

North Pole Refinery Technical Project Team

October 30, 2012

Alaska Department of Environmental Conservation, Fairbanks Office

Summary

Technical Project Team Members in Attendance

Dr. Dave Barnes	UAF, Civil and Environmental Engineering, Department Chair
Cindy Christian	DEC, Drinking Water Program, Compliance Program Manager
Ann Farris	DEC, Contaminated Sites Program, Project Manager
Jim Fish	DEC, Contaminated Sites, Program Specialist
Loren Garner	FHRA, Groundwater Program, Program Manager
Nim Ha	DHSS, Health Educator
Ali Hamade	DHSS, Toxicologist (via telecon)
Lee Johnson	DEC, Drinking Water Program
Paul Lhotka	DEC, Prevention Emergency Response Program (via telecon)
Elizabeth Page	Koch Remediation and Environmental Services, Director
Phil Roberts	Williams Inc.
Dave Smith	Koch Remediation Services

Support Personnel in Attendance

Rebecca Andresen	Arcadis
Brian Angerman	Barr Engineering (via telecon)
Mary Beth Leigh	UAF, Department of Biology and Wildlife (via telecon)
Cody Black	ERM/OASIS Environmental (via telecon)
Robert Burgess	DEC, Graduate Intern
Stephanie Buss	SPB Consulting, Toxicologist
Todd DeJournett	Barr Engineering (via telecon)
JoAnn Grady	Grady and Associates, Team Facilitator
Patrick Haas	P.E. Haas and Associates
Ty Keltner	DEC, Commissioner's Office, Information Officer (via telecon)
Brad Koons	Arcadis, Principal Engineer (via telecon)
Kimberly Lake	Johnson and Wright (via telecon)
Michael Lilly	GW Scientific
Johnny Mendez	DEC, Drinking Water Program, Engineer
Meg Mitchell	Environmental Standards (via telecon)
Andrew Ohrt	Arcadis (via telecon)
Jane Paris	ERM/OASIS Environmental
Shannon Price	FHRA
Gary Remple	Barr Engineering (via telecon)
Max Schwenne	OASIS Environmental, Project Manager (via telecon)
Marisa Sharrah	FHRA
Chris Shock	ERM/OASIS Environmental (via telecon)
Eric Zentner	Boreal Communications

INTRODUCTIONS AND ACTION ITEM REVIEW

The meeting began at 9:00 Alaska Time as team members introduced themselves and reviewed the action items from the previous meeting. The team agreed that the all action items had been completed or were in the process of being completed. The team reviewed and approved the agenda for the upcoming meeting.

UPDATE FROM THE ADEC MANAGER'S MEETING

Ms. Farris described a recent meeting with managers of the Alaska Department of Environmental Conservation (ADEC) concerning the overall schedule and direction of the project. She said that ADEC management has decided to revise the project schedule outlined in its August 2010 letter and extend the approaching deadlines for the final version of the Feasibility Studies (FSs) and the draft version of the project's cleanup plan. Ms. Farris said that ADEC will draft a letter allowing FHRA to continue its efforts to mitigate off-property contamination using their existing, upgraded systems under an updated interim remedial action plan to be completed by the end of the year.

Ms. Farris said that the final version of that plan will allow the team more time to collect and review additional data and various engineering alternatives to be evaluated in the final FSs and Cleanup Plan. Ms. Farris said that ADEC management has not yet finalized the new schedule but they are currently considering deferring the draft FSs until after the 2013 field season and deferring the final version of the FSs to the end of the 2013 or the beginning of 2014 with the draft Cleanup Plan to be completed by the Spring of 2014. Ms. Farris said that the exact dates for the project schedule and the details for the long-term maintenance of the in-home treatment systems will be included in the Compliance Order by Consent (COBC) which is currently being drafted.

