

TECHNICAL MEMORANDUM (REV.1):

Onsite Groundwater and Surface Water PFAS Characterization Workplan

To: James Fish – Environmental Program Specialist, Alaska Department Of Environmental Conservation

From: Integral Consulting Inc.

Date: September 24, 2020

Subject: Onsite Groundwater and Surface Water PFAS Characterization at the former North Pole Refinery, North Pole, Alaska

On behalf of Williams Alaska Petroleum, Inc. (Williams), Integral Consulting Inc. has prepared this Technical Memorandum (Tech Memo) to conduct site characterization activities at the former North Pole Refinery located in the City of North Pole, Alaska. The scope of the activities discussed herein were prepared in response to the June 19, 2020 letter to Williams from the Alaska Department of Environmental Conservation (ADEC) outlining ADEC's specific requests for per-and polyfluoroalkyl substances (PFAS) site characterization on the former North Pole Refinery (ADEC, 2020). The June 19 letter does not limit the site characterization to PFOS and PFOA; it requests work for PFAS generally. This Tech Memo was revised based on ADEC's comments to this Tech Memo dated July 23, 2020 and in subsequent correspondence and teleconference call on September 2, 2020.

Specifically, ADEC requested that Williams undertake characterization of PFAS in soil and groundwater to understand the vertical and horizontal extent of PFAS contamination where aqueous film-forming foam (AFFF) was previously stored, used, or dispersed during refinery "hot work". The request identified specific potential areas of concern including sumps and tanks associated with the refinery wastewater collection system, welding building and other potential AFFF storage locations, the former sulfolane extraction unit, former and current lagoons, and the two gravel pits located on the property. ADEC has also requested an ecological evaluation.

After Williams sold the refinery, Flint Hills Resources Alaska (FHRA) used PFAS at the refinery in its fire-fighting training exercises and "hot work" (Arcadis, 2013; NPR- PowerPoint Summary of PFAS Sample Results, 2018). In addition, FHRA performed significant decommissioning and demolition activities of the facility including removal of the three crude units and the sulfolane extraction unit; therefore, many of the features identified by ADEC are no longer present or the surface has been significantly reworked. Because of the significant disturbance to the site, Williams proposes an iterative approach starting with a groundwater and surface water investigation as described below to determine the nature and extent of PFAS in groundwater and surface water and identify any areas of concern where PFAS may have been released. As requested by ADEC and

consistent with ADEC's current guidance, Williams will sample, analyze for and report on the levels of the 14 PFAS in groundwater and surface water, outlined in USEPA Method 537.

After identifying any potential areas of concern based on the results of groundwater sampling, Williams will work with ADEC to identify appropriate soil characterization or response actions, if any, to address those areas.

Current PFAS Regulatory Framework

ADEC published clean up levels for PFOA and PFOS in soil and groundwater (ADEC 2018). ADEC's regulatory framework for evaluating PFAS in drinking water is limited to the October 2019 Memo on Action Levels for PFAS (superseding the 2018 action levels set for six PFAS and the April 9, 2019 revised Technical Memorandum on Action Levels for PFAS). The October 2018 clean up levels and the October 2019 Memo do not establish PFAS standards for ecological evaluation (no screening levels or other criteria for PFAS have been published). Furthermore, ADEC has not defined action levels based on fish tissue PFAS concentrations (e.g., the current fish ban on Kimberly Lake is based on the presence of PFAS, not the presence of PFAS above any guidance or regulatory limit applied to fish consumption at a given frequency).

Per the October 2019 Memo the responsible party shall "characterize the nature and extent of contamination in groundwater including, if appropriate, surface water and pore water if contaminated groundwater is discharging to surface water, using approved analytical methods and PFOS and PFOA results, following the ITRC sampling guidance for PFAS". Additional requirements include conducting a water well survey and sampling of potentially impacted drinking water supplies, both public and private using approved analytical methods. Williams' proposal contained herein meets ADEC's requirements as set forth in the Memo.

Potential potable well receptors downgradient of the former North Pole Refinery have already been identified due to the presence of sulfolane in groundwater and mitigated through the connection of private homes to the public piped water supply or installation of point of entry treatment systems on individual wells. Therefore, as outlined in ADEC's October 2, 2019 Memo on Action Levels for PFAS, the investigation will focus on characterizing the nature and extent of PFAS in groundwater and surface water. Based on current ADEC PFAS guidance and in accordance with 18 AAC 75.335, Williams proposes the following site characterization activities to evaluate potential sources of PFAS at the former North Pole Refinery.

