

DEPARTMENT OF THE AIR FORCE

AIR FORCE CIVIL ENGINEER CENTER INSTALLATION SUPPORT SECTION EDWARDS AIR FORCE BASE, CALIFORNIA

15 May 2025

MEMORANDUM FOR DISTRIBUTION

FROM: AFCEC/CZOW

120 North Rosamond Boulevard

Edwards Air Force Base, California 93524

SUBJECT: Edwards AFB Restoration Advisory Board (RAB) Meeting Minutes – 21 November 2024

1. Time: 5:30 p.m.

2. Place: Best Western Plus Desert Poppy Inn, 2038 West Avenue I, Lancaster, California 93536

3. Chairman: Col Joel Purcell, Air Force Co-Chair

4. The following RAB members were present:

<u>Name</u> <u>Position</u>

Mr. Mark Allen California Environmental Protection Agency (Cal/EPA) Lahontan

Regional Water Quality Control Board (LRWQCB) Remedial Project

Manager (RPM)

Mr. Ethan Finkel United States Environmental Protection Agency (U.S. EPA) RPM

Mr. William Gaddis Rosamond Public Representative

Mr. Mohamed Ibrahim U.S. EPA RPM

Mr. Bruce Lewis Cal/EPA Department of Toxic Substances Control (DTSC) RPM
Dr. Joseph Mabry Air Force Research Laboratory (AFRL) Public Representative
Ms. Alexis McCadney National Aeronautics and Space Administration (NASA) Armstrong

Flight Research Center (AFRC) Public Representative

Mr. Dante Rodriguez U.S. EPA RPM Mr. Paul Schiff Edwards AFB RPM

Ms. Alexia Svejda California City Public Representative

Mr. Victor Yaw Public Co-Chair and Mojave Public Representative

Mr. Toufic Zeidan Cal/EPA LRWQCB RPM

5. The following RAB members were absent:

Name Position

Ms. Melody Couch
Ms. Lauren Hughes-Leslie
Mr. Raj Malhi
Mr. David Soltis
Main Base Test Wing Public Representative
Alternate Lancaster Public Representative
Base Housing Public Representative

Vacant Boron Public Representative

Vacant Edwards AFB North Base Public Representative Vacant Edwards AFB South Base Public Representative

Vacant North Edwards Public Representative

6. The following advisors were present:

<u>Name</u> <u>Organization</u>

Mr. Julio Barrios 412th Civil Engineer Group (CEG)/Environmental Management Division

(CEV)

Mr. Steven Black NASA AFRC
Mr. Dan Crowley NASA AFRC
Mr. Bob Cummings NASA AFRC

Mr. Joe Dunwoody Air Force Civil Engineer Center (AFCEC)/Environmental

Management Directorate, Operations Division, West Branch (CZOW)

Mr. Gary Hatch 412th Test Wing Public Affairs (TW/PA)

Ms. Angelica Jackson NASA AFRC Environmental Mr. David Liu NASA AFRC Environmental

Mr. Paul Mattson 773rd Test Squadron (TS)/ Engineering/Flight Hardware (ENFH)

Mr. Tom Rademacher 412 CEG/CEV
Ms. Leilani Richardson AFCEC/CZOW

Mr. Dale Riedel 412th Test Wing Judge Advocate

Ms. Mendy Stanislawski AFRL

Ms. Julia Tseng AFCEC/CZOW
Ms. Jeanette Van Norden AFCEC/CZOW

7. Others present were as follows:

Name Organization

Ms. Claudia Basura Public

Mr. Anthony Cummins Media Fusion
Ms. Madeline Guadarrama Media Fusion

Ms. Belinda Martinez Cherokee Federal (Recorder)

Mr. Joaquin Morales Public

Mr. Fouad Nasraddine
Mr. Mike Paoli
Mr. Mike Paoli
Ms. Sharissa Singh
Ms. Jen Stackhouse
Ms. Thelma Valle
Mr. Dan Ziarkowski
Cherokee Federal
Cal/EPA DTSC
Cal/EPA DTSC

- 8. Col Purcell called the meeting to order and read the Statement of Purpose and Conduct.
- 9. Col Purcell introduced three new RAB members: NASA Armstrong public representative Ms. Alexis McCadney, Main Base Test Wing public representative Ms. Melody Couch and alternate Lancaster public representative Ms. Lauren Hughes-Leslie.
- 10. Col Purcell presented the 16 May 2024 RAB Meeting Minutes for acceptance. The RAB members accepted the minutes as presented.
- 11. New Business Environmental Restoration Program (ERP) Update (see attachment).
- a. Mr. Schiff provided an overview of the ERP activities that occurred at Edwards AFB since the May 2024 RAB Meeting.
- (1) Mr. Schiff identified the current roles of the ERP staff base remedial project manager, ERP managers and in-house contractor support.

