

RPM MEETING: SUMMARY
NASA JET PROPULSION LABORATORY CERCLA SITE

Date/Time: March 11, 2014 / 10:00 AM – 12:30 PM

Location: Foothill Municipal Water District (FMWD) Conference Room
4536 Hampton Road La Cañada Flintridge, CA

List of Attendees:

- Steve Slaten (NASA)
- Merrilee Fellows (NASA)
- Yarissa Martinez (U.S. EPA)
- Herb Levine (U.S. EPA)
- Alice Campbell (DTSC)
- Kwang Lee (RWQCB)
- Chi Diep (DPH)
- Karen Wong (DPH)
- Gary Takara (PWP)
- Roumiana Voutchkova (PWP)
- Bob Hayward (LAWC)
- Jennifer Betancourt (LAWC)
- Kelly Gardener (Raymond Basin Management Board)
- Nina Jazmadarian (FMWD)
- Steve Johnson (Stetson Engineers)
- Chuck Buriel (JPL)
- Claudia Garcia (U.S. Army Corps of Engineers [USACE])
- Monica Eichler (USACE)
- Janice Opperman (USACE)
- David Conner (Tidewater)
- Keith Fields (Tidewater)

Attachments:

- Attachment 1 – Agenda
- Attachment 2 – Sign-In Sheet
- Attachment 3 – Presentation Slides

Summary and Action Items:

- Background – The Optimization Work Plan was submitted to the EPA, State regulators, and local water purveyors on February 24, 2014. The primary objective of this meeting was to get regulatory support for the optimization work. In particular, the new LAWC well is being proposed for installation this year.
- Another objective of this meeting was to introduce the team to Yarissa Martinez, the new RPM for the U.S. EPA.
- Steve Slaten presented the slides. Steve provided a general overview of the CERCLA Program, provided a summary of the existing treatment systems and plans for the final groundwater remedy, discussed the optimization concepts, and then provided additional details on the proposed Monk Hill wells for LAWC and PWP. The additional details included the purpose of the new wells, implementation considerations, and next steps.
- There was some discussion on the impact of the drought in Southern California. Gary Takara (PWP) indicated that they have observed an 80 foot drop in the water

table elevation near the MHTS over the past three years. This drop in the water table elevation has decreased groundwater extraction rates due to increased pumping head.

- Gary Takara provided perchlorate data collected from PWP's Sunset wells and Eastside wells. Data has not been collected from the Sunset Wells (since July 2013) while a new disinfection system is being installed.
- Gary informed the group that PWP was currently building two chloramination systems in the Raymond Basin (one for the Sunset wells and one for the Jones wells) to replace existing disinfection systems. The MHTS already has a chloramination system in place and operational.
- Roumiana Voutchkova (PWP) asked about NASA's estimated travel times for particles to travel through vadose soils and groundwater. Keith Fields answered that he recalled estimates of approximately 7 years in vadose zone soils below JPL and approximately 1 foot/day in groundwater near JPL; although, migration rates for contaminants are dependent on their chemical properties. Keith Fields also indicated that these values have been documented in previous NASA submittals.

(Additional details not provided in the meeting: NASA's 2007 *Technical Memorandum: Additional Investigation Results* states, "Groundwater modeling indicates that particles in groundwater could travel 1,500 to 2,000 feet in five years." This equates to 0.82 to 1.1 feet per day. Note that this represents the estimated travel time in the Monk Hill Subarea for particles as they travel toward Monk Hill extraction wells for containment. NASA's 2008 *Responses to Comments on the Additional Investigation Results* states, "Conservative estimates indicate vadose zone travel times of at least 7.5 years...")

- During discussion of the LAWC well, Alice Campbell (DSTC) mentioned that there may be alternative drilling methods and well development methods available. Specifically, Alice mentioned air rotary may be faster and require less well development than the methods proposed in the Optimization Work Plan (i.e., direct mud-rotary drilling and reverse circulation drilling). Alice also mentioned the use of straddle packers to sequentially develop zones of the well to reduce the volume and flow rate of extracted groundwater.
- **Action Item (Tidewater):** Research alternative drilling methods including air rotary, and well development methods, including straddle packers, that may be applicable to the LAWC well.
- Discussed next steps with CDPH, RWQCB, and RBMB. RBMB does not require permits pertaining to the proposed LAWC well but will review plans and design.
- **Action Item (Tidewater):** Contact Sutida Bergquist (CDPH) to discuss the Permit Amendment and CEQA requirements associated with the proposed LAWC well.
- **Action Item (Tidewater):** Contact the group within RWQCB that issued the current National Pollutant Discharge Elimination System (NPDES) permit for LAWC. K. Lee (RWQCB) indicated that a new permit (rather than an amended permit) may be required because the discharge volume would increase by more than 25%.

- **Action Item (Tidewater):** Add Kelly Gardner and Steve Johnson to NASA's JPL CERCLA Program e-mail distribution list of regulators and local water purveyors.
- Merrilee Fellows discussed the upcoming community outreach activities. These include an addendum to the 2006 Community Involvement Plan (CIP), a Public Meeting for the final groundwater remedy (targeting August 2014), and outreach activities associated with the new LAWC well (including a fact sheet that will be finalized soon).
- Bob Hayward (LAWC) mentioned that there will be a LAWC Shareholders Meeting on May 5, 2014. He recommended that NASA present plans for the new LAWC well at this meeting.

Attachment 1

Agenda

RPM Meeting: Agenda
NASA-JPL CERCLA Site
March 11, 2014 – 10:00 AM-12:15 PM
Foothill Municipal Water District (FMWD) Office

No.	Item	Time	Discussion Lead
1	Introductions	10:00–10:20	NASA
2	Project Background	10:20-10:40	NASA/ Steve
3	Status of Treatment: <ul style="list-style-type: none"> • Source Area Treatment System • Lincoln Avenue Water Company • Monk Hill Treatment System • Final Remedy for Groundwater • City of Pasadena Wells Update 	10:40-11:20	NASA/ Steve
4	Optimization Projects	11:20-12:00	NASA/ Steve
5	Community Outreach Update	12:00-12:15	NASA/ Merrilee
6	Adjournment	12:15	NASA

Attachment 2
Sign-In Sheet

Attachment 3
Presentation Slides



NASA Jet Propulsion Laboratory CERCLA Program Summary

Steven Slaten, NASA Remedial Project Manager
Merrilee Fellows, NASA Manager for Community Involvement

Presentation Summary

- (1) Introductions
- (2) Project Background
- (3) Status of Treatment
- (4) Optimization Projects

