

GW - 28

**NEW PSH MW
DETECTIONS**

2021

From: [Tsinnajinnie, Leona, NMENV](#)
To: [McDill, Teresa L, EMNRD](#)
Cc: [Billings, Bradford, EMNRD](#); [Cobrain, Dave, NMENV](#); [Suzuki, Michiya, NMENV](#)
Subject: RE: HFNR Artesia Refinery GW Monitoring - New PSH in 2021
Date: Wednesday, August 11, 2021 11:12:58 AM

Hi Teresa-

HWB has not received any information about the other wells where PSH is historically present. The extent of the PSH plume had started decreasing after 2015 and the current situation appears to be a result of groundwater fluctuation as the screened intervals of the wells identified by HollyFrontier have been submerged for several years. In addition, the RO Reject Ponds are no longer being utilized and the fields are no longer being irrigated. It is HWB's opinion that the hydraulic barrier (created by the RO Reject ponds) that was keeping the product from migrating to other parts of the Refinery and to the east of the Refinery may be dissipating and we may be starting to see the effects. HWB will ask HollyFrontier to provide a discussion about PSH showing up in the new wells in the upcoming annual report and if there were any significant increases in wells where product was present. We can ask them to discuss the groundwater fluctuation and why changes in groundwater elevations were more significant in some places than others.

At this time, we do not have enough information to make any decisions about how to approach product showing up in these new wells. There are nearby recovery trenches and wells in the northern part of the Refinery that should be able to recover product from these sites and HollyFrontier is also currently working on the Pilot Test for a recovery system. In the meantime, the wells will continue to be monitored and if this continues to be a reoccurring event, NMED will address it at that time.

Leona

From: McDill, Teresa L, EMNRD <TeresaL.McDill@state.nm.us>
Sent: Tuesday, August 3, 2021 2:52 PM
To: Tsinnajinnie, Leona, NMENV <Leona.Tsinnajinnie@state.nm.us>
Cc: Billings, Bradford, EMNRD <Bradford.Billings@state.nm.us>
Subject: FW: HFNR Artesia Refinery GW Monitoring - New PSH in 2021

Hello Leona,

We had a couple of questions...

1. Was there a commensurate increase in the wells that were already showing PSH?
2. Do they have a program in place to aggressively go after this, like bailing?

Let us know if you want to discuss (to save you a long email if needed).

Thank you!

Terry

Teresa L. McDill • Environmental Scientist

Environmental Bureau
EMNRD - Oil Conservation Division
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505.469.6769 | TeresaL.McDill@state.nm.us
<http://www.emnrd.state.nm.us/OCD/>

From: Leik, Jason <Jason.Leik@HollyFrontier.com>
Sent: Friday, July 30, 2021 2:53 PM
To: Tsinnajinnie, Leona, NMENV <Leona.Tsinnajinnie@state.nm.us>; McDill, Teresa L, EMNRD <TeresaL.McDill@state.nm.us>
Cc: Tupou, Kawika <Kawika.Tupou@HollyFrontier.com>
Subject: HFNR Artesia Refinery GW Monitoring - New PSH in 2021

Leona and Terry,

This email serves to notify the New Mexico Environment Department (NMED) of new occurrences of phase-separated hydrocarbon (PSH) in 14 wells at the HollyFrontier Navajo Refining LLC (HFNR) Artesia Refinery (refinery) located at 501 East Main Street in Artesia, New Mexico. The Post-Closure Care Permit (PCC Permit) issued by the NMED and the 2020 Facility Wide Groundwater Monitoring Work Plan (2020 FWGMWP) approved by the NMED on December 15, 2020, require HFNR to notify NMED if PSH is present in wells where PSH has not previously be encountered.

During the semi-annual groundwater monitoring event conducted April 13-14, 2021, PSH was observed for the first time in wells MW-23, MW-40, MW-43, MW-59, MW-60, MW-62, MW-95, MW-96, MW-126A, KWB-1A, and KWB-1B. During subsequent gauging conducted as part of routine recovery system operation and maintenance (O&M) activities, PSH was observed for the first time in well MW-66 on May 18, 2021, and in wells MW-41 and RW-10 on July 1, 2021. The measured apparent in-well PSH thicknesses in these well are provided below:

Well ID	Apparent In-Well PSH Thickness (feet)	Date
MW-23	2.98	4/13/2021
MW-40	0.25	4/13/2021
MW-41	2.25	7/1/2021
MW-43	0.40	4/13/2021
MW-59	0.93	4/13/2021
MW-60	1.61	4/13/2021
MW-62	0.20	4/13/2021
MW-66	0.42	5/18/2021
MW-95	2.15	4/13/2021
MW-96	0.06	4/13/2021
MW-126A	0.58	4/13/2021
KWB-1A	1.06	4/13/2021

KWB-1B	1.27	4/13/2021
RW-10	3.45	7/1/2021

A figure showing the location of these wells is attached for your reference. HFNR believes the observed occurrences of PSH in the wells listed above are attributable to declining groundwater elevations, and are not indicative of a new release or PSH migration, as described below:

- MW-23, MW-40, and MW-43: These wells were installed in the North Refinery between 1982 and 1984 with only 5-feet of screen (there are no well logs available for MW 40 but wells installed in this area during that time were completed with only 5-feet of screen). Indications of hydrocarbon impacts (odor and staining) were observed in the vadose and saturated zones during drilling and installation of these wells as noted on the available well logs. Groundwater elevations decreased in these wells 12.62 feet (MW 23), 13.92 feet (MW 40), and 11.16 feet (MW 43) from historical maximums in 2015 to historical minimums in April 2021. Further, groundwater elevations in MW 23 and MW 43 were within the 5-foot screen interval for the first time in April 2021 (i.e., well screens were historically submerged). PSH has also historically been present in downgradient and crossgradient wells.
- MW-59, MW-60, MW-62, MW-95, and MW-96: These wells were installed in the North Refinery between 2003 and 2007. Indications of hydrocarbon impacts (odor, staining, sheen, and/or elevated organic vapor meter [OVM] readings) were observed in the vadose and saturated zones during drilling and installation of these wells. Groundwater elevations decreased in these wells 14.10 feet (MW 59), 14.12 feet (MW 60), 8.49 feet (MW 62), 9.09 feet (MW 95), and 7.65 feet (MW 96), from historical maximums in October 2015 to historical minimums in April 2021. Further, groundwater elevations in MW 59 were below the top of the screen interval for the first time in April 2021 (i.e., well screen was historically submerged).
- KWB-1A and KWB-B: These nested wells were installed in the Field East of Refinery in 1992 with the same screened intervals, but different well diameters (KWB-1A is 2-inch, KWB-1B is 4-inch). No field screening data or observations of odor/staining (neither presence or lack of) were recorded on the well logs. Groundwater elevations have decreased in these wells 13.14 feet from a historical maximum in November 2014 to a historical minimum in April 2021. Further, groundwater elevations were at or below the top of the screen intervals for the first time in April 2021 (i.e., well screens were historically submerged).
- MW-126A: This well was installed in the Field East of Refinery in 2014 when groundwater elevations across the refinery were historically high. Indications of hydrocarbon impacts (odor, staining, and elevated photoionization detector [PID] readings) were observed in the vadose and saturated zones during drilling and well installation. Groundwater elevations decreased 14.10 feet from a historical maximum in November 2014 to a historical minimum in April 2021. Further, the groundwater elevation was measured below the top of the screen interval for the first time in April 2021 (i.e., well screen was historically submerged).
- MW-66: This well was installed in the South Refinery in 2005. Indications of hydrocarbon impacts (odor and staining) were observed in the vadose and saturated zones during drilling

and well installation. Groundwater elevations have decreased 8.46 feet from a historical maximum in October 2016 to a historical minimum in May 2021.

- MW-41 and RW-10: These wells are located in the North Refinery. MW-41 was installed in 1984 with only 5-feet of screen. No field screening data or observations of odor/staining (neither presence or lack of) were recorded on the well log for MW-41 and there is no well log available for RW-10). Groundwater elevations have decreased in these wells 12.61 feet (MW-41) and 13.30 feet (RW-10) from historical maximums in April 2017 to historical minimums in April 2021. Further, groundwater elevations in MW-41 were historically above top of the screen interval prior 2021 (i.e., well screens were historically submerged). The presence of PSH in MW-41 and RW-10 was observed after the diesel release that occurred near these wells on April 20, 2021. As documented in the *April 2021 Diesel Release, Site Characterization, Assessment, and Closure Report* dated July 19, 2021, HFNR collected a sample of PSH from MW-41 and analyzed it for sulfur at the refinery laboratory. Sulfur was measured at a concentration of 979 parts per million (ppm), which is not consistent with finished diesel like was released. Finished diesel at the refinery typically contains only 6 ppm of sulfur. HFNR will collect additional PSH samples for further forensics evaluation in the vicinity of the diesel release.

Plots of PSH thicknesses and groundwater elevations over time will be provided in the 2021 Annual Groundwater Monitoring Report.

If you have any questions or comments regarding this notification, please contact me at (214) 970-8902.

Thanks,
Jason

Jason Leik, P.E.
Environmental Specialist | Corporate Environmental

HollyFrontier
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From: [Tsinnajinnie, Leona, NMENV](#)
To: [Leik, Jason](#)
Cc: [Tupou, Kawika](#); [Cobrain, Dave, NMENV](#); [Suzuki, Michiya, NMENV](#); [McDill, Teresa L, EMNRD](#)
Subject: RE: HFNR Artesia Refinery GW Monitoring - New PSH in 2021
Date: Wednesday, August 11, 2021 11:14:07 AM

Jason-

Thank you for providing the notification. In the upcoming 2021 Annual Report, NMED requests the following information:

- a. Discuss the appearance of PSH in these new wells and if there were any observations of significant increases in wells where PSH was already present;
- b. Discuss if the termination of applying RO Reject water to the former North and South RO Reject Water Areas is having any impact to the presence of groundwater flow and PSH presence;
- c. State if the appearance of PSH in these new wells are based on groundwater fluctuation or refinery operations (i.e., releases);
- d. Discuss the groundwater fluctuation observations at the site and why the changes at parts of the Refinery were more significant than others;
- e. Include screened interval information in the plots for product thicknesses and groundwater elevations for the new wells and current wells where PSH is present.

Can you also verify if there is anything being grown in the agricultural fields or if the fields are currently being irrigated?

Thanks,
Leona

From: Leik, Jason <Jason.Leik@HollyFrontier.com>
Sent: Friday, July 30, 2021 2:53 PM
To: Tsinnajinnie, Leona, NMENV <Leona.Tsinnajinnie@state.nm.us>; McDill, Teresa L, EMNRD <TeresaL.McDill@state.nm.us>
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