- (2) Mr. Schiff summarized the contracts and contractors that support the ERP. He said that contracts have a five-year duration and cover two United States Army Corps of Engineers (USACE) districts Albuquerque and Sacramento. These contracts provide services for treatment system operation, groundwater monitoring and reporting, investigation efforts, and document preparation. The contractors primarily include Oneida ESC Group, AECOM, and Tetra Tech, along with various specialty sub-contractors.
- (3) Mr. Schiff shared that the Air Force is currently in fiscal year 2025 (FY25). He explained that the federal FY spans from October to September, with contracts typically awarded at the end of each FY. Mr. Schiff mentioned that contract awards for FY23 and FY24 totaled \$51 million. He provided examples of costs associated with task awards, such as \$504,000 for the annual Operations and Maintenance (O&M) of the Operable Unit (OU) 2 South Base Site 14 treatment system, and \$974,000 for biennial groundwater monitoring for OU1/8 Main Base.
- (4) Mr. Schiff reported that the Air Force is currently updating the 2023 Community Involvement Plan (CIP) to incorporate sections on environmental justice and emerging contaminants. The update will not include new community interviews.
- (5) Mr. Schiff briefly reviewed the phases that the base ERP implements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly known as Superfund. The chronological phases of a cleanup site are as follows: identification, involves conducting a Preliminary Assessment and Site Inspection (PA/SI); investigation, includes Remedial Investigation (RI) and Feasibility Study (FS); selection, a Proposed Plan (PP) and Record of Decision (ROD) are presented; cleanup, involves completing a Remedial Design/Remedial Action (RD/RA) or O&M; and closeout of a site.
- (6) Mr. Schiff discussed the perfluoroalkyl and polyfluoroalkyl substances (PFAS) program and the RI efforts underway for aqueous film-forming foam (AFFF) areas. Mr. Schiff said that the Phase I RI consisted of three field events. In November 2021, Field Event #1 was completed and groundwater monitoring sampling was performed at 162 existing monitoring wells. In November 2023, Field Event #2 was completed, including the installation of 54 new monitoring wells, completion of 71 soil borings and sampling of 340 monitoring wells. In July 2024, Field Event #3 was completed, including the installation of 36 new monitoring wells, completion of 91 soil borings, installation of 6 lysimeters and sampling of 431 groundwater monitoring wells. He noted that the RI effort is ongoing, with the Air Force currently working on the conceptual site model (CSM) and drafting the RI report. The final RI report is expected to be submitted in January 2026.
- (a) Mr. Schiff announced that on 10 April 2024, the United States EPA issued final maximum contaminant levels (MCLs) for several PFAS chemicals in drinking water. The established MCLs, which the Department of Defense (DoD) will enforce in its drinking water systems, also serve as cleanup standards and can trigger short-term actions under CERCLA. Edwards AFB will continue its PFAS RI efforts and characterize groundwater contamination plumes.
- (b) Mr. Schiff discussed the Smoldering Combustion Demonstration Project, which was funded by the Air Force to test how effectively PFAS-impacted soil can be treated. In April 2024, approximately 100 cubic meters of soil from three on-base PFAS sites were excavated as part of the project. The soil was treated by a smoldering combustion technology using a carbon-fueled flameless, exothermic reaction to destroy PFAS. Mr. Schiff stated that the project finished in mid-May 2024 and the results will advance both Air Force and industry knowledge of PFAS cleanup.
- (c) Mr. Schiff stated a PA effort is underway across the Air Force to understand potential releases of PFAS from past and present sources other than AFFF and shared some examples of potential sources. A draft of the Due Diligence for Supplemental PFAS Sources Report is anticipated to be submitted to regulatory agencies for review in 2025.
- (7) Mr. Schiff discussed that Technical Working Group (TWG) meetings for OU1/8 Main Base continue being held to resolve issues necessary to advance the FS Addendum. The Air Force is preparing responses to

regulatory comments on the Draft Phase II Comprehensive Vapor Intrusion (VI) Report and Draft OU1/8 Groundwater Modeling Report. Additionally, the Air Force submitted the OU1/8 Soil and Groundwater Investigation Report for regulatory review in May 2024 and is also preparing responses to regulatory comments.

- (a) Mr. Schiff said the Air Force received semiannual indoor air results from the 8 May 2024 sampling event at Building 1807. The results confirmed that trichloroethene (TCE) levels are below all action levels with the heating, ventilation and air conditioning (HVAC) system operating continuously. The Final Building 1807 Indoor Air Monitoring Report for November 2022 through May 2023 was anticipated to be submitted in November 2024. Mr. Schiff reported that the most recent semiannual sampling event was completed on 8 November 2024.
 - (8) Mr. Schiff reviewed remediation activities from OU2 South Base.
- (a) Sites 81 and 102 are former skeet sites that have been covered with crushed concrete as an interim removal action. A Draft Sites 81/102 Final Confirmation Sampling Work Plan was expected to be submitted to regulatory agencies in November 2024. The results will be used for updated human health and ecological risk assessments to evaluate the effectiveness of the interim removal action.
- (b) To address carbon tetrachloride at Site 5, the Air Force submitted a Draft Supplemental FS to regulatory agencies for review in June 2024, with comments due November 2024. The Air Force and regulatory agencies anticipate meeting and resolving comments before issuing a draft final.
- (c) The groundwater extraction and treatment system (GETS) and biosparging (PHOSterTM) system continue to operate at Sites 5/14; and sampling for PFAS will continue at the Site 14 GETS. Annual Remedial Action Status Reports (ARASRs) documenting post-ROD activities at Sites 5/14 were submitted to regulatory agencies for review and uploaded to the Administrative Record (AR).
- (d) Mr. Schiff said the in situ chemical oxidation (ISCO) treatment process at Site 76 continues operating. The September 2024 ISCO injection project included the installation of six new injection wells and three new monitoring wells. Site 76 ARASRs were submitted to the regulatory agencies and uploaded on the AR. Mr. Schiff mentioned the 2023-2024 ARASR is currently being prepared.
- (e) The PHOSterTM system at Site 86 continues operating. In August 2024, a new air compressor for the PHOSterTM system was installed. Mr. Schiff said the Site 86 ARASRs were submitted to the regulatory agencies and uploaded on the AR.
- (f) For Site 29, Mr. Schiff said the Revised Remedial Action Work Plan is expected to be submitted to regulatory agencies in January 2025. The landfill cover construction is anticipated to begin in the spring of 2025.
- (9) Mr. Schiff said a 2024 groundwater monitoring event occurred in all four groundwater areas of OU4/9 AFRL. The post-ROD areas at South AFRL and AFRL Soil and Debris Sites have Land Use Controls (LUCs) in place as part of their cleanup remedies. The South AFRL also has a soil vapor extraction (SVE) system that continues to operate near Building 8595 to mitigate potential VI. The Air Force is preparing a draft work plan to address potential data gaps in the South AFRL monitoring well network at deeper depths.
- (a) The Air Force submitted the Draft Final AFRL Arroyos In Situ Treatability Study Work Plan to the regulatory agencies in October 2024. Mr. Schiff said the study will evaluate enhanced in situ bioremediation of contaminants in downgradient deep alluvial portions of the groundwater plume. Field activities were anticipated to commence in winter 2024.
- (b) In October 2024, the Air Force submitted the Draft Final Northeast AFRL SVE Treatability Study Work Plan to regulatory agencies. Mr. Schiff said the study will evaluate SVE to remove contaminants from the vadose zone located in fractured bedrock. Field activities were anticipated to begin in winter 2024.