Evaluation of Potential Onsite Sources of PFAS

In their June 19, 2020 letter to Williams, ADEC identified several potential sources of PFAS that were present at the site during the tenure of FHRA (ADEC, 2020). To date the only PFAS investigation completed at the site is the limited groundwater investigation and interim remedial action (soil removal) of the former Fire Training Area (FTA) in 2015 (Arcadis, 2015). Groundwater sampling conducted to date is insufficient to evaluate if groundwater east of Distribution St. (the railroad tracks) is impacted by PFAS or if the source of PFAS in groundwater is limited to the activities conducted at the FTA.

To determine if PFAS source(s) are present at the former FHRA refinery, Williams proposes a groundwater and surface water investigation. Consistent with ADEC’s guidance, the objective of the investigation is to use the existing monitoring well network to locate any additional source areas of PFAS to groundwater, and then determine if additional steps are required such as soil sampling. The proposed scope of work is summarized below has been updated to reflect discussions with ADEC on September 2, 2020.

Groundwater and Surface Water Investigation

Groundwater samples will be collected from 60 locations (124 total wells) shown on Figure 1 and included in Table 1 below.

Table 1. Groundwater Sample Locations

MW102-70	MW176A-15/B50/C-90	MW362-15/25/35/50/80/150
MW106-25	MW178A-15/B-50/C-90	MW355-15/55
MW109-15	MW186A-15/B-60/C-75	MW358-15/20/40/60/150
MW110-20/65	MW186D-135/E-75	MW359-15/35/60/80/150
MW-113-15	MW-192A-15/B55	MW360-15/35/50/80/150
MW115-15	MW195A-15/B-55	MW361-15
MW130-25	MW198-150	MW363-15
MW133-20	MW300-150	MW364-15/30/65/90/150
MW137-20	MW-301 CMT (10)	MW365-15
MW139-25	MW-304-15	MW366-15
MW141-20	MW309-15/60/150	MW367-15
MW146A-15/B-20	MW310-15/65/110	MW368-15
MW149A-15/B-20	MW310-15/65/110	MW370-15/55/75
MW154A-75/B-95	MW321-15/65/151	MW371-15/55/75/125
MW-174-15/50A/90B	MW330-20/65/150	MW372-15
MW180A-15/B-50/C-90	MW336-20/35/55	MW373-15
O-6	MW-345-15/55/75	O-16
O-9	MW351-15/55/75/150	O-24/O-24-65
O-10	MW354-15/65	O-30
O-14	O-15	O-35

Groundwater samples will be collected using methods included in the Interstate Technology and Regulatory Council (ITRC) Fact Sheet - Site Characterization Considerations Sampling Precautions and Laboratory Analytical Methods for PFAS.

It is anticipated that Geotech© PFAS-free portable bladder pumps will be used in wells where light non-aqueous phase liquid (LNAPL) is not present. For wells with LNAPL, a peristaltic pump will be used. LNAPL will not be sampled. Pumps and materials for sampling will be free of PFAS containing components (e.g., free from polytetrafluoroethylene or ethylene tetrafluoroethylene).

Surface water samples will be collected from the North and South Gravel Pits following methods in the ITRC fact sheet for PFAS sampling. Surface water samples will be collected using a peristaltic pump. Pumps and materials (tubing) will be free of PFAS containing components.

Groundwater samples will be analyzed using United States Environmental Protection Agency (USEPA) Method 537.1. The results of all 18 PFAS included in the 537.1 list will be reported. Eurofins Lancaster Laboratories Environmental, LLC – Lancaster (Certification #PA00009) is anticipated to conduct the analysis. QA/QC protocols for water sample collection will include 1 field equipment blank per sampling team/equipment per day. Equipment blanks and blind duplicates will be collected at a frequency of 1 per 20 samples. Prior to sampling a synoptic water level event will be completed in all onsite wells accessible for gauging (intact wells without free product present) including surveying elevations of water level measuring points.

Reporting

Following the completion of the site characterization activities included herein, a meeting will be scheduled with ADEC to present the results and to discuss the need for any further evaluations or actions. Results will then be summarized in a site characterization report consistent with 18 AAC 75.335.

References

ADEC, 2020. Onsite PFAS Characterization on the former North Pole Refinery, Alaska, June 2020.

Department of Environmental Conservation, 2018. 18AAC75 (As amended through October 27, 2018), October, 2018, published January 2019, Register 228.