THE DRINKING WATER SUBGROUP

Ms. Christian and Mr. Price updated the team on recent developments within the Drinking Water subgroup. Ms. Christian reported that sulfolane was not detected in the latest samples taken on October 10th from Well B of the City of North Pole's municipal water system. She said that the wells have been placed on an alternating sampling schedule with Well A scheduled to be sampled in November. Ms. Christian added that sulfolane has never been detected in the new municipal wells.

Mr. Price updated the team on the status of FHRA's ongoing efforts to sample private wells and provide an alternative source of drinking water to affected residents in and about the impacted area. He said that as of August 31st, 2012, FHRA has identified 302 affected properties with a detection of sulfolane or are located inside the plume area and have requested a long term alternative water solution. To date, FHRA has installed long-term solutions at 276 locations, approximately 50 percent of which are treatment systems, 35 percent of which are bulk water tanks, and the remaining 15 percent of which are on bottled water. FHRA has also installed 15 bulk water tanks for residents who have opted to have them installed for gardening purposes. There are 33 property owners who are still deciding on a long-term solution. Mr. Price said that, as a precautionary measure, FHRA is providing bottled water at

approximately 200 additional locations that have not had sulfolane detections but are situated near the boundaries of the plume.

The team discussed various concerns associated with the maintenance and monitoring of the long-term alternative water systems. Ms. Farris suggested that representatives of FHRA and ADEC consult with their legal departments to establish the appropriate institutional controls in the Interim Remedial Plan and other pertinent legal documents for the maintenance, monitoring, and the potential transfer of the Point of Entry (POE) and bulk water systems. FHR agreed to prepare a detailed summary of the operations and maintenance procedures for the POE systems and summarize progress during the next TPT meeting.

The team engaged in a brief discussion on the possibility of testing the Granulated Activated Carbon (GAC) filter on the POE systems for potential intermediate products from the breakdown of sulfolane. Mr. Haas pointed out that while various efforts have been devoted to studying the breakdown of sulfolane in aerobic conditions, the breakdown of sulfolane in the anoxic conditions, such as those that exist in the POE systems, have yet to be evaluated. Ms. Farris emphasized the importance of the concern and suggested that the state will require an answer to the question of whether degradation intermediates are being generated by the breakdown of sulfolane in the POE systems. The team agreed to further discuss how to integrate the evaluation into the ongoing work studies that are being administered by the Degradation subgroup.

THE CHEMISTRY SUBGROUP

Ms. Buss briefed the team on recent developments within the Chemistry subgroup. She said that the subgroup is currently updating its key elements documents to reflect changes that have been made regarding the new action level and to ensure that they correlate with the controls and standards that have been established.

THE TOXICOLOGY SUBGROUP

Ms. Buss briefed the team on recent developments within the Toxicology subgroup. She said that she recently spoke with Dr. Blystone of the National Toxicology Program (NTP) who told her that the program intends to proceed with the studies that it accepted to further evaluate the toxicity of sulfolane. Ms. Buss reminded the team that the first study will be a standard 28-day dosing study that will evaluate the response of different species to various dosing levels in order to establish the dosing regimen and species sensitivity for use in future studies. The second, somewhat longer study, will evaluate the developmental and immune effects. The NTP may then choose, based on the results of the first two studies, to conduct a two-year chronic exposure study on the long term effects of exposure of sulfolane.

The team discussed the significance of the studies. Ms. Buss informed the team that the United States Environmental Protection Agency (USEPA) will review and potentially update the Provisional Peer Reviewed Toxicity Value (PPRTV) for sulfolane once it receives the results of the studies from the NTP. She added that the results of the NTP studies could potentially impact the reference dose that was used

to develop the cleanup level for sulfolane but that is potentially many years away. Ms. Buss said that she expects to see the reportable results from the first study by the end of 2013. She added that it could actually take between four to six years before the results of the two-year chronic toxicology study, if conducted, are finalized.