- (c) For OU4/9 Mars Blvd, the Air Force submitted the Draft Final Work Plan for In Situ Co-Metabolic Biosparging Study to regulatory agencies in October 2024. Mr. Schiff said the study will evaluate in situ biosparging, which involves injecting air and/or propane, and its ability to stimulate aerobic degradation of groundwater contaminants situated in fractured bedrock. Field activities were anticipated to begin winter 2024.
- (10) Mr. Schiff said that on 30 July 2024, a Revised Draft OU5/10 FS was submitted to the regulatory agencies with comments due December 2024. He mentioned the Site 285 interim treatment system continues to operate. Since 2003, the interim system has reduced the perchlorate plume area by 87 percent, removing a total of 230 pounds of perchlorate.
- (11) Mr. Schiff announced that OU6 NASA Armstrong completed an annual groundwater monitoring event in September 2024, sampling 111 monitoring wells. The data collected will evaluate contaminant concentration trends throughout the plume and ISCO performance in treatment areas. He mentioned that during the ISCO treatment event, activated persulfate was deployed to treat volatile organic compounds, primarily TCE, in wells at Sites N3, N4, and N7. Mr. Schiff also reported that NASA completed PFAS Phase I RI Round 1 sampling in August 2024, which included the sampling of 78 monitoring wells, geophysical utility locating, soil borings, soil sampling, borehole optical televiewer surveys, and the installation of two new wells. Additionally, the Final PFAS Phase I RI Work Plan was issued in October 2024.
- (12) Mr. Schiff reviewed cleanup activities at OU7 Basewide Miscellaneous sites. In June 2024, a soil gas sampling report for two of the sites, Sites 272 and 293, was submitted to regulatory agencies. Regulatory comments were provided in September 2024, and the Air Force anticipates submitting responses in 2025.
- (13) For OU7 Site 3, the landfill cap was completed. From August through October 2024, an O&M repair event was conducted. The semi-annual groundwater and landfill gas sampling and the semiannual LUC inspection were completed at the site in September 2024.
- (14) Mr. Schiff explained vegetation at OU7 Chemical Warfare Materiel Site 442 has been identified as "stressed or dead" during the semiannual inspection for multiple years. Re-seeding and revegetation efforts were performed in December 2022 at Site 442 Areas 1, 2, and 3. In January 2024, the semi-annual inspection included vegetation surveys indicating 12 percent coverage at Area 1, 25 percent coverage at Area 2, and 20 percent coverage at Area 3. The July 2024 inspection indicated increased coverage in all areas. However, additional revegetation activities are in process, including a new vegetation plan and targeted revegetation efforts to achieve the vegetation coverage per the Site 442 O&M Plan Addendum.
- (15) For Site 25, Mr. Schiff said the Air Force expects to submit a Revised Draft Site 25 FS in winter 2024. Simultaneously, the Air Force is developing an updated three-dimensional groundwater model for remedy development to address regulatory comments. The Final Site 25 Phytoremediation Treatability Study Report was submitted in June 2024. Mr. Schiff mentioned that annual groundwater monitoring for Site 25 is ongoing.
- (16) Mr. Schiff discussed the Military Munitions Response Program (MMRP). He said the regulatory agencies concurred on the Draft Final MMRP ROD. The Air Force is awaiting determination of a California land use covenant regulation to be included in the ROD before the final ROD can be issued. Mr. Schiff also mentioned that solar developer preconstruction activities have commenced at MMRP Site AL505-2.
- (17) Mr. Schiff concluded by sharing the reminder of following the 3Rs of Explosive Safety: Recognize, Retreat, and Report.
- (18) Mr. Schiff asked the RAB members whether there were any questions or comments. Ms. Svejda asked about the hydroseeding process. Mr. Schiff responded that native seeds from Edwards AFB are utilized for the process. Ms. Svejda mentioned that she has a contact at the Bureau of Land Management who can potentially assist the Air Force with more information regarding reseeding efforts. Mr. Schiff shared that a tour was conducted for the RAB members in October 2024 and he encouraged the RAB members to request future tours of cleanup sites as needed. Additionally, he mentioned that another tour took place earlier that morning for

regulatory agencies and their leadership. He expressed his gratitude to Dr. Mabry for his support and for sharing valuable information during the tour, which was successful.

- 12. Opportunity for Public Comment Mr. Hatch reported no public comments or questions had been submitted.
- 13. Old Business Status of RAB Vacancies.
- a. Mr. Hatch reported significant progress with the RAB vacancies over the last few months. He mentioned that six incumbent public representatives have renewed their positions, and three new public representatives have been selected, leaving only four vacancies. Two vacancies are for the off-base communities of Boron and North Edwards, while the other two are for the on-base communities of South Base and North Base. Mr. Hatch noted that vacancy notices continue to be advertised diligently and there has been increased interest in the positions. He also mentioned that three additional individuals have expressed interest in joining the RAB, and the application process is currently underway.
- 14. Reports from Public Representatives.
 - a. Ms. Svejda, California City, had no comments.
 - b. Ms. McCadney, NASA Armstrong, had no comments.
- c. Mr. Yaw, Public Co-Chair and Mojave Public Representative, announced that he provided RAB meeting flyers to the Mojave Water Agency board to encourage his community to attend the meeting.
 - d. Dr. Mabry, AFRL, had no comments.
 - e. Mr. Gaddis, Rosamond, had no comments.
- 15. Reports from RPMs.
 - a. Mr. Finkel, U.S. EPA, had no comments
- b. Mr. Rodriguez, U.S. EPA, shared that in the coming year, he looks forward to the three treatability studies in the OU4/9 AFRL areas, as he believes the studies are a key step in the RI and FS process.
 - c. Mr. Ibrahim, U.S. EPA, had no comments.
 - d. Mr. Zeidan, Cal/EPA LRWQCB, had no comments.
 - e. Mr. Allen, Cal/EPA LRWQCB, had no comments.
 - f. Mr. Lewis, Cal/EPA DTSC, had no comments.
 - g. Col Purcell, Air Force Co-Chair, had no comments.
 - h. Mr. Schiff, Edwards AFB RPM, had no comments.

- 16. The next RAB meeting is proposed for 15 May 2025 in California City, California.
- 17. The meeting was adjourned at 6:55 p.m.

