

**North Pole Refinery-Technical Project Team Meeting
January 8, 2013
Final Summary**

TPT members in attendance

Dave Barnes	University of Alaska Fairbanks
Cindy Christian	DEC Drinking Water Program, Compliance Program Manager
Tamara Cardona	DEC, Contaminated Sites, Project Manager
Ann Farris	DEC
Loren Garner	FHRA Project Manager
Mark Gebbia	Williams, Inc.
Nim Ha	DHSS Health Educator, EPHP
Paul Lhotka	DEC, PERP - via telecon
David Smith	Koch Remediation Services

Support Personnel

Rebecca Andresen	Arcadis
Brian Angerman	Barr Engineering - via telecon
Robert Burgess	DEC
Stephanie Buss	SPB Consulting
Todd DeJournett	Barr Engineering - via telecon
Denise Elston	DEC, Contaminated Sites
Jim Fish	DEC, Contaminated Sites
JoAnn Grady	Grady and Associates -Team Facilitator
Patrick Haas	P.E. Haas and Associates
Chris Kasanske	UAF Graduate Program
Brad Koons	Arcadis - via telecon
Mark Lockwood	Shannon and Wilson
Mary Beth Leigh	University of Alaska Fairbanks
Michael Lilly	GW Scientific
Johnny Mendez	DEC, Drinking Water Program
Andrew Ohrt	Arcadis - via telecon
Shannon Price	FHRA Project Engineer
Gary Remple	Barr Engineering - via telecon
Patrick Sartz	DEC-PERP
Max Schwenne	OASIS/ERM
Marissa Sharra	Koch Industry, Public Relations
Eric Zentner	Boreal Communications

DEC Management in attendance

Steve Bainbridge	DEC: Manager, Contaminated Sites Program
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INTRODUCTIONS AND ACTION ITEM REVIEW

The meeting began at 8:30 Alaska time as team members introduced themselves, approved the day's agenda, and reviewed the one action item from the previous meeting asking whether back calculations can be performed to help answer the question whether increasing sulfolane concentrations in particular wells could be attributed to the change in analytical methods.

Ms. Farris clarified her concern that if a few wells have shown subsequent increases in concentration it may affect the calibration of the ground water model. The question whether the changes were a result of

analytical adjustments or because increasing concentrations are actually occurring in the field needed to be answered. Ms. Buss added that it was stated in the previous TPT by Shannon and Wilson (S&W) that it appeared in some wells that increasing trends may be attributable to the analytical method. Ms. Buss suggested that that statement should be verified through reviewing the analytical recovery data for those particular wells to see if comparable results could be developed. It was agreed this approach should only be used for verifying the potential effect of analytical method changes on increasing trends and should not be used to reassign well data concentrations.

Mr. Garner stated they had discussed the question with Mr. Vitale and concluded that while back calculations could be performed, FHRA was apprehensive to correct old data sets. Dr. Barnes agreed and cautioned against making any trend prediction, at this time, on any corrected data. Mr. Garner stated FHRA is looking to make the decision soon on the best way to collect and compare meaningful data and will be presenting a path forward for discussion on the topic in the upcoming subgroup meetings.

DRAFT COBC MEETING UPDATE

Mr. Bainbridge presented a brief update to the team regarding recent discussions among managers from DEC, FHRA and Williams, Inc. He reported that at the December 19th meeting to discuss the draft COBC, Flint Hills announced that they would soon be presenting DEC with a transition plan identifying project tasks for which they would no longer be responsible, and for which they felt should be addressed by Williams. He stated that on January 2nd, DEC received and reviewed the plan and is continuing discussions with all parties. DEC is currently focusing on two deliverables: the Onsite Site Characterization Work Plan and the Offsite Characterization Work Plan. DEC is working to identify current data gaps, who will be responsible for filling the data gaps, and the timeline for completing the tasks. He stated a forthcoming modeling meeting between parties would hopefully provide further information toward filling the data gaps.

DATA SHARING AND WEB BASED APPLICATION DISCUSSION

Mark Lockwood began discussions on the data sharing and web based application and provided background on the subject to the team. He stated Shannon and Wilson developed an internal database in 2005 for FHRA which included a GIS component. This database allowed their team to manage data, produce reports, track information at sites, import data from labs, etc. He stated that Shannon and Wilson is presently working to update their web based data sharing tool and will be setting up meetings with DEC in the very near future to agree on the best way forward to address data sharing needs. Mr. Lockwood agreed to set up the meeting.

ACTION ITEM Mr. Lockwood will schedule a meeting the week of the January 21st for the team to discuss its data sharing needs. Mr. Lockwood will send out the agenda and invitations to the meeting by January 16th to give the invitees time to send any specific questions that they would like to discuss during the meeting.