SITE CHARACTERIZATION

Mr. Garner and Mr. Lockwood updated the team on the status of recent site characterization efforts. Mr. Lockwood gave a brief discussion on the results of a preliminary analysis of the trends in the sulfolane concentrations in the project's monitoring wells. He informed the team that the Site Characterization subgroup has been discussing the results of a Mann Kendall trend analysis that was recently performed on the concentrations of sulfolane that were measured in the monitoring wells between 2006 and the second quarter of 2012. Mr. Lockwood informed the team that while the preliminary analysis indicated that there may be increasing trends in the sulfolane concentrations at a handful of project monitoring wells, there are a number of possible limitations of that data that the team must be aware of while it evaluates the significance of the analysis.

Mr. Lockwood elaborated on his description of the limitations of the aforementioned analysis. He said that there was an apparent increase in the concentration of sulfolane measured in many project wells in July 2011 when the project labs changed the analytical method that they used to analyze the samples. Mr. Lockwood explained that prior to switching to the current isotope dilution method the sample results were not corrected for surrogate recovery. He suggested that changing to the isotope dilution method may have resulted in the apparent increase in concentration that was seen in the project wells when the isotope dilution method was adopted. Mr. Lockwood pointed out a number of wells in which the apparent increase in sulfolane concentration was seen. These apparent increases occurred during the time the change in analytical methodology occurred. When this data was statistically analyzed it showed an increasing trend by the Mann Kendall analysis but could have otherwise been stable or inconclusive if there wasn't a change in analytical methods. He added that in many other cases, the data sets from wells shown to have increasing trends were quite limited and thus more susceptible to be affected by similar situations, such as seasonal variation, which do not reflect a sustained increasing trend in the concentration of sulfolane.

The team discussed Mr. Lockwood's presentation. Ms. Farris questioned whether the apparent increase in concentration that resulted from the change in analytical methods could be resolved through back calculations. She further asked Mr. Garner whether the apparent increasing trends were predicted by the project's groundwater model. Both Ms. Page and Mr. Garner thought the groundwater model did predict increasing sulfolane trends as shown by the trend analysis; however, as the team discussed the question further, neither specific locations of the predicted increasing groundwater trends nor calibration details on the model predictions could be identified.

The team engaged in a lengthy discussion on the relationship between the simulated data generated by the model and the data that is generated in the field and how this relationship pertains to the team's confidence in the validity of both the model and its field data. The team concluded they would discuss

the specifics with the modelers and see how the model predictions match the field observations. Ms. Farris emphasized the importance that this relationship be sound and well articulated by the team since it is of vital importance to the evaluation of potential risk and the various remedial alternatives that have been put forth.

ACTION ITEM: Ms. Page will contact Mr. Vitale and ask whether back calculations can be done to help answer the question whether increasing sulfolane concentrations in particular wells could be attributed to the change in analytical methods.

REPLACEMENT GROUNDWATER RECOVERY WELLS

Mr. Angerman updated the team on upgrades and replacements that have recently been made, and others that are scheduled to be made, to the refinery's groundwater recovery system. He pointed out the locations of recovery wells that were recently installed to replace recovery wells of a similar age and construction to two wells that have previously failed and been replaced or repaired. Mr. Angerman described the depths and dimensions of the replacement wells and added that each will have a ground water pump and pneumatic LNAPL skimmer similar to the existing recovery wells. Mr. Angerman explained that his team used the ground water model to evaluate different well locations, well depths, and pumping rates to expand and optimize the capture zone of the system and pointed out the general areas where the influence of the system is expected to be expanded.

