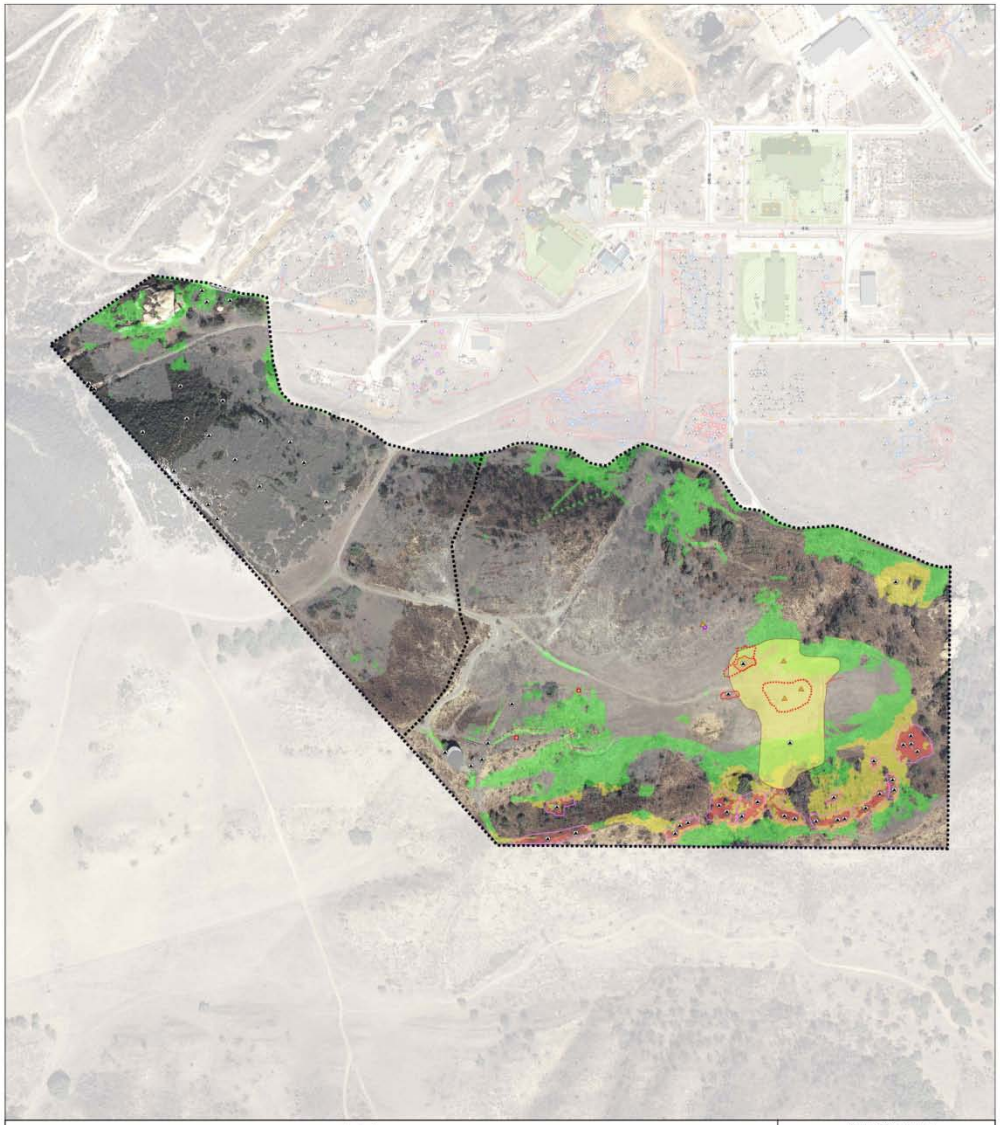
N

0 50 100 200
Scale In Feet

Geophysical Anomalies
Subarea 5D South
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL



Legend

Subarea 5DS & 8S Groups

Centerline Roads

Type, narrative

- PRIMARY, Area IV, NBZ Road Centerline
- SECONDARY, Area IV, NBZ Road Centerline
- TERTIARY, Area IV, NBZ Road Centerline

Buildings

- Demolished
- Existing

Streams

- Intermittent Stream
- Permanent Stream

Proposed Sample Locations Subarea 6

- Drainage Sample
- Subsurface Sample
- Surface and Subsurface Sample
- Sediment Sample Locations
- Likely Structural Remediation Zones
- Likely Chemical Remediation Zones
- Historical Radiological Samples
- Gamma Static Count
- Cs-137

Total Count (CPS)

Geophysical Anomalies

- Magnetometer Point Features
- Terrain Conductivity Point Features
- Ground Penetrating Radar Point Features
- Magnetometer Linear Anomaly
- Terrain Conductivity Linear Anomaly
- Ground Penetrating Radar Linear Anomaly
- Magnetometer
- Terrain Conductivity
- Ground Penetrating Radar
- Magnetometer Anomaly Area
- Cut and Fill

