

North Pole Refinery Technical Project Team

December 1, 2011

DHSS Anchorage Offices

Anchorage, AK

Summary Comments

Technical Project Team Members

Dr. Dave Barnes	UAF, Civil and Environmental Engineering (via telecom)
Cindy Christian	DEC, Drinking Water Program, Compliance Program Manager (absent)
Ann Farris	DEC, Contaminated Sites Program, Project Manager
Loren Garner	FHRA, FHR Program Manager
Nim Ha	DHSS, Acting Program Manager, EPHP (absent)
Brian Jackson	DEC, Prevention and Emergency Response Program
Lee Johnson	DEC, Drinking Water Program (absent)
Elizabeth Page	Koch Remediation Services
Brandon Perkins	EPA, Site Assessment Manager (via telecom)
Shannon Price	FHRA, Alternate Water Source Manager
Jeanne Swartz	DEC, Spill Prevention and Response Program, Program Manager

Support Personnel in Attendance

Rebecca Andresen	Arcadis
Brian Angerman	Barr Engineering (via telecom)
Dr. Mary Beth Leigh	UAF, Assistant Professor, Microbiology (via telecom)
Steve Bainbridge	DEC, Contaminated Sites Manager
Stephanie Buss	SPB Consulting, Toxicologist
Tamara Cardona-Marek	DEC, SPR-Contaminated Sites, Program Specialist (via telecom)
Todd Dejournett	Barr Engineering (via telecon)
Denise Elston	DEC, SPR-Contaminated Sites, Program Specialist
Jim Fish	DEC, SPR-Contaminated Sites, Program Specialist (via telecom)
JoAnn Grady	Grady and Associates, Team Facilitator
Ty Keltner	DEC, Commissioner's Office, Information Officer (via telecom)
Brad Koons	Arcadis, Principal Engineer
Mark Lockwood	Shannon & Wilson (via telecom)
Meg Michell	Environmental Standards, Inc. (via telecom)
Phil Roberts	Williams (via telecom)
Gary Ruple	Barr Engineering (via telecom)
Dr. William Schnable	UAF, Water and Environmental Research Center, Director (via telecom)
Max Schwenne	OASIS Environmental, Project Manager
Dr. Yuri Shur	UAF, Department of Civil & Environmental Engineering (via telecom)
Ben Sultoon	Johnson and Wright (via telecom)
Eric Zentner	Boreal Communications Strategies

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 all of the action items had been completed. The team reviewed and approved the meeting's agenda after making minor changes to the order of presentations.

EPA REGION 10 PRESENTATION AND DISCUSSION:

EPA's Brandon Perkins presented an overview of the status of the site within the EPA's Superfund assessment program. A typical assessment consists of two main phases; the pre-remedial and the remedial phase. The refinery project is currently in the pre-remedial phase which consists of the following sub-phases: initial site discovery, preliminary assessment, site investigation, and proposal to the National Priorities List (NPL). Mr. Perkins said that the EPA is in the process of completing the preliminary assessment of the site. During this phase the agency reviews all of the data from previous site investigations. The agency may conduct additional sampling and analysis during the next phase; site investigation. Mr. Perkins clarified that the agency can skip over the site investigation if it determines that the data collected during the preliminary assessment is sufficient to develop a Hazard Ranking Score (HRS) for the site.

The team discussed whether the characterization efforts that have been conducted to date would be sufficient to allow the agency to develop a HRS without conducting its own site investigation. Several members of the team informed Mr. Perkins that the team has been following the EPA's data quality objectives and data quality validation guidelines and its members have confidence in the quality and robustness of the data that has been gathered to date. Ms. Page informed Mr. Perkins that the most recent project data is available on the project's SharePoint site.