//Original signed by//

JOEL D. PURCELL, Colonel, USAF Air Force Co-Chair Restoration Advisory Board VICTOR YAW Public Co-Chair Restoration Advisory Board

Attachment:

Environmental Restoration Program Update for Edwards AFB, California, 21 November 2024

DISTRIBUTION
AFCEC
412 CEG/CC/CEV
412 OMRS/SGPB
412 TW/JA/PA/SE
AFRL
RAB Members
Cal/EPA DTSC
Cal/EPA LRWQCB

U.S. EPA

Air Force Installation & Mission Support Center



Environmental
Restoration
Program Update
for Edwards AFB,
California

Paul Schiff AFCEC/CZOW 21 November 2024

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Acronyms



- 3-D = three-dimensional
- 3Rs = Recognize, Retreat, Report
- AFFF = aqueous film-forming foam
- AFRL = Air Force Research Laboratory, Detachment 7
- ARASR = Annual Remedial Action Status Report
- CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
- CIP = Community Involvement Plan
- CSM = conceptual site model
- DAF = Department of the Air Force
- DoD = Department of Defense
- FS = Feasibility Study
- FY = Fiscal Year
- GETS = groundwater extraction and treatment system
- · ISCO = in situ chemical oxidation
- LUC = Land Use Controls
- MCL = maximum contaminant level

- MMRP = Military Munitions Response Program
- O&M = operations and maintenance
- OU = Operable Unit
- PFAS = perfluoroalkyl and polyfluoroalkyl substances
- PA = Preliminary Assessment
- PP = Proposed Plan
- RI = Remedial Investigation
- ROD = Record of Decision
- SI = Site Inspection
- SVE = soil vapor extraction
- TCE = trichloroethene
- UFP-QAPP = Uniform Federal Policy-Quality Assurance Project Plan
- USACE = United States Army Corps of Engineers
- U.S. EPA = United States Environmental Protection Agency
- VI = vapor intrusion
- VOC = volatile organic compounds

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Contracts and Contractor Summary



- The United States Army Corps of Engineers (USACE) provides contract administration
 - Contracts have a five-year lifespan
 - Multiple contracts are ongoing with USACE districts Albuquerque and Sacramento
- Contracts provide:
 - Treatment system operation, groundwater monitoring and reporting, investigation efforts (e.g., soil sampling, well installation and sampling, vapor intrusion sampling), document preparation
- Contractors include:
 - Oneida ESC Group, AECOM, Tetra Tech
 - Many specialty sub-contractors (e.g., laboratories, waste haulers, earthmoving, and borehole drilling/groundwater well installation)

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Recent Fiscal Year Budgets



- Each Federal Fiscal Year (FY) runs October–September
 - E.g., FY25 is 01 October 2024-30 September 2025
- FY23 executed: \$26.6M
 - \$19.1M toward a new FY23 contract
 - \$7.5M toward available tasks on previous FY contracts
- FY24 executed: \$24.4M
 - \$22.7M toward a new FY24 contract
 - \$1.7M toward available tasks on previous FY contracts
- Examples of tasks awarded:
 - Annual operations and maintenance (O&M) of Operable Unit (OU) 2
 Site 14 Treatment System: \$504K
 - Biennial Groundwater Monitoring for OU1/8: \$974K
 - Annual O&M of OU5/10 Site 285 Treatment System: \$556K
 - Annual Land Use Controls (LUC) Inspections and Monitoring for OU7 Site 442: \$119K

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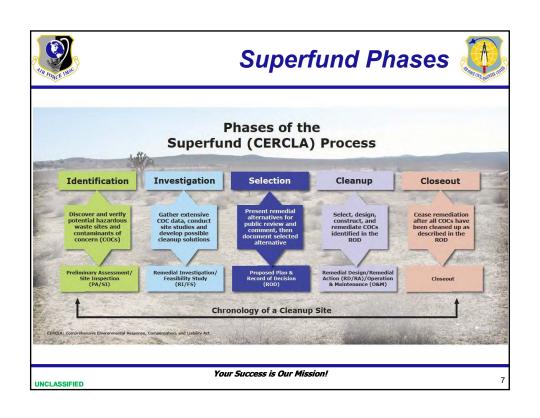
CIP Update

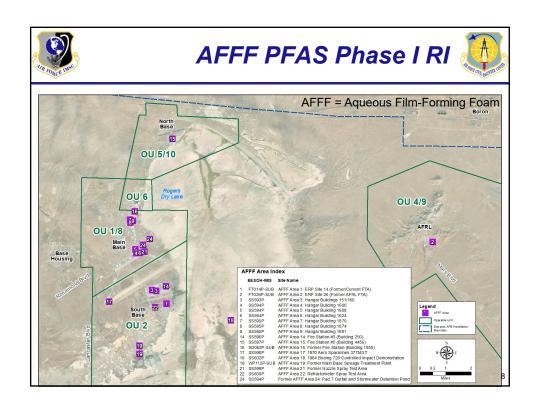


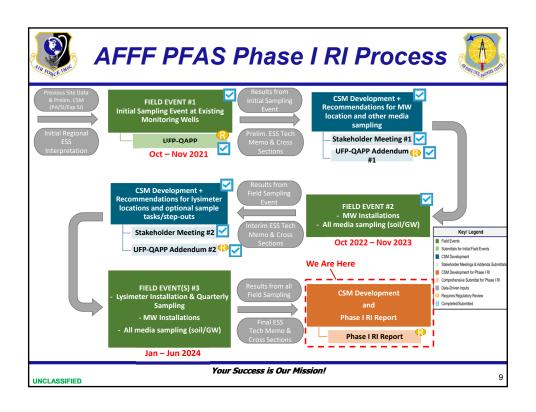
- Community Involvement Plan (CIP) finalized August 2023
- Currently drafting an update
 - Air Force initiative to include Environmental Justice and emerging contaminants in CIPs
 - Will not include community interviews

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AFFF PFAS Phase I RI



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- Remedial Investigation (RI) effort underway - field activities complete.
 - November 2021: Field Event #1 completed; groundwater sampling performed at 162 existing monitoring wells
 - November 2023: Field Event #2 completed; 54 new monitoring wells installed, 71 soil borings completed, and 340 monitoring wells sampled
 - July 2024: Field Event #3 completed; 36 new monitoring wells installed, 91 soil borings completed, 6 lysimeters installed, and 431 monitoring wells sampled



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AFFF PFAS Phase I RI



- RI effort underway conceptual site model (CSM) and RI Report development
 - Continue receipt, review, and validation of analytical and field data
 - Evaluation of site data to continue CSM development
 - Drafting RI Report final document anticipated for January 2026



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U.S. EPA MCLs



The U.S. Environmental Protection Agency (U.S. EPA) issued final maximum contaminant levels (MCLs) on 10 April 2024 for several perfluoroalkyl and polyfluoroalkyl substances (PFAS) in drinking water. The Air Force is awaiting a holding statement from the Assistant Secretary of the Air Force for Installations, Environment, and Energy (and or Office of the Secretary of Defense)

In this final rule, U.S. EPA is setting limits for five individual PFAS: PFAO, PFOA, PFOS, PFNA, PFHXS, and HFPO-DA (known as GenX Chemicals). And the U.S. EPA is also setting a Hazard Index level for two or more of four PFAS as a mixture: PFNA, PFHxS, HFPO-DA, and PFBS.