HSA Findings

- Aerial Photography Features
- Process Knowledge

Historical Site Assessment
Draft Technical Memorandum - HSA-7

Soil Sample Locations
Subarea 5DSouth & 8 South
Santa Susana Field Laboratory

U.S. EPA Region 9

HGL

Project Milestones

Gamma Scanning Complete	December 2011
Geophysical Report	October 2011
Groundwater Report	November 2011
Round 1 Soil Sampling	April 2012
Gamma Scanning Report	May 2012
Round 2 Soil Sampling	August 2012

Sample Tracking Table

The number of soil samples allocated for Round 1 and Round 2 soil sampling are for planning purposes only. The actual number of soil samples ultimately necessary for EPA to complete its study is based on EPA's implementation of its technical approach for soil sampling in coordination with study stakeholders.

HSA Subarea	Totals and Round Summary	Allocated Samples	CURRENT STATUS: Soil Samples Collected: Surface Soil Samples	Subsurface Soil Samples	Total Soil Samples
3*	**Total**	**40**	**2**	**13**	**15**
	Round 1	*12*	*2*	*13*	*15*
	Round 2	*28*			*0*
5A	**Total**	**1482**	**143**	**222**	**365**
	Round 1	*444*	*143*	*222*	*365*
	Round 2	*1037*			*0*
5B	**Total**	**927**	**227**	**283**	**510**
	Round 1	*278*	*227*	*283*	*510*
	Round 2	*649*			*0*
5C	**Total**	**1207**	**83**	**122**	**205**
	Round 1	*362*	*83*	*122*	*205*
	Round 2	*845*			*0*
5D-North	**Total**	**1372**	**188**	**220**	**408**
	Round 1	*412*	*188*	*220*	*408*
	Round 2	*960*			*0*
5D-South*	**Total**	**463**	**36**	**38**	**74**
	Round 1	*139*	*36*	*38*	*74*
	Round 2	*324*			*0*
6	**Total**	**1427**	**190**	**322**	**512**
	Round 1	*428*	*190*	*322*	*512*
	Round 2	*999*			*0*
7*	**Total**	**985**	**111**	**169**	**280**
	Round 1	*295*	*111*	*169*	*280*
	Round 2	*689*			*0*
8-North	**Total**	**1088**	**110**	**119**	**229**
	Round 1	*326*	*110*	*119*	*229*
	Round 2	*762*			*0*
8-South*	**Total**	**150**	**24**	**24**	**48**
	Round 1	*45*	*24*	*24*	*48*
	Round 2	*105*			*0*
NBZ-E	**Total**	**494**	**0**	**0**	**0**
	Round 1	*148*			*0*
	Round 2	*346*			*0*
NBZ-W	**Total**	**368**	**0**	**0**	**0**
	Round 1	*110*			*0*
	Round 2	*258*			*0*
All Subreas	**Total**	**10000**	**1114**	**1532**	**2646**
	Round 1	*3000*	*1114*	*1532*	*2646*
	Round 2	*7000*			*0*

Footnote:

*Planned sample number as of August 17, 2011. Actual number of samples to be collected pursuant to the FSP Addendum in September - October 2011

August 17, 2011

Update on EPA's Analytical Lab

- EPA has contracted with a second laboratory to analyze samples for its Area IV and NBZ radiological study.
- This lab is: GEL Laboratories located in Charleston, South Carolina
- In June 2011, EPA announced that it had contracted with Test America Laboratory located in St Louis

Northern Buffer Zone Strategy

- Divide 180 acres into # of watersheds
- 8 watersheds receive runoff from the northern portion of Area IV
- Prioritize watersheds into three priority groups (P1, P2, and P3)

Priority 1 Watersheds

- Most likely to receive contamination through runoff from operations in Area IV.
- 88 total acres
- Primary facilities that either do or have the potential to drain into the P1 watersheds in the NBZ
  - Sodium Burn Pit
  - Portions of Building 9 and 10
  - 56 Landfill
  - North side of SNAP
  - RMHF
  - SRE
  - North side of old conservation yard
  - Geophysical areas/old dumps identified in the NBZ

