

Final Meeting Notes: Community Advisory Group (CAG)
Aerojet General Corporation Superfund Site Issues
Meeting Date: March 16, 2016

1. Introductions and Attendees

Janis Heple, CAG Chair, opened meeting at 7:08 p.m. by noting sign-in sheet, explaining meeting format, agenda changes and beginning introductions.

Attendees:

- Allen Quynn, City of Rancho Cordova
- Alex MacDonald, RWQCB
- Brian Rinde, Golden State Water Agency Company
- Charles O'Neill, HDR
- Chris Fennessy, Aerojet Rocketdyne (Aerojet)
- Dan York, Sacramento Suburban Water District
- Frederick Gayle, Sacramento Suburban Water District
- Jackie Lane, U.S. Environmental Protection Agency (EPA)
- Janis Heple, CAG Chair
- Jerald Drobesh, Community Member
- Jimmy Spearow, Community Member
- Kevin Thomas, Sacramento Suburban Water District
- Larry Ladd, CAG Member
- Mars & Mayree Burnside, Community Members
- Peter MacNicholl, Department of Toxic Substances Control (DTSC)
- Stephen Green, SARA
- Tammy Teurn, HDR – EPA Contractor

Draft Meeting Notes from January 20, 2016 (minor changes shown below were made)

- Page 4: Typo – delete the standalone “r” in the answer to the third question
- Add introduction of new CAG members: Allen Quynn, City of Rancho Cordova (replacing Brit Snipes) and Jim Rohrer, DTSC (taking over for Steven Ross)

Q: There are businesses across Folsom Blvd. from the SVE extraction system that is in Area 49000 (hotel, Samurai Sushi, law firm, etc.). Do we know if the workers there are protected?

A: [A. MacDonald] Samples collected in the street show that soil vapors have not gotten that far.

Q: So the levels did not pose a risk?

A: [A. MacDonald] Correct.

2. Aerojet Community Update – Chris Fennessy, Aerojet

Carmichael Area - drilling occurring at four locations to install monitoring wells and investigate extent of n-Nitrosodimethylamine in groundwater.

- Waynart Court: Monitoring well installation completed
- Lindi Court: Next monitoring well installation to occur
- Oak Cliff Circle and Ancil Hoffman Park: Two monitoring wells being installed in next couple months (more updates will be provided at May CAG meeting)

Sailor Bar Park Area:

- Two monitoring wells installed at Sailor Bar Park
- One recently completed on Oakview Lane
- Next monitoring well location will be on Greenvale Road (potentially in May)
- Two more proposed (will be discussed later)

Q: Mr. Cox blocks any wells within his neighborhood, is this close?

A: [A. MacDonald] No, it's really close but not in his neighborhood.

3. Aerojet Site Project Overview – Alex MacDonald, RWQCB

Presentation shared with CAG that was given to RWQCB Board in 2006 and updated in 2014. The presentation highlighted the Aerojet property and operable units (OU's), it discussed the history of how contamination occurred, and Aerojet's investigation, monitoring, and clean-up efforts.

Key background highlights include:

- Aerojet moved to Sacramento in 1950 with 20,000 acres in Rancho Cordova
- Due to hydraulic mining, property was left with piles of cobble – good for industrial work, but bad for placing wastes on the ground
- Between 1952 & 2006, the RWQCB issued 40 orders (NPDES permits, waste discharge requirements, Cleanup and Abatement Orders, Referrals to the Attorney General, etc.) to Aerojet regarding waste discharge to water, including stormwater runoff and industrial discharges
- Contamination areas: the Aerojet Superfund Site, Inactive Rancho Cordova Test Site (IRCTS), Areas 39, 40 and 41, Mather Air Force Base and White Rock Road North Dump #4, Purity Oil Sales
- Groundwater flows generally to the west and moves off of property (depth to water on east side 10-20 ft. down, but over 100 ft. on west side)
- Today Aerojet is divided into sectors A-G based on groundwater flow
- Contaminants of Concern: Solvents for cleaning, liquid rocket motor (uses hydrazine-based fuels), TCE, perchlorate (primarily ammonium perchlorate found in rocket propellant)

Clean & Abatement Orders (C&As):

- In response to Cleanup and Abatement Orders, Aerojet designed and operated five groundwater extraction and treatment systems commencing in the early 1980's. They designed, built and operated these systems without any permits and were some of the first such systems in the United States for addressing solvents.
- The solvents, TCE and PCE were main concerns on property. Aerojet pumped, treated and then injected water back into ground. NDMA was an issue on east side of the site
- In 1983, EPA declared Aerojet property as one of the first 114 Superfund sites in the country
- In 1989, a partial consent decree was issued between Aerojet, federal and state governments to conduct an RI (remedial investigation) on the property