Mr. Lockwood shared that historically, data has been provided only after submission of a hard copy report to ensure that the data shared had been adequately validated. Mr. Farris explained that this has caused too long of a delay for DEC to adequately keep up with the results of data being generated at the site. She voiced her objective to make certain those parties working on the offsite and onsite portions of the site

had access to all data as soon as possible so they are understood in context of how they each inform the activity of the other. She furthered that the data sharing has become more time-critical as the University continues to conduct their work. Mr. Smith assured DEC that once data is validated, it will be shared on a timelier basis, and data sharing will not be held until submittal of written reports. The team will meet to discuss the specific agreed upon prerequisites needed to meet that objective.

Pressure Transducers

The team segued into discussion on transducer data. Dr. Barnes began the discussion suggesting that the team come to an agreed upon approach in collecting pressure transducer data. He cited several ways in which collecting data incorrectly can result in error. Mr. Garner suggested members of the site characterization subgroup come to agreement on the SOP regarding transducer data collection, finalize an agreed-upon approach to process the data, and, agree on the project standards for interpreting those results. The also agreed that the subgroup should take up discussions and come to agreement on the frequency of the transducer surveys.

The team agreed to hold two separate meetings, one to discuss the data sharing application, and the other to discuss the transducer specifics.

THE PFC DISCUSSION

Ms. Andresen began the discussion regarding the sampling process for perfluorinated compounds (PFCs) undertaken by FHRA. As discussed earlier, these compounds may be included in firefighting foam which has been used at the refinery site. Ms. Andresen said that two separate labs are working on the Phase 2 sampling and she had just received the final data from Test America and the preliminary data from AXYS Laboratories. She reported there was only one detection found in the Phase 2 samples that exceeded DEC screening levels. She emphasized these were preliminary results and while FHRA would usually wait to validate the information, they wanted to share the first results with the technical project team. She added there were detects, but the only sample above screening levels was at the same location as Phase I. She also noted there were a number of 'flags', which would be expected, but those would be examined during the validation process. They are still awaiting final data from AXYS Laboratories.

Ms. Farris asked if both labs were using the same analytical method. Ms. Andresen thought there may be a very few proprietary differences. Ms. Buss added that based on discussions with EPA, Oregon State University and Environmental Standards, it is believed that the methods were essentially the same, and that the chemistry subgroup would look at the results and be able to compare. Ms. Buss agreed to schedule a meeting of the Chemistry Subgroup to discuss the validation of the results of recent sampling for perfluorinated compounds at the site once the final data is available.

Mr. Haas asked if the precursors to PFCs could also be tested for at the site, stating the only lab in the US at this time that is testing for the precursor chemicals is the Dr. Jennifer Field's lab at Oregon State University. Ms. Buss stated she had discussed this sampling method with Dr. Fields who was very willing to run the analysis if she could receive the groundwater samples. Ms. Cardona stated that it may be helpful to have Dr. Fields run the analysis and the subgroup should take up the recommendation at its next meeting. Ms. Buss stated she had information from Dr. Fields on her current research into the precursors of PFCs and would forward the information to the group prior to the subgroup meeting.

ACTION ITEM Ms. Buss will schedule a meeting of the Chemistry Subgroup to discuss the validation of the results of recent sampling for perfluorinated compounds at the site once data from both laboratories is available. Ms. Buss will forward her information from Dr. Field's lab at Oregon State University to the subgroup prior to the meeting.

SITE CHARACTERIZATION DISCUSSION

Mr. Garner and Andrew Ohrt of Arcadis provided a review of the 2012 Site Characterization Report activities to the team.

- New monitoring wells: A number of new monitoring wells were installed at the site in addition to added transducers. Monitoring wells were installed to evaluate LNAPL distribution onsite, sulfolane concentrations on and offsite, and to support the hydro punch studies, the groundwater model and the transmissivity factor in the hydro-geological studies. Mr. Ohrt added the University of Alaska Fairbanks provided an additional 10 pressure transducers which have been installed in some of the wells.
 - In 2012, 23 onsite wells were added and 45 offsite wells. Sixty nine (69) transducers were deployed.
- Hydro punch investigation was undertaken in 2012 to evaluate, primarily, sulfolane concentration and BTEX concentrations.
- In 2012 FHRA focused soil boring investigation on soils where sulfolane had previously been detected.
- A LIF/UVOST LNAPL investigation was undertaken. LIF/UVOST emits a certain wavelength and as the ground is probed molecules that are present in all PAHs emit light that is picked up by an optical screening tool. LIF/UVOST was used to investigate the distribution of LNAPL in the area.
- Bio studies on sulfolane degradation were started and are on-going.