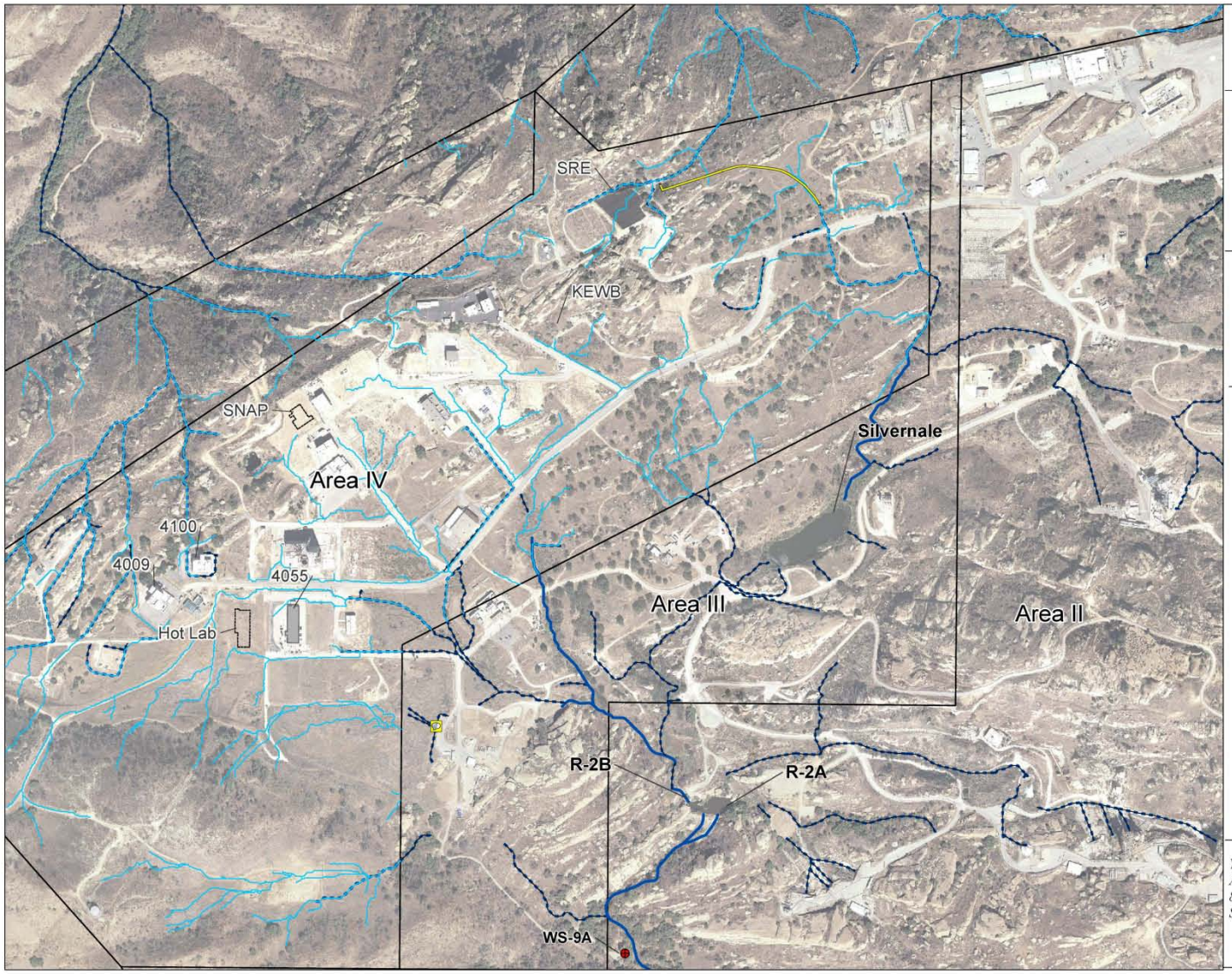
Priority 2 Watersheds

- Secondary watersheds adjacent to Area IV but with no primary facilities at the headwaters
- 32 total acres

Priority 3 Watersheds

- Least likely watersheds to receive runoff from Area IV
- P3 watersheds are distant and separated from SSFL operations by ridges.
- Flow does not originate in Area IV
- 60 total acres

Priority Watersheds	Total Acreage	Total Minus Sandstone	Proposed Quantities		
			Estimated % Accessible	Estimated Final Acreage	Estimated Days to Survey
Priority 1	88	72	75%	54	95
Priority 2	33	27	50%	13.5	24
Priority 3	60	44	NA	0	0



HGL— Surface Water & Sediment Sampling at Silvernale & R2 PondsAddendum, SSFL —Ventura County, California

Figure 1
Drainage Ways and Retention Pond Locations Area II & III

U.S. EPA Region 9

Legend

- Drainage Pathways
- Intermittent Stream
- Permanent Stream
- SSFL Area Division

Y:\Santa_Susana\EP9038\Soil_Sampling\AreaII_SedimentSampling_20110817.mxd
8/17/2011 sdrallos-kopecky
Source:HGL 2010, CIRGIS 2007

HGL

HGL— Surface Water & Sediment Sampling at Silvernale & R2 PondsAddendum, SSFL —Ventura County, California

Figure 4
Potential Sediment and Surface Water Sampling Locations Area II and III

U.S. EPA Region 9

Legend

- Sediment Sample Locations
- Surface Water Sample Locations
- Drainage Pathways
- Intermittent Stream
- Permanent Stream
- SSFL Area Division

Y:\Santa_Susana\EP9038\Soil_Sampling\AreaII_SedimentSampling_20110817.mxd
8/17/2011 sdrallos-kopecky
Source:HGL 2010, CIRGIS 2007