



Sulfolane Investigation Update

October
2011

This update is provided by the Technical Project Team to inform the North Pole community of recent developments in the investigation and remediation of soil and groundwater contamination related to the North Pole refinery.

DEC establishes faster cleanup schedule

In September, the Alaska Department of Environmental Conservation (DEC) and Flint Hills Resources (FHR) reached an agreement on an accelerated timeline for investigating and remediating the North Pole sulfolane groundwater contamination.

DEC regulators established new dates for completion of the project's 19 main tasks – in many cases advancing them by as much as 1 1/2 years. The decision to advance the timetable came after careful review of FHR's proposed schedule. Overall completion of the project is now scheduled for late 2012, rather than the initial proposal of the summer of 2014.

According to Steve Bainbridge, manager of DEC's Contaminated Sites

Program, this contamination "... has impacted the City of North Pole drinking water wells, as well as at least 230 private drinking water wells and additional parcels of land that have yet to be developed ... making this site our highest priority to investigate."

FHR has accepted the revision and is actively revamping its cleanup activity timeline to ensure the new target dates are met. "FHR shares the state's sense of urgency and remains committed to aggressively protect the public and remediate the contamination," said Loren Garner, Flint Hills Resources' groundwater project manager.

Ann Farris, DEC's project manager said, "This is an aggressive schedule for the size and complexity of the

problem, but the entire technical project team is committed to understanding and cleaning up the contamination as quickly as possible. We have been bringing in outside experts and the university to assist us and we will continue to bring in whatever resources are needed to be certain we are being protective."

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Federal assistance requested for new sulfolane study

The Alaska Department of Environmental Conservation has formally requested the federal government to nominate sulfolane for further study of its potential effect on human health.

The study would fill a significant void in the scientific community's understanding of the human health hazards associated with the chemical currently affecting many North Pole residents' groundwater.

The request for nomination was submitted to the National Toxicology Program (NTP), an interagency effort of the National Institutes of Health, the Centers for Disease Control and Prevention, and the Food and Drug Administration.

According to its website, NTP's mission is "to evaluate agents of public health concern by developing and applying tools of modern toxicology and molecular biology."

Each year, NTP selects a limited number of chemicals for further study about which little or nothing is currently known of their effects on human health, and where further scientific understanding would have the broadest impact. NTP's review of this year's requests for nominations for further study is scheduled to be completed by December 2011.

If sulfolane is selected for further study, the process of designing scientific research and conducting experiments would then begin. These steps could be lengthy, with actual results of the toxicity study not published for several years. Nonetheless, DEC regulators see a nomination as an encouraging step in their effort to understand more about the toxicity of sulfolane.

"The NTP nomination is an important step in addressing community concerns about past contaminant expo-

sure and helping us gain a higher level of confidence that we understand what 'safe' means concerning sulfolane," said Ann Farris, an environmental engineer with DEC's Contaminated Sites Program and its Technical Project Team coordinator for the North Pole refinery cleanup.

"Rather than rehashing older studies, we want to add to the science with well-designed research conducted by one of the best independent agencies in the country whose primary mission is to specifically address these issues," Farris said.

The request for nomination received letters of support from Fairbanks North Star Borough Mayor Luke Hopkins, Alaska District F Sen. John Coghill, the Alaska Department of Health and Social Services, and the U.S. Agency for Toxic Substances and Disease Registry.

FHR's drinking water sampling and resampling efforts

In March, Flint Hills Resources began providing long-term alternative water solutions for residents in the North Pole area who are outside City of North Pole water services and have detectable levels of sulfolane in their drinking water wells. To date 193 residents have received one of three options Flint Hills has offered.

These options include bottled-water service, a bulk-water-tank system, or a point-of-entry water treatment system. FHR is providing bottled-water service as an interim drinking water source to affected residents who are in the process of selecting an alternative long-term water solution.

With any of the three long-term options, FHR has also offered an above-ground garden water tank. Local contractors installing these systems

will continue to do so, weather permitting, until all residents with detectable levels of sulfolane have their solution of choice installed.

Beginning in July, Flint Hills contracted with Shannon & Wilson, a geotechnical and environmental consultant, to resample 165 wells within and along the plume boundary area that did not show a detectable level of sulfolane in the first round of sampling.