- In 2002, the partial consent decree was modified
 - Divided by operable unit
 - Deed restrictions
 - Alternate water supply contingency plan
 - Put up \$75 million and financial insurance
- Aerojet conducted RI (remedial investigation) on 330-350 source sites

Aerojet Action – Under Partial Consent Decree:

- Monitored offsite water supply wells
- Provided treatment systems on three offsite wells in 1993
- Operated five groundwater treatment plants and set standards (different from today's)
- In 1996, when the US EPA confirmed that perchlorate toxicity was a problem, RWQCB directed Aerojet to study groundwater contamination for perchlorate and add perchlorate treatment at its groundwater treatment facilities
- Perchlorate was found south of the American River and in groundwater flowing to the northwest into Sailor Bar Park in Fair Oaks. The extensive off-site plume to the southwest is due to injection from two treatment system that removed VOCs, but not perchlorate
- 18 wells shut-off due primarily to perchlorate contamination, with a few due to NDMA
- Aerojet paid for most of new pipelines to connect operational wells and constructed new water supply wells (i.e. Mather Field family housing area)
- Responsible for contingency plan for future well losses
- In 1999, water purveyors sued Aerojet and State for contamination. RWQCB requested Aerojet make offsite plume an operable unit and begin investigation
- USEPA issued a Record of Decision in 2001 for groundwater contamination off-site to the west
- In 2002, EPA issued Aerojet a unilateral administrative order requiring Aerojet to design remedy and included requirements for replacement water when needed

Q: What year did Aerojet win its lawsuit with the Department of Defense to pay 88%?

A: [A. MacDonald] Sometime in the 90s and has been renegotiated for more since then.

Q: I'm on the Sun River email group; what area is the contamination in?

A: (A. MacDonald) The Island Operable Unit.

Q: On the map what do the squares represent?

A: [A. MacDonald] Each square is an area with very high TCE concentration (concentration levels over 13,000 ppb of TCE in groundwater), representing a potential pure product at one point in time; however, there might not be a pure product there today.

Q: On the distribution of TCE, please discuss the Citrus Heights dump and the 1961 hydrazine that killed the fish.

A: [A. MacDonald] Risk is not only based on TCE. The sand and gravel operation that operated in the Sun River area had washwater ponds that went into Buffalo Creek. Past hydrazine spills on Aerojet that reached Buffalo Creek brought NDMA into the washwater ponds where the fish kill occurred. Leakage from the ponds to groundwater allowed NDMA to get into the

groundwater. The groundwater goes westerly towards American River and now contamination is on the opposite side of the river in Carmichael.

Q: You now know you have shallow NDMA at layer 1? Is there NDMA at a lower level?

A: [A. MacDonald] The concentrations off property are deeper than the ones on property today.

Q: Regarding the wells over Rancho Cordova that were closed, what was the alternative source of water? Where did it come from?

A: [A. MacDonald] Rancho Cordova originally received water from other areas within the Golden State Water system that were away from the contamination. Additionally, wells brought water to the Rancho Cordova area from adjacent areas. Aerojet eventually paid Golden State Water Company for the construction of four additional water supply wells and expanded the surface water treatment plant.

Q: I'm assuming the wells are monitored monthly?

A: [A. MacDonald] The wells are sampled monthly by RWQCB, Aerojet, and the water purveyors.

Q: For which chemicals?

A: [A. MacDonald] We sample for all of the concerned solvents, volatile organics, NDMA and perchlorate.

Q: What is the best way to get perchlorate out of water?

A: [A. MacDonald] The easiest way is ion exchange. Perchlorate absorbs onto the resin; periodically the resin gets saturated and then you'll replace it with the new resin. The spent resin gets burned.

Q: There's a big water tank out at Mather, what's the source of that water?

A: [A. MacDonald] The tank was paid for by Aerojet and Boeing to be used as an extra water supply. I believe it holds 1.8 million gallons.

Q: Where does it come from?

A: [A. MacDonald] It gets filled up by the California American Water (Cal-AM) and is used as an emergency supply. It can also be filled by wells operated by Sacramento County.

Q: Does Mather use it?

A: [A. MacDonald] If needed, the tank can be used by Sacramento County to supply facilities and housing on Mather.

Q: So the wells are still active?