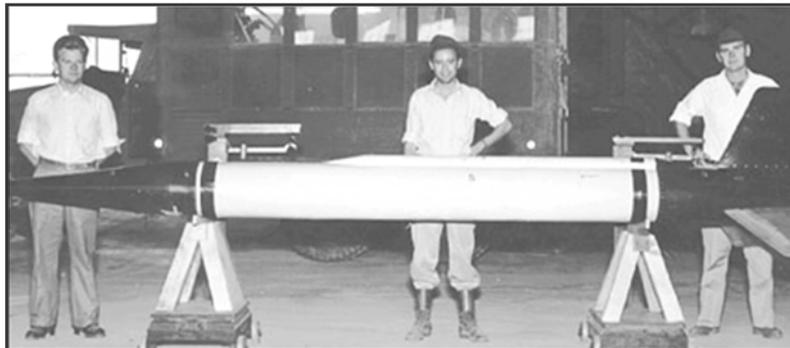
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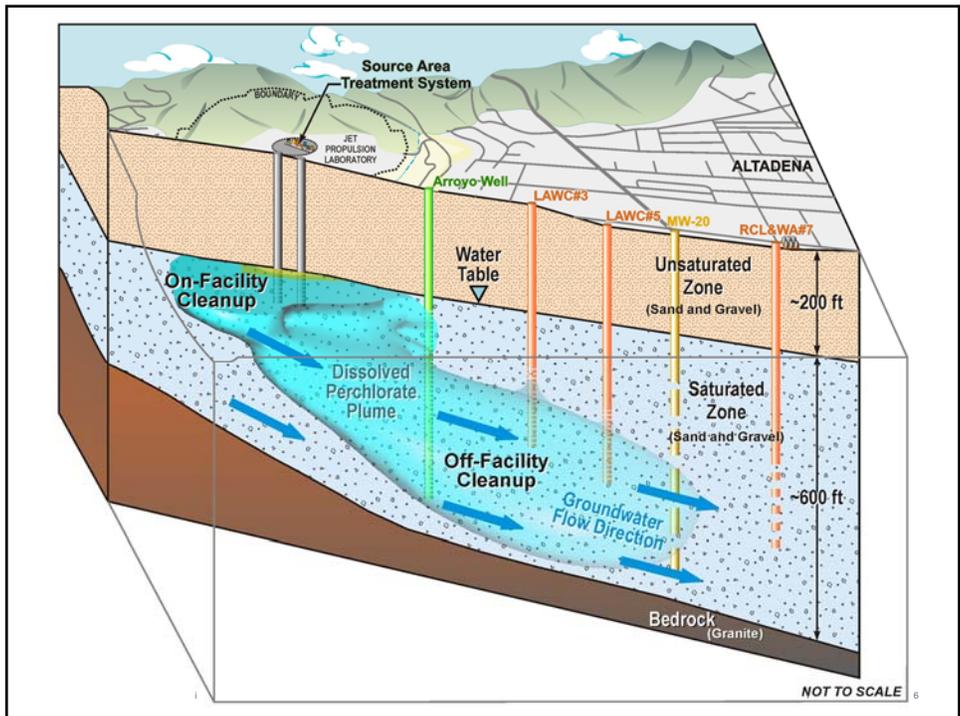
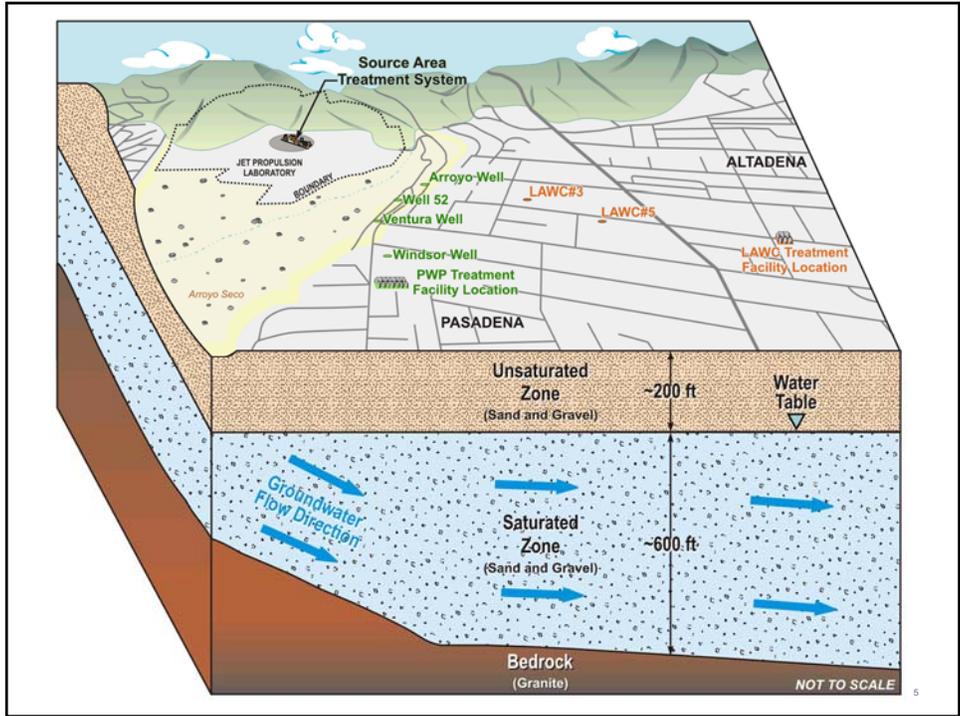
Introductions

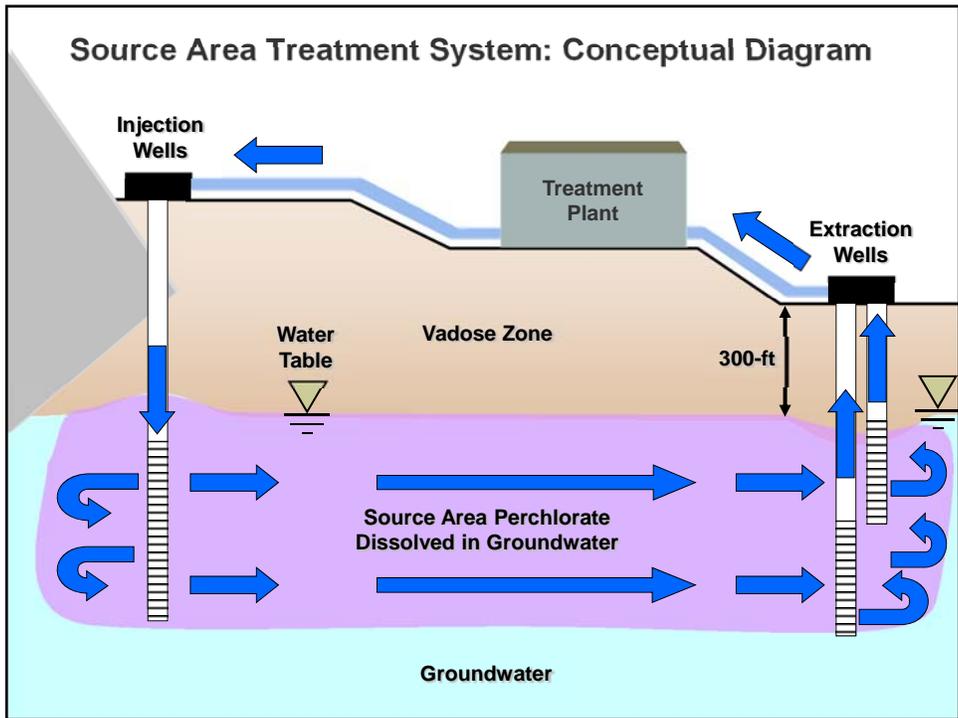
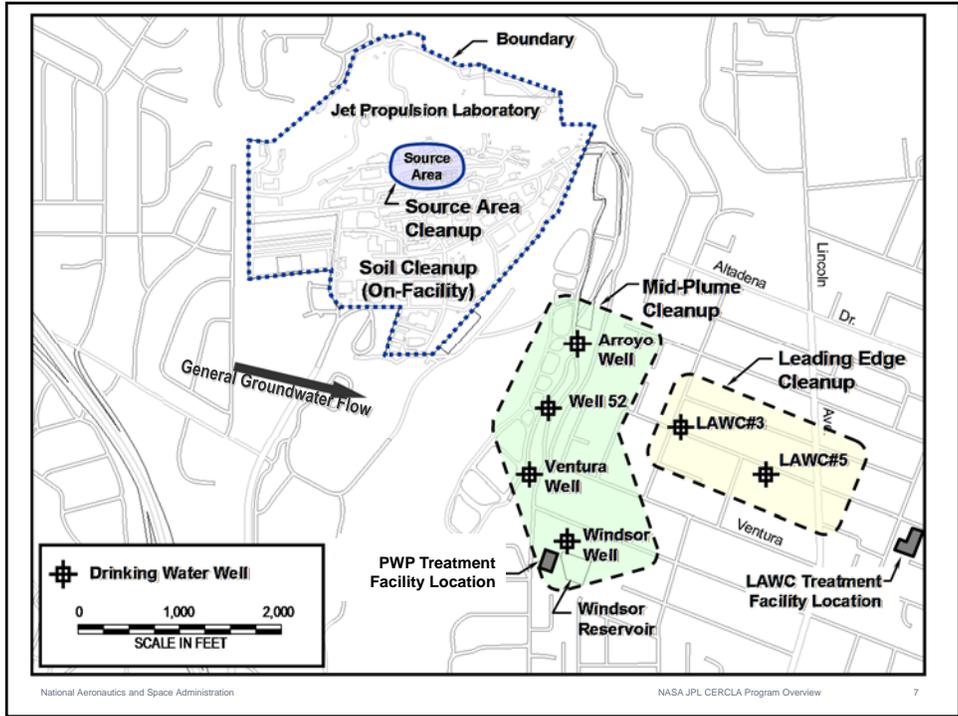