Mr. Perkins described how EPA establishes the HRS. He explained that while the threshold for a screening investigation is a score of 28.5, it is possible, depending on numerous factors, for the agency to refrain from listing a site on the NPL that exceeds that threshold. He added there are also circumstances in which state or federal agencies will investigate a site with a HRS that is below the threshold value. Mr. Perkins said there are a number of provisions that determine whether a site is eligible to be managed under CERCLA. He said that in order to make that determination the EPA reviews the Site Characterization Report (SCR) and other information pertaining to the investigation of the source, and in this circumstance, the extent of sulfolane contamination at the site. The EPA recently completed its analysis of the site's eligibility with regard to the source and extent of contamination but it is still waiting on the finalization of the Provisional Peer Reviewed Toxicity Value (PPRTV) to establish the site's HRS.

ACTION ITEM: Mr. Perkins will provide Ms. Farris with the contact information for the EPA's manager of the SCDM data base.

If a PPRTV is available and a benchmark is set, the agency will then calculate the HRS by assigning a weighted score to each well and determine whether its concentration is above the benchmark value.

Mr. Perkins clarified that all affected wells will be evaluated, even though many are only used for outdoor irrigation as FHRA has provided an alternate drinking water source to all known impacted residents. Groundwater is considered a potential exposure route as long as it is potentially drinkable.

Mr. Perkins described the implications of the four possible scenarios that can play out if the HRS score exceeds the screening threshold. He described the first scenario (“Other Cleanup Activity”) as a continuation of the present situation in which the state conducts the investigation and cleanup of the site without EPA oversight. In this situation, the EPA will probably meet with state representatives once or twice a year to discuss their efforts and then review the documentation presented by the state to determine if EPA can consider the site closed. The second option is to list the site on the NPL. The third option (“State Deferral”) is to defer the site to the state under a formal agreement in which the state assumes responsibility for what would be the equivalent of an investigation and clean-up required by CERCLA. Under this option, the EPA would continue to be involved in the site cleanup, but its involvement would be formally defined in the agreement with the state. The final option (“Superfund Alternative”) is to designate the site as a Superfund site, the cleanup and investigation of which would be conducted and funded by the PRP under EPA oversight.

The team discussed how the EPA will decide among the aforementioned options. Mr. Perkins stated the decision will ultimately be based on discussions with the state concerning details such the nature of the exposure pathways, the degree and extent of the contamination, and ultimately, whether the state is comfortable handling the site. Ms. Buss asked how the agency will evaluate the data quality for the project and specifically, how it will assess the state’s method for analyzing sulfolane given that the EPA does not have a corresponding method. Mr. Perkins replied that the agency will probably look at whether the method is reproducible and defensible. Ms. Farris asked Mr. Perkins to send her the contact information for the EPA representative that could provide guidance for the development of the state’s analytical methods, data quality objectives, and other acceptance criteria that pertain to the EPA’s evaluation of state’s management of the site.

ACTION ITEM: Mr. Perkins will provide Ms. Farris with the contact information for the EPA representative that can provide guidance for the development of the state’s analytical methods, data quality objectives, and other acceptance criteria that pertain to the EPA’s evaluation of state’s management of the site.

THE UNIVERSITY OF ALASKA FAIRBANKS’ PROPOSED STUDY ON THE NATURAL ATTENUATION OF A SULFOLANE PLUME IN DISCONTINUOUS PERMAFROST

Dr. Barnes, Dr. Leigh, Dr. Shur, and Dr. Schnable of the University of Alaska Fairbanks gave a presentation on their proposed study on the natural attenuation of a sulfolane plume in discontinuous permafrost. Dr. Barnes and his associates hope to use the study to make recommendations on the extent to which monitored natural attenuation is a viable option for site remediation, and to define the parameters in the conceptual site model to ensure that the groundwater model reflects actual site conditions as accurately as possible. The study will help the team ascertain many of the site’s natural

attenuation parameters including microbial ecology. In addition, a portion of the study will be devoted to clarifying the biodegradation pathways on sulfolane.

