

United States Environmental Protection Agency (USEPA)

Radiological Study

Santa Susana Field Laboratory (SSFL)

SSFL Technical Stakeholder
Group Meeting

September 1, 2010



Agenda

- ▣ Introductions and Ground Rules
- ▣ Project Schedule Update
- ▣ Gamma Scanning Update
- ▣ Water Testing
- ▣ HSA Update
- ▣ Soil Testing
- ▣ Background Study Update
- ▣ Review of Action Items
- ▣ Set Next Meeting Date
- ▣ Adjourn



Project Schedule Update



Key Area IV Project Milestones

Task	Estimated Start Date	Actual Start Date
Gamma Scanning	July 2010	July 2010
Ground Water Sampling	August 2010	August 2010
Surface Water and Sediment Sampling	November 2010	---
Soil Sampling	October 2010	---
Laboratory Analyses	November 2010	---
Task	Estimated Completion Date	Actual Completion Date
Environmental Compliance	July 2011	---
All Field Activities	December 2011	---



Gamma Radiation Scanning Status Update



Agenda

- ▣ Milestones Progress and Accomplishments
- ▣ HSA-5C Gamma Scanning Data Review
- ▣ Detector Data Normalization Process
- ▣ Summary of HSA-5C Potential GRAYs
- ▣ Next Steps



Milestones Progress

- ✓ Initial project planning
- ✓ Final Gamma Radiation Scanning SAP
- ✓ RBRA data collection
- Equipment purchase/lease and preparation
- Detection system integration/testing
- Scanning survey of Study Area
- Continuous data evaluation and analysis
- Interim report preparation
- Final report preparation

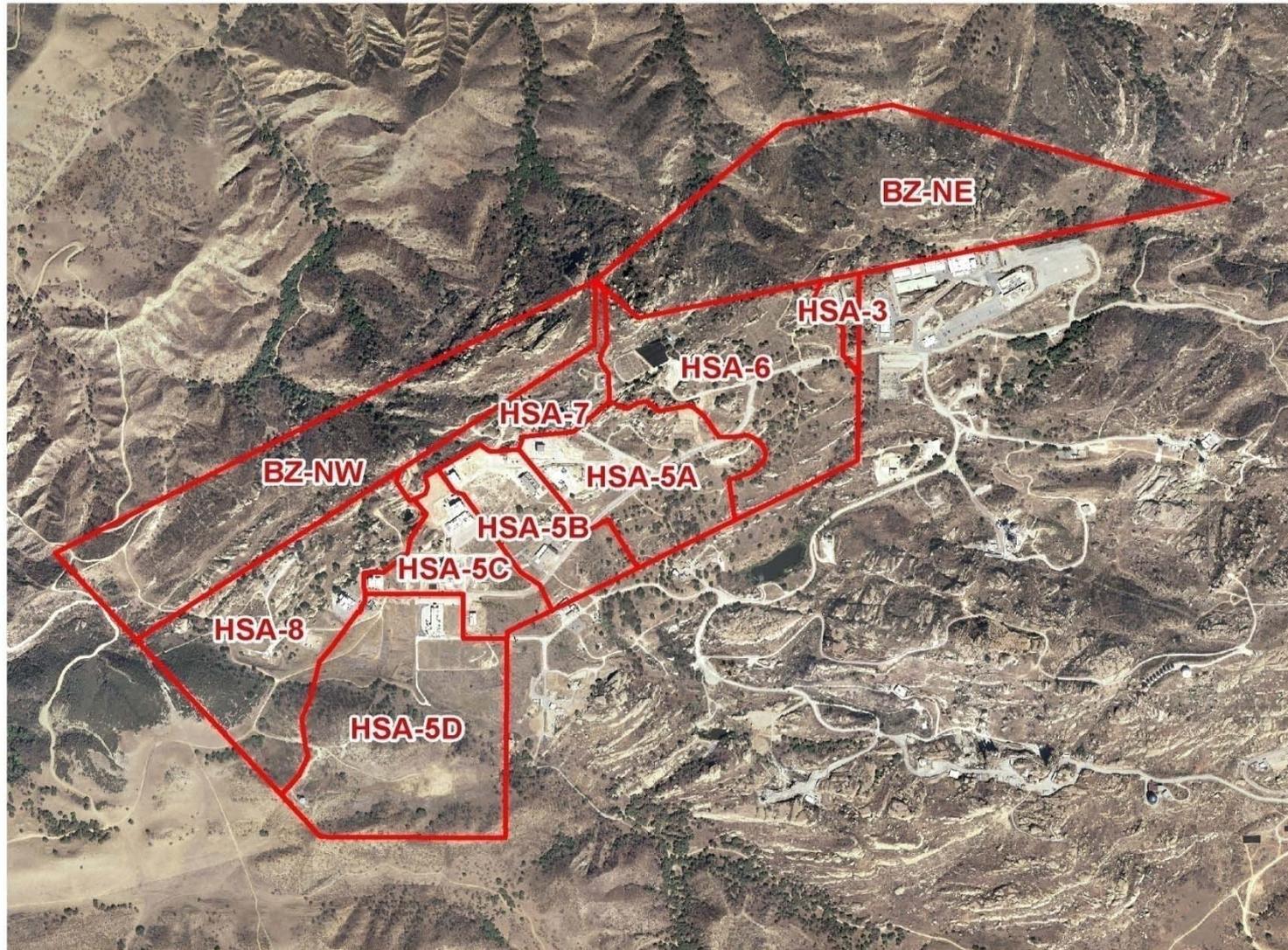


Accomplishments

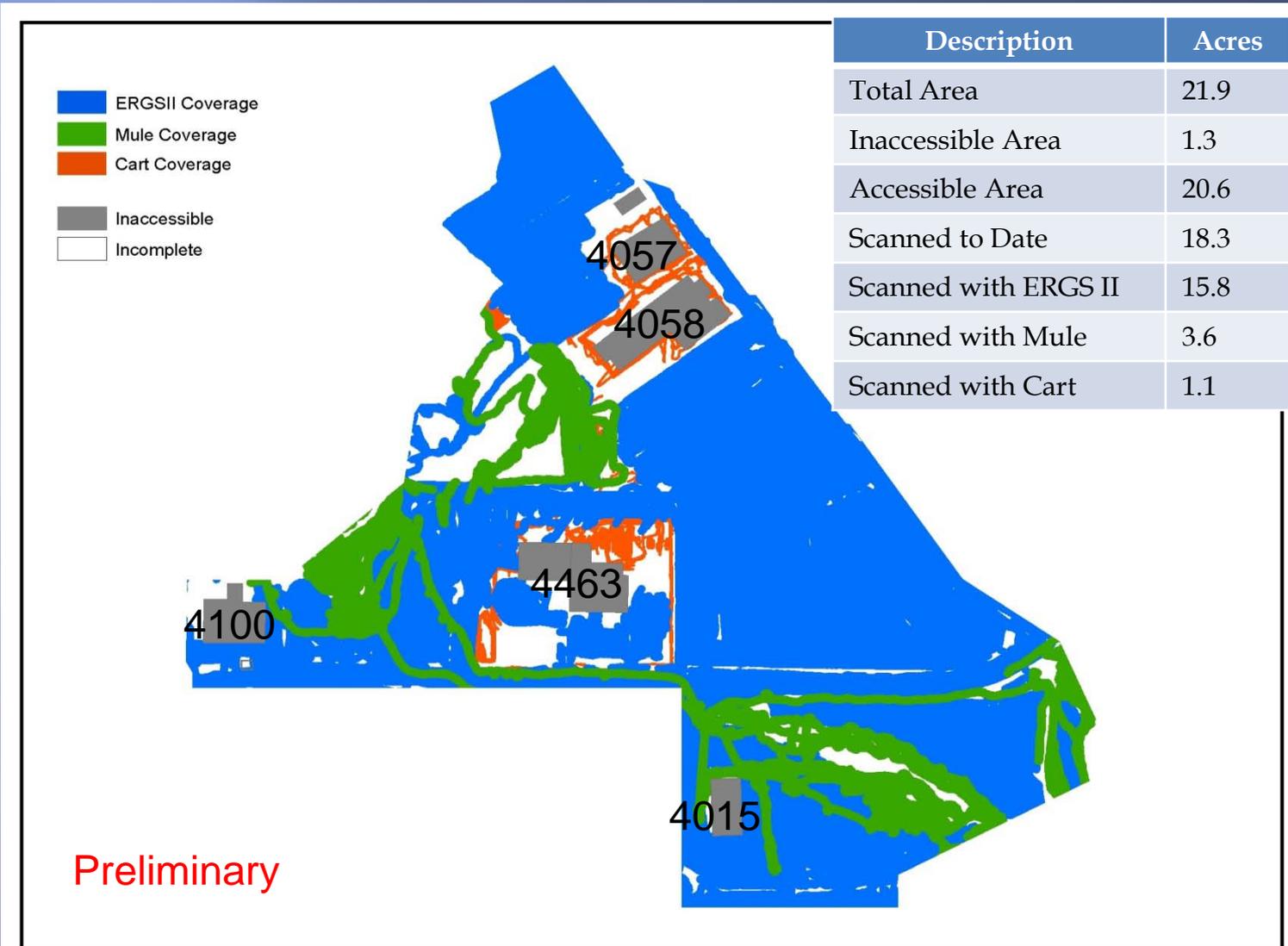
- ✓ August: Completed gamma scanning for approximately 89% of accessible areas of HSA-5C
- ✓ August: Completed approximately 75% of data evaluation for HSA-5C
- ✓ August: Started HSA-5B gamma scanning
- ✓ August: Completed RBRA data collection for MMGS and HHGS at Lang Ranch and Bridle Path