Project Background



In the 1930s and during the years of World War II, the area that is now JPL was a site for testing some of the first rockets.



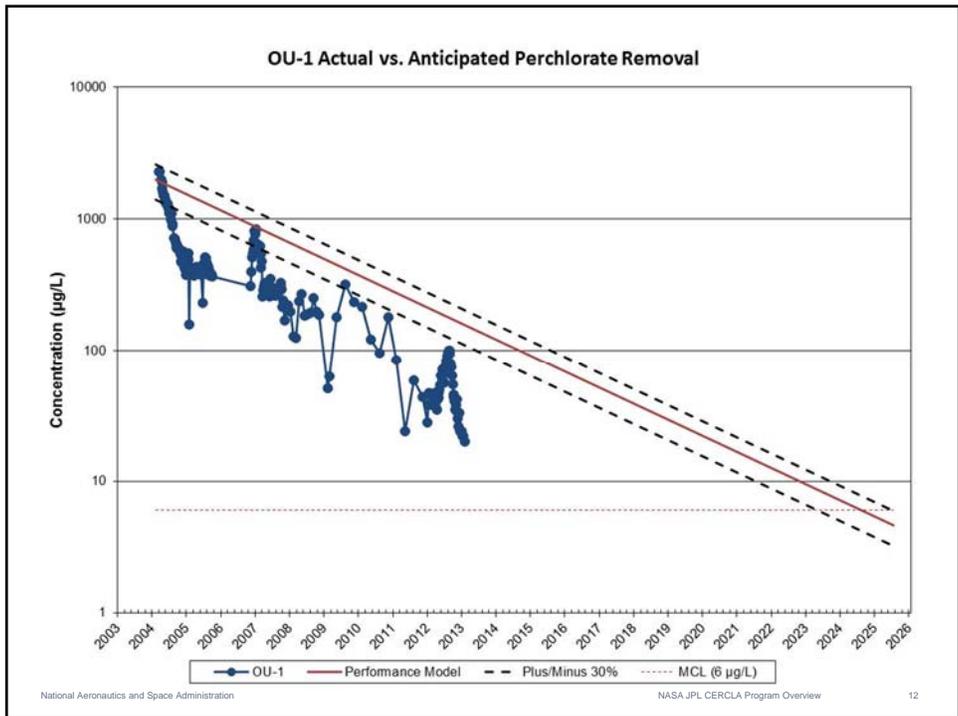
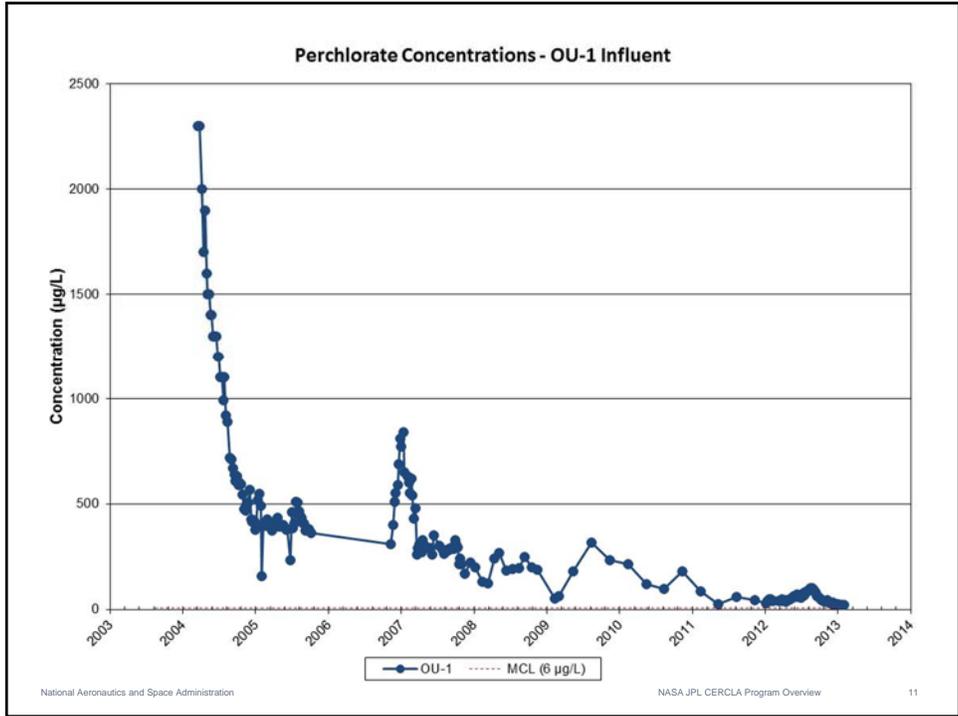


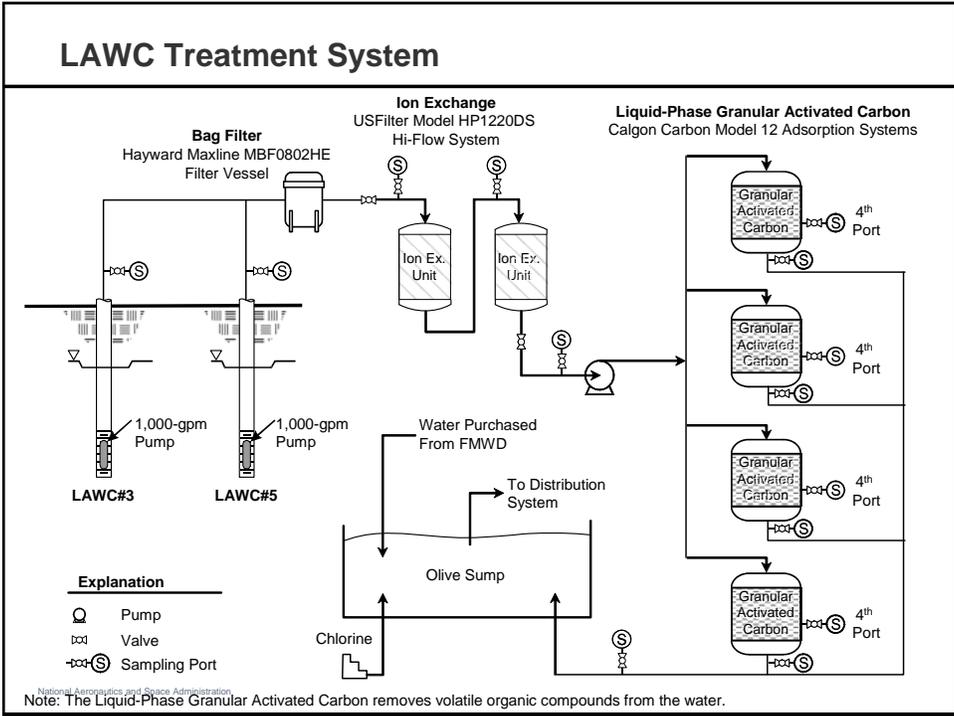


OU-1 Operational Summary (January 2005 Through February 2014)

Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	3,107
Mass of Perchlorate Removed	lbs	1,775
Mass of CCl ₄ Removed	lbs	36.6
Mass of TCE Removed	lbs	6.1

- Next semi-annual progress report in April/May

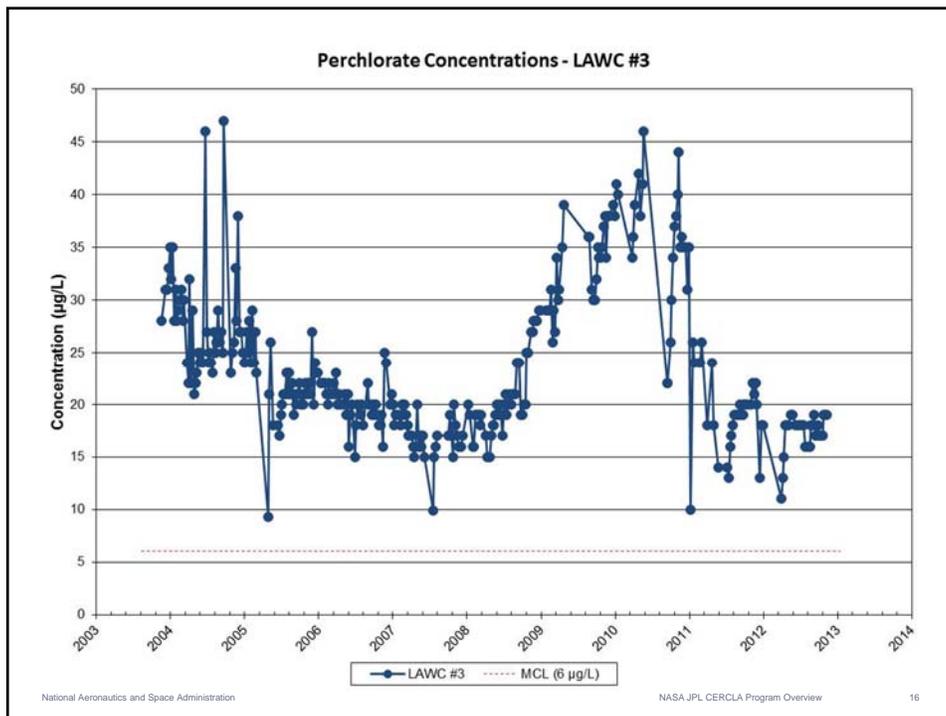


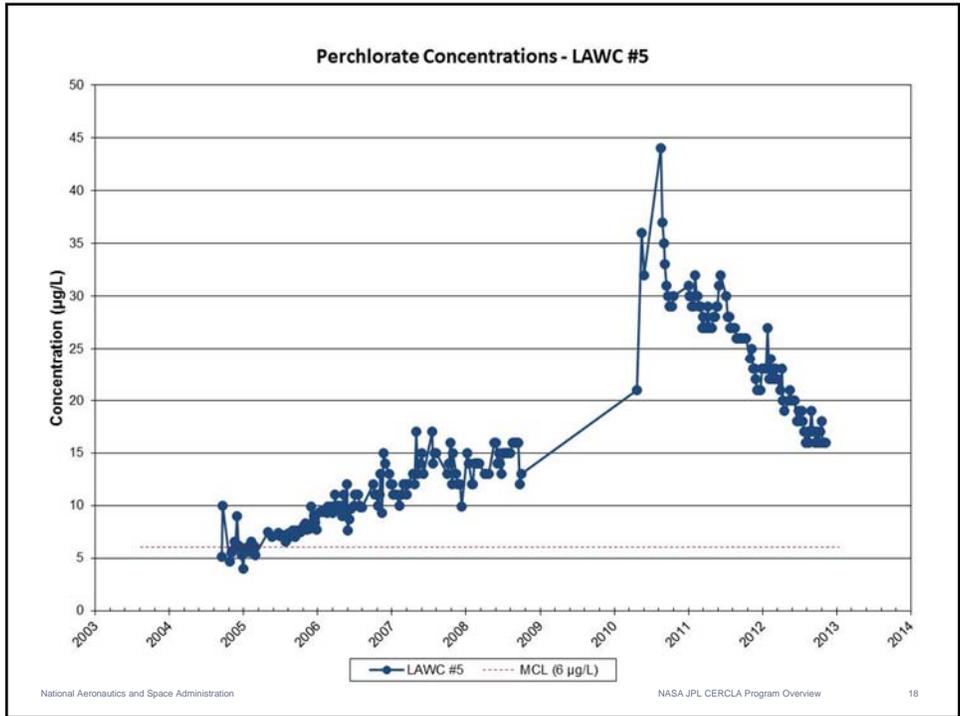
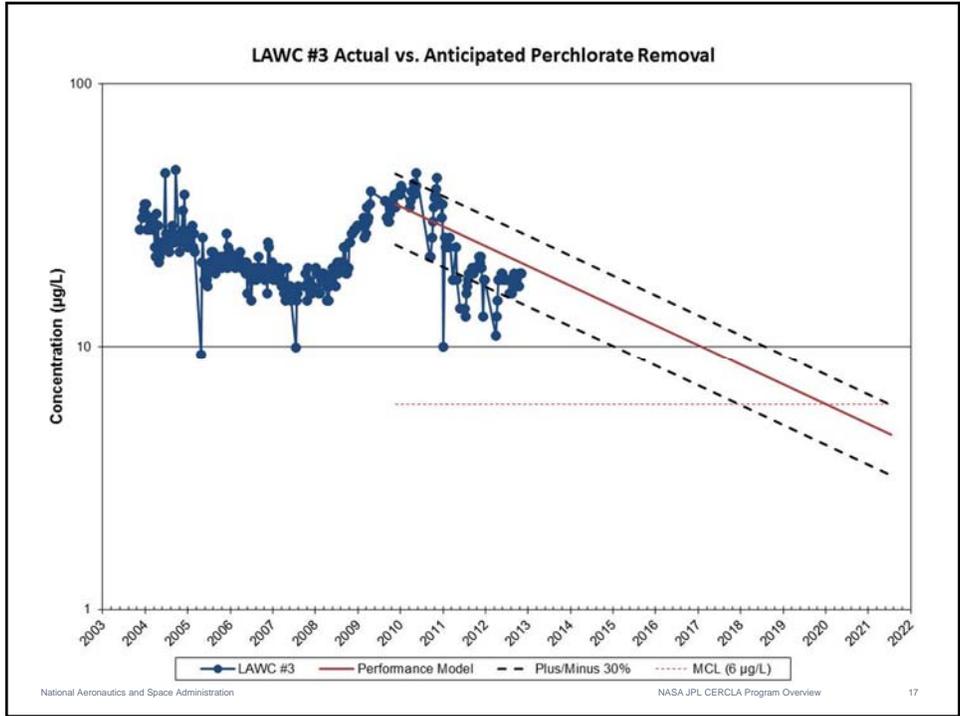