Flint Hills commissioned the re-sampling because of the development of a more sensitive laboratory test that detects sulfolane at much lower levels than was previously possible. The earlier tests were able to identify sulfolane at a level of about 10 parts per billion (ppb) or higher. The more sensitive test is able to detect sulfolane at a level of about 3.1 ppb or higher (de-

pending on the sample size). As the re-sampling continues, homeowners whose wells show detectable levels of sulfolane at the new lower detection level are offered the same three alternative water solutions mentioned earlier. In other words, everyone whose well shows a detectable level of sulfolane – under either the earlier tests or the new tests – will be offered an alternative water solution.

As a precaution, FHR will continue to provide bottled water delivery service to roughly 200 residents whose wells have no detectable levels of sulfolane because those homeowners are located in or adjacent to the plume. FHR will continue the bottled water deliveries as the plume and its movement are evaluated and better understood.

Technical Project Team background

In March 2010, the Alaska Department of Environmental Conservation's Contaminated Sites Program established a Technical Project Team to provide comprehensive and coordinated oversight for the investigation into the release of sulfolane at the Flint Hills Resources refinery in North Pole. The team consists of experts in the fields of toxicology, engineering, hydrology, environmental chemistry and other relevant fields, and is working to ensure the protection of human health and the environment.

TPT Priorities

- Eliminate the current exposure to sulfolane.
- Pursue aggressive on-site remediation.
- Establish a monitoring network that adequately measures the success of the remediation at eliminating off-site contaminant migration and removing the contamination on site.
- Achieve and maintain source control:
 - Determine an inspection process and operational policies that eliminate systemic releases or leaking issues and minimize the potential for new spills.
 - Aggressively respond to and clean up any new spills that do occur.
- Determine the extent of the contamination downgradient and potential for movement of the plume in order to develop a remedial strategy that will control exposure for the duration of time it takes to achieve final cleanup levels via engineered and/or natural mechanisms.
- Complete an evaluation of risk that accounts for all exposure pathways and cumulative risk.

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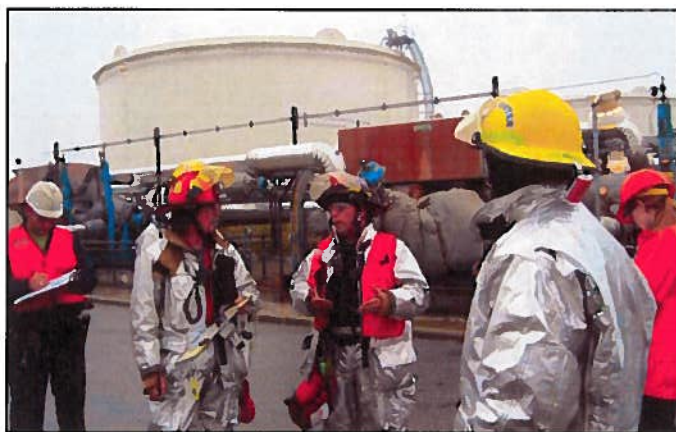
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*For more information, visit DEC's North Pole refinery sulfolane website at:
dec.alaska.gov/spar/csp/sites/north-pole-refinery/*



Clockwise from right: A DEC exercise evaluator takes notes at an Incident Management Team briefing at the Aug. 11 North Pole refinery exercise.

The initial Flint Hills spill response team arrives on scene and begins unloading.

Responders work to control the simulated spill.

Response team members discuss the current status and next steps in the contingency plan procedure.

(DEC photos)



Spill drill tests FHR's emergency capabilities

DEC verifies readiness for response to oil spill at North Pole refinery

The North Pole Refinery was the recent scene of an unannounced "spill drill" emergency response exercise called by the Alaska Department of Environmental Conservation.

The purpose of the Aug. 11 drill was to exercise and evaluate the Flint Hills Resources North Pole Refinery Oil Discharge Prevention and Contingency Plan (ODPCP). It also allowed on-scene DEC evaluators to verify the response readiness of both Flint Hills Resources personnel and its contractors.

ODPCPs are facility-specific documents, approved by DEC regulators, containing pre-established response procedures to be implemented in emergency situations. State law requires all petroleum-related facilities to have an approved ODPCP in place and ready for use. Additionally, each facility must ensure its staff is trained in ODPCP procedures and that its

response capabilities are exercised annually.

This DEC drill was designed to determine how refinery staff would respond to a major oil release onto and flowing outside of facility property. Specifically, the exercise tested how the organization would activate its incident management team (IMT), set up an information center, deploy resources, make notifications and public announcements, perform response tactics using appropriate safety precautions, control the source of the release, recover spilled hydrocarbon product and respond to unexpected developments in real-time.