10 HSAs of Study Area



HSA-5C Detector Coverage Map



HSA-5C ERGS II Data Compared to Lang Ranch Background



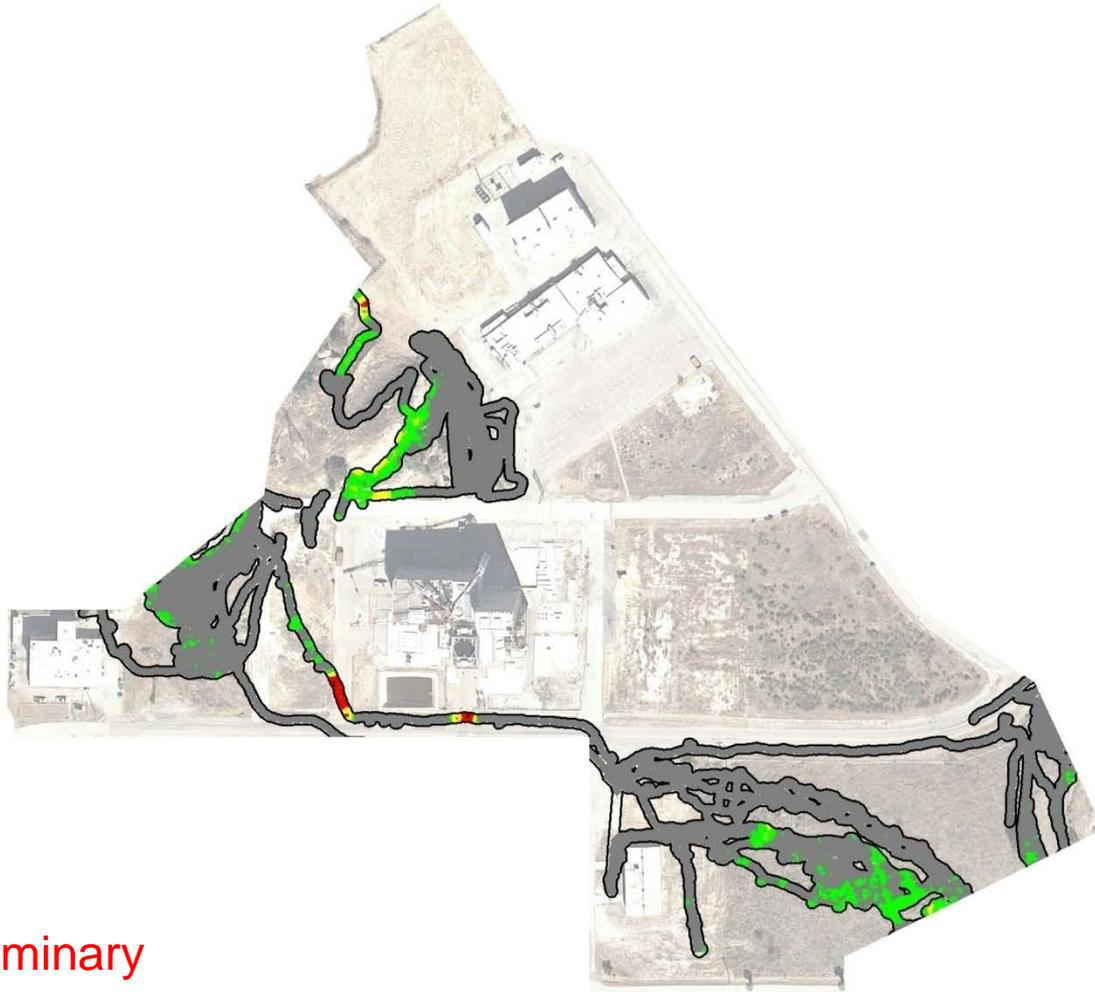
Preliminary





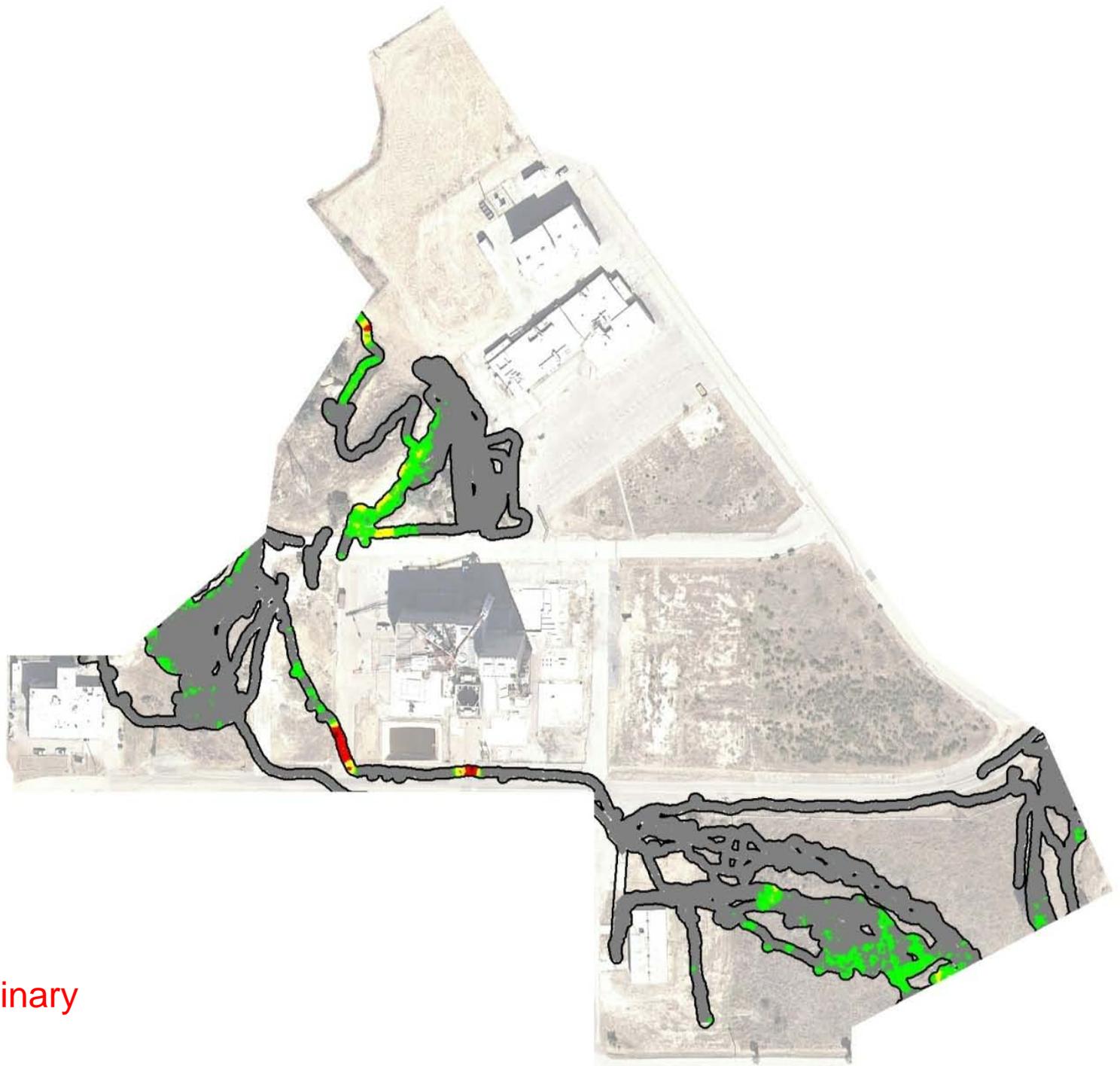
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HSA-5C Mule Data Compared to Lang Ranch Background



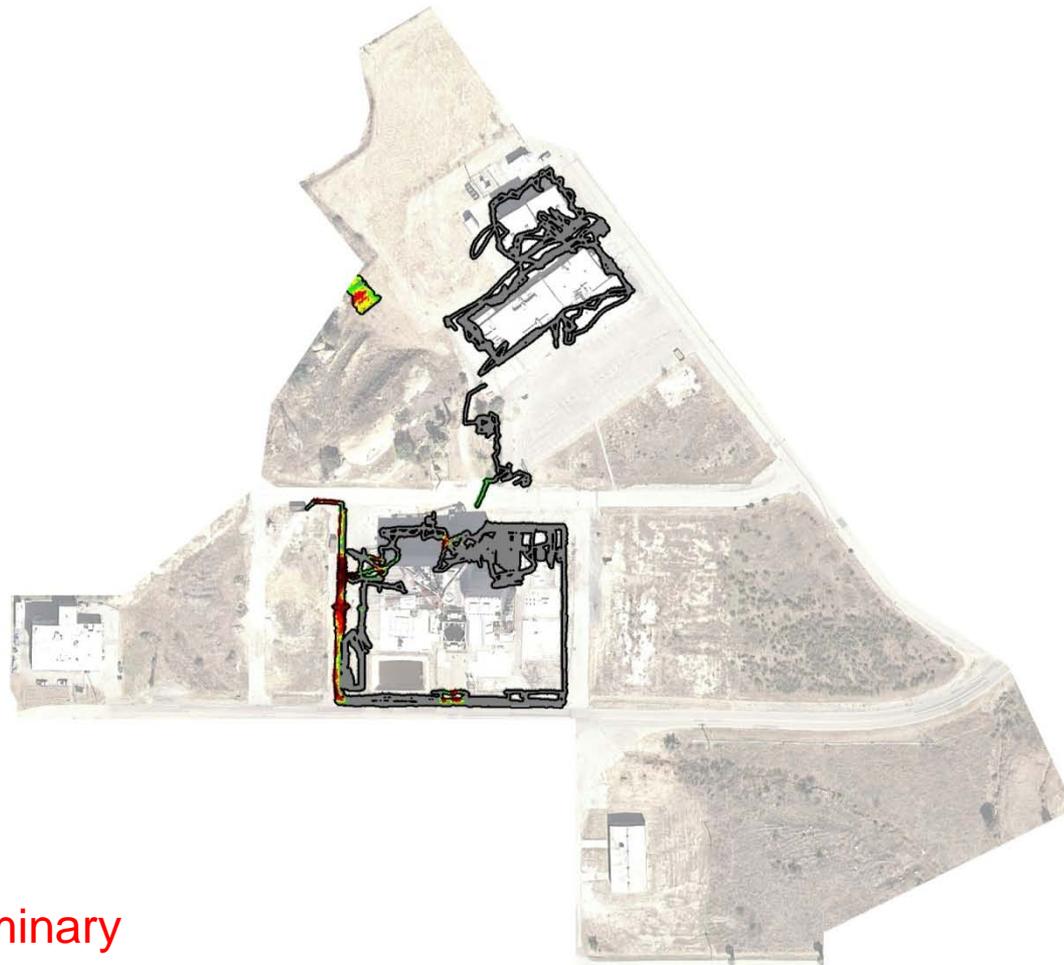
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HSA-5C Cart Data Compared to Lang Ranch Background