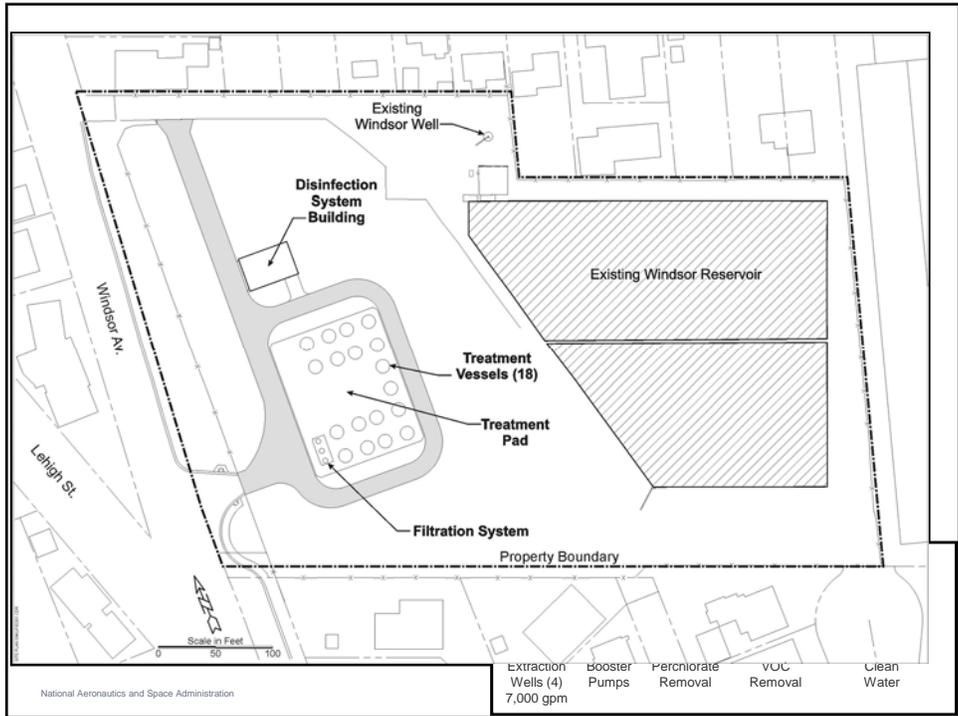
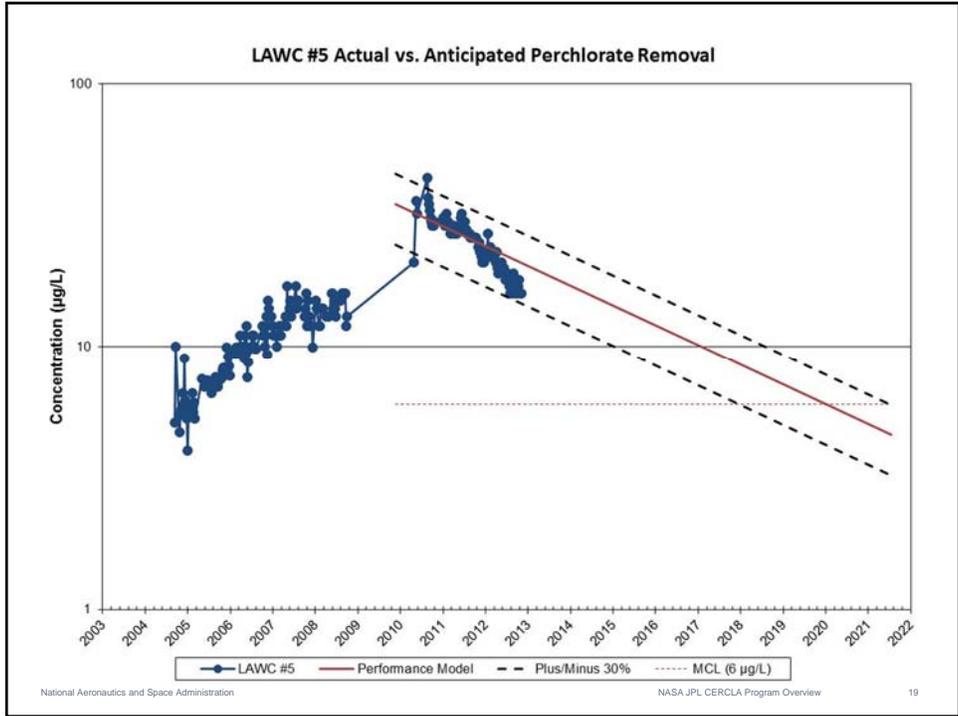
LAWC Operational Summary (July 2004 Through February 2014)

Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	19,326
Mass of Perchlorate Removed	lbs	1,009
Mass of CCl ₄ Removed	lbs	90
Mass of TCE Removed	lbs	131

- Annual progress report will be submitted in May





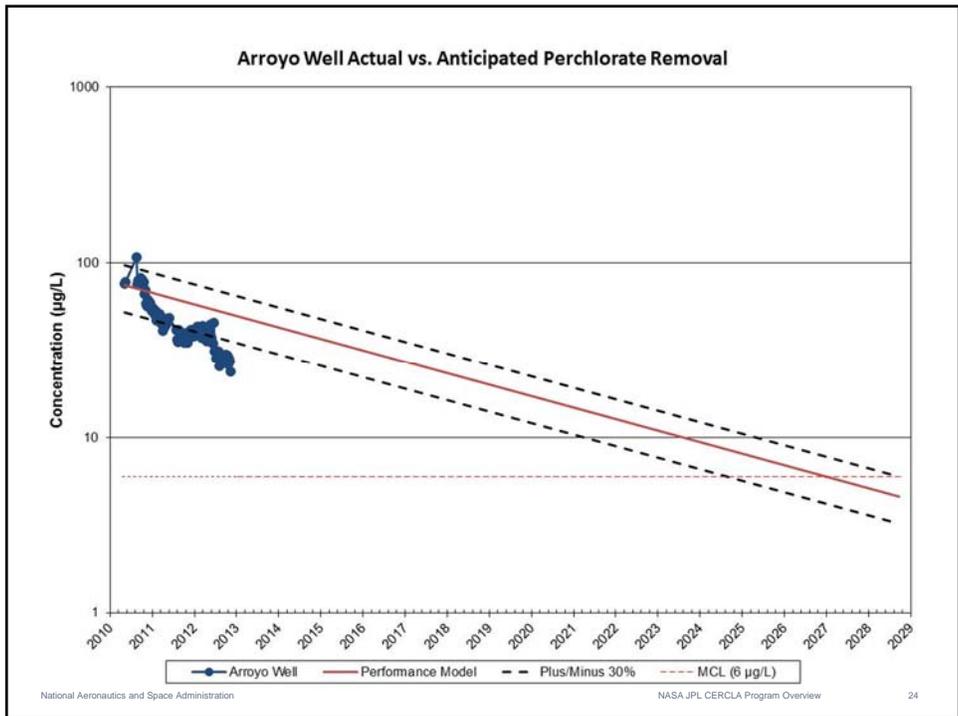
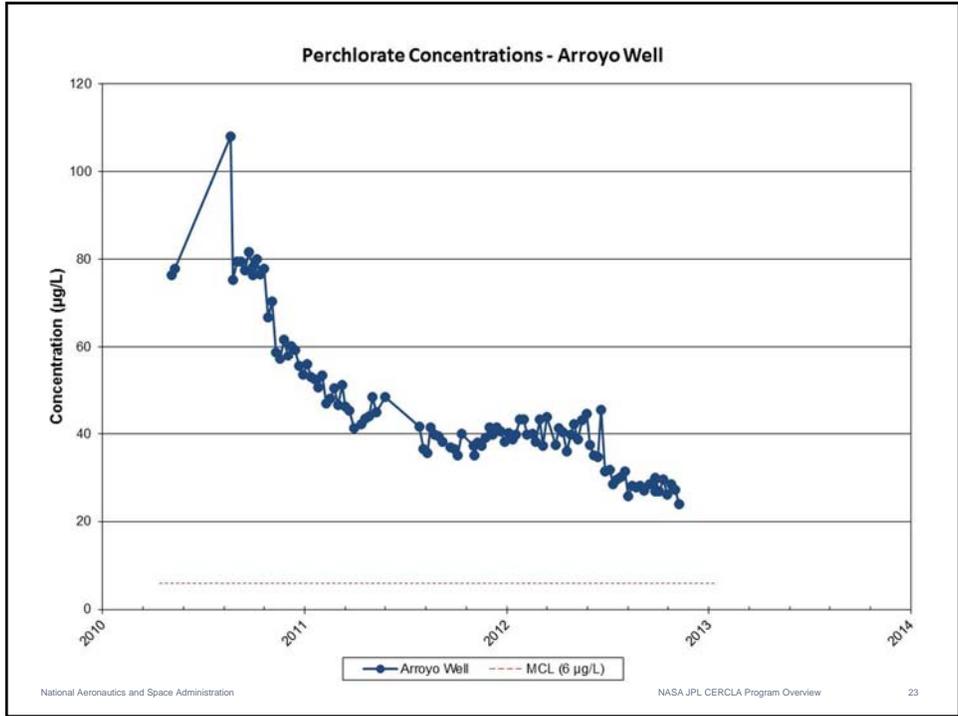