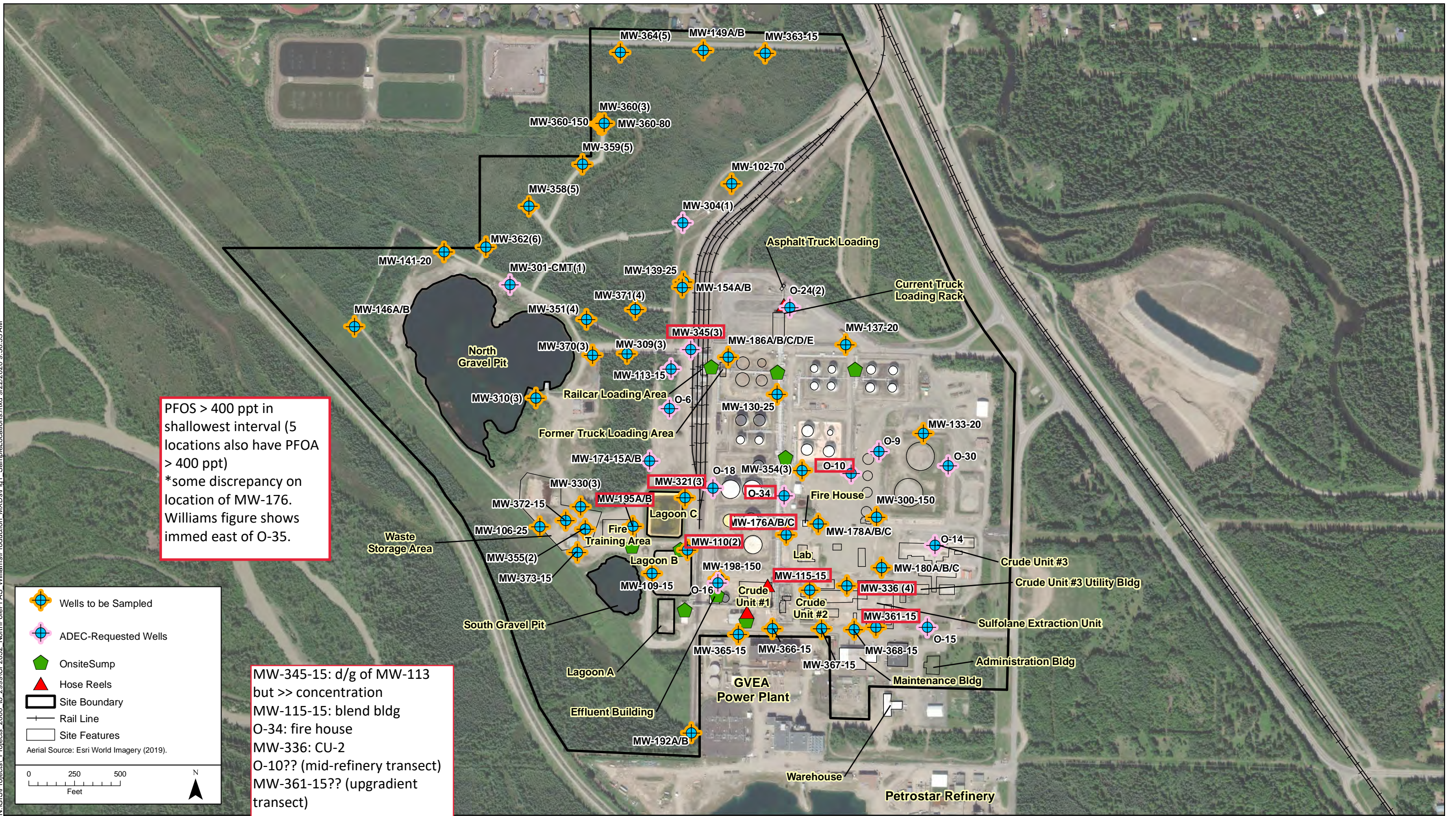
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NPR-PowerPoint Summary of PFAS Sampling Results, May 2018.

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PFOS > 400 ppt in shallowest interval (5 locations also have PFOA > 400 ppt)
 *some discrepancy on location of MW-176. Williams figure shows immed east of O-35.

MW-345-15: d/g of MW-113 but >> concentration
 MW-115-15: blend bldg
 O-34: fire house
 MW-336: CU-2
 O-10?? (mid-refinery transect)
 MW-361-15?? (upgradient transect)

+ Wells to be Sampled
+ ADEC-Requested Wells
+ Onsite Sump
+ Hose Reels
 Site Boundary
+ Rail Line
 Site Features
 Aerial Source: Esri World Imagery (2019).

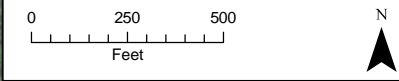


Figure 1. Anticipated Sample Locations