Chemical	Maximum Contaminant Level	Maximum Contaminant Level (MCL)
	Goal (MCLG)	
PFOA	0	4.0 ppt
PFOS	0	4.0 ppt
PFNA	10 ppt	10 ppt
PFHxS	10 ppt	10 ppt
HFPO-DA (GenX chemicals)	10 ppt	10 ppt
Mixture of two or more: PFNA, PFHxS, HFPO-DA, and PFBS	Hazard Index of 1	Hazard Index of 1
		it in drinking water below which there is no

https://www.epa.gov/newsreleases/biden-harris-administration-finalizes-first-ever-national-drinking-water-standard

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The Maximum Contaminant Level Rule



- The rule provides five years for regulated drinking water purveyors to comply with the MCL levels
- Department of Defense (DoD) will implement these standards at all DoD-owned drinking water systems
- MCLs are also used as cleanup standards, and can be used as a risk trigger level to take short-term actions (e.g., private drinking water well treatment), under the federal cleanup law, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
 - Department of the Air Force (DAF):
 - Is reviewing existing PFAS sampling results
 - Will be expanding existing cleanup investigations, and assess "background" levels of PFAS
 - Providing drinking water treatment for impacted off-base wells on prioritized basis, with focus on installing enduring solutions such as municipal connections or wholehouse filters
 - Prioritizing locations where known levels of PFAS in drinking water from DAF activities are the highest

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Smoldering Combustion Demonstration Project Update



- Pilot test/demonstration of smoldering combustion technology to treat PFAS
- Uses carbon-fueled flameless, exothermic reaction to destroy PFAS in excavated soil
- System mobilized to Edwards in April 2024 and treated approximately 100 cubic meters of soil from three onbase PFAS sites
- On-site test finished in mid-May 2024
- Results will advance Air Force and industry PFAS cleanup knowledge base:
 - Technical report will be posted to Administrative Record
 - Article published in a peer-reviewed technical journal
 - Presented at industry technical forums



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Due Diligence for Supplemental PFAS Sources Report

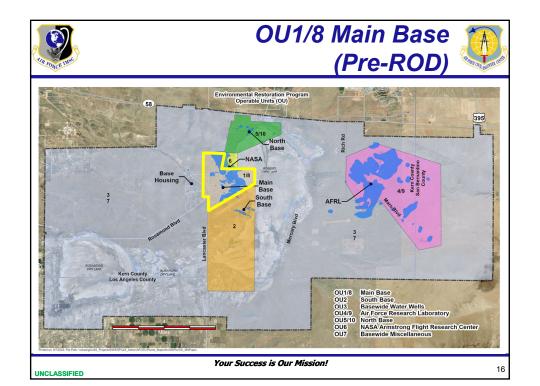


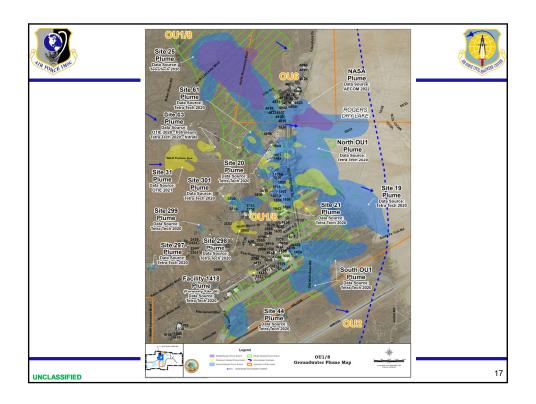
- Preliminary Assessment (PA) effort underway across the Air Force
- Potential releases of PFAS deriving from past and present sources other than aqueous film-forming foam (AFFF)

Wastewater Treatment Plants/Biosolids	Painting Stations
Landfills and Snowpack	Herbicides/Pesticides/Insecticide Use/Storage
Oil/Water Separators	Fogger Trucks
Sanitary/Storm Water Runoff	Textile Plants/Storage/Parachutes/Safety Wear
Carwashes and Dry Cleaners	Photolithography, Semiconductor Industry
Non-AFFF Foam Fire Suppression	Automotive/Hobby Shops/Motor Pool
Warehouses	Medical Clinics/Facilities
Landscaping Sheds	Marinas/Docks
Cleaning Supply Storage	Underground Wiring
Metal Finishing / Chrome and Electro Plating	Radar Domes

- Report will be titled Due Diligence for Supplemental PFAS Sources
- Anticipate draft report to be submitted to regulatory agencies for review in 2025

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OU1/8 Main Base (Pre-ROD)



- Continue OU1/8 Technical Working Group meetings to resolve issues for incorporation into the Feasibility Study (FS) Addendum
 - Vapor intrusion (VI)
 - Regulatory agencies provided comments on Draft Phase II Comprehensive VI Report; Air Force preparing responses
 - Groundwater modeling/plume stability
 - Regulatory agencies provided comments on Draft OU1/8 Groundwater Modeling Report; Air Force preparing responses
 - Groundwater and soil data gap investigation
 - Submitted the OU1/8 Soil and Groundwater Investigation Report in May 2024 for regulatory review; Air Force preparing responses to regulatory comments

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OU1/8 Main Base (Pre-ROD)

- Building 1807
 - Semiannual indoor air sampling results from 8 May 2024 event confirmed that trichloroethene (TCE) levels are below all action levels with new heating, ventilation and air conditioning operating continuously (i.e., 24/7)
 - Detection of benzene in both outdoor and indoor air samples will be evaluated in 2023-2024 report
 - Anticipate submitting Building 1807 Indoor Air
 Monitoring Report for November 2022 through May 2023 in November 2024 for regulatory review
 - Next indoor air sampling event scheduled for November 2024