Dr. Barnes said that the team will use the study to further define how discontinuous permafrost, seasonal changes in the Tanana River, and surface features such as sloughs and ponds effect the movement and dispersion of sulfolane within the affected area. He added that much of the existing information on the plume, particularly its aspect ratio, indicates that the topography of the site area is complex and, consequently the plume is extremely heterogeneous. He commented that it will be essential to evaluate the aforementioned factors in order to understand whether observed decreases in sulfolane concentration are due to the breakdown of the chemical or whether it is merely the temporal result of dilution and dispersion.

Dr. Mary Beth Leigh elaborated on the proposed study on sulfolane biodegradation. She reiterated that few studies have been carried out in the subject area, and those that have been conducted were in areas with microbial communities and physical conditions that differ significantly from those found in the project area. Dr. Leigh said that the proposed study will include a section on sulfolane biodegradation as the above mentioned variables can greatly affect the relative viability of monitored natural attenuation at the project site. Dr. Leigh said that in addition to identifying the microbial communities at the site, the proposed biodegradation study will include an examination of the potential for sulfolane biodegradation in aerobic as well as anaerobic conditions. It will investigate the limits of insitu biodegradation, nutrient limitations, and the possibility that the degradation process produces acidic or otherwise inhibitory byproducts. If anaerobic degradation is discovered at the site, the study will attempt to ascertain the nature of the electron acceptors within the degradation process.

SITE CHARACTERIZATION

The team transitioned to a discussion on the status of various site characterization efforts. Mr. Garner and Mr. Price reviewed a map summarizing the results of FHRA's recent site characterization efforts. Mr. Garner pointed out the locations from which soil samples were recently taken from residential gardens. He said that, as expected, the results of these samples were non-detect for sulfolane. Mr. Price described the recent efforts of Flint Hills Resources Alaska (FHRA) to provide screening and an alternative water source to residents living outside the city limits. All of the residents living outside of the city limits have been placed on bottled water while they await their chosen permanent water option. To date, FHRA has had 269 detections among the residencies sampled outside of the city limit. Among the residencies with detections, 238 homeowners have selected one of the three alternatives being offered by FHRA for an alternate water source, and 220 have been provided with a long-term option. Mr. Price added that, as a precautionary measure, FHRA is providing bottled water to homes where sulfolane was not detected but which are located within a buffer zone near the edge of the plume. FHRA intends to resample the homes in the buffer region regularly to further clarify the edges of the plume.

Mr. Garner presented a slide showing the vertical profile of the recently installed monitoring well transect. The transect consists of six continuous multichannel tubing (CMT) wells which were installed

to a depth of 60 feet with monitoring intervals set at 10 foot intervals. These wells are accompanied by additional monitoring wells that are screened 10 feet below their endpoints, in addition to depths ranging between 75 to 80 feet. This appears to be the depth at which detection of sulfolane ceases. Mr. Garner said that permafrost was detected in all but two of the wells: #304 and #306. He added that FHRA intends to reexamine a dense layer of material which was found in well #304 to confirm whether or not it is permafrost.

SOURCE REMEDIATION UPDATE

Mr. Garner and Ms. Page presented a brief update on recent improvements that have been made to the remediation system. Mr. Garner stated that since adding recovery well R 42, and upgrading other recovery wells and the treatment system, there has been a noticeable increase in the system's rate of groundwater recovery: from 197 gallons per minute in October 2010 to 385 gallons per minute in October 2011. He said that they are now observing significant LNAPL recovery from several of the recovery wells including well R-40, R-39, and R-21, which alone has yielded 780 gallons. Mr. Garner commented that they observed a similar increase in the rate of LNAPL recovery last year and they are trying to determine whether it can be attributed to increases in the efficiency of the system or to seasonal changes in groundwater elevation. The team discussed observations of seasonal variation in the site's groundwater elevation and the extent of free product that has been encountered in the recovery wells. Ms. Farris said that the 780 gallons recovered by R-21 represents a maximum for the system over the last few years. She asked Mr. Garner to confirm whether that amount was recovered by R-21 alone.