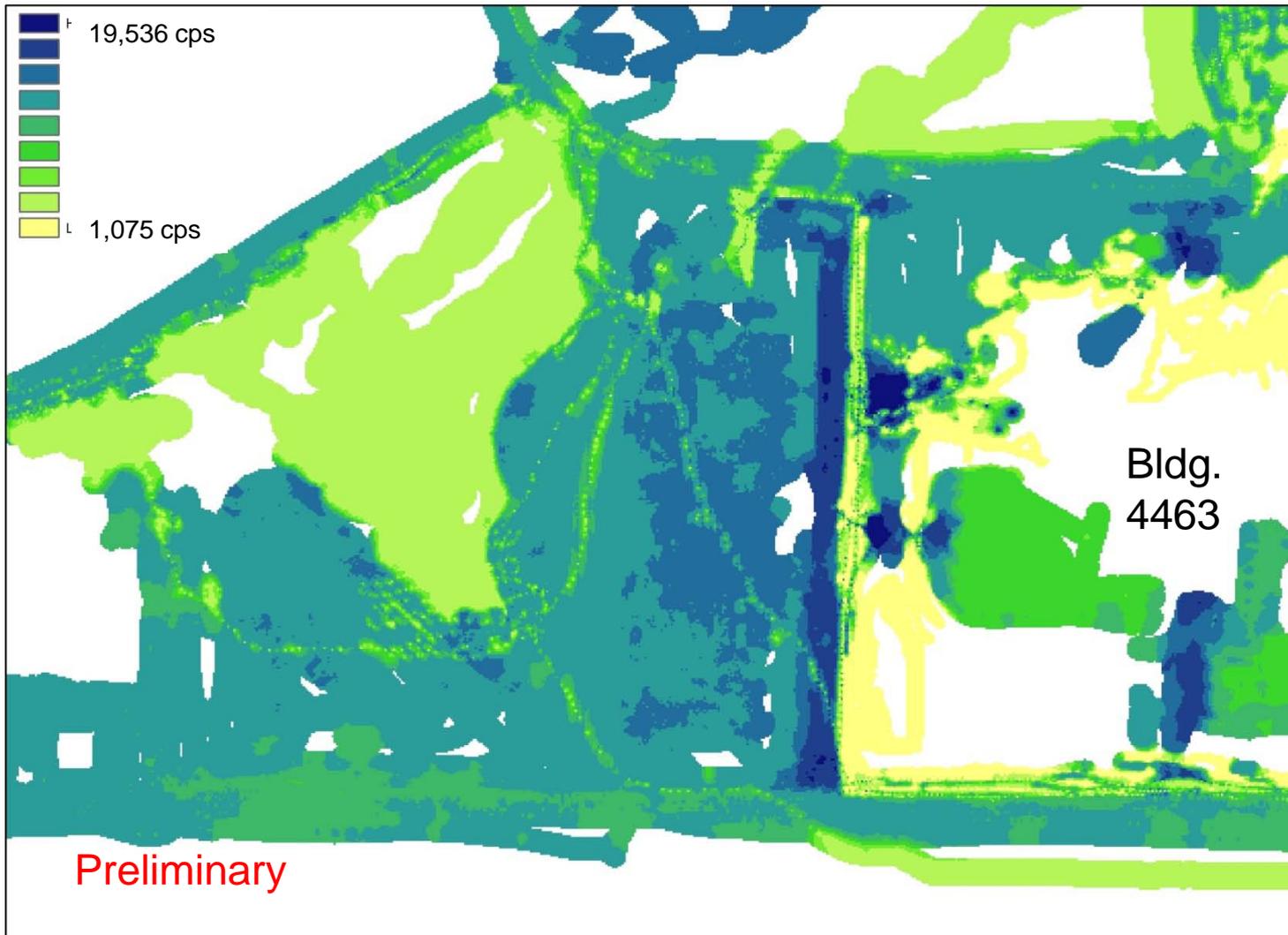


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Preliminary

Bldg 4463 Non-Normalized Data for ERGS II, Mule and Cart



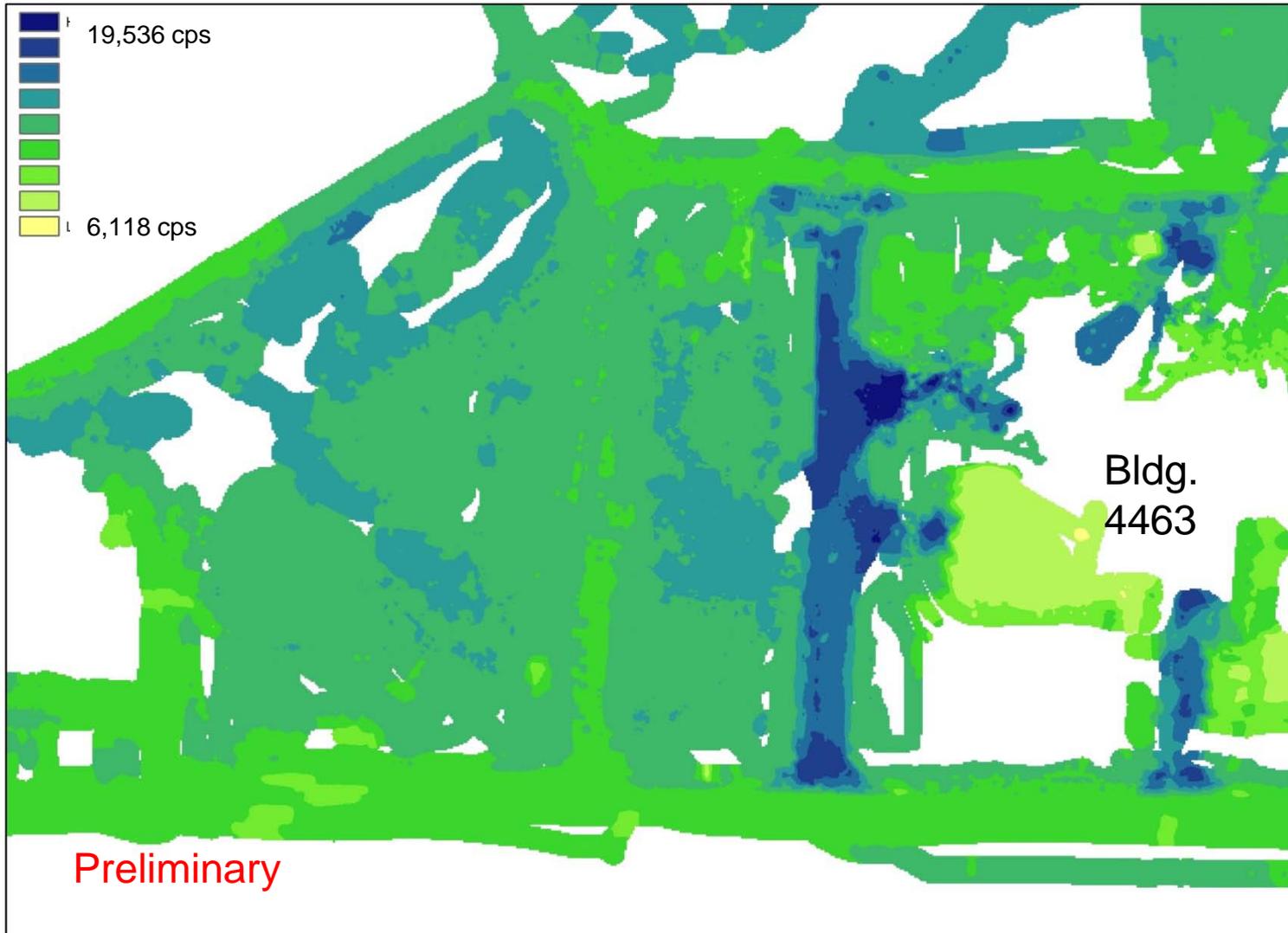
Gamma Detection Equipment Normalization

Detector System	ERGS (cps)	Mule (cps)	Cart (cps)
Mean	13,133	4,098	2,020
Standard Deviation	385	116	64
Conversion Factor	1.000	3.205	6.502
Normalized Mean	13,133	13,133	13,133
Normalized Standard Deviation	385	372	414



Preliminary

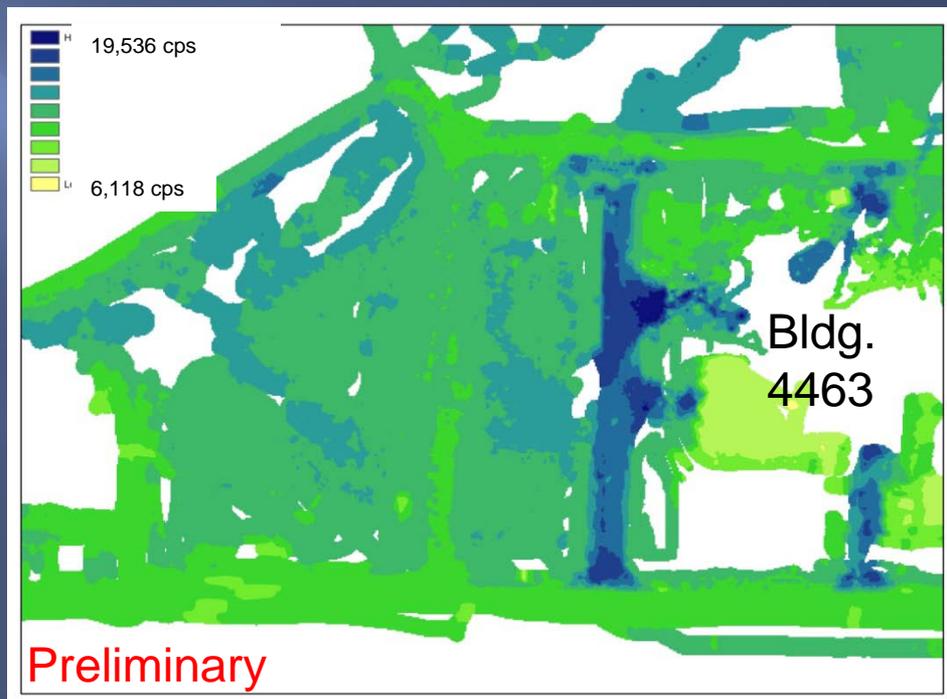
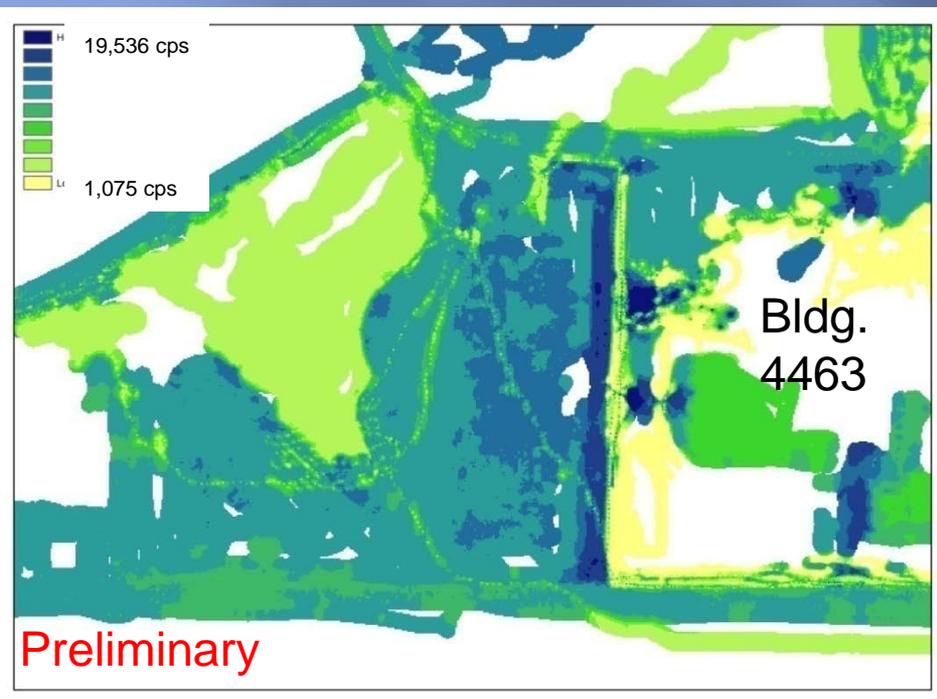
Bldg 4463 Normalized Data for ERGS II, Mule and Cart



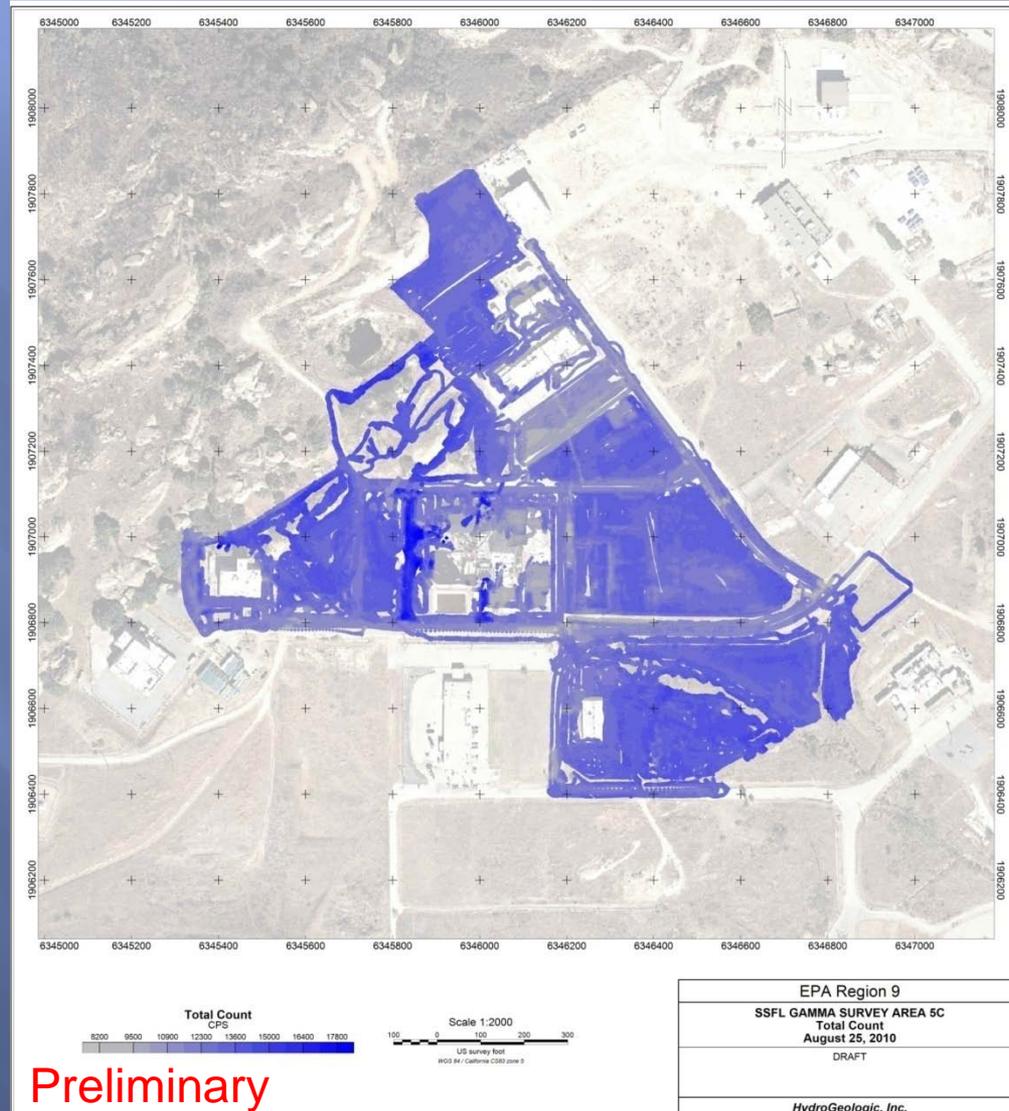
Bldg 4463 Comparison of Non-Normalized to Normalized Data