The unannounced drill took the FHR personnel and contractors by surprise. Even so, they immediately activated the response team, set up an emergency response office, and went through the necessary procedures for source control and recovery, while

maintaining health and safety precautions.

DEC exercise evaluators found both FHR employees and contractors well prepared and well versed in spill response tactics.

"While there were a few lessons learned, the unannounced drill was quite useful in determining the capability of FHR personnel and their contractors to respond to a major spill, if ever required," according to Bob Tisserand, an environmental program specialist for DEC's Industry Preparedness Program.

He credited FHR's observed preparedness to its participation in response training programs. "Deploying response teams in realistic training and exercise scenarios is the most effective preparation for an actual emergency."

TPT subgroups' status report

Chemistry

Recent activities:

- Continuing to develop methods with commercial and state laboratories that accurately detect sulfolane in water, soil and produce. There is no certified federal or state laboratory method for sulfolane and the subgroup is proceeding to develop consistent methods for all laboratories that analyze for sulfolane to ensure the results are accurate and comparable.
- Developed data quality objectives for the sulfolane analysis of plant tissue.
- Streamlined the data validation process to ensure all data are useable for site investigation and remediation efforts.

Toxicology

Recent activities:

- Released the Alaska Department of Health and Social Services garden sampling conclusions and recommendations fact sheet, available at dec.alaska.gov/spar/csp/sites/north-pole-refinery/documents.htm under "Fact Sheets." The subgroup discovered that edible garden plants can take up sulfolane present in water. Sulfolane was found in all parts of plants sampled (leaves, fruits, flowers, stems and roots). People can come in contact with sulfolane by eating affected produce.
- Released the Agency for Toxic Substances and Disease Registry (ATSDR) second health consultation, available at dec.alaska.gov/spar/csp/sites/north-pole-refinery/documents.htm under "Human Health." The report re-evaluated available sulfolane toxicity data and slightly lowered public health action levels for sulfolane in drinking water.
- Collaborating with the U.S. Environmental Protection Agency, ATSDR, National Toxicity Program (NTP),

and University of Alaska Fairbanks (UAF) to identify areas of uncertainty in evaluating sulfolane toxicity and determine additional study needs.

- Discussions with the NTP to pursue the nomination of sulfolane for additional toxicology research on the health effects of long-term exposure.

Site Characterization and Remediation

Recent activities:

- Completed a technical review of the Site Characterization and First Quarter Groundwater Monitoring Report. Also participated in a comment resolution meeting with the Alaska Department of Environmental Conservation and Flint Hills Resources to discuss and resolve concerns.
- Submitted technical review comments on the Site Characterization Work Plan Addendum.
- Participated in a groundwater modeling meeting with DEC, FHR and UAF experts to better understand the modeled components of the fate and transport of sulfolane migration in the aquifer.
- Continuing to review the on-site monitoring well network and off-site residential well database.
- Proposed a more aggressive time-frame for the completion of the site investigation and remediation, in order to reach a final cleanup action plan by December 2012.
- The subgroup continues to assess the technical findings of the 2011 field season.

Drinking Water

Recent activities:

- FHR constructed two new City of North Pole public drinking water production wells located outside of the contaminant plume. Approval to operate the wells is currently

undergoing review by Drinking Water Program engineers, with final operational approval expected in fall 2011. Samples taken from the new wells have shown levels of all regulated contaminants to be below allowable maximum levels.

- Collecting and analyzing monthly samples from the new wells with results being non-detect. Monthly monitoring will continue through the end of 2011. At that time, if results remain at non-detect, the monitoring requirement will be reduced to quarterly sampling for one year.
- The Church at North Pole, which manages a federally regulated public water system, is currently in the engineering plan review process for treatment to remove sulfolane from the facility's drinking water. DEC's Drinking Water Program engineers are expected to grant construction approval in fall 2011.

Risk Communication

Recent activities:

- Providing the North Pole community and interested stakeholders the most recent available project information.
- Organized a community workshop that included inviting national experts to North Pole to provide the most current information, and answer community questions, regarding the toxicity of sulfolane.
- Developed and distributed a survey for community members and affected stakeholders to help identify and better understand the North Pole community's concerns regarding the sulfolane release and investigation, available at <http://www.survey-monkey.com/s/PYHHKB2>.
- Published a "Frequently Asked Questions" document produced as a result of questions gleaned from discussions with the public (available at dec.alaska.gov/spar/csp/sites/north-pole-refinery/documents.htm).