ACTION ITEM: Mr. Garner will confirm whether the 780 gallons of recovered LNAPL attributed to R-21 was recovered by that well alone. **Mr. Garner later confirmed that the 780 gallons was from R-21 alone, and that all wells yielded 1050 gallons total for the month of October 2011.**

Mr. Garner continued his presentation on the refinery's source remediation system. FHRA observed a stepwise increase in the amount of product recovered from wells R-21 and R-40 which they believe is the result of screen cleaning and other improvements that have increased the communication between the wells and the fluids in the grounds. Mr. Garner presented a slide summarizing LNAPL occurrences throughout the site. He noted the proposed locations of eight additional wells which will be installed to determine the extent of the measurable LNAPL. Mr. Garner pointed out the locations of two proposed transects across the site with 6 additional wells. He commented that FHRA hopes that the transects are able to provide the team with a better understanding of the depth to permafrost below the refinery.

Mr. Garner reviewed a slide summarizing changes that FHRA intends to make to its transducer network due to freezing and frost jacking issues. FHRA believes that the transducers in well cluster 179 A – D should satisfy ADEC's previous request for an additional well cluster. Mr. Garner commented that FHRA intends to add additional transducers to the gauging stations located on the Tanana River, as well as to on-site and off-site gravel pits and other additional locations throughout the plume.

ACTION ITEM: Mr. Garner will provide Ms. Farris with a list of the changes that FHRA is proposing to make to its transducer network.

SULFOLANE DEGRADATION BENCH TESTING

Mr. Garner informed the team that after treating 67 million gallons of wastewater, FHRA has yet to observe sulfolane breakthrough in the system's lead Granular Activated Carbon (GAC) vessels. He commented that, given this volume, as well as observations of an appreciable reduction of sulfolane in the raw water before it reaches the GAC vessels, FHRA believes that there is some yet unknown degradation process occurring within the system. FHRA is working with Mr. Dejournett of Barr Engineering to develop bench studies to further investigate the degradation mechanism. Bench testing is currently being performed in association with studies of the sand filter backwash system. Although the reduction is assumed to be partly biological, it has been observed in cold temperatures. Preliminary results from the studies seem to indicate that the reduction activity is associated with the oxidation of iron and manganese which are naturally present in the groundwater.

RESPONSE ACTION

Mr. Garner stated workers recently discovered a missing seal in one of the gasoline truck rack sumps. Further investigation revealed that an estimated 540 gallons of gasoline and ultra-low sulfur diesel (ULSD) were released. All truck lanes have since been resealed and LNAPL characterization in wells 0-11 and 0-13 has not shown gasoline or ULSD as appreciable constituents. Records indicate that the piping was successfully pressure tested in 2009 and, while FHRA does not have suspicions of previous problems in the area, they are currently reviewing the testing schedule for those systems.

THE ON-SITE FEASIBILITY STUDY

Mr. Garner updated the team on the status of the on-site feasibility study. Preliminary soil data from the study indicates that the extraction unit, the sump, and likely Lagoon B are the likely significant on-site source areas for sulfolane. In addition, the soil data suggests that there are few minor source areas located in the waste management areas and in the lay-down area where project equipment is stored. Mr. Garner said that FHRA intends to further investigate the minor source areas.

ACTION ITEM: Mr. Garner will provide Ms. Farris with information on the testing schedule for the truck racks.

Mr. Brad Koons of Arcadis presented an overview of the status of the development of the project's feasibility study. He briefly reviewed the basic guidance for drafting of a Remedial Investigation/Feasibility Study (RI/FS) following EPA's CERCLA guidance. Mr. Koons reviewed a draft outline of the proposed feasibility study to give the team a sense of its level of detail. He emphasized that the drafters intend to ensure that the document is compact by briefly summarizing its background information and by including references to more lengthy documents when appropriate. The team discussed Mr. Koons' presentation. Ms. Farris requested that the drafters of the RI/FS document their decisions regarding the elimination of various remedial technologies listed in the study.