Non-Normalized Data

Normalized Data

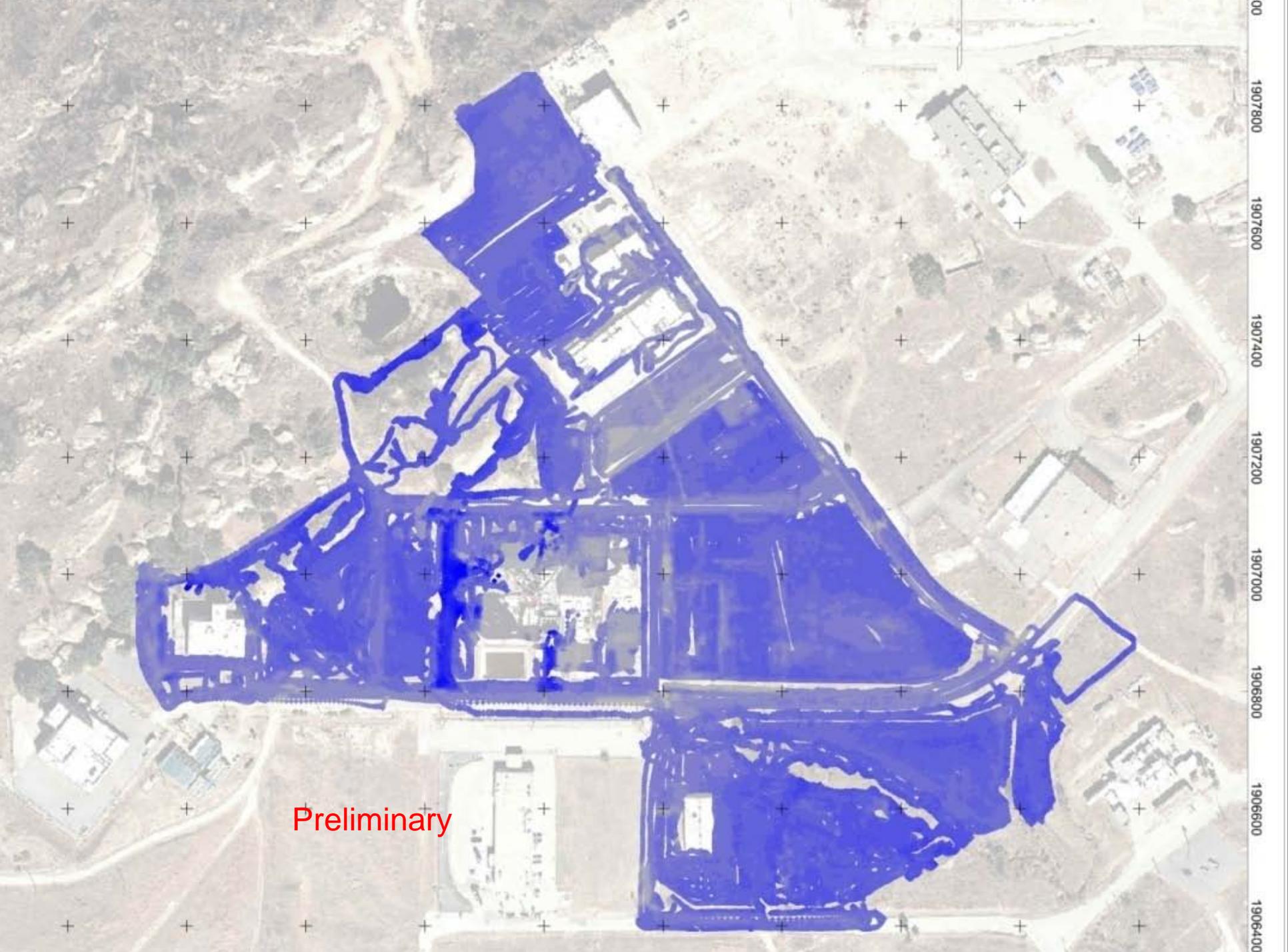


HSA-5C All Detectors Normalized



Preliminary





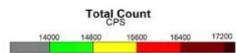
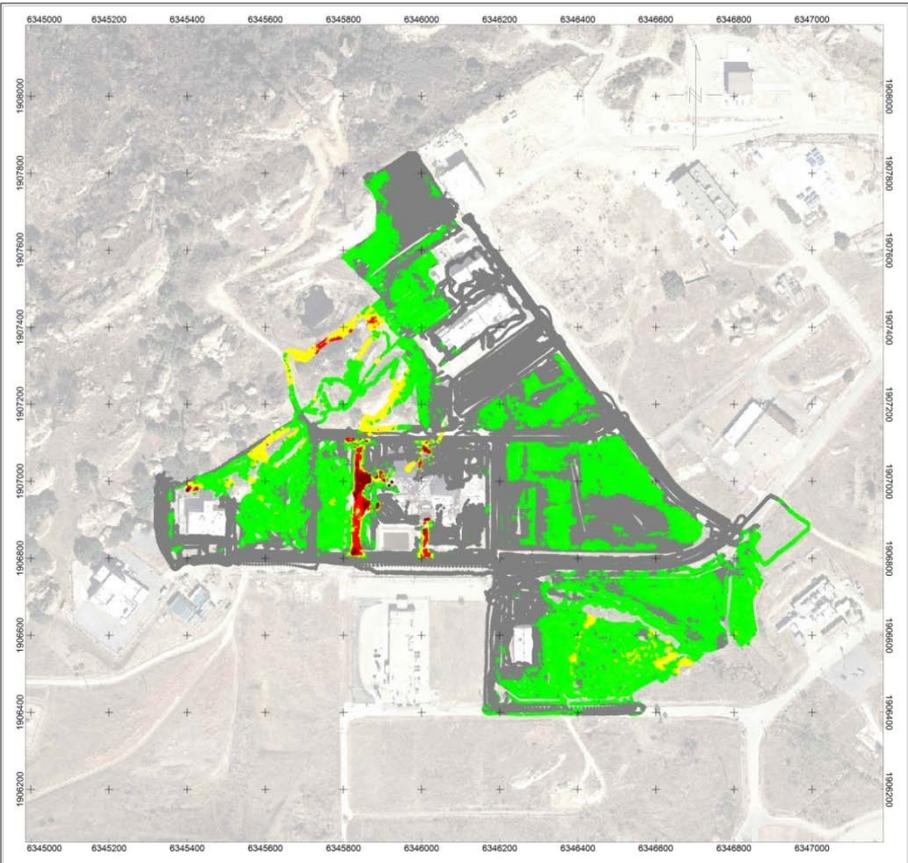
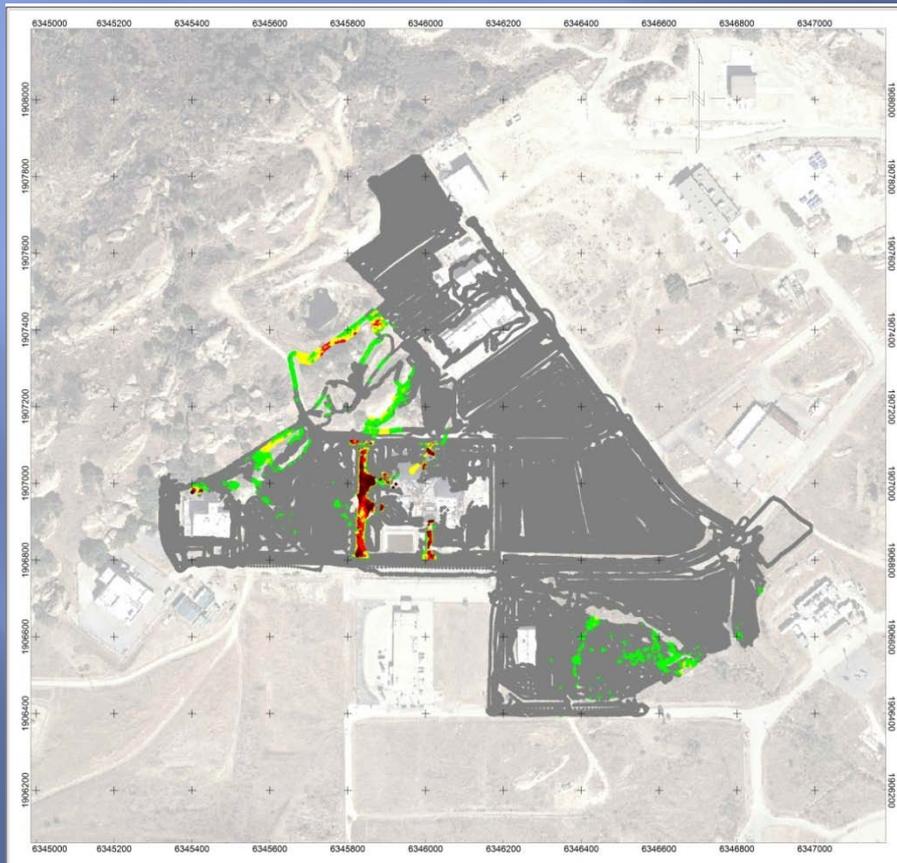
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1907800
1907600
1907400
1907200
1907000
1906800
1906600
1906400

HSA-5C Comparison by Background

Lang Ranch Background

Local Background



EPA Region 9
SSFL GAMMA SURVEY AREA 5C
Total Count
August 25, 2010
DRAFT
Mean: 14000
Standard Deviation: 400
Color Increments: Mean Plus 25Sigma
HydroGeologic, Inc.



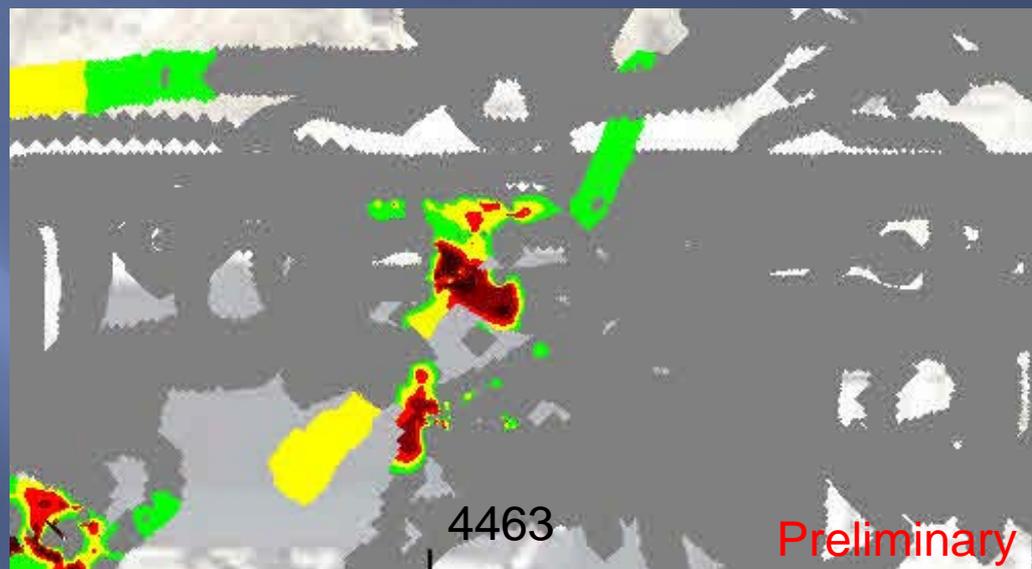
EPA Region 9
SSFL GAMMA SURVEY AREA 5C
Total Count
August 25, 2010
DRAFT
Mean: 12700
Standard Deviation: 700
Color Increments: Mean Plus 25Sigma
HydroGeologic, Inc.