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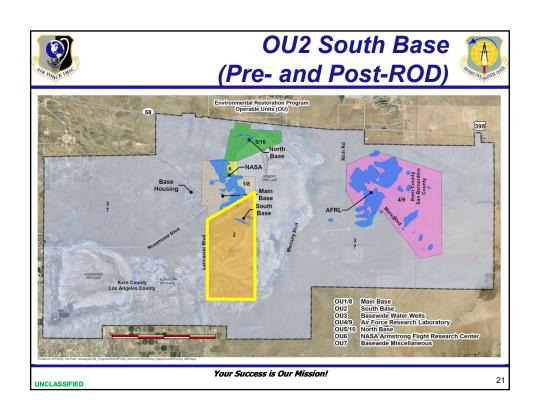
OU1/8 Main Base (Pre-ROD)

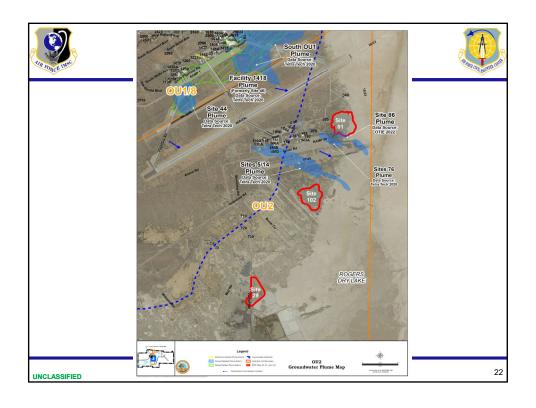




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OU2 South Base (Pre-ROD)

- Sites 81 and 102
 - Anticipate submitting Draft Final Confirmation Sampling Work Plan to regulatory agencies in November 2024
 - Results will be used for updated human health and ecological risk assessments to evaluate the effectiveness of the interim removal action
- Site 5 Carbon Tetrachloride Plume
 - Draft Supplemental FS submitted to regulatory agencies for review in June 2024, with comments due November 2024
 - Air Force and regulatory agencies expected to meet and resolve regulatory comments before a Draft Final is issued

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OU2 South Base (Post-ROD)



- Sites 5/14
 - Groundwater extraction and treatment system (GETS) continues to operate
 - Bio-sparging (PHOSter™) system continues to operate
 - Installed new air compressor September 2024
 - Continue sampling for PFAS at the Site 14 GETS
 - Annual Remedial Action Status Reports (ARASRs) documenting post-ROD activities submitted to regulatory agencies for review and posted to Administrative Record





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OU2 South Base (Post-ROD)





• Site 76

- In situ chemical oxidation (ISCO) treatment process continues
 - ISCO project included installing 6 new injection wells and 3 new monitoring wells, and a September 2024 injection
- ARASRs submitted to regulators and posted on Administrative Record
 - 2023-2024 ARASR currently being prepared

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OU2 South Base (Post-ROD)



- Site 86
 - Bio-sparging (PHOSter™) system continues to operate
 - Installed new air compressor August 2024
 - ARASRs submitted to regulators and posted on Administrative Record



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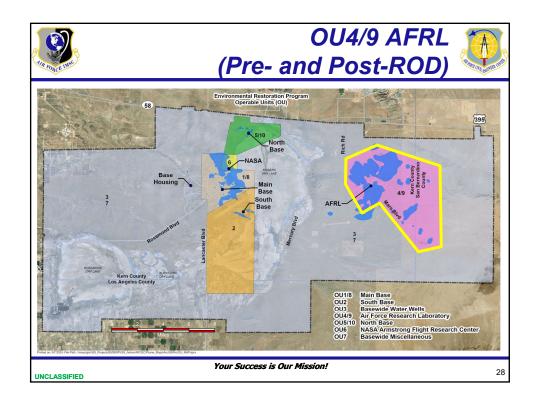


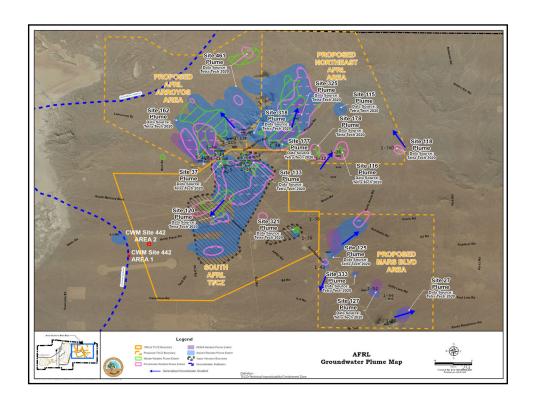
OU2 South Base (Post-ROD)

- Site 29
 - Revised Remedial Action Work Plan expected to be submitted to regulatory agencies in January 2025
 - Landfill cover construction anticipated to start in spring 2025



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OU4/9 AFRL (Pre- and Post-ROD)



- · Annual groundwater monitoring in all areas
- LUCs in place for post-ROD areas South Air Force Research Laboratory (AFRL) and AFRL Soil and Debris Sites
- South AFRL
 - Soil vapor extraction (SVE) system continues operating near Building 8595 to mitigate potential VI
 - Preparing draft work plan to address potential data gaps in well network at deeper depths



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OU4/9 AFRL Arroyos (Pre-ROD)





- In October 2024, the Air Force submitted the Draft Final Work Plan for In Situ Treatability Study to regulatory agencies
 - Study will evaluate enhanced in situ bioremediation of contaminants in downgradient deep alluvial portions of the groundwater plume
 - Field activities are anticipated to begin winter 2024

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OU4/9 Northeast AFRL (Pre-ROD)





- In October 2024, the Air Force submitted the Draft Final Work Plan for SVE Treatability Study to regulatory agencies
 - Study will evaluate SVE for removing contaminants from the vadose zone situated in fractured bedrock
 - Field activities are anticipated to begin winter 2024