CHEMICAL OXIDATION PROPOSAL

The team listened to a presentation from Brian House and members of Moran Environmental regarding their use of a chemical oxidation process in the remediation of sulfolane. Mr. House stated they were presenting the material simply to inform the team on a current technology being tested by Moran. The TPT asked a number of questions regarding the proposal and thanked Mr. House for taking the time to inform the team regarding their work.

THE TOXICOLOGY SUBGROUP

Ms. Buss updated the team on recent developments within the Toxicology subgroup. Dr. Petersen of the EPA has expedited the finalization of the PPRTV which is expected to be completed very soon. In addition, the National Toxicology Program (NTP) has indicated that will likely determine whether to nominate sulfolane for further research during the month of December. Ms. Buss reiterated that if sulfolane is nominated, it is possible that the NTP will perform their own toxicology studies on the chemical to address existing data gaps. Ms. Buss informed the team that TPT member Nim Ha recently completed the latest health consult from the Alaska Department of Health and Social Services (DHSS), which was distributed to the TPT members for review. She added the current version was written as a compilation of previous factsheets and does not contain a considerable amount of new information.

The team discussed the schedule for the project's Risk Assessment (RA), specifically; whether its drafters would have time to incorporate the PPRTV into the document once it is released. The team revisited its discussion how to calculate the 95 percent upper confidence limit (UCL) for purposes of risk calculation in the RA. After a lengthy discussion, the team agreed to take up further consideration of the issue offline.

THE CHEMISTRY SUBGROUP

Ms. Buss and Ms. Mitchell updated the team on recent developments within the Chemistry subgroup. Ms. Mitchell said that the team did not find any interference issues in its validation of the residential groundwater sample packages received to date. Ms. Andresen indicated that due to the limited amount of soil sample data that is currently available, FHR has decided to defer the evaluation of soil data to the final RA and not include any soil data in the draft risk assessment. Ms. Buss said that SGS recently performed pilot testing on a method which they are developing to address hydrocarbon interference found in monitoring wells samples. She said that the recent results from preliminary testing of this method have been promising and the subgroup is hopeful that the method will be approved by the end of the following week. Ms. Buss said that, pending approval of the method, the team hopes to correct the affected data and correspondingly update the key elements document for groundwater and soil sometime during the month of January.

THE RISK COMMUNICATION SUBGROUP

Ms. Grady updated the team on recent developments within the Risk Communication subgroup. She stated that the team is currently working on the next edition of its quarterly newsletter which is

scheduled to be published on January 20th to coincide with the beginning of the state's legislative session. The next version of the newsletter will include updates from each of the subgroups recent work, and articles on DHSS' health consult, PPRTV, and if applicable, the nomination of sulfolane to the NTP. Ms. Farris expressed her opinion that the project newsletter is an effective communication tool and added that the last version of the project newsletter was well received by ADEC's commissioner and management as well as by key stakeholders.

Ms. Elston briefly summarized the results of the project survey conducted by the risk communication subgroup. She said that the survey was posted online between September 23rd and October 31st with mail outs being sent to residents that requested hard copies. The department received a remarkable 87.5% response to the online survey. Ms. Elston summarized the responses to questions concerning the respondent's activities within the plume area, their level of their involvement in the team's community presentations, and aspects of the project which are of particular interest. She said that the survey also contained a write-in section in which respondents were invited to make suggestions about ways in which the team could improve its public outreach. She remarked that many of the comments written in this section were highly informative and will serve to provide the subgroup with direction as it plans future community events.

FUTURE MEETINGS

The team discussed the schedule for future meetings. The team agreed that a teleconference meeting of the site characterization subgroup (and any interested TPT members) will be held January 4th 9:00AM Alaska time for a walk through on the Site Characterization Report. The next in-person meeting of the TPT will be held in Anchorage January 18th. A subsequent TPT meeting is also scheduled for March 7th, and again will be held in Anchorage.

The meeting adjourned at 3:30 PM Alaska Time.