A: [A. MacDonald] Yes. Family housing wells are not impacted by Aerojet or Boeing operations and are also sampled on a regular basis.

Q: An important note: After 34 years of mitigation efforts, the plume is still spreading and that is the source of enormous frustration for most of us.

A: [A. MacDonald] *I would say the plume is pretty much under control with only a relatively small area remaining to be captured.*

Q: There are three identified contaminants that are regulated at really low levels. Your risk, if there's a risk, is the other contaminants that are more persistent in groundwater that are at the periphery of the system. As the liquid rocket fuel breaks down, there are 15 different carcinogens and the three regulated chemicals do not represent the sum of the risk. However, NDMA is the worst.

A: [A. MacDonald] *If you look at how the system works, we have Aerojet do a tentatively identified compounds (TIC) analysis. Sometimes TICs will show up and they'll be gone for a year and a half, then they'll show up over here and it's gone so we don't know whether it's actually there as they are at very low concentrations and are not consistently detected.*

Q: What year did Aerojet first show up in the city?

A: [A. MacDonald] *They bought the property in 1950.*

Q: Who owned it before that?

A: [A. MacDonald] *The Natomas Land Company. They're the people who were doing the dredging and actually had water rights. They had about 20,000 acre feet of water rights.*

Q: Has there been any unusual medical problems in this area that could've been caused by contaminants?

A: [Community Member] *The reason they found NDMA is because when they looked at cancer in Rancho Cordova, there were 111 cases of cancer instead of 85 as expected.*

A: [A. MacDonald] *It wasn't because of cancer; we were looking into NDMA before the cancer cases were made known. When perchlorate was found, we wanted to make sure it was the only contaminant. We actually had Aerojet sample the water supply wells for NDMA, in fact, that's where they found NDMA in the Golden State Water Company wells 15, 16 and 9.*

Q: Perchlorate is one of the causes for thyroid problems. Has anybody studied thyroids?

A: [A. MacDonald] *Yes.*

Q: Has thyroid problems been an issue in area?

A: [Community Member] *At a certain dose, it's going to be a problem. I think there may have been a couple of thyroid cancer patients in the area. This issue has basically gone to a national level for regulation.*

A: [A. MacDonald] *The current drinking water standard in California is six micrograms per liter. There are only two states that have a drinking water standard of perchlorate. In California the standard for perchlorate is undergoing a 5-year review. The standard could be revised following the review process.*

Q: Have they changed the process for making rockets?

A: [A. MacDonald] *Probably not a whole lot. The propellants are the same; however, wastes from the process are handled much differently to prevent release to the environment.*

Q: So if they use the same process, you're going to get something similar to Chernobyl here. If you never change the process, you're doing the same thing over and over.

A: [A. MacDonald] They're not dumping on the ground anymore. Aerojet is doing all the rocket pre-work out of the area. Most of the contamination wasn't from actual testing. Most of it was from making or putting the rockets together and trying to keep it clean. Dumping everything onto the ground—they don't do that anymore. They're not allowed to anymore.

Q: Could you send the PowerPoint to Janis or us for background info?

A: [A. MacDonald] Yes, we updated the Board in 2014, but it didn't have as much of the background in it.

4. Island Operable Unit (OU-7) Remedial Investigation Report - A Guided Tour – Chris Fennessy, Aerojet

Chris Fennessy presented information from the remedial investigation for the Island OU.

- Eastern OU is solid rocket test area
- Central OU is basically everything in the middle
- Cavitt Ranch is its own OU

Groundwater plume expanded due to groundwater flow. Aerojet had two groundwater extraction treatment systems E and F. Aerojet removed TCE and injected the treated water back into the ground.

- In 2005, Aerojet prepared a field sampling plan to implement the remedial investigation
- Aerojet was required to investigate areas where chemicals were known to have been released under the partial consent decree
- Lots of groundwater data that indicated there were chemicals in the groundwater
- Initial investigation data from late 1980s, early 1990s that identified problem
- As water supply wells became impacted after 1991, all focus went to groundwater to make sure water supply was protected
- In 2004-2005, focused on internal portion of site to investigate contamination and where chemicals seeped into ground
- Island OU was one of first to be investigated in 2006-07
- Collected samples of soil, soil vapor and groundwater (thousands of samples)
- Documented everything within report
- 2012 submitted draft to agency for review
- 2014 received all comments back and began revision
- Aerojet submitted responses to Agency comments in September 2014
- Received EPA final comments in December 2014
- Resolved all responses to comments in March 2015
- Submitted revised draft RI to Agencies in September 2015
- Received EPA approval to publish in March 2016

Chris Fennessy presented the layout of the Remedial Investigation (RI) report and explained what is in each section and where to find copies including: Sacramento State Library and the Downtown Sacramento Library. There is also a CD with appendices to accompany the report.