Preliminary

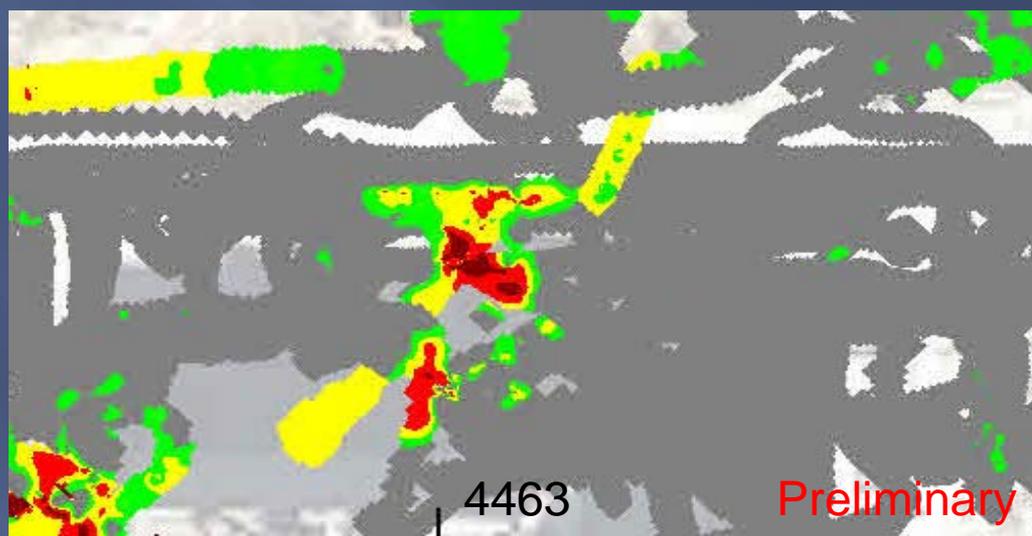
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Partial Zoom of HSA-5C Comparison by Background

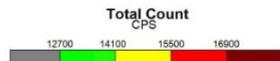
Lang Ranch Background



HSA-5C Local Background



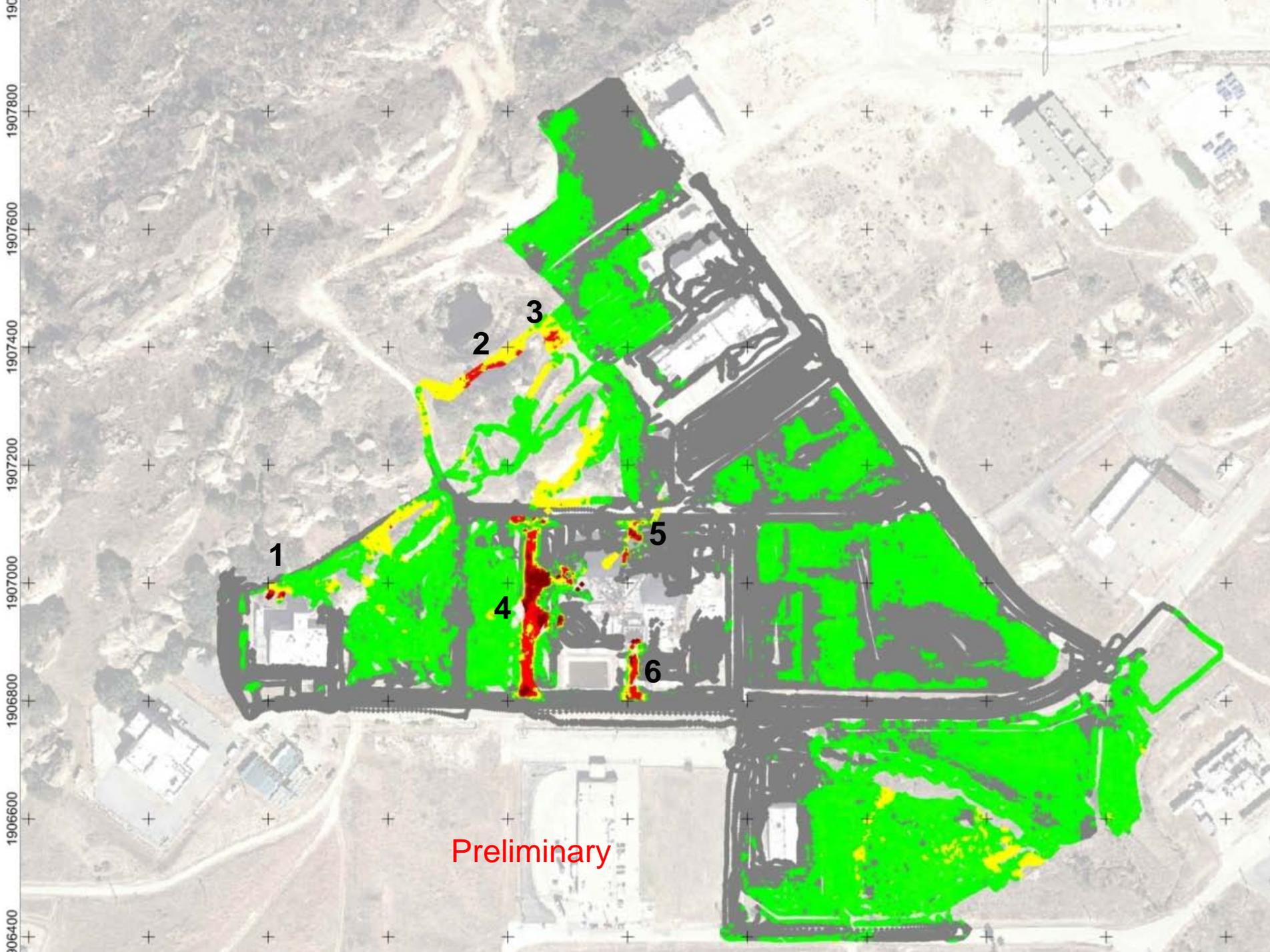
HSA-5C Potential GRAYs



Preliminary

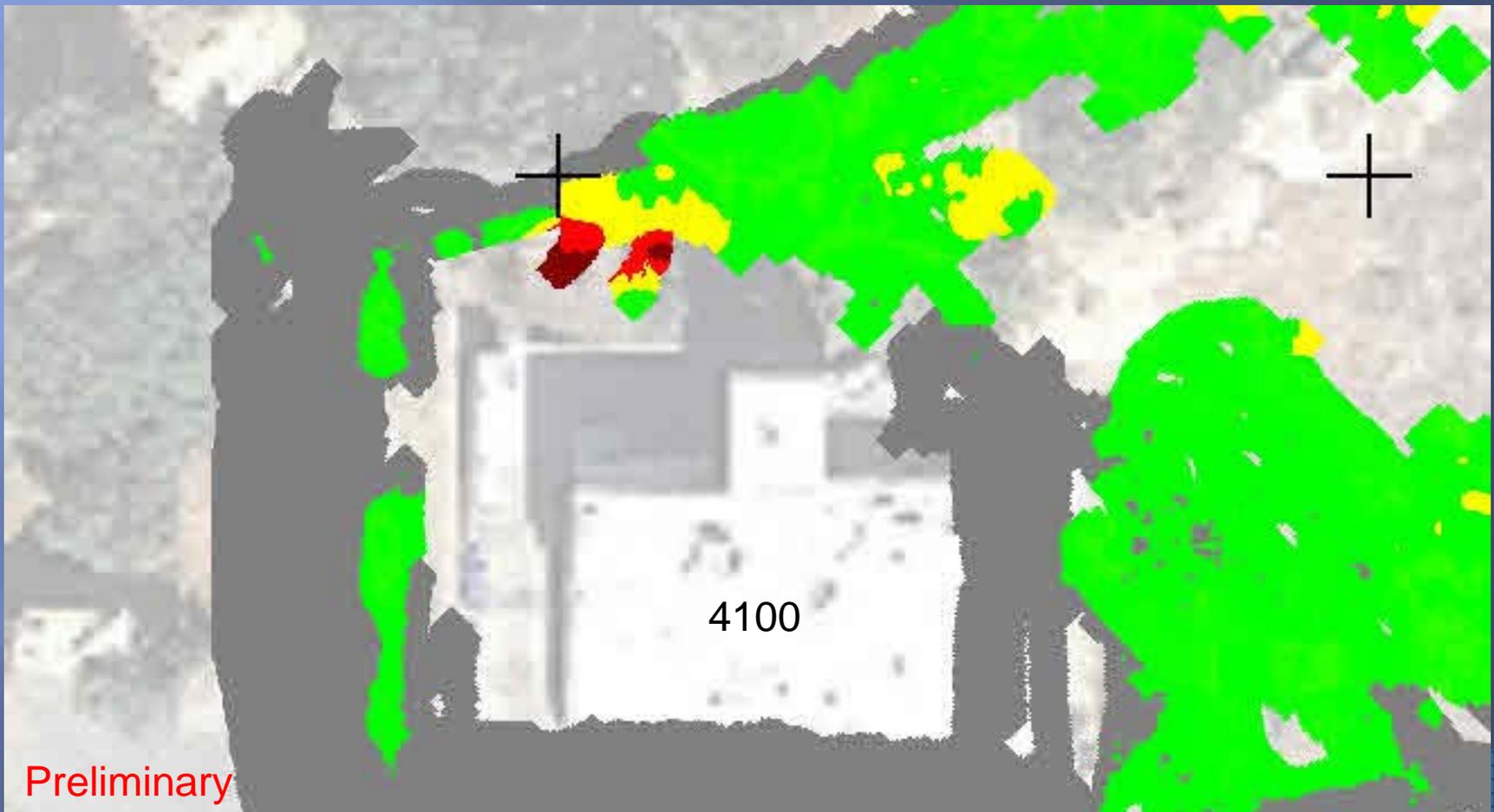
EPA Region 9
SSFL GAMMA SURVEY AREA 5C
Total Count
August 25, 2010
DRAFT
Mean: 12700
Standard Deviation: 700
Color Increments: Mean Plus 2Sigma
<i>HydroGeologic, Inc.</i>