PHASE TWO OF THE STABLE ISOTOPE ANALYSIS

The biodegradation subgroup continued to discuss the isotopic composition of the contaminant molecule itself (sulfolane) as one line of evidence to understand whether or not it is biodegrading in situ within the plume under background conditions. In addition, samples were collected from points along the groundwater extraction treatment train and within the air sparge pilot test treatment zone to evaluate the potential isotopic composition shift under aerobic conditions created by the remediation systems. Mr. Ohrt presented an overview of the preliminary results of the second phase of a stable isotope analysis. The study involved the resampling of the seven monitoring wells sampled during the first phase plus an additional 12 monitoring wells, in addition to the analysis of samples taken from the groundwater extraction system and the air sparge pilot test monitoring well network. He noted that several of the standard monitoring wells outlined in the study plan were frozen and unavailable for sampling during the second phase of the study.

Mr. Ohrt summarized the sulfolane isotopic composition analytical results from the groundwater extraction treatment system. Only one sample from the system influent to the air strippers was successfully analyzed for sulfolane isotopic composition due to the limited sulfolane detections along the treatment train.

Mr. Ohrt noted that at the time the samples were taken from the air sparge pilot monitoring wells, they exhibited an increased concentration of dissolved oxygen and a decreased concentration of sulfolane, generally below the detection limit of the isotopic composition analytical method. He added that these results are consistent with historical pilot test monitoring data indicating that an aerobic degradation

mechanism may be causing the sulfolane concentration to drop. Only two air sparge pilot test monitoring wells were successfully analyzed for sulfolane isotopic composition due to the limited sulfolane detections from this well network.

Mr. Ohrt presented a series of slides comparing the results of the first and second phases of the stable isotope analysis. He commented that the data from the two phases complement each other in that they show a consistent drop in sulfolane concentration and an increase of isotopic composition of sulfolane with increasing distance from the source areas. Mr. Ohrt reiterated that his team is just beginning its analysis of the data. He said that they are looking forward to comparing the results of the stable isotope analysis with the results of some of the other degradation studies that are currently underway at the University of Alaska Fairbanks.

PRELIMINARY TESTING FOR PERFLUORINATED COMPOUNDS

Ms. Andresen updated the team on recent efforts to investigate the possibility that certain areas in the refinery may have been contaminated by the use of Class B fire-fighting agents containing perfluorinated compounds (PFCs). Per recommendations during the last TPT meeting, her team performed an additional review of the records of the fire retardants that have been used at the site, but they were not able to uncover any additional information. Ms. Andresen said that Arcadis took hydropunch groundwater samples at six temporary ground water monitoring point locations around and down-gradient of the Fire training area but did not sample the area itself due to the presence of its protective liner and freezing soil conditions. Arcadis also sampled a number of existing monitoring wells as a first step in a phased investigation to determine whether PFC contamination was released from the refinery's waste water system. Ms. Andresen said that the samples were submitted to Test America for analysis of the suite of 15 analytes that was recommended by ADEC. She said that she expects to have the results of the analysis within a two-week period.

RISK COMMUNICATION

Ms. Grady updated the team on recent developments within the Risk Communication subgroup. She said that group intends to schedule the release of the next project newsletter some time in the month of January. She asked team for its suggestions on how to best sequence the release of the project newsletter with the upcoming TPT and open house meetings. The team agreed to tentatively schedule the next TPT meetings for January 8th and February 21st and to schedule the open house meeting on February 20th 2013. (These dates were agreed upon after this meeting and during subsequent discussions with the team)

The team continued its discussion on various issues pertaining to the subgroup. Ms. Sharrah expressed her concern that developments within the Risk Communication subgroup and the broader TPT are often not being related to FHRA representatives that are actively working with affected homeowners in the field. She said that these representatives are sometimes questioned about these developments without having responses that have been vetted by the subgroup. Ms. Sharrah attributed this gap in the communication process to a lack of a formal DEC communication leader within the subgroup that has been fully dedicated to the project. Ms. Grady suggested that in the short-term, while ADEC considers

the situation, the TPT allot a certain portion of its meeting time to reviewing communication issues and when needed, crafting discussion points identified by the overall team or subgroups as being significant and potentially sensitive.

The team adjourned at 5:00 PM Alaska Time