Ms. Farris asked if the presented data would be included in the 2012 Site Characterization Addendum. Mr. Garner stated all but the bio studies data would be included as it was recently received. He added the bio studies data should be available at the end of February and would be presented in a separate deliverable to DEC.

Ms. Cardona asked Mr. Ohrt to outline where the additional wells had been installed in 2012, both offsite and onsite. Mr. Ohrt showed the locations of the wells and offered FHRAs reasoning behind the placement.

Ms. Grady asked Mr. Gebbia if, given the new transition plan, Williams would be taking over the investigation offsite. Mr. Gebbia stated that discussions were on going and that had yet to be decided. Ms. Farris stated there will need to be ongoing discussions with both FHRA and Williams regarding what DEC considers to be outstanding data gaps both onsite and offsite, and who will be conducting the work to fill the gaps. The team segued into the discussion on specifics of the 2013 Work Plan.

2013 WORK PLAN DISCUSSION

The team undertook a robust discussion on the next steps regarding preparation for work being planned for the upcoming field season. The 2013 Work Plan which is to be submitted to DEC in February will address the next steps being proposed by FHRA and will feed into the upcoming deliverables including the Feasibility Studies and Cleanup Plan. Ms. Farris indicated there is a time sensitive need for data, and asked how FHRA planned to assemble and present the needed data to DEC.

Ms. Andresen presented an overview of the 2013 Work Plan, the data that will be collected and the documents into which the data will be placed. The team discussed specifics of the monitoring well network for the air sparge system, the bio studies currently underway, the investigation for sulfolane intermediates, the increasing trends of sulfolane in particular wells, and how FHRA will present the current data to DEC for their review.

Ms. Farris emphasized the need for DEC to have access to this important data in order to evaluate the decision to approve the plan. Mr. Smith concurred and stated FHRA will do their best to provide the information to DEC for their review.

THE DEGRADATION SUBGROUP

Mr. Fish, Dr. Leigh, and Dr. Barnes updated the team on recent developments within the Biodegradation subgroup. Mr. Fish briefly reminded the team that the objective of the subgroup is to understand the mechanisms by which biodegradation is occurring at the site in order to recommend its own remedial actions or to evaluate the efficacy and protectiveness of others that may be proposed. To this end, the subgroup is working under a study plan to determine whether degradation is occurring through biotic or abiotic mechanisms, or a combination of both, and whether the degradation process is producing potentially harmful chemical intermediates that may persist within the affected area. The subgroup has partnered with the University of Alaska Fairbanks (UAF) as well as FHRA contractors Barr Engineering to carry out the objectives of the study plan. He introduced Dr. Barnes and Dr. Mary Beth Leigh who updated the team on the status of various research efforts that are currently underway at UAF.

The goal of the current research program at the University is to isolate and identify sulfolane degrading bacteria from the site and to assess the aerobic biodegradation potential in incubations of soil and groundwater that were taken from the site.

Dr. Leigh reported that the preliminary conclusions of the experiment indicate that aerobic sulfolane degrading bacteria are present in the air sparge system and the GAC from the in-home treatment system.

Dr. Barnes updated the team on an ongoing experiment to assess aerobic sulfolane biodegradation in aquifer water and sediment taken from the impacted area. The objective of the experiment is to compare the rates of biodegradation with mixed cultures in native water and soil and to attempt to determine the extent to which degradation can be attributed to biological and abiotic mechanisms. Dr. Barnes briefly reviewed the design for the experiment and its conclusions. He said that, at the current time, 20 days into the experiment, the team has yet to detect any significant decrease in the sulfolane concentration or pH in the experimental samples. Dr. Barnes noted that the biodegradation may be limited by nutrients, temperature, and/or other factors. He remarked that the observations thus far are consistent with the extent of the plume, though they are inconsistent with the apparent sulfolane degradation that has been observed in the air sparge systems. The university will continue incubating and measuring the experiment samples.

CHEMICAL OXIDATION

Mr. Ohrt gave a presentation on why Arcadis, a contractor for FHRA, decided to exclude chemical oxidation as a possible remediation technology in the Feasibility Study (FS). Mr. Ohrt briefly described chemical oxidation, the situations in which it can be used as an effective remedial technology, and some of its chemical and physical limitations. He then described the three-stage screening process that was used by Arcadis to sort through the wide variety of candidate technologies that they included in their draft FS. The initial screening consisted of a broad technical discussion of the applicability of a given technology at the site. This was followed by a more detailed evaluation of its effectiveness, implementability, and cost. The final step consisted of a detailed evaluation according to the nine criteria for evaluation that are outlined in CERCLA. Mr. Ohrt said that evaluation was based on information that has been gathered from bench testing and field work conducted throughout the project as well as the brief memo submitted by Moran Environmental and other sources of literature on sulfolane.