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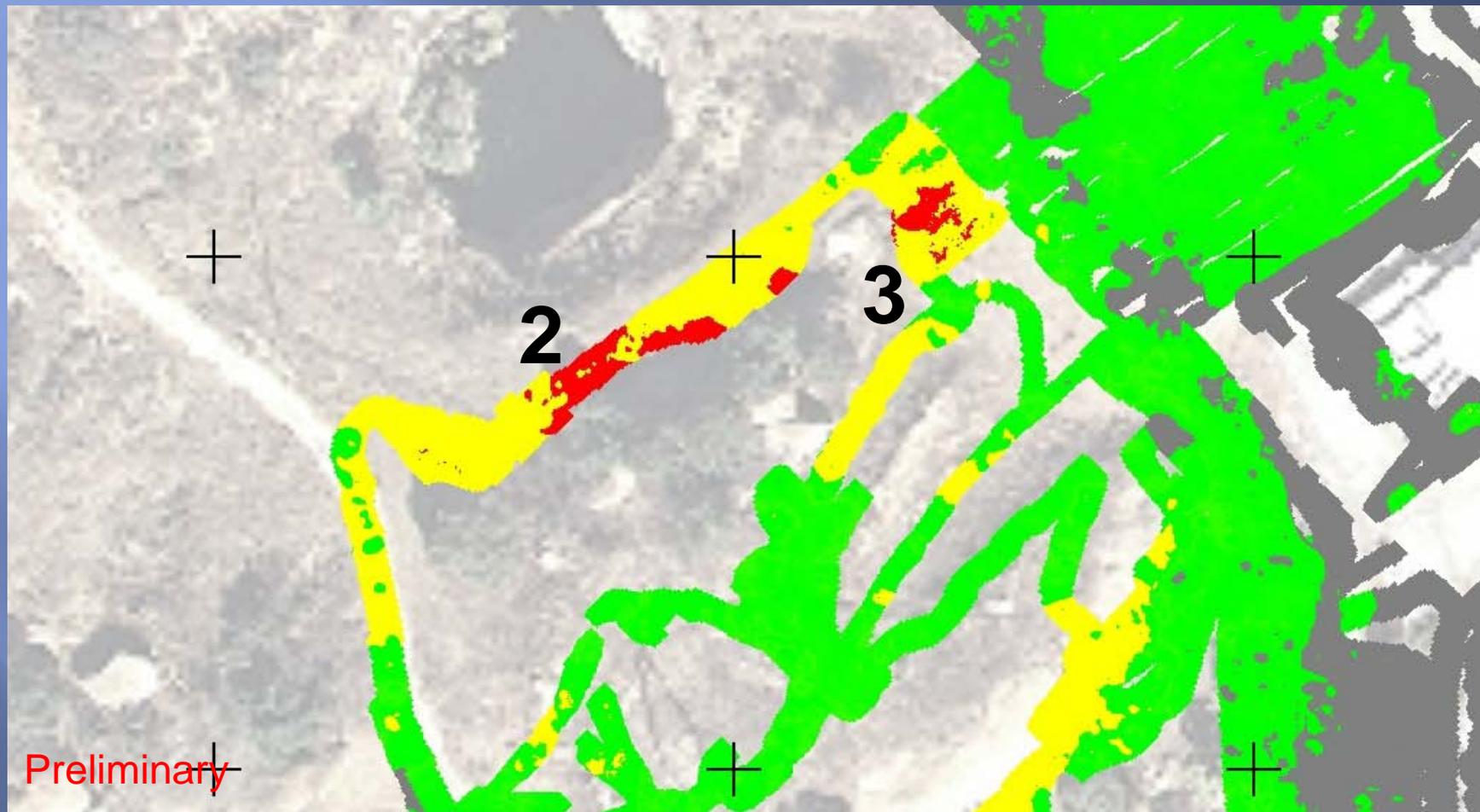
HSA-5C Potential GRAY 1



HSA-5C Potential GRAY 1



HSA-5C Potential GRAY 2 & 3



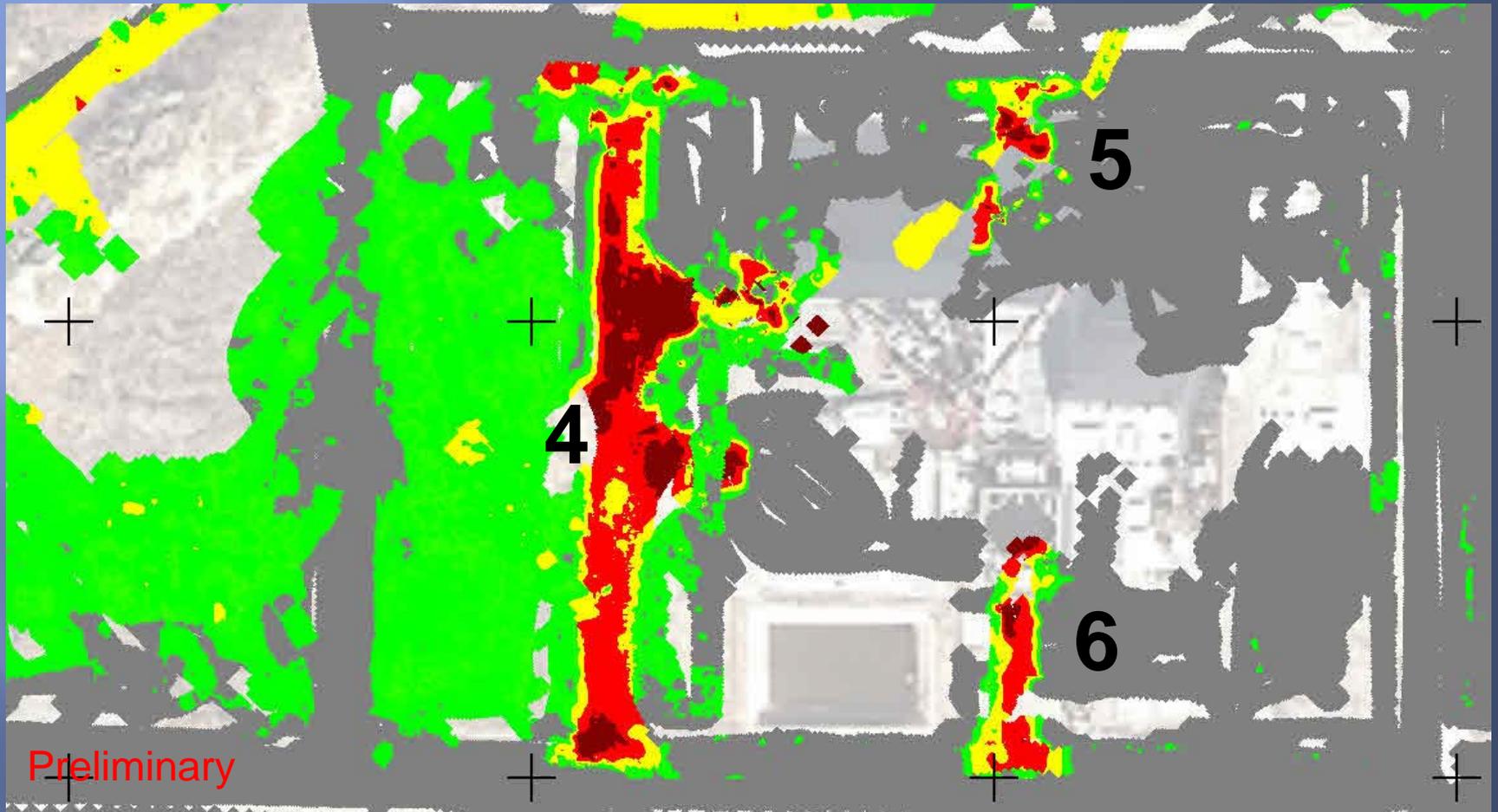
HSA-5C Potential GRAY 2



HSA-5C Potential GRAY 3



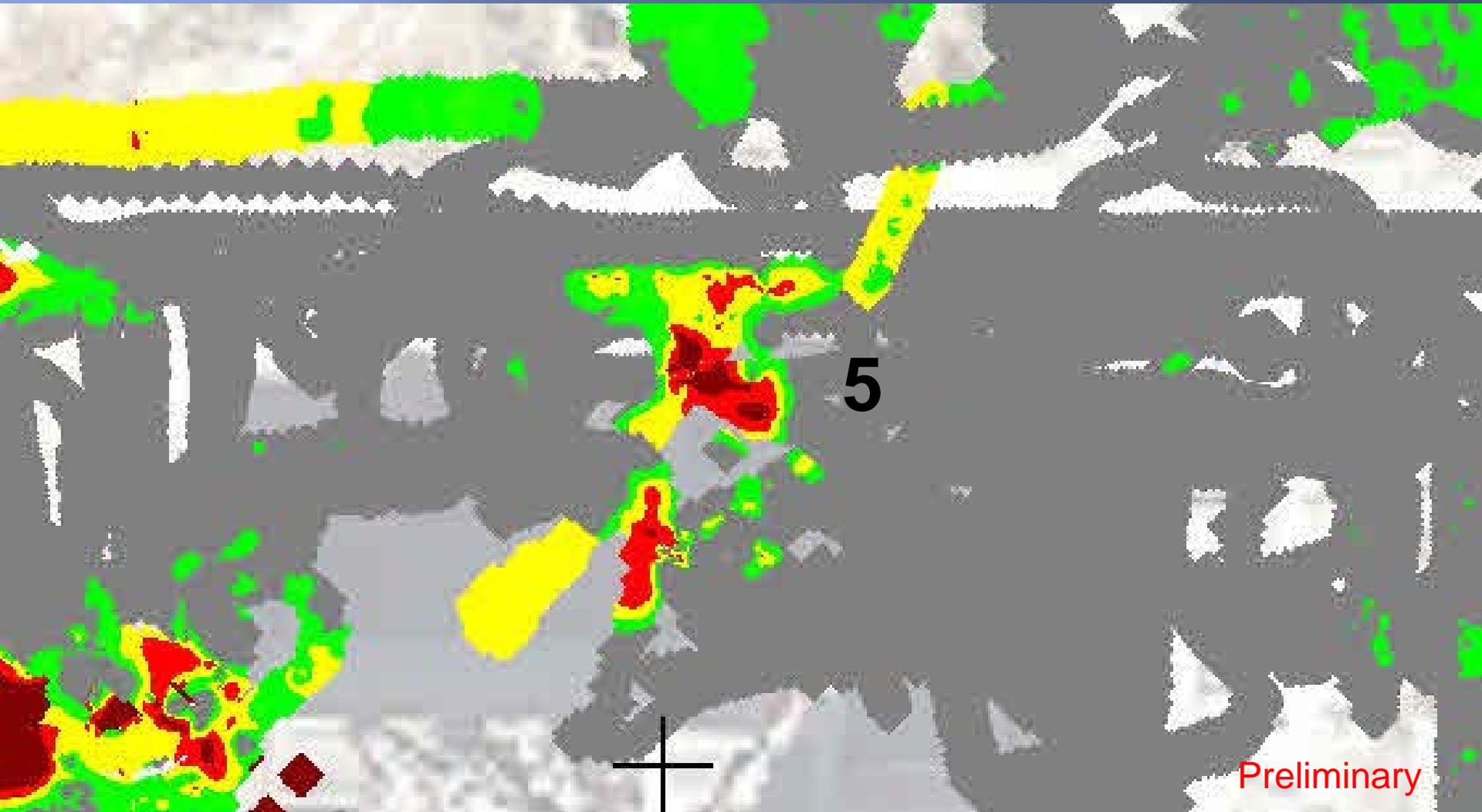
HSA-5C Potential GRAY 4, 5, & 6



HSA-5C Potential GRAY 4 & 6



HSA-5C Potential GRAY 5



Preliminary



HSA-5C Potential GRAY 5



HSA-5C Potential GRAYs

Potential GRAY	Description	Preliminary Evaluation
1	Two gravel fill areas	NORM - Natural uranium & thorium
2	Large sandstone rock	Undefined; likely NORM
3	Vernal pool area	NORM - Natural potassium & uranium
4	Asphalt West of Bldg. 4463	NORM - Asphalt matrix
5	Asphalt NE of Bldg. 4463	NORM - Surface, possible subsurface
6	Asphalt South of Bldg. 4463	NORM - Asphalt matrix
NORM = Naturally Occurring Radioactive Material		

Preliminary



Next Steps

- ▣ September: Finish gamma scanning HSA-5C
- ▣ September: Complete scanning of HSA-5B and start scanning HSA-5A
- ▣ October: Complete sensitivity report
- ▣ On-going: Locate Field QC Area in Area IV and conduct subsurface sensitivity tests



Questions?