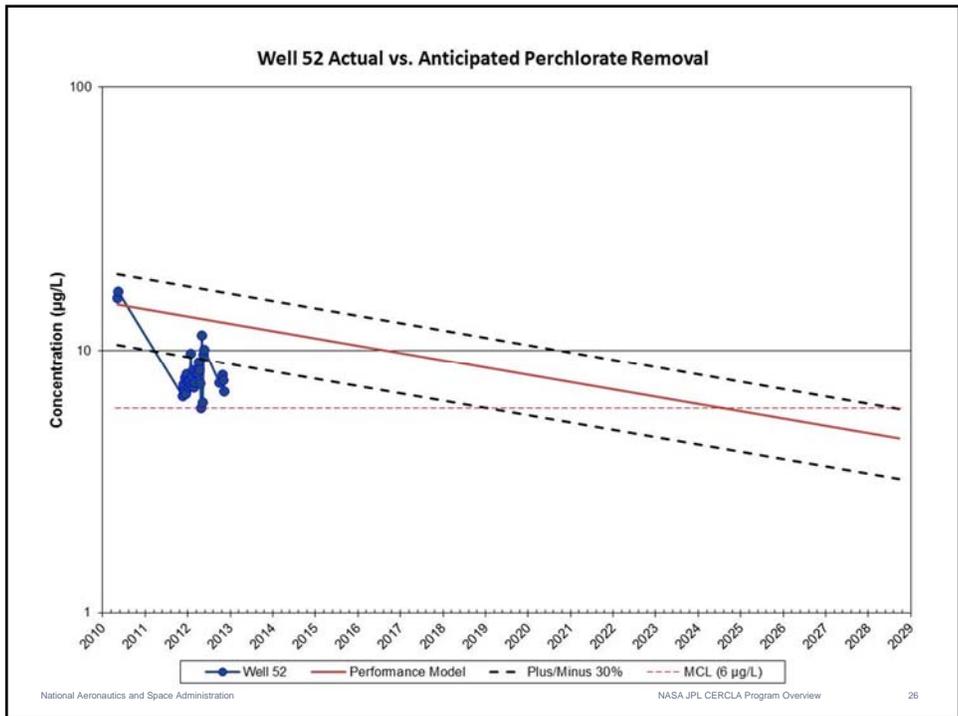
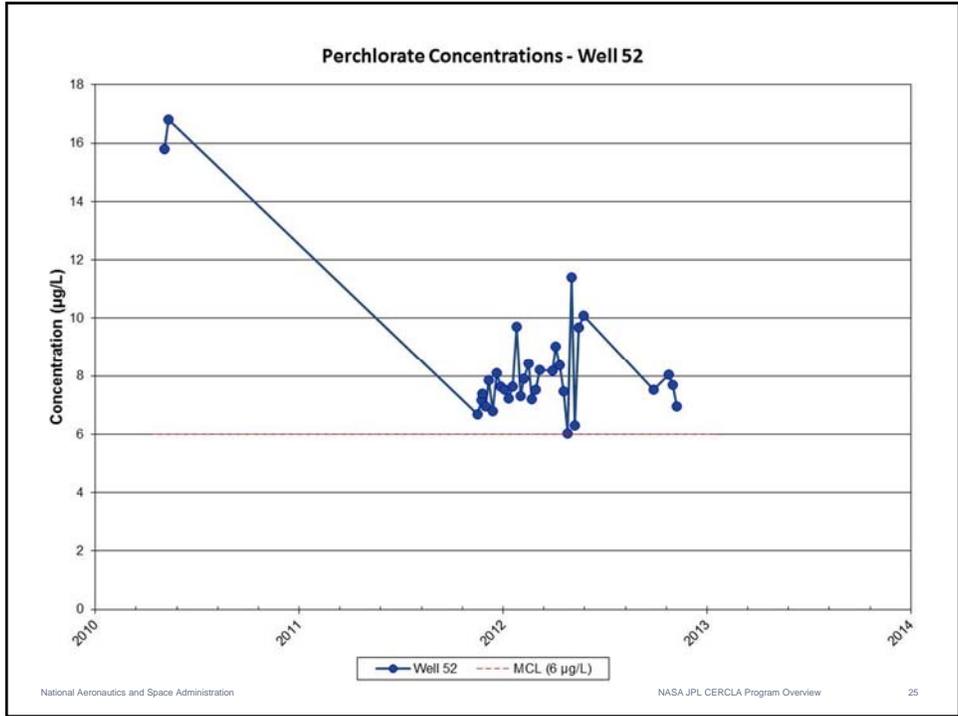


MHTS Operational Summary (January 2011 Through February 2014)

Parameter	Units	Result
Total Volume of Groundwater Extracted	ac-ft	10,627
Mass of Perchlorate Removed	lbs	816
Mass of CCl ₄ Removed	lbs	44
Mass of TCE Removed	lbs	34