Chemical oxidation was evaluated as a means of treating COCs in soil, ground water, and light non-aqueous phase liquid (LNAPL) contamination. Chemical oxidation was eliminated as a potential candidate for treating sulfolane in LNAPL during the initial screening due to the results of bench tests which show that chemical oxidation has limited effects on COCs when directly applied to LNAPL. He added that his team also determined that chemical oxidation is not implementable at the site since much of its LNAPL lies beneath existing infrastructure and because there was a strong possibility that most of the oxidants would likely slip around the LNAPL when they were applied. Mr. Ohrt also cited concerns about the corrosive properties of most oxidants and the potential threat they would pose to human health and property. He said that his team decided that the cost of using chemical oxidation would be too high given the cost of viable oxidants and the high treatment demand given the vertical and horizontal extent of LNAPL at the site and the impracticality of administering it during the winter months.

Mr. Ohrt said that chemical oxidation was eliminated as a potential candidate for treating sulfolane in soil during the second phase of the screening process. He said that there were concerns that its effectiveness would be highly variable depending on the type of petroleum contamination in the ground in a given area and the implementability would be low given placement of existing infrastructure. He explained that it would not be possible to use chemical oxidation to treat impacts in the unsaturated zone and that the cost of using chemical oxidation to treat COCs in the saturated zone would be very high. Mr. Ohrt said that his team also eliminated chemical oxidation as a potential candidate for treating sulfolane in soil during the second phase of the screening process due to concerns about interference from existing infrastructure and the variability of its effectiveness across the site. He said that, similarly, the horizontal and vertical extent of the plume, and the physical limitations to injection would also make the cost of the treatment prohibitively high.

The team discussed Mr. Ohrt's presentation. A few team members remarked that while chemical oxidation may not be a viable comprehensive treatment technology for the plume, or even substantial portions of the plume, it may still be a viable technology for the treatment of limited areas. Ms. Farris remarked that the concern highlights the advantage of separating the affected area into operable units that account for factors such as the density of existing infrastructure. Mr. Smith commented that while it appears that chemical oxidation may not be practical as a comprehensive treatment, it may be viable for

use in certain surgical operations. He added that there may be cases in which the use with certain options may be reconsidered as the site is further characterized.

DRINKING WATER PROGRAM UPDATE

Mr. Price presented an outline on the Operation and Maintenance (O&M) manual that FHRA is developing for the alternative drinking water sources that are being provided to residents living in the project area. The first section of the manual will describe the testing procedures that are being used to identify affected wells within the plume area and how those procedures will be carried out during the transitional period before management of the offsite area is transferred to Williams. The next section will discuss the procedures for communicating legal issues to property owners that relate to their drinking water options. These issues include topics such as access safeguards, pre-construction concerns, and quality assurance and control issues. This section will include a discussion for the alternative water system which will describe how the water will be delivered as well as a discussion of the maintenance schedule for the point of entry (POE) systems and a discussion of the sampling and analysis plan for the spent carbon from the systems. The third section covers the response procedures in the event of urgent situations. The last section describes the management procedures for information pertaining to the residents and the operation of their systems.

The team discussed Mr. Price's presentation. Ms. Farris suggested that the team hold interim meetings on the manual and other documents related to FHRA transition plan before the formal June 1st delivery. She said these meetings should be devoted to discussing institutional controls and other issues that may be related to the establishment of new wells in the affected area. Mr. Lockwood and Mr. Price said they would continue to discuss the management of the data from the alternative water systems and how it could be shared with representatives of DEC.

ACTION ITEM: Mr. Price will set up a meeting to allow Ms. Cardona to view the P.O.E system and its O&M manual.

NEXT STEPS

The team discussed the schedule for the upcoming meetings and project deliverables. Ms. Farris suggested that representatives of FHRA and Williams meet with DEC and its contractors and provide their input on DEC's list of outstanding data gaps that remain. The team agreed that DEC should send its list data gaps as a formal deliverable to representatives of FHRA and Williams by January 17th for their review. Mr. Lockwood agreed to compile GIS data and other pertinent information to facilitate the discussion and Mr. Schwenne agreed to schedule the meeting.

ACTION ITEM: Ms. Farris will send a comprehensive list of data gaps to FHRA and to Williams. Mr. Schwenne will set up a meeting to allow the team to discuss the data gaps. (Subsequent to the TPT meeting, the date of January 28th was set for the meeting) Mr. Lockwood will compile GIS data related to the data gaps to facilitate the team's discussion during the meeting.

The team agreed to hold the next Community Open House on February 20th at the North Pole Mall, and the next TPT meeting on February 21st at DEC's Fairbanks Office. The team tentatively agreed to schedule the following TPT meeting for April 16th at DEC's Fairbanks office.