Groundwater, Surface Water, and Sediment Sampling

Update

September 1, 2010



Phase I Groundwater Sampling Summary of Activities

- ▣ Phase I groundwater sampling began on August 17.
 - Phase I consists of all accessible wells in Area IV.
- ▣ EPA has been coordinating closely with Boeing prior to and during collection.
- ▣ EPA collects every sample and retains custody of samples up to shipment off-site.
- ▣ Shipments made every night to laboratory



Phase I Groundwater Sampling Status

97 Wells in Area IV

- ▣ 39 Wells Sampled
- ▣ 30 Wells Remaining
- ▣ 17 Wells Dry
- ▣ 12 Wells Damaged
- ▣ 1 Inaccessible



Well Sampling Status



Phase I Groundwater Sampling Current Status

36 Wells Sampled

8/18/10	8/19/10	8/20/10	8/23/10	8/24/10	8/25/10	8/26/10	8/27/10	8/30/10
RD-50	RD-57	RD-34A	RS-18	PZ-160	PZ-161	RD-20	PZ-108	PZ-052
RD-33A	RD-14	RD-34B	PZ-103	PZ-150	RD-91	RD-56A	PZ-041	PZ-101
	RD-86		RD-70	RD-13 ²	RD-17 ²	RD-15	WS-07	PZ-005
	RD-85			RD-92	RS-25 ¹	PZ-106	PZ-122	
	RD-96			ES-31	PZ-109	PZ-105	PZ-120	
	RD-18			PZ-114 ¹				
	RD-19 ²			PZ-056 ¹				

1 Screening Sample (Tritium only)

2 Priority 2 Samples



Phase I Strategy

Phase I Groundwater Analysis

- ▣ Priority 1 Radionuclide Analysis
 - Gamma Emitters
 - Tritium
 - Uranium
 - Strontium 90
 - Gross Alpha and Beta
- ▣ Priority 2 Radionuclide Analysis (select wells)
 - Carbon 14
 - Technetium 99
 - Iodine 129
 - Radium 226
 - Americium
 - Curium
 - Plutonium
- ▣ Surface Water, Springs and Sediment will be analyzed for the full radionuclide list used for the background study



Wells Not Sampled

15 Wells Dry

RD-97	RS-16
RS-23	RS-24
RS-27	PZ-073
PZ-110	PZ-116
PZ-143	PZ-102
RS-11	PZ-111
PZ-113	PZ-124
PZ-101	

12 Wells Damaged

PZ-115	PZ-051
PZ-107	RD-89
RD-28	RD-30
PZ-104	RD-25
RD-28	RD=74
PZ-097	PZ-099



Water Level Monitoring



Groundwater Sampling Rig



Collecting Samples



Sample Cooler



Purge Water Tanks



Key Points

- ❑ Area IV wells will not be retrofitted with low-flow sampling equipment until EPA has completed winter 2011 Phase II sampling.
- ❑ Sediment, surface water, and spring sampling in the NBZ cannot begin until SHPO approves work in the area.
- ❑ EPA will provide the opportunity for stakeholders to observe where samples are planned and make suggestions.
- ❑ Surface water and spring sampling are opportunistic and we will have a team and field equipment on standby when the opportunity arises.



Schedule

- ▣ September 10, 2010 -- Phase I Groundwater Sampling Completed
- ▣ November/December, 2010 – Analytical Data Received
- ▣ Phase I Surface Water, Sediment , and Spring Sampling – Winter 2010



Historical Site Assessment Update



Presentation Outline

- ▣ Revised Draft Technical Memorandum (TM) Subarea HSA-5C
- ▣ Overview of Key Corrective Actions
- ▣ Tech Memo reorganization
- ▣ Highlights of Significant Findings in the 5C Tech Memo
- ▣ Schedule for future Tech Memos
- ▣ Former Employee Interviews Update



Contents of the Revised Tech Memo for Area 5C

- ▣ Text and Figures: sent out to Stakeholders via email on August 25, 2010.
- ▣ Appendix A: EPA's Aerial Photograph Analysis
- ▣ Appendix B: Bibliography (i.e. list of referenced reviewed to prepare the Tech Memo)
- ▣ Entire Tech Memo on disc distributed at today's meeting



Overview of HSA Technical Memoranda Corrective Actions

- ▣ Integration of additional spatial information into the TMs (e.g., tanks, leach fields, pipelines, drainages)
- ▣ Incorporation of aerial photo interpretation
- ▣ Incorporation of soil testing data and D&D information
- ▣ Incorporation of additional information from previously reviewed records
- ▣ Incorporation of information recently provided by Boeing

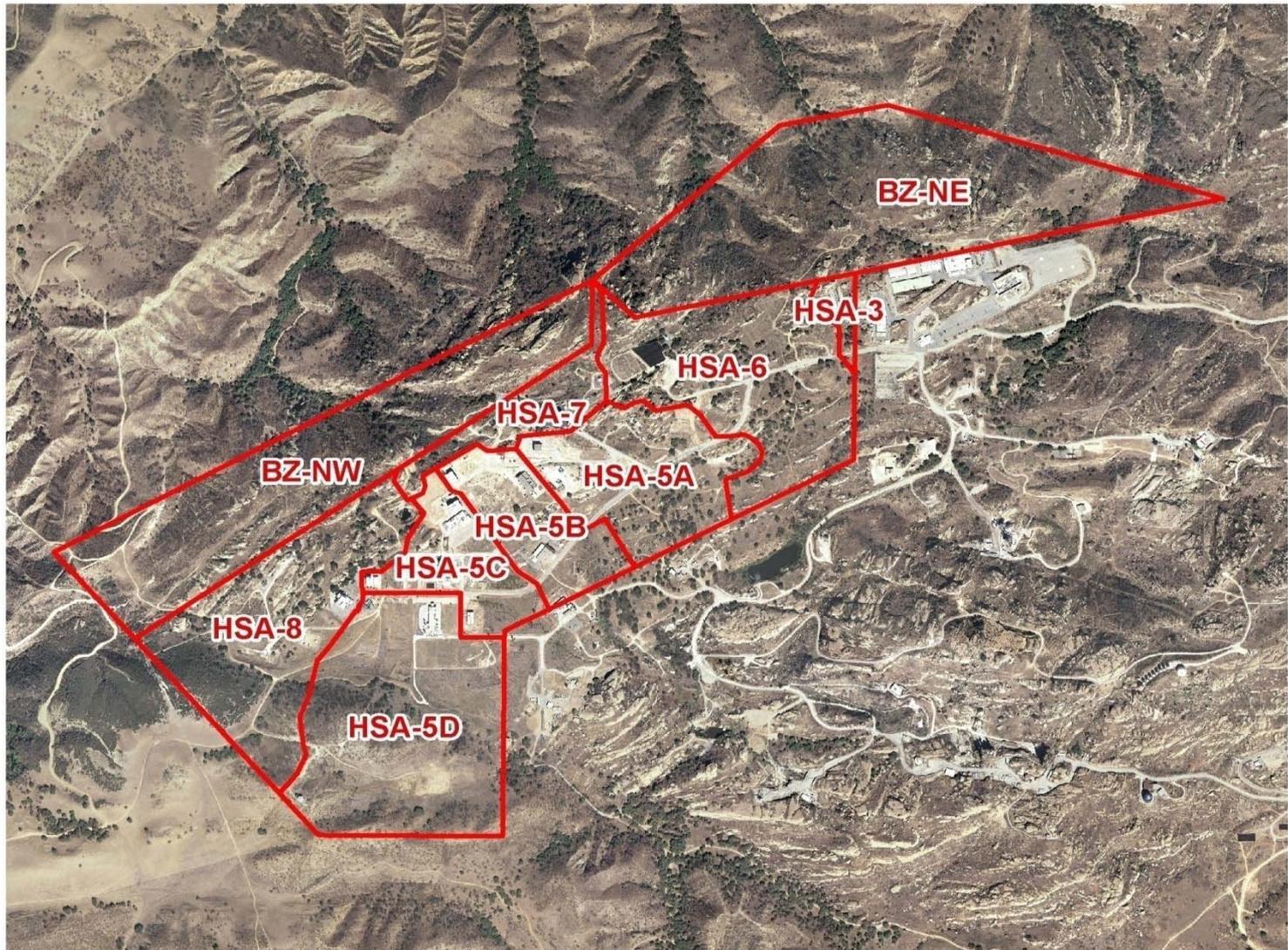


Overview of HSA Technical Memoranda Corrective Actions, cont.

- ▣ Presentation of a full bibliography that includes all documents reviewed for the TM preparation
- ▣ Addressed stakeholder comments to the original draft HSA 5C TM
- ▣ Inclusion of a section providing recommendations for soil sampling
- ▣ More information on potential radiological contaminants of concerns



HSA Subareas



Revised Draft TM Subarea HSA-5C Reorganization

- ▣ Section 1 augmented with additional overall site information to aid in “Big Picture”
 - Table 1.2: Research Reactors at SSFL
 - Table 1.3: Criticality Test Facilities at SSFL
- ▣ Section 1 updated with additional methodology details to highlight the extent of research
 - EPA’s CERCLA § 104(e) information requests
 - Former Worker Interview process



Revised Draft TM Subarea HSA-5C Reorganization, cont.

- ▣ Attachment A: EPA's Aerial Photograph Analysis
 - Easy access to complete set of site aerial photographs and features identified in EPA's report
 - Independently refer to the aerial photograph analysis



Revised Draft TM Subarea HSA-5C Reorganization, cont.

- ▣ Attachment B: Bibliography
 - Front page of each document reviewed is shown for clarity purposes
 - Breadth of documents to ensure completeness
 - Images of documents can be viewed to see if certain reports or information have been included in the text of the Tech Memo



Revised Draft TM Subarea HSA-5C Reorganization, cont.

- ▣ Section 2 reorganized according to logical subareas
 - Organization depicted in Plate 1, in conjunction with Figures 2.1 through 2.6 (i.e., six groupings or “clusters”)
 - Subareas chosen based first on similar operational characteristics, then based on geography
- ▣ Section 3 revised with additional analysis
 - Tables 3.1 and 3.2 on nuclear materials licenses
 - Preliminary MARSSIM classifications updated in Table 3.3



HSA Tech Memo Schedule for 2010

- ▣ Tech Memo on HSA-5C: Done
- ▣ Tech Memo for HSA-5B: October
- ▣ Tech Memo for HSA-5A: November
- ▣ Tech Memo for HSA-6: December



Soil Sampling Planning and Update



Today's Discussion

- ▣ Review EPA's soil sampling objectives
- ▣ Review overall soil sampling approach
- ▣ Review HSA recommended sampling locations for Area 5C
- ▣ Use of gamma scan results for Area 5C
- ▣ Update on geophysical investigation
- ▣ Discuss selection of potential source areas
- ▣ Discuss prioritization
- ▣ Next Steps and Schedule



EPA's Soil Sampling Objectives

- ▣ Primary Objective: Define the nature and extent of radiological soil contamination (above background or agricultural PRGs)
- ▣ Potential Secondary Objectives
 - Collect data of sufficient quality that could be used to support the following
 - ▣ Screening-level ecological risk assessment
 - ▣ Human health risk assessment
 - ▣ Development and evaluation of remedial alternatives
- ▣ Provide data that can be used for a MARSSIM final status survey



Step 1: Information to Identify Potential Source Areas

Historical Site Assessment

- Process knowledge and facility operation history
- Former worker interviews
- Aerial Photo Interpretation
- Past remediation and D&D



Gamma Survey

- Gamma radiation anomalies



Hypothetical Gamma Survey Results

Field Observations

- Deposition or erosion areas
- Topography
- Drainages

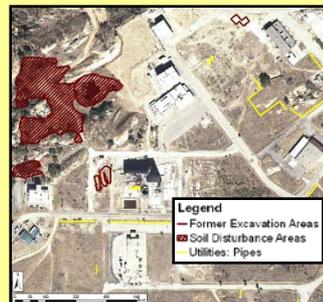


Identify PSAs



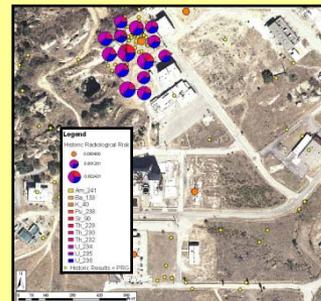
Geophysical Survey

- Utilities
- Former excavation areas
- Areas identified by aerial photos and/or former worker interviews