- Annual progress report will be submitted in May



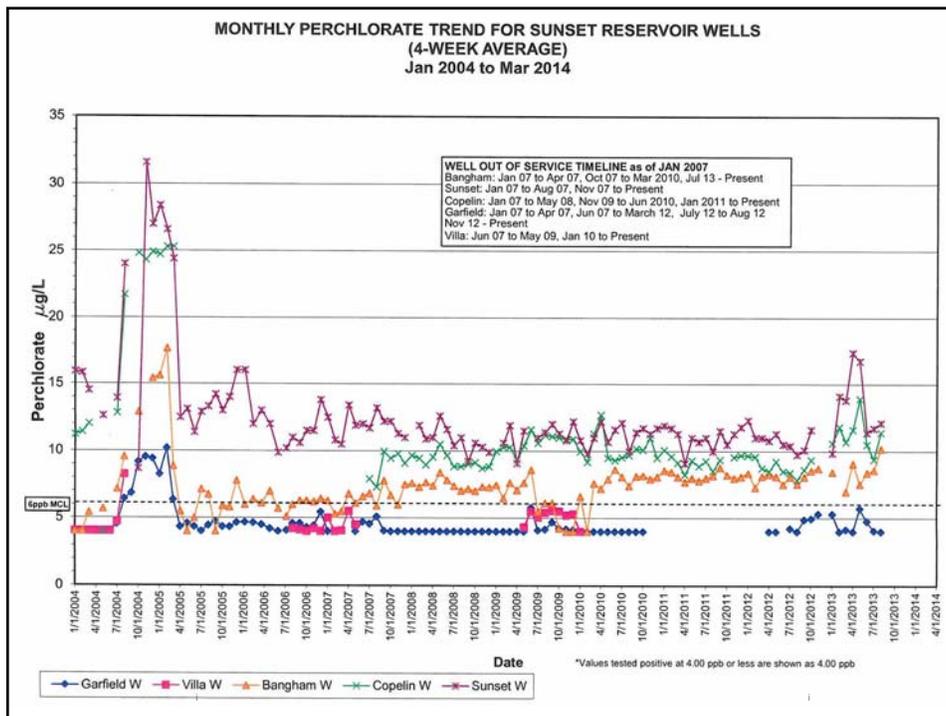


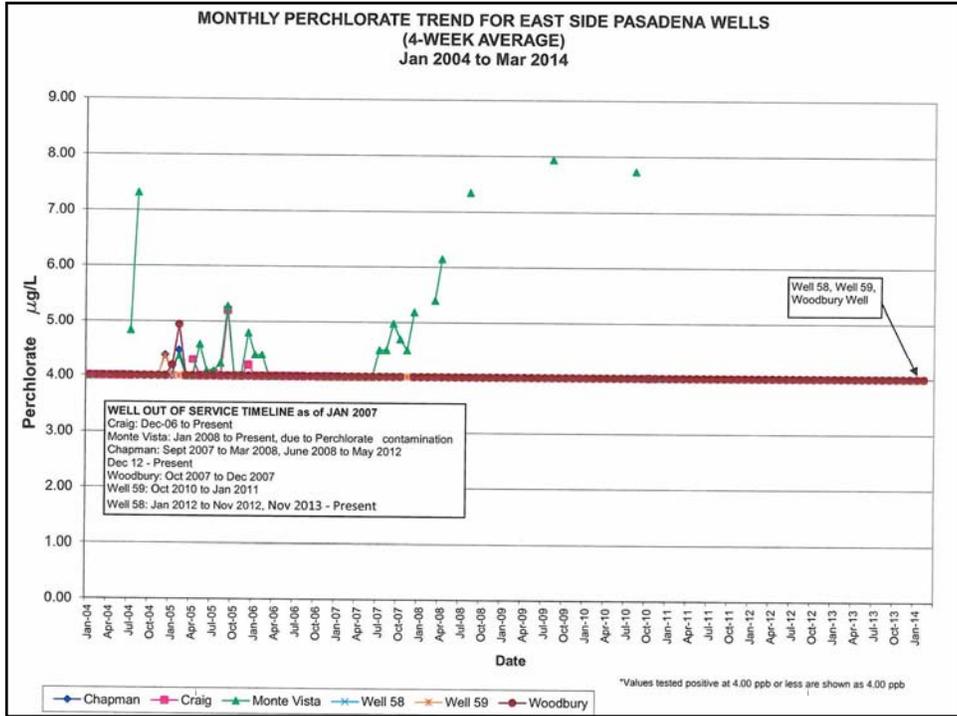
Final Remedy for Groundwater

- The current OU-1 system, LAWC system, and the MHTS are operating effectively and are fully protective of human health and the environment.
- Moving Toward a Final Remedy for Groundwater
 - » Draft Focused FS was submitted to the regulators and local water purveyors on June 17, 2013
 - » Draft Final Focused FS submitted February 24, 2014
 - » Proposed Plan – Public Review and Public Meeting – Late Summer 2014
 - » Final Record of Decision (ROD) – Final in 2015
- A Final Remedy for groundwater is required under CERCLA (currently we are operating under Interim Remedies since 2007).
- The optimization projects and the selection of the Final Remedy are separate and independent processes.

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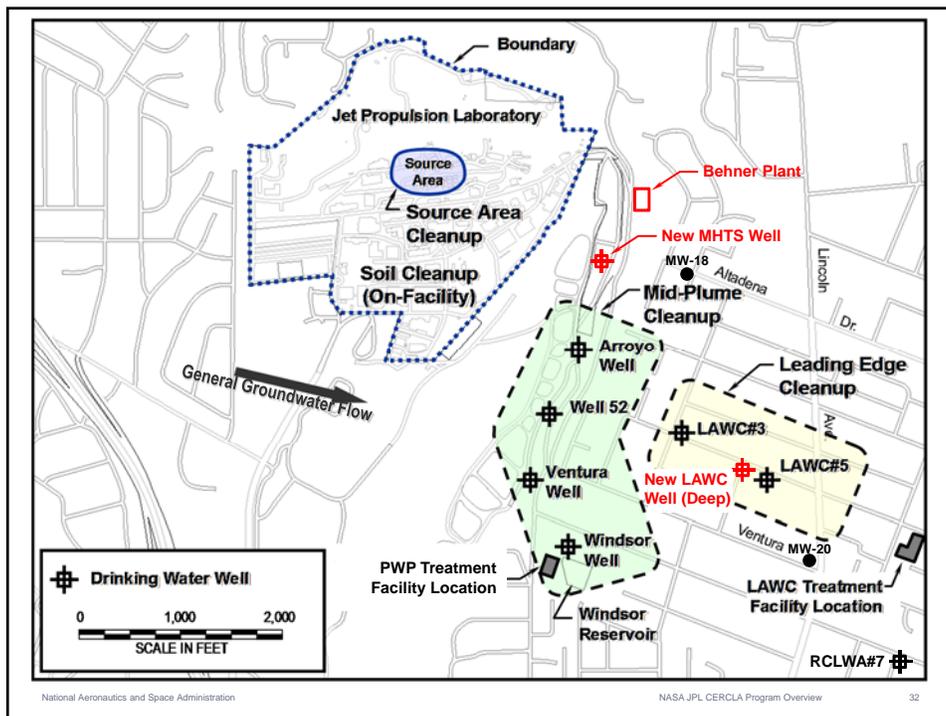




Optimization Projects

Optimization Concepts

- *November 2012*: Initiated a Project to Evaluate Optimization Concepts That Would Reduce JPL's Life-Cycle Costs and/or Mitigate Risks
- Identified Three Optimization Concepts working with LAWC and PWP:
 - » **New LAWC Well** – Enhanced Leading-Edge Containment, Operational Flexibility (No Change to Treatment Plant Capacity)
 - » **New MHTS Well** – Enhanced Mid-Plume Capture, Operational Flexibility (No Change to Treatment Plant Capacity)
 - » **Wastewater Management Improvements at MHTS** – Incorporate Storage Capacity of Behner Treatment Plant
- Presented Concepts to JPL Regulators and Local Water Purveyors (April 2013)
- Met with CDPH (March 2013) and RBMB (January 2014)
- Draft Optimization Work Plan submitted to regulators and local water purveyors on February 24, 2014 (30-day review)
- Contract has been awarded to design and install the New LAWC Well; MHTS enhancements are planned for 2015 and 2016