- Sections 1-4: Introduction, background, approach with discussion of Central Disposal Area
- Sections 5-8: Lines 1 and 3 through 5
- Sections 9-11: The Hog-Out Area, Thermal Treatment Area and Area 40
- (Area 39, the state vehicular recreational area is included within the Island OU but the RI was completed previously under the Boundary OU)

All sections are set up the same way and all figures and tables match section numbers. The sections discuss the source areas, what they were used for, what the physical features are, where the aquifers are, and identify all chemicals present and how they impact, etc. for each area.

Q: Could you describe which area is the Central Disposal Area?

A: [C. Fennessy] *The Central Disposal Area is south of the main Aerojet entrance off of Hazel Avenue. If you continue south on Aerojet Road, you would run right into it.*

Q: Which part describes the Island unit that's in the northern end of AMPAC Fine Chemicals?

A: [C. Fennessy] *It's in line 5, Section 8 or part D.*

Q: Is the AMPAC Chemical operation still processing?

A: [C. Fennessy] *Yes.*

A: [A. MacDonald] *Instead of doing herbicides, they do research drugs for AIDS, HIVs, hepatitis, cancer drugs, etc.*

A: [C. Fennessy] *When we operated it, it was an herbicide manufacturing facility.*

Q: I've lived in the area a long time. How did Aerojet move its rockets once they were assembled, by truck?

A: [C. Fennessy] *Yes, they move rockets by truck still today.*

Q: And that's safe?

A: [C. Fennessy] *They use special routes and notices prior to the move. It's been done that way for a long time.*

Q: I'm assuming there isn't a problem with it?

A: [C. Fennessy] *Right now most of the testing is done in Vandenberg Air Force Base. There still is a lot of solid rocket manufacturing done at Aerojet but most testing is at Vandenberg.*

Section 3 talks about how we went about our remedial investigation for 71 source areas between 2006 and 2007. Risk management decision boundaries were based on 100 times the screening level, so essentially if you get into a number 100 times the screening level, you have to take action. The cost analysis that must be done if it's above 100 times the risk level is also captured. Each area sampled looked at every chemical.

Q: Is it fair to say in this stage you're triaging?

A: [C. Fennessy] *Yes.*

In the report, data was screened against the 2012 regional screening levels (RSLs), even though the investigation was performed in 2006 and 2007. The screening indicated additional data was necessary to define the extent of contamination down to the 2012 RSLs. Before the document was published, we re-screened the data against the 2014 screening levels and again determined more investigation was necessary. To conclude, this upfront section is an analysis of whether or not we met the objectives of the field sampling plan.

Q: Three chemicals that we talked about in the past, I'm just checking to see if they're in there. Tetramethyltetrazene

A: [C. Fennessy] *Tetramethyltetrazene would've been analyzed under an SVOC and if we detected it, it would be there.*

Q: You did find it, though?

A: [C. Fennessy] *I don't have that answer.*

Q: Ok, formaldehyde?

A: [C. Fennessy] *Yes.*

Q: And then ethylene glycol?

A: [C. Fennessy] *Yes.*

Q: Is this relative to 2012 or 2014 RSLs?

A: [C. Fennessy] *2012, but there's a section that also talks about 2014 so it's a sensitivity analysis. We looked at going back and redoing the figures to the 2014 RSLs, but it didn't change significantly enough to warrant going back.*

Q: Were they the same as the California modified levels? The DTSC modified levels, did you discuss those?

A: [C. Fennessy] *It would've been the lower of the California PRGs or the EPA 2014 RSLs. We also used DTSC Note 3.*

Q: So Area 40 is not in there?

A: [C. Fennessy] *Area 40 is in the last section and describes everything up until the 2012 timeframe so all of the supplemental information that we've recently done isn't in here yet. However, there have been additional investigations at Area 40.*

Q: For chlorinated solvents, did you talk about the breakdown of TCE?

A: [C. Fennessy] *We don't talk too much about that just because we don't see the daughter products. We've got thousands and thousands of water samples and we see TCE in probably 98% of them but we've only seen 1-2 DCE in a small percent of the samples.*

Q: How deep do the sample wells go and what levels can they test? Do they go down 25 ft. or 50 ft.?