Past Environmental Data

- Past characterization studies
- Confirmation sampling results



Overview of EPA's Soil Sampling Approach

- Step 1: Evaluate a wide range of information to identify potential source areas
- Step 2: Use GIS Mapping to spatially locate each potential source area
- Step 3: Prioritize and select potential source areas
- Step 4: Layout targeted sample locations for selected source areas
- Step 5: 1st Round: Collect and analyze targeted samples
- Step 6: Evaluate and Publish 1st round data results
- Step 7: 2nd Round: Collect and analyze step-out samples and random samples
- Step 8: Evaluate and publish all data results



Examples of HSA Potential Source Areas

- ▣ One drywell (south of bldg 4057)
- ▣ One metals clarifier basin (south of bldg 4065)
- ▣ One leach field (north bldg 4383)
- ▣ Two surface impoundments (south of bldgs 4462 and 4662)
- ▣ Several aerial photo features
- ▣ Four artifacts east of Bldg 4100
- ▣ Several areas of surface water drainage and conveyance
- ▣ Several sewer line locations



Update On Geophysical Investigation

- ▣ Geophysical investigation plan issued to Stakeholders on August 6
- ▣ Survey target areas (87 acres) based on aerial photo analysis and historical information
- ▣ Area 5C Survey (9 acres) began August 12
- ▣ Survey with terrain conductivity meter and magnetometer completed August 25
- ▣ Data processing and interpretation of results underway
- ▣ Survey in Area 5C with ground penetrating radar to start September 8

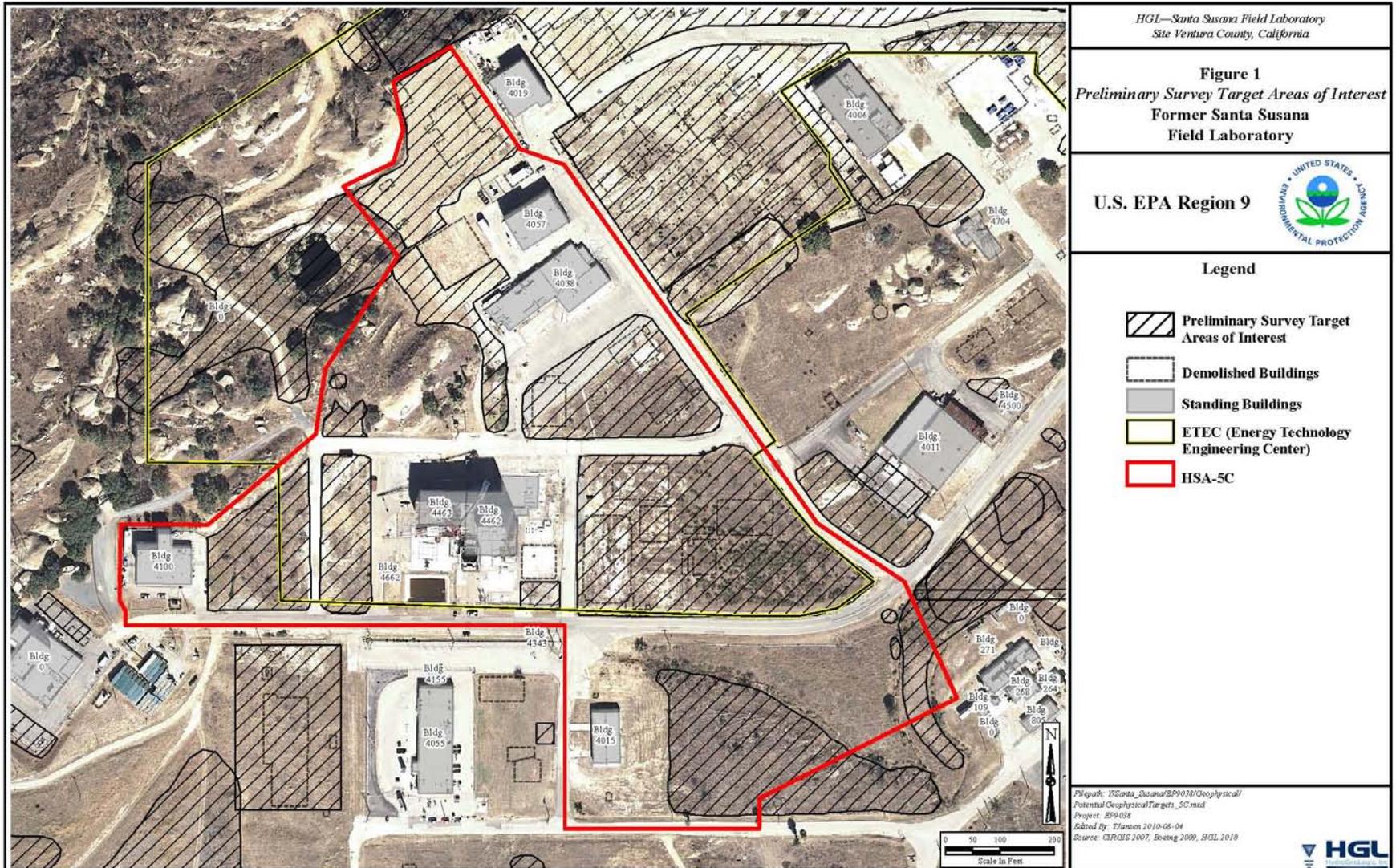


Geophysical Survey Equipment

- ▣ Magnetometer: Used to detect buried metal objects
- ▣ EM-31: Used to detect differences in soil conductivity
- ▣ Ground penetrating radar (GPR): Used to detect changes in subsurface properties (e.g., location of trenches)



HSA 5C Geophysical Survey Target Areas



Geophysical Survey in Area 5C



Photos of Geophysical Survey



Photos of Geophysical Survey



Identification and Prioritization of PSAs

- ▣ All gamma anomalies will be identified as a high priority PSA
- ▣ All geophysical anomalies will be identified as high priority PSA
- ▣ The recommended sampling locations described in the HSA 5C Tech Memo will be prioritized based on a weight of evidence approach
- ▣ Stakeholder technical session on soil Sampling in Area 5C



Next Steps in Area 5C

- ▣ Finalize gamma scan anomalies map
- ▣ Complete Ground Penetrating Radar survey
- ▣ Finalize geophysical anomalies map
- ▣ Issue Master Field Sampling Plan: Mid-September
- ▣ Issue draft map of Round 1 soil sampling locations: Mid-September
- ▣ Hold Tech Session on Round 1 sampling: September 22
- ▣ With Stakeholder input issue FSP Addendum for HSA-5C Area – Early October 2010
- ▣ Begin soil sampling in Area 5C – October 14, 2010



Background Study Update



Radiological Background Study Objectives

- ▣ The purpose of the Background Study is to determine the level of “ambient or background” radioactivity found in soil.
- ▣ The results of the Background Study will be compared to radiological data collected at the SSFL to determine the extent of radiological contamination.



Status of Radiological Background Study

- ✓ Initial project planning
- ✓ Background location evaluation and selection
- ✓ Sampling Plan preparation
- ✓ Sampling preparation and mobilization
- ✓ Sampling – Mobilization 1
- ✓ Sampling – Mobilization 2
- Laboratory analyses
- Data validation
- Tech Memo
- Data evaluation and statistical analysis
- Report preparation



Background Study Update

1. Response to Questions from Last Meeting
2. Laboratory Update
3. Releasing Data/Data Evaluation
4. Project Schedule



Action Items/Questions from Last Meeting

Question 1:

Lang Ranch Background Samples. EPA to verify and explain the rationale for decision to select which soil samples to analyze from Lang Ranch.

Response:

EPA decided to collect samples on the southern portion of the 1-acre Lang Ranch area because this area seemed to be less impacted by a small trail located in the area.



Action Items/Questions from Last Meeting

Question 2:

What is EPA/DTSC's position on testing ravine sediments as part of the background study?

Response:

EPA continues to believe that collecting additional samples in ravines to establish a separate background value for radionuclides is not necessary. We understand that naturally occurring radionuclides (radium, thorium, uranium) could be at higher levels in drainage areas and are willing to discuss adjusting background values for these constituents as data comes in from the on-site study.



Laboratory Analysis Update

- ▣ Laboratory has completed approximately 20% of the sample analyses
- ▣ As analytical data is received, it is being validated by The Palladino Company.
- ▣ Isotopic Plutonium results may be delayed due to the difficulty of achieving MDCs. The laboratory had to develop a new procedure and make sure the procedure will work on project samples.



Releasing Data/Data Evaluation

- ❑ EPA will be sending out the validated data for all areas and radionuclides in a technical memorandum as previously discussed.
- ❑ As validated data becomes available to the EPA project team, we will be evaluating with respect to the appropriate statistical approach
 - The project team will be meeting with statistician and risk assessor in mid-September
- ❑ EPA will provide a presentation by our statistician and risk assessor at the next stakeholder meeting about our statistical evaluation.



Project Schedule

Activity	Planned Date
Laboratory Analysis Completion	November 2010
Data Validation Completion	December 2010
Tech Memo	December 2010/January 2010



Review of Action Items



Action Item Status

ID	Action Item	Status
1	<u>Lang Ranch Background Samples.</u> EPA to verify and explain the rationale for our decision to select which soil samples to analyze from Lang Ranch.	<u>Completed</u> Discussed during today's presentation
2	<u>Spider Maps.</u> EPA to consider the best methodology to prepare "spider maps" (i.e. sample location maps with analytical results inserted). EPA to recommend criteria for selection of which data will be presented in the inserted data boxes on the map. All data will still be presented in accompanying tables.	<u>Completed</u> Spider maps will be used
3	<u>Background Data.</u> EPA to decide if Background Data can be released in mini-data reports prior to EPA release of the technical memorandum with 100% of the surface soil data results.	<u>Completed</u> No, as discussed during today's presentation
4	<u>Ravine Sediments Testing.</u> What is the DTSC/EPA position regarding a background study of "ravine sediments"?	<u>Completed</u> No, as discussed during today's presentation.



Action Item Status, cont.

ID	Action Item	Status
5	<p><u>Water Testing SOPs.</u> Boeing's Water Testing SOPs/Protocols will match the SOPs/Protocols in Final EPA Water Testing Plan. Boeing will eventually change purge methodology when pumps are changed out in certain wells.</p>	<p><u>Completed</u> Boeing will not change pumps until after January 2011</p>
6	<p><u>HSA Interviews.</u> EPA to contact Dan H, Bonnie K to discuss additional contact information of former Area IV employees (esp. SNAP reactor employees).</p>	<p><u>Completed</u> Additional interviews have been scheduled</p>
7	<p><u>Pipeline location information.</u> EPA HSA Tech Memos should include location information for sodium pipelines, gaseous/liquid waste pipelines and any pipelines to/from reactor buildings</p>	<p><u>Completed</u> Yes, available pipeline data are included in HSA-5C TM</p>
8	<p><u>Backfill quality.</u> EPA to find and analyze Boeing's backfill characterization data that was used to determine the suitability of backfill soil prior to placement in excavation areas in Area IV.</p>	<p><u>In Progress</u> Information was obtained regarding Building 4059 backfill</p>



Action Item Status, cont.

ID	Action Item	Status
9	Indicator Contaminants. EPA to develop and release a draft methodology for the use of indicator contaminants including the selection and reduction of analytical test methods during the Area IV radiological characterization study.	<u>In Progress</u>
10	Sampling Deeper than 10 feet. EPA to develop preliminary cost, logistical, and technical decision-criteria for potential subsurface soil sampling at depths greater than ten feet below ground surface at limited situations (i.e. Area IV reactor vault excavation areas).	<u>In Progress</u>