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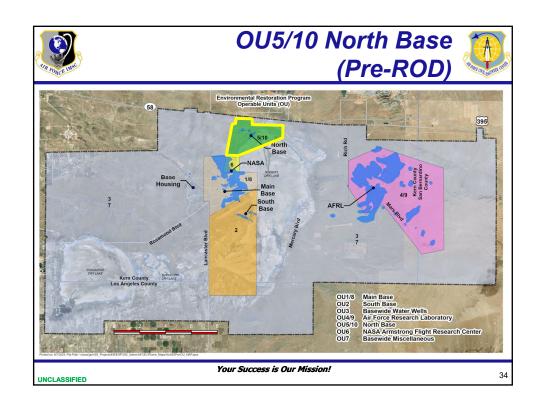
OU4/9 Mars Blvd (Pre-ROD)

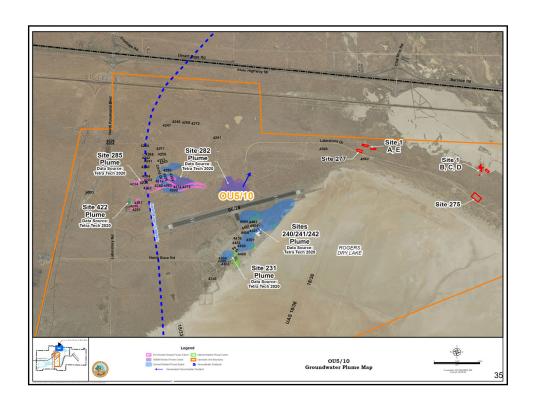
- In October 2024, the Air Force submitted the Draft Final Work Plan for In Situ Co-Metabolic Biosparging Study to regulatory agencies
 - Study will evaluate in situ biosparging (air and propane) and its ability to stimulate aerobic degradation of groundwater contaminants situated in fractured bedrock
 - Field activities are anticipated to begin winter 2024

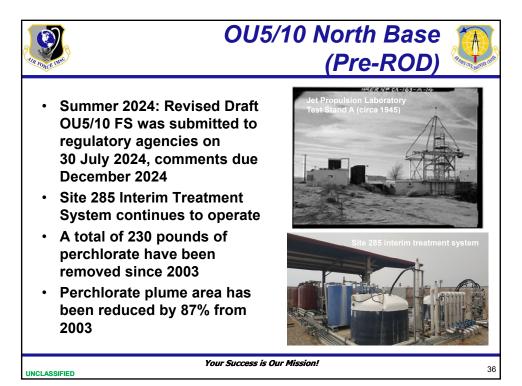


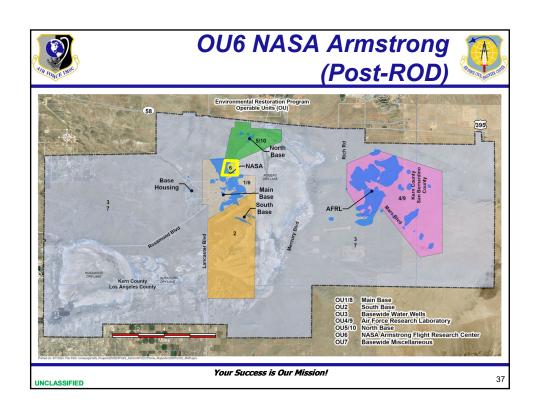
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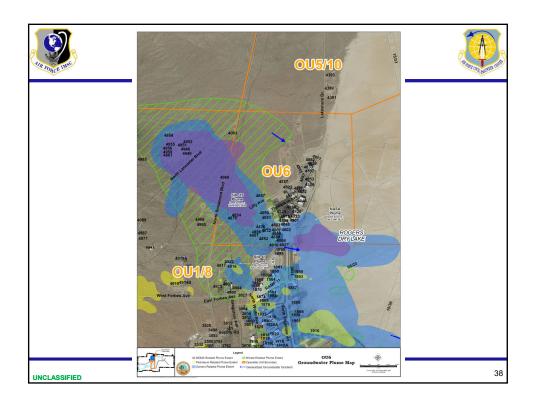
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OU6 NASA Armstrong (Post-ROD)



- Annual groundwater monitoring event completed September 2024 – 111 monitoring wells sampled
 - Collected data to evaluate:
 - · Contaminant concentration trends throughout the plume
 - · ISCO performance in treatment areas
- ISCO
 - Deployed activated persulfate to treat volatile organic compounds (VOCs, primarily TCE) in wells at Sites N3, N4, and N7



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OU6 NASA Armstrong PFAS Update



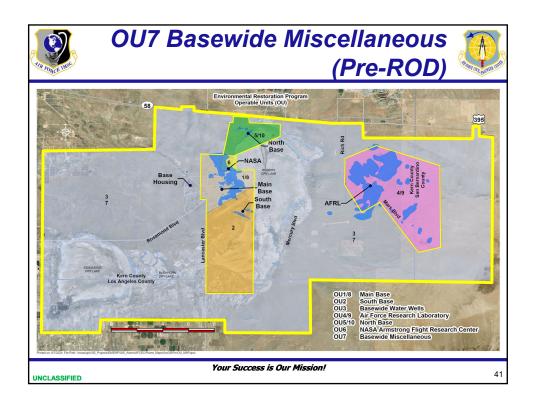
- Completed PFAS Phase I RI Round 1 Sampling in August 2024
 - Sampled 78 monitoring wells
 - Conducted geophysical utility locating, soil borings, soil sampling, borehole optical televiewer surveys, and installed two new wells
- Submitted Final PFAS Phase I RI Work Plan in October 2024





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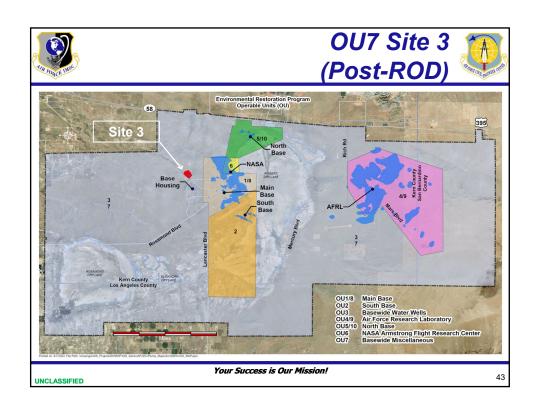
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OU7 Basewide Miscellaneous (Pre-ROD)



 Submitted soil gas sampling report in June 2024 for regulatory review; regulatory agencies provided comments in September 2024; pending Air Force responses in 2025