A: [C. Fennessy] *Not typically. When we put in groundwater wells, it's targeting a specific zone and if multiple depths in area are needed then we'd have three separate wells to monitor three separate areas.*

Q: What is the deepest well you have?

A: [C. Fennessy] *It's between 400-600 ft. and those are off property to the west.*

Q: Have you found any contaminants in Layer F?

A: [C. Fennessy] *We don't have Layer F contamination onsite, but they investigated it offsite.*

A: [A. MacDonald] *Layer F contamination is on the far west of the property about 450 ft. down.*

Q: Can you go down to get clean water?

A: [A. MacDonald] *Yes, Golden State Water Company has put some wells that go down about 500-600 ft.*

A: [Community Member] *Beyond Layer F is saltwater. In 1963, they took the waste and jetted it down to the saltwater so potentially there's a future problem with waste percolating back up from the saltwater.*

A: [A. MacDonald] *On property, injection levels were about 1,000 to 1,100 ft.*

Q: This gives us the flavor of the organization, not the contaminants that are there. This is labeled as being a draft final; the CAG has never even seen the draft RI.

A: [C. Fennessy] *The process goes as follows: we prepare a draft document (the agencies haven't even seen it yet), then we submit it for comments/revisions. The document gets revised with responses to agency comments. Agencies review again and then can approve.*

Q: What I'm asking is more about the levels of contaminants that are there and are we looking at levels that are not just 100 times but a 1,000 or 10,000 or 100,000 times the screening levels, and if so, within which areas? I'm really asking about the mass of TCE and just thinking about how long it's going to take to clean this up to protect human health. How is that going to be done?

A: [C. Fennessy] *During four or five CAG meetings previously, we went through each area. There's so much detail it's difficult to convey. Due to the variety of operational aspects, there are a lot of mass and chemicals out there. There's a performance boundary that we don't want the contamination to get past. Many monitoring and extraction wells are currently being placed, but it's not a quick fix and just placing the wells takes time.*

Q: Has any current wells in the Rancho Cordova area been closed in the last year or two?

A: [A. MacDonald] *No, not in the last year or two.*

Q: No drinking water recently?

A: [A. MacDonald] *No.*

Q: Is there a deadline when it's going to go out to public for review and comment?

A: [C. Fennessy] *It will be in the Sac. State Library and the Downtown Library within the next week.*

Q: I thought you said first it goes through the agencies?

A: [C. Fennessy] *Agencies reviewed the draft version of the document and this incorporates their comments. Since we are not able to finalize until after the data gap sampling, the agencies decided to publish this revised draft document.*

Q: Can the City of Rancho Cordova comment on that document?

A: [A. MacDonald] Yes they can.

A: [C. Fennessy] There's typically not a comment process for documents other than the proposed plan.

Q: We would like the CAG to actually see some of these documents earlier in the process instead of getting to this point to see it.

A: [C. Fennessy] This is the earliest you can see it. We've supplied it to the agencies, we want the agencies to stand beside us and say this document presents the information correctly.

A: [A. MacDonald] There's a long time before the next version is going to be produced, especially for eco-risks.

Q: That's the 2018 version?

A: [C. Fennessy] That's the proposed schedule.

5. Regional Board Aerojet Cleanup Overview – Alex MacDonald, RWQCB

Note: A schedule and map were distributed

Q: If I remember correctly from past presentations, the pond next to the plant has not been sampled?

A: [A. MacDonald] It was sampled in 1993 during the first investigation. They also sampled when AMPAC was looking into filling part of the pond for the project.

Q: I'm assuming there's ongoing testing in the American River and if so, who does it and how often?

A: [A. MacDonald] Under Aerojet permit; there are several locations on American River that need monthly sampling due to all the different discharge points upstream and downstream.

Q: No big issues in the American River?

A: [A. MacDonald] There shouldn't be unless someone else is discharging because currently groundwater is going underneath the river. In 1983, there was higher perched groundwater in the vicinity of the fish hatchery that had TCE making it into the river.

Q: How did they test the river? Did they test the different levels up the water?

A: [A. MacDonald] A bailer is lowered (i.e., off Sunrise there is a pedestrian bridge to go along where a bailer can be lowered into the water to grab a sample). Other samples are collected from the bank of the river by throwing a bailer out into the river and retrieving with an attached rope. Additional samples are collected at the influent to the Carmichael Water District and City of Sacramento intakes off the American River.

6. 2016 Meeting Dates

- May CAG - Wednesday, May 18, 2016 (American River South Room)