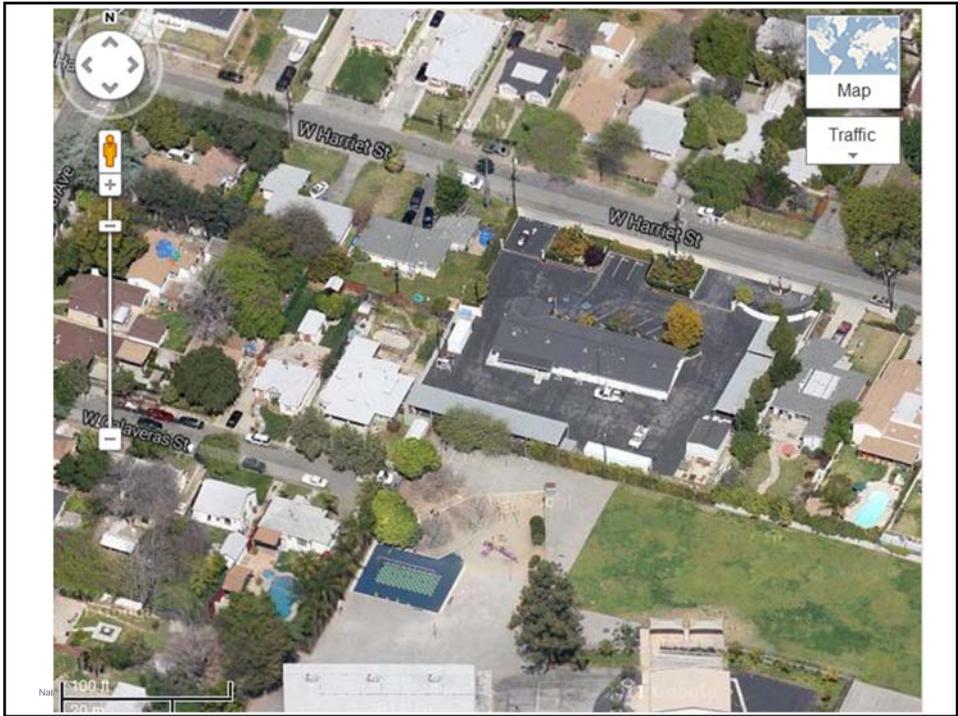


The New LAWC Well Purpose

- **Enhance reliability and containment.** LAWC#5 (installed in 1971) is currently the furthest downgradient containment well associated with the NASA JPL cleanup program. Concentrations of perchlorate and carbon tetrachloride have increased in samples collected from LAWC#5 since 2004, with current levels near 20 µg/L and 2 µg/L, respectively. A new well near LAWC#5 improves system reliability and the ability of the LAWC system to effectively contain the leading edge of the chemical plume originating from JPL.
- **Enhance plume capture and mass removal at the leading edge of the JPL plume.** Some of the perchlorate detections near the leading edge of the JPL plume have been in the deeper portions of the aquifer, below the screened interval for LAWC#5. A new well near LAWC#5 would be screened in the deeper portions of the aquifer to better capture chemicals originating from JPL.

Water supply wells in the Monk Hill Subarea were installed up to 100 years ago, before the neighborhood. New LAWC well must be installed within a densely populated residential neighborhood. Planning and permitting must deal with the following challenges:

- **Space** – Limited space for well installation and development equipment.
- **Sensitive Receptors** – The LAWC facility located at 564 West Harriet Street is bordered by residential homes on the east and west sides and an elementary school to the south.
- **Sound Walls (LAWC)** – Temporary sound walls will be installed on all sides of the work area prior to construction.
- **Development Water Treatment** – Estimate 8.0M gallons of well development and testing water. Will utilize filtration equipment at the well site and the LAWC plant (with sacrificial media) for treatment.
- **Other Projects** – Multiple projects will be underway in and around the Arroyo Seco in the coming years.

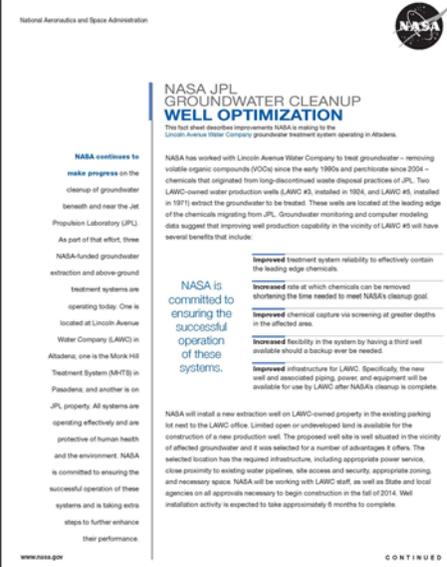


New LAWC Well – Next Steps Discussion

- CERCLA
 - » Optimization Work Plan Review
- CDPH
 - » Optimization Work Plan and CDPH Technical Report
 - » CEQA Initial Study
 - » Design Drawings
- RWQCB
 - » Surface Water Discharge (NPDES) Permit Revision
- RBMB Requirements
- LA County Well Permit

Community Outreach Update

- Preparing an Addendum to the Community Involvement Plan (CIP) prepared in 2006
- Targeting August 2014 for the Public Meeting associated with the Final Remedy for groundwater
- Preparing an outreach Fact Sheet associated with the new LAWC well



National Aeronautics and Space Administration

NASA JPL GROUNDWATER CLEANUP WELL OPTIMIZATION

This fact sheet describes improvements NASA is making to the Lincoln Avenue Water Company groundwater treatment system operating in Altadena.

NASA continues to make progress on the cleanup of groundwater beneath and near the Jet Propulsion Laboratory (JPL). As part of that effort, three NASA-funded groundwater extraction and above-ground treatment systems are operating today. One is located at Lincoln Avenue Water Company (LAWC) in Altadena, one is the Mark Hill Treatment System (MHTS) in Pasadena, and another is at JPL property. All systems are operating effectively and are protective of human health and the environment. NASA is committed to ensuring the successful operation of these systems and is taking extra steps to further enhance their performance.

NASA has worked with Lincoln Avenue Water Company to treat groundwater - removing volatile organic compounds (VOCs) since the early 1990s and perchlorate since 2004 - chemicals that originated from long-discontinued waste disposal practices at JPL. Two LAWC-owned water production wells (LAWC #3, installed in 1994, and LAWC #5, installed in 1971) extract the groundwater to be treated. These wells are located at the leading edge of the chemicals migrating from JPL. Groundwater monitoring and computer modeling data suggest that improving well production capability in the vicinity of LAWC #5 will have several benefits that include:

- Improved** treatment system reliability to effectively contain the leading edge chemicals.
- Increased** rate at which chemicals can be removed shortening the time needed to meet NASA's cleanup goal.
- Improved** chemical capture via screening at greater depths in the affected area.
- Increased** flexibility in the system by having a third well available should a backup ever be needed.
- Improved** infrastructure for LAWC. Specifically, the new well and associated piping, power, and equipment will be available for use by LAWC after NASA's cleanup is complete.

NASA will install a new extraction well on LAWC-owned property in the existing parking lot next to the LAWC office. Limited open or undeveloped land is available for the construction of a new production well. The proposed well site is well situated in the vicinity of affected groundwater and it was selected for a number of advantages it offers. The selected location has the required infrastructure, including appropriate power service, close proximity to existing water pipelines, site access and security, appropriate zoning, and necessary space. NASA will be working with LAWC staff, as well as State and local agencies on all approvals necessary to begin construction in the fall of 2014. Well installation activity is expected to take approximately 6 months to complete.

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