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OU7 Site 3 (Post-ROD)

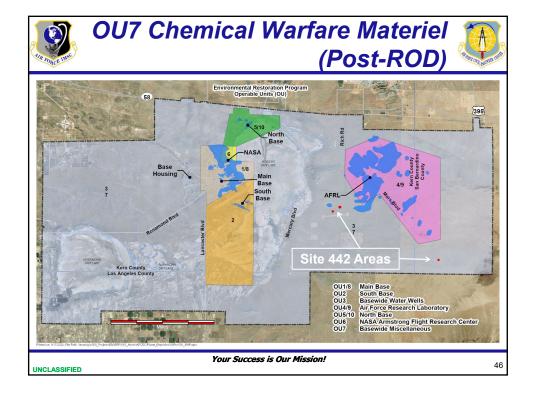
- Landfill cap completed
 - August–October 2024:
 O&M repair event completed
 - 3,500 linear feet of cap slope
 - 250 linear feet of the top deck
 - 200 linear feet of stormwater channel
- Site 3 O&M
 - September 2024: Semiannual groundwater and landfill gas sampling. Semiannual LUC inspection

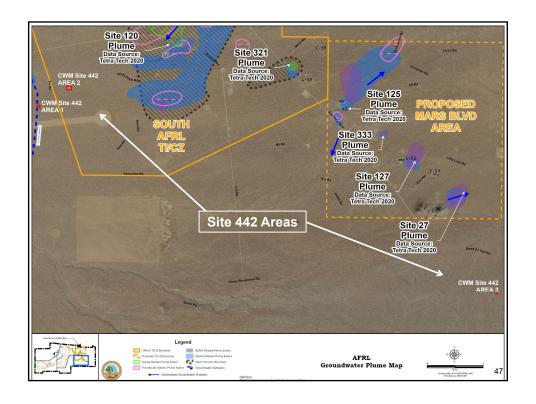




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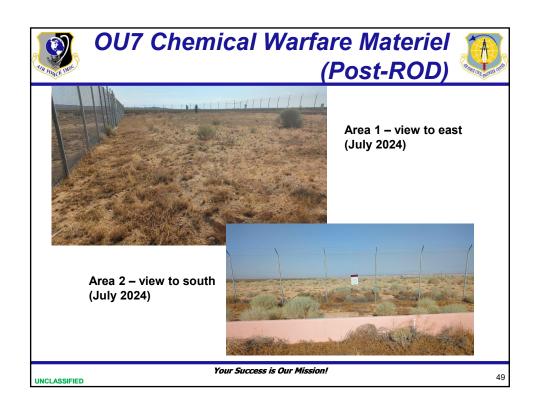
OU7 Chemical Warfare Materiel (Post-ROD)

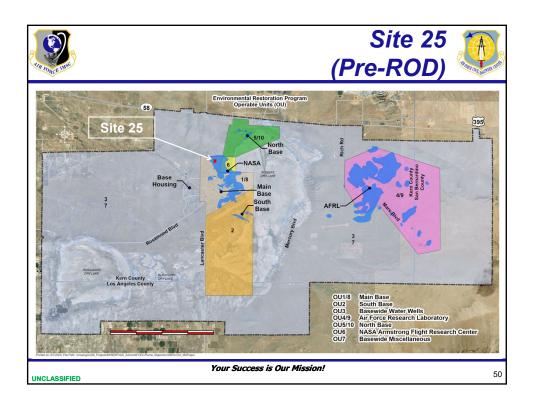


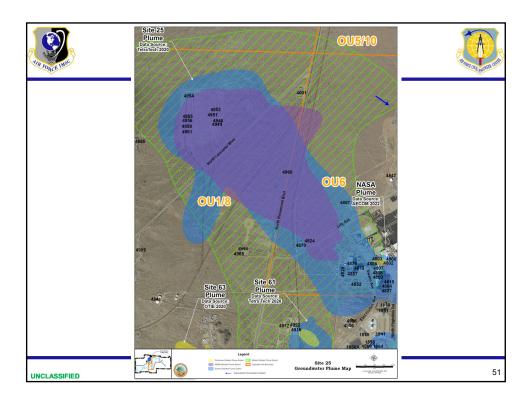
- Vegetation has been identified as "stressed or dead" during the semiannual inspection for multiple years
- Re-seeding/revegetation effort performed in December 2022 at Site 442 Areas 1, 2, and 3
- January 2024 Semiannual Inspection included vegetation surveys
 - 12% coverage at Area 1
 - 25% coverage at Area 2
 - 20% coverage at Area 3
- July 2024 inspection indicated increased coverage at all areas; however additional revegetation activities in process, including new vegetation plan and targeted revegetation effort, to achieve vegetation coverage per O&M Plan Addendum

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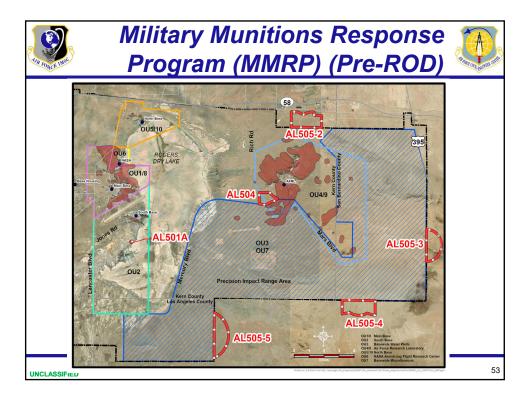
Site 25 (Pre-ROD)



- Air Force anticipates submitting the Revised Draft Site 25 FS in winter 2024
- Developing updated three-dimensional (3-D) groundwater model for remedy development to address regulatory comments
- Submitted the Final Phytoremediation Treatability Study Report in June 2024
- Ongoing annual groundwater monitoring

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- The regulatory agencies concurred on the Draft Final ROD
 - Awaiting determination of California land use covenant regulation to be included in ROD before final ROD can be issued
- Solar developer preconstruction activities have begun at AL505-2



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MMRP 3Rs







Follow the 3Rs of Explosives Safety:

· Recognize:

when you may have encountered a munition and that munitions are dangerous.

do not approach, touch, move or disturb it, but carefully leave the area.

Report:

call 911 and advise the police of what you saw and